

Issue No. : Issue 5
Issue Date : June 2021
Project No. : 1825



SILT CURTAIN & COFFERDAM DEPLOYMENT PLAN

FOR

PORT SHELTER PHASE 3, PO TOI O SEWERAGE TREATMENT PLANT EM&A

Prepared by

Allied Environmental Consultants Limited

COMMERCIAL-IN-CONFIDENCE

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Our Ref: PL-202106062

Drainage Services Department
Special Duty Division
42/F, Revenue Tower, 5 Gloucester Road,
Wan Chai, Hong Kong.

Attention: Ms. Wing W.Y. Law

29 June 2021

Dear Wing,

Sewerage Works at Po Toi O
Silt Curtain and Cofferdam Deployment Plan

I refer to the email from the ET concerning the captioned. I have no adverse comment on the Silt Curtain and Cofferdam Deployment Plan (Issue 5). In accordance with Condition 2.13 of the Environmental Permit with permit No EP-516/2016, I hereby verify that this document has conformed to the relevant information, requirements and recommendations contained in the approved EIA Report (Register No. AEIAR-206/2017).

Yours faithfully,

F.C. Tsang
Independent Environmental Checker

cc. ETL – Timmy WONG

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Certified
by:

A handwritten signature in black ink, appearing to read 'Timmy Wong', written over a horizontal line.

Timmy Wong
Environmental Team
Leader

Verified
by:

A handwritten signature in black ink, appearing to read 'F.C. Tsang', written over a horizontal line.

F.C. TSANG
Independent Environmental
Checker

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Document Verification



Project Title Port Shelter Phase 3, Po Toi O Sewerage Treatment Plant EM&A **Project No.** 1825

Document Title Silt Curtain & Cofferdam Deployment Plan

Issue No.	Issue Date	Description	Prepared by	Checked by	Approved by
1	11/01/2021	1 st Submission	Timmy Wong	Joanne Ng	Grace Kwok
2	16/02/2021	2 nd Submission	Timmy Wong	Joanne Ng	Grace Kwok
3	20/04/2021	3 rd Submission	Timmy Wong	Joanne Ng	Grace Kwok
4	18/05/2021	4 th Submission	Timmy Wong	Joanne Ng	Grace Kwok
5	04/06/2021	5 th Submission	Timmy Wong	Joanne Ng	Grace Kwok
					

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Silt Curtain and Cofferdam Deployment Plan (Po Toi O)

DC/2019/09 – Provision of Village Sewerage in Sai Kung

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Part A – General

Construction of the submarine outfall will be by means of horizontal directional drilling from the rising mains at the rocky shore through the seabed. A diffuser will be installed on top of a riser shaft extending about 1m above the seabed at the end of the submarine outfall. An area of 500 m² will be fully enclosed by sheet pile cofferdam at the diffuser point.

About 500m² seabed will be dredged to remove the sediments in the seabed temporarily in order to ensure the stability of the seabed for the installation of the diffuser. Most of the area will be backfilled with rockfill and the permanent area lost at the diffuser is about 5 m². After the backfilling work is completed, the cofferdam will be removed.

Marine-based construction works (i.e. installation & extraction of sheeting pile cofferdam by vibratory action) would cause minor displacement of marine sediment. With erection and maintenance of silt curtain, the displaced sediment will settle quickly and will not significantly increase the suspended solid level in water. Prior to the erection of temporary platform at the rocky shore and the cofferdam for diffuser, silt curtains will be deployed until the works have completed. Besides, an additional silt curtain will be deployed at the outlet of a box culvert prior to the construction of PTO Sewerage Treatment Plant and will be removed upon the completion of the construction of PTOSTP.

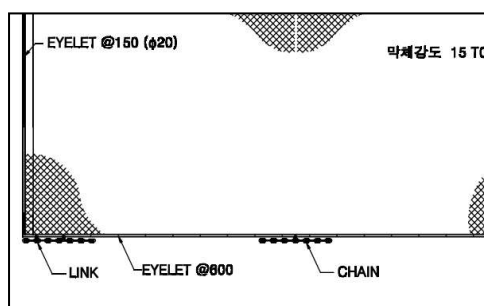
This deployment plan includes construction programme, details on the design, method of installation, operation and maintenance of silt curtains and cofferdam, and other associated information.

Part B – Deployment of Silt Curtain

2.1 Details of the Proposed Silt Curtain

In general, silt curtain “GEONIA® Silt Protector - DSP 15” will be deployed to fully enclose the cofferdam and the outlet of the box culvert prior to commencement of works. With reference to the location of deployment, distance to the coast, and the maximum depth of seabed, the silt curtain specialist suggested that the silt curtain (DSP 15) with tensile strength 150 kN/m would be suitable for deployment.

The proposed silt curtain (DSP 15) applies a durable fabric for the float device by using high tenacity colored yarn, which was improved to solve the problem of fault construction, poor visibility caused by a damaged PVC coated fabric, and marine pollution of a broken PVC coated fabric. The size of each silt curtain will be 10m in length and various sizes in depth. The silt curtain will be connected by using 10mm-diameter PP ropes. A chain (5kg/m) will be installed at the bottom of the silt curtain to ensure the straightness of silt curtain. No gaps will be retained between the seabed and the silt curtain.



Detail of Chain

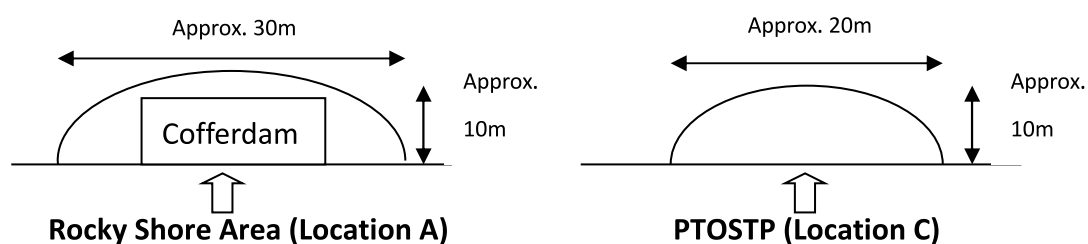
Ton bags with size 1.5mx1.5mx1.5m will be adopted as the anchorage points to fix the silt curtains.

The typical section, connection details, material properties, certificates and job reference of the proposed silt curtain (including anchor block) is attached in **Appendix A – Specification of Silt Curtain**.

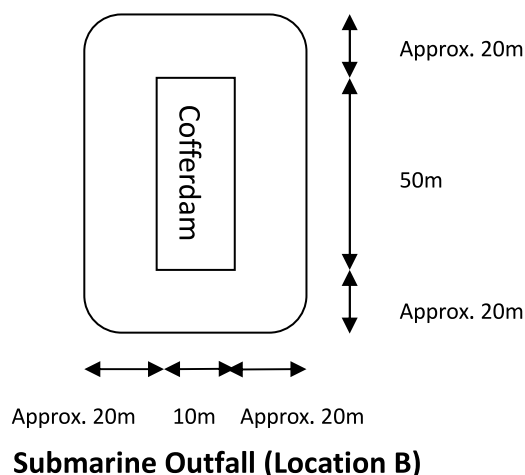
2.2. Location Plan of Anchor Blocks and Silt Curtain

During the installation and extraction works of temporary steel cofferdam, as well as the construction of submarine outfall by Horizontal Directional Drilling (HDD), silt curtains will be deployed for the rocky shore area (Location A) and the submarine outfall area (Location B) respectively. In addition, silt curtains will be also deployed near the outlet of the box culvert to avoid overflowing of construction wastewater from Po Toi O Sewerage Treatment Plant (PTOSTP) (Location C).

At the recommendation of the silt curtain specialist, sufficient buffer zone would be provided to avoid leakage of wastewater to the sea. For location A and location C, the farthest point of the silt curtain to the rocky shore/outlet of box culvert will be about 10m, and the maximum width would be about 30m and 20m respectively.



For location B, silt curtain shall be about 20m away from the 10m x 50m cofferdam.



In these connections, the total lengths of silt curtains at Location A, B, and C were calculated, which were 50m, 150m, and 40m respectively.

The proposed arrangement of the silt curtain and anchor blocks is illustrated in **Appendix B – Location Plan of Silt Curtain and Anchor Blocks.**

2.3. Summary of Silt Curtain

The below table summarizing relevant information regarding the silt curtains and anchor blocks to be deployed at the three proposed locations:

INFO \ LOCATION	Location A: Rocky Shore	Location B: Submarine Outfall	Location C: PTOSTP
Length of Each Silt Curtain	10m		
Total Length of Silt Curtain * ¹	50m	150m	40m
Proposed Nos. of Silt Curtain * ¹	5	15	4
Proposed Nos. of Anchor Blocks	17	45	14
	(Please kindly refer to anchor details in Appendix A and layout plan in Appendix B for easier understanding of the numbers of anchor block)		
Type of Silt Curtain and Connection	Durable Tube Type (DSP 15) (Please kindly refer to Appendix A)		
Size of Silt Curtain	10m (length) x 1m ~ 12m (height) (Please kindly refer to Appendix A)		
Size of Anchor Block	1.5m x 1.5m x 1.5m (Please kindly refer to Appendix A)		
Location of Anchor Blocks	(Please kindly refer to Appendix B)		

Notes:

1. Length estimated from the layout plan attached in **Appendix B**.

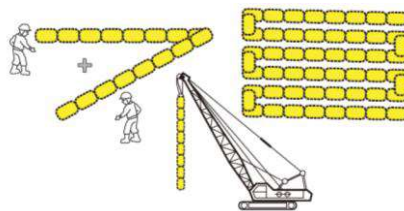
2.4. Installation Sequence

Installation of silt curtains will mainly follow the below steps.

Step 0:

Preparation work - Before fabrication, necessary survey and inspection will be carried out to confirm the depth of silt curtain.

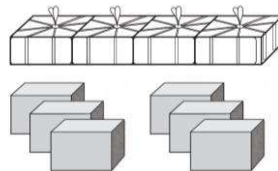
Step 1:



Checking – Checking of product will be carried out before assembly;

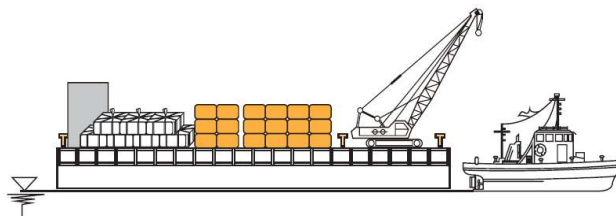
Assembly – Connect each unit of silt curtain on shore;

Step 2:



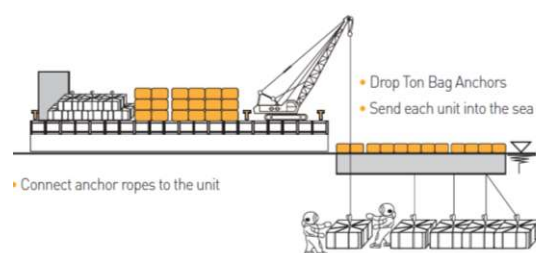
Anchor Blocks – Prepare Ton Bag Anchors for further use;

Step 3:



Transportation – All the materials will be loaded on the barge and transported to the proposed locations.

Step 4:



Deployment –Surveyor will help to set out the location of deployment. Ton Bag Anchors will be deployed on the seabed and silt curtain units will be unloaded in the sea. Then, diver will connect the anchor ropes to the units (please refer to Appendix A for the connection details). Dive checking would be carried out to ensure the components were well installed in the right positions.

The typical inspection checklist for installation of silt curtain is attached in **Appendix C - Inspection Checklists for Silt Curtain**.

2.5. Maintenance

The silt curtain should be visually monitored weekly 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. Visual inspection shall be once per day before commencement of works and the checklist will be signed by appropriate parties and ready for checking on-site.

In addition to visual inspection on the boat, dive to check the unit thoroughly. Diving inspection shall be at least once per every three months. The checklist will be signed by the Contractor and ready for checking on-site.

After Typhoon Signal No. 3 or above, and/or Black Rainstorm Warning Signal informed by the Hong Kong Observatory, check the unit for the purpose of finding possible damages or troubles earlier. This check is performed basically on the boat (visual inspection), but dive to check the unit if necessary (diving inspection).

Related works will be suspended immediately if the silt curtain is found damaged. A new silt curtain will be installed to surround the broken one and will be well connected to the anchor blocks. Then the broken one would be untied and removed by grab barge.

To avoid collision caused by vessels, waterproof flash lanterns will be mounted on the float tubes.

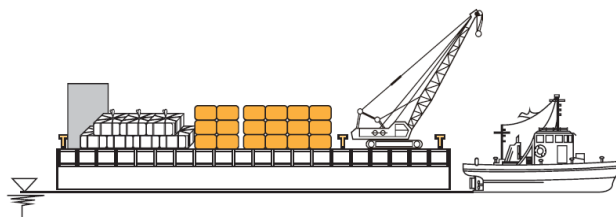
The typical inspection checklists (Visual and Diving) is attached in **Appendix C - Inspection Checklists for Silt Curtain**.

The inspecting person shall be delegated by the Specialist Sub-contractor in Marine Works, who shall complete the training about silt curtain by the supplier, and have experiences about the similar checking and inspection works.

2.6. Silt Curtain Removal/Repositioning

In order to reduce negative impact on water quality during the demolition or removal works of the cofferdam and temporary platform at the rocky shore. Silt Curtain will be removed after completion of construction works (i.e. removal of cofferdam and temporary platform at the rocky shore and removal of cofferdam at the submarine outfall) in rocky shore and submarine outfall.

Silt curtain removal will be carried out by derrick lighter barges. After the removal of temporary steel cofferdam, granular fill and anti-scour concrete mattress will be placed on the seabed before the placement of sorted marine deposits. Only insignificant sediment loss would be expected during the silt curtain removal.



Tentatively, there will not be any plan for repositioning of silt curtain. The actions upon re-deployment will be submitted separately if necessary.

Part C – Deployment of Cofferdam

3.1. Details of Temporary Steel Cofferdam

The purpose for the temporary steel cofferdam is to minimize the water quality impact due to the dredging and filling works. The temporary impermeable steel cofferdam will be installed (from the seabed up to a height above the high-water mark) to fully enclose the entire dredging / filling areas before carrying out any dredging/filling works. Cofferdam will be installed around the proposed excavation area for entry pit of HDD work to prevent falling of debris into the sea. All dredging and filling works shall be carried out inside the cofferdam.

Ground investigation will be carried out to verify the seabed geological condition to ensure a safe and reliable design for cofferdam. During design, lateral forces induced by the sea water would be considered, and sufficient toe-in below the seabed will be required to ensure the stability of cofferdam. Before installation, the design will be checked certified by the Independent Checking Engineer. In addition, the Independent Checking Engineer will also check the as-constructed cofferdam to comply with the design.

The proposed size of the cofferdam will be about 10m x 50m on plan, and approximate 17m in depth. Approximate 5m toe-in will be required. Lateral loading from wave and water pressure will be resisted by struts and walings system, which form part of the cofferdam.

Details on the Cofferdam Design and the location plan are attached in **Appendix D – Cofferdam Details** and **Appendix E – Sectional Properties of The Proposed Sheet Pile**.



Typical Arrangement of Cofferdam with Sheetpiles and Struts

3.2 Installation and Removal of Cofferdam

Installation and extraction of sheet piles will be conducted by vibratory action. This will cause minor displacement of marine sediment, which will quickly settle without significant increase in suspended solids.



Installation/Extraction of Sheet pile by Vibratory Method

The installation and removal of cofferdam will basically follow the below steps:

1. After the deployment of silt curtain, sheet pile will be driven by vibratory hammer along the alignment with sheet piles interlocked until the desired depth has reached.
2. The installation arrangement will start from the Southwest corner of the cofferdam and will proceed in clockwise direction. The installation of sheet piles for cofferdam at the manifold is scheduled to commence from May 2023 and will last for about 40 working days. For the installation of sheet piles for cofferdam at the rocky shore, it would be commenced in December 2022 and will last for about 35 working days. The proposed construction arrangement of cofferdam is also shown in the drawing Po Toi O – Cofferdam Layout Plan in **Appendix D – Cofferdam Details**;
3. Wailing and strut will be installed by derrick barge and weld and cutting set accordingly; A dive inspection will be conducted to confirm if the cofferdam is intact with no leakage after installation. Sufficient flash lanterns will be installed on the cofferdam to alert the workers, and reliable anchorages will be adopted to stabilized the barges.

4. Marine dredging and construction of diffuser will be proceeded upon the completion of cofferdam. Sediment confined within the cofferdam would be dredged by closed-grab and stored in sealed compartment of the barge anchored outside the cofferdam.

5. Backfilling works will be confined within the cofferdam. No opening of cofferdam is required and thus there will be no release of sediment into water bodies. Increase in suspended solids is not likely to happen and no significant water quality impact is expected.

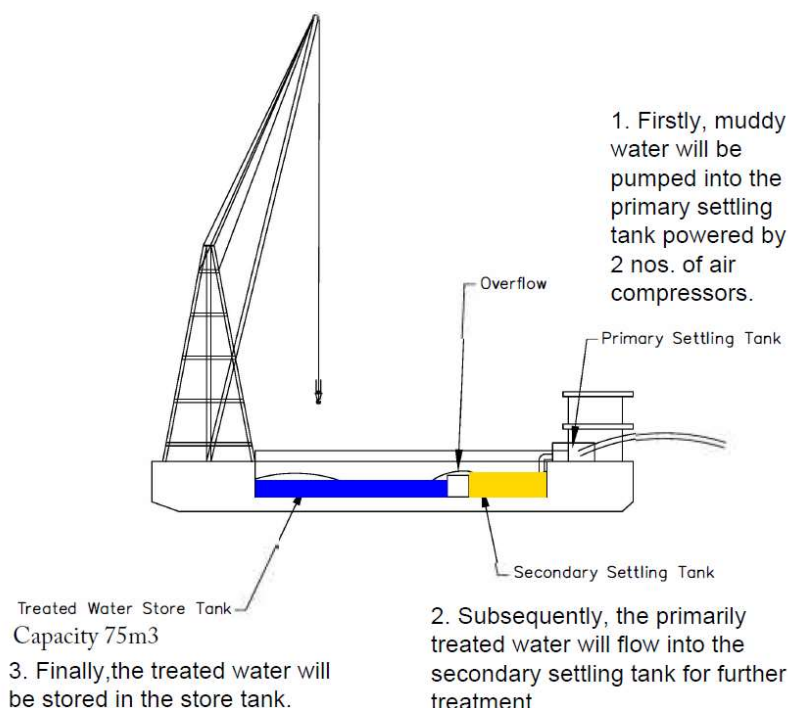
6. Wailing and strut will be demolished step by step after backfilling;

7. Sheet piles of the cofferdam will be extracted during ebb tide at the final stage with vibratory hammer, and stored on the barge. Extraction of sheet pile will basically follow the steps in Bullet Point 2. The size of barge is about 12m x 25m.

A Works Programme is attached in ***Appendix G – Works Programme for Po Toi O.***

3.3 Wastewater Treatment Facility on the Barge

After erection of cofferdam, the water inside will be pumped out and stored in the settling tanks of the barge for settling suspended solids. The capacity of the store tank will be about 75m³ (design flow 75m³ per day, sedimentation reaction time 24 hours).



Barge with Wastewater Treatment Facility

Firstly, muddy water will be pumped into the primary settling tank powered by 2 nos. of air compressors. Subsequently, the primarily treated water will flow into the secondary settling tank for further treatment. The treated water will be stored in the store tank. The treated water will be visually monitored by patrol daily.

The treated water will be checked in accordance with the checklist attached in **Appendix H – Inspection Checklist for Treated Water**. After checking against Appendix H, the treated water will be discharged to the designated discharge point.

CCTV system will be installed to closely monitor the cofferdam and water condition. In case of emergency cases, construction works will be stopped immediately. Site staffs will be delegated to the frontline to investigate in the leakage and coordinate the remedial works.

Seawater trapped inside the casing and cofferdam would be pumped out to generate a dry working environment. The seawater pumped out from the casing and cofferdam should be directed to sedimentation tank or settling devices before discharge to the designated discharge point.

The contractor should ensure the effluent from the sedimentation tank meet the WPCO/TM requirements before discharge. If failure in visual inspection, discharge shall be ceased immediately and investigation in the whole facility shall be carried out to figure out the reason.

The proposed discharge point is indicated in the drawing Po Toi O – Cofferdam Layout Plan in ***Appendix D – Drawings for Cofferdam Details;***

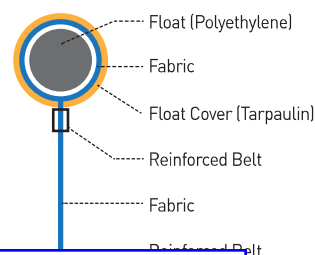
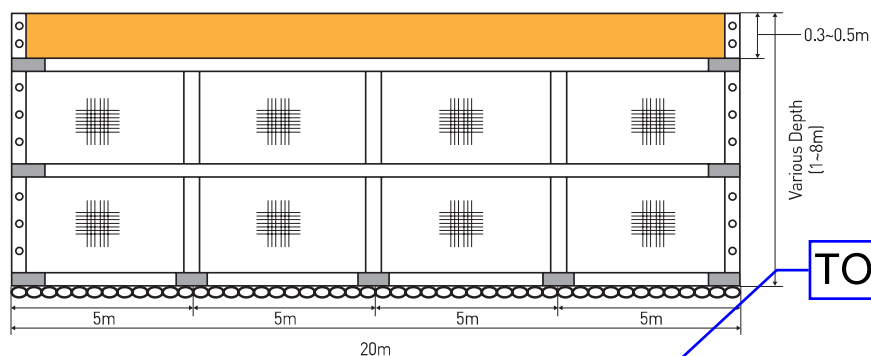
The proposed wastewater treatment facility on the barge is attached in ***Appendix F – Wastewater Treatment Facility on the Barge.***

Appendix A – Specification of Silt Curtain

TYPES

• Tube Type

High external force of tide, wave and wind



TO BE ADOPTED

• Durable Tube Type

High external force of tide, wave and wind + long resistance from the sunlight

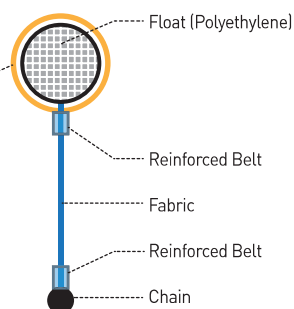


A broken PVC coated fabric in a part of the float



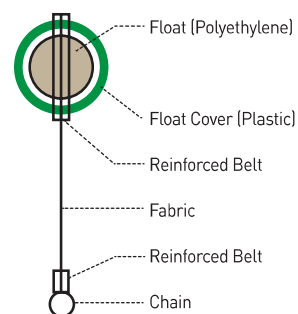
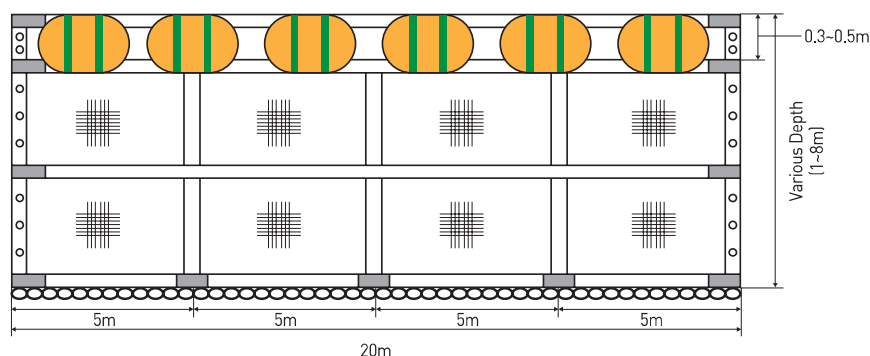
A durable fabric for the float using high tenacity colored yarn

Durable Tube Type GEONIA® Silt Protector applies a durable fabric for the float device by using high tenacity colored yarn, which was improved to solve the problem of fault construction, poor visibility caused by a damaged PVC coated fabric, and marine pollution of a broken PVC coated fabric.



• Covering Head Type

Less external force than tube type / easy to install

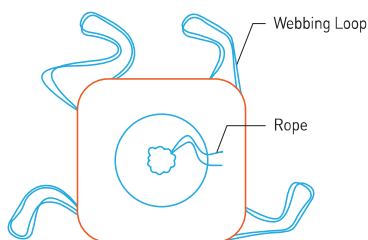
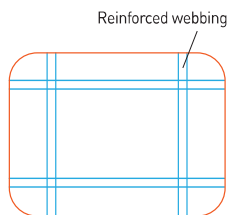
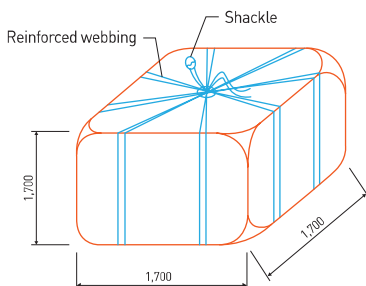


SPECIFICATION

TO BE ADOPTED

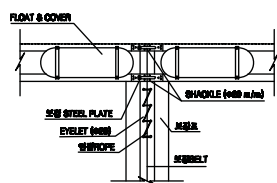
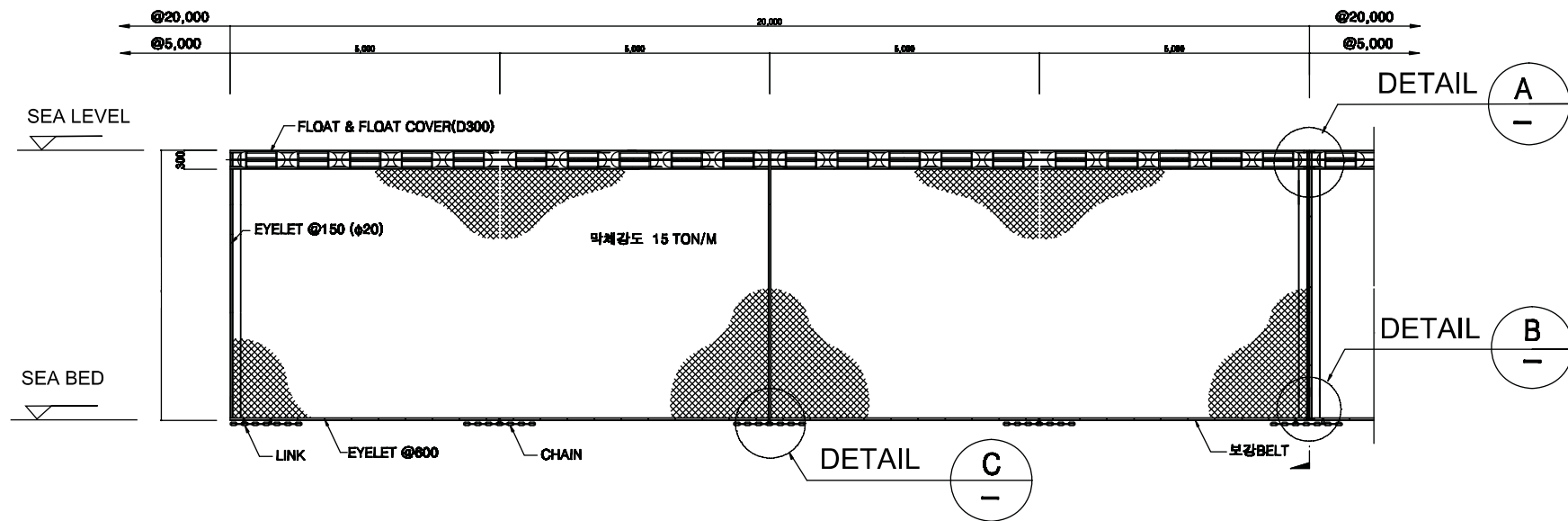
GEONIA® Silt Protector

Property	Unit	TEST METHOD	DSP 15	DSP 20	DSP 25	DSP 30
Fabric Unit Weight	g/m ²	ASTM D 5261	450	650	750	900
Fabric Tensile Strength	kN/m	ASTM D 4595	150	200	250	300
Fabric Elongation	%	ASTM D 4595	20	20	25	25
Fabric Permeability	cm/s	ASTM D 4491	$\alpha \times 10^{-2 \sim -4}$ ($\alpha=1 \sim 9.9$)			
Rate of Contraction	%	ISO 7771	± 0.2			
Material of Fabric		ASTM D 276	Polyester			
Float Diameter			300 mm ~ 500 mm			

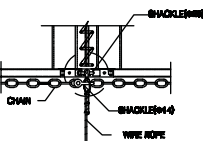
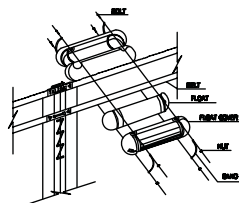


GEONIA® Ton Bag Anchor

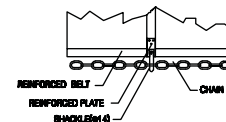
Property	Unit	Ton Bag Anchor	TEST METHOD
Fabric Weight	g/m ²	350	ASTM D 5261
Fabric Tensile Strength	kN/m	100	ASTM D 4595
Fabric Elongation	%	30	ASTM D 4595
Fabric Permeability	cm/sec	$\alpha \times 10^{-2 \sim -4}$ ($\alpha=1 \sim 9.9$)	ASTM D 4491
Raw Material		Polypropylene	ASTM D 276
Size	m	1.5 X 1.5 X 1.5 1.6 X 1.6 X 1.6 1.7 X 1.7 X 1.7	



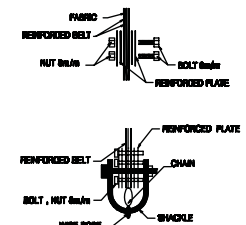
DETAIL A



DETAIL B

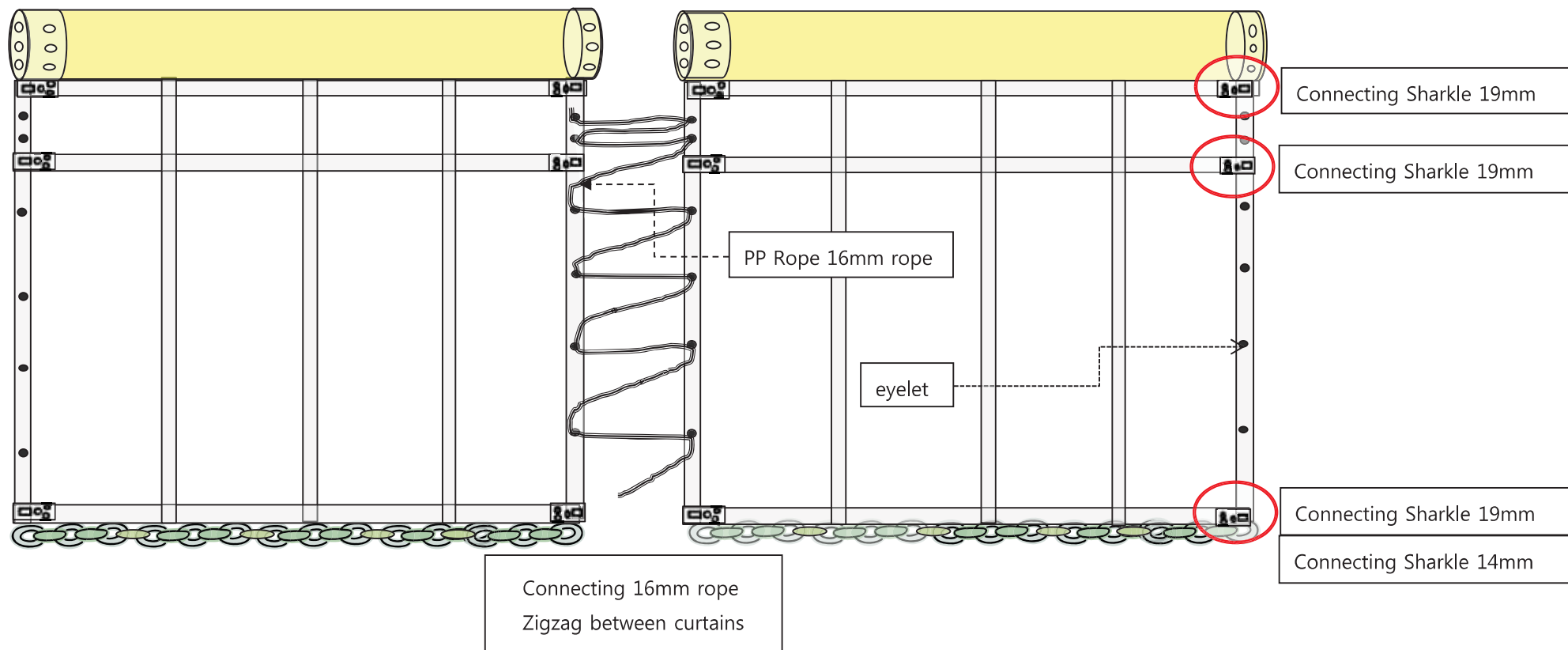


DETAIL C



발 주 자	설 계 자	설 계	심 사	책임기술자	승 인	도면구분	공 사 명
	대광산업사	DESIGNED BY	CHECKED	CHIEF ENG'R	APPROVED BY	SERIAL NO.	PROJECT
		제 도	속 력	일 자	일 자	도면번호	도면명
		DRAWN BY	SCALE	DATE	DATE	SHEET NO.	TITLE
							오타방지막 상세도

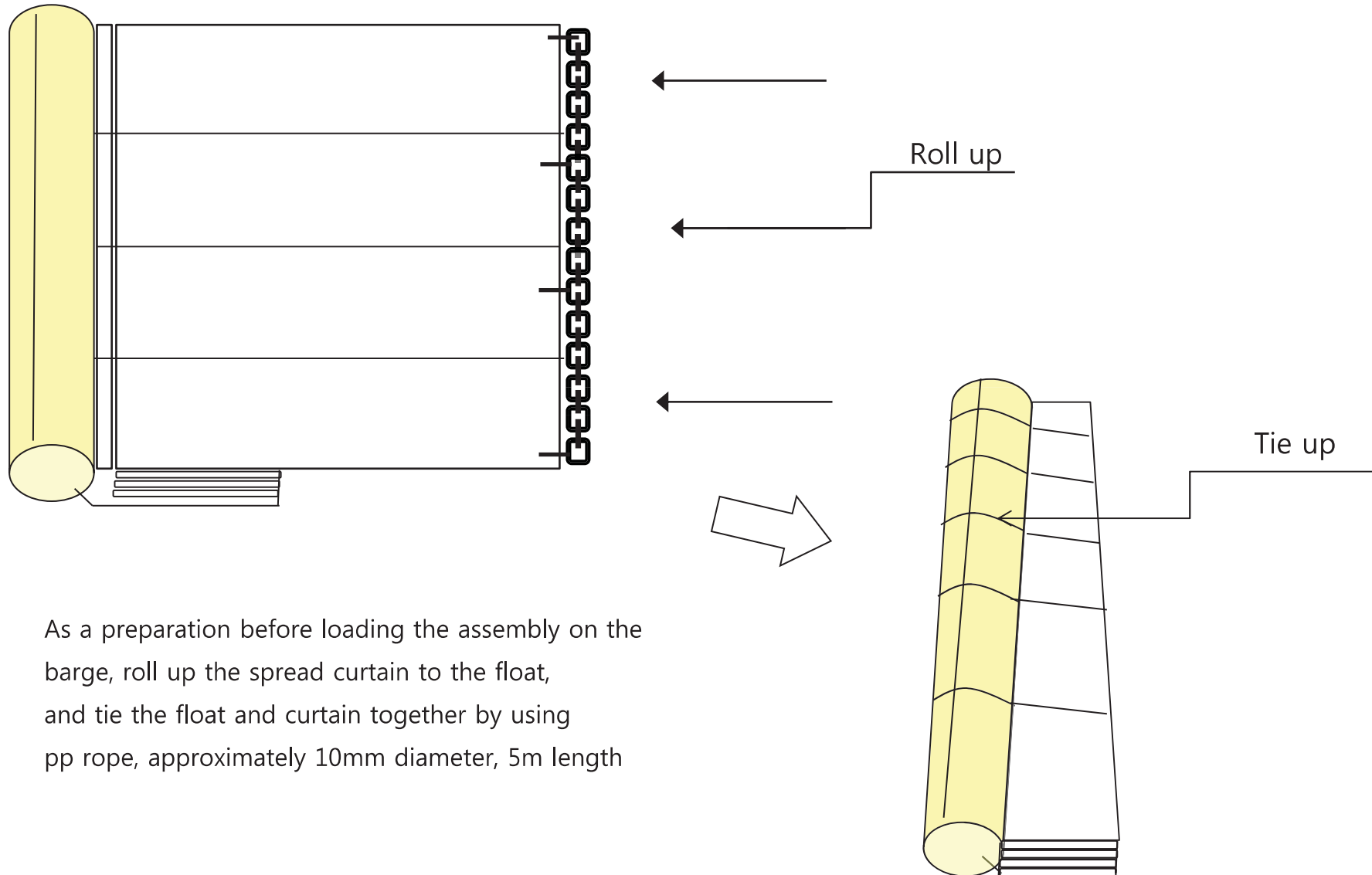
Installation Guide (Connecting curtain and curtain)



* Number of connections(between curtain and curtain)

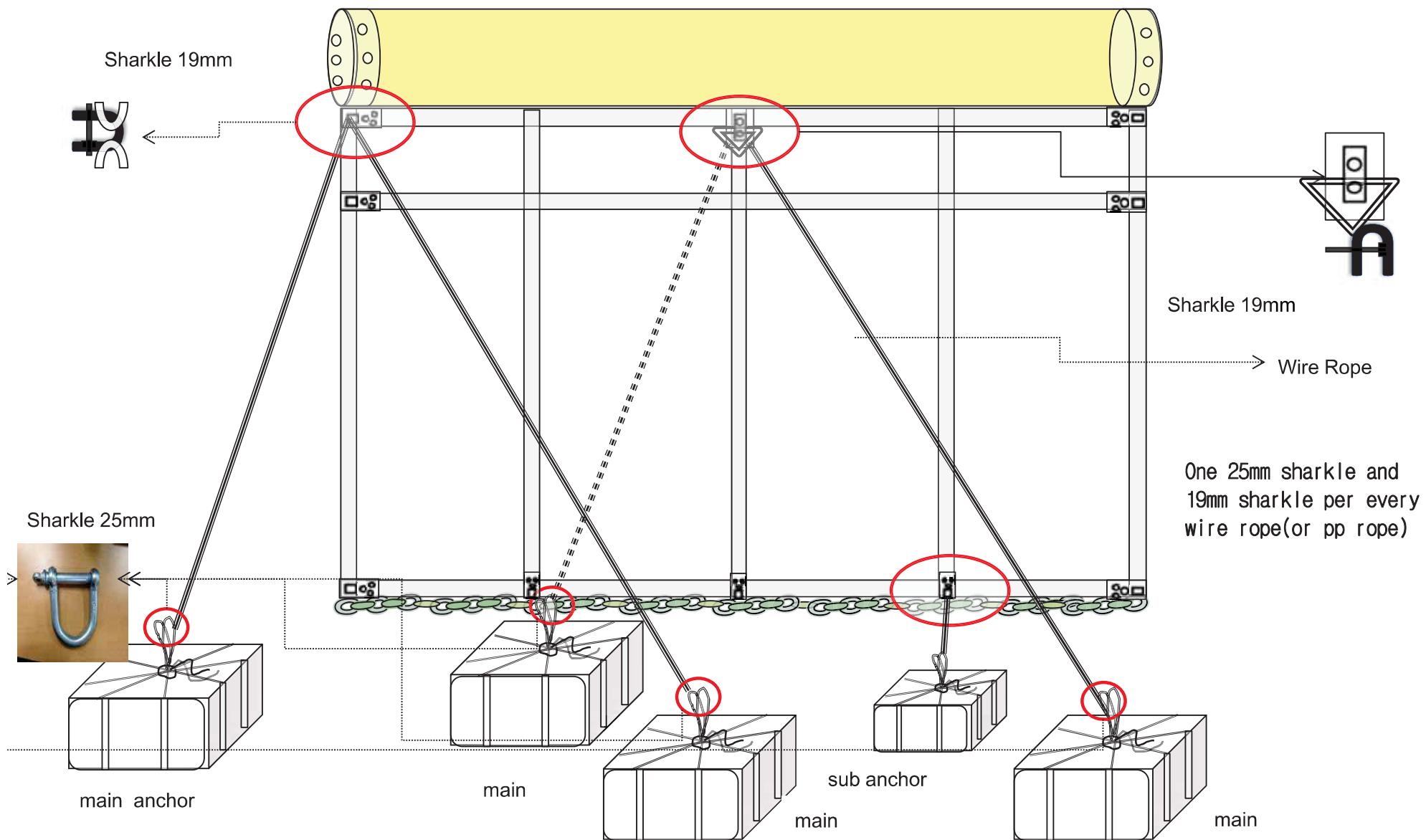
	19mm sharkle	No. of eyelet
2m height of curtain	3	6
3m height of curtain	4	9
4m height of curtain	4	12
5m height of curtain	5	15
6m height of curtain	5	18

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, approximately 10mm diameter, 5m length

Installation Guide (Connecting Curtain and Anchor)





Daeyoun Geotech
GEONIA Silt Protector

Certificate



Certificate of Registration

This is to certify that
Environmental Management System
of

DAEYOUN GEOTECH CO., LTD.

55-2, Dogog-ri, Gyrye-myeon, Gimcheon-city,
Gyeongsangbuk-do, Korea.

complies with the requirements of

ISO 14001:2004

This certificate is valid concerning all activities related to:

**Manufacture and Servicing of Industrial Fabrics
(PET Woven Geotextile, PP Woven Geotextile, Geotextiles,
Geocomposite and Base Cloth) & Twisted Yarn.**

ANZSIC Code: C 2212, C 2229

E1356

Aug. 31, 2013

Sep. 26, 2014

Certificate No.

Date of this Certificate

Certificate Expiry Date

Oct. 11, 2010

Sep. 26, 2016

Date of Initial Registration

*Recertification Due Date

Managing Director/Director



TRANSPACIFIC CERTIFICATIONS LIMITED

Website : www.tclcertifications.com E-mail : info@tclcertifications.com

Accreditation by Joint Accreditation System of Australia and New Zealand (Accreditation No. E3560506IN)
11, London Circuit, Canberra, Act 2600, AUSTRALIA

www.jas-anz.com.au/register

* Lack of fulfillment of conditions set out for the issuance of the certificate and timely completion of periodic surveillance audits may render the certificate invalid.



Certificate of Registration

This is to certify that
Quality Management System
of

DAEYOUN GEOTECH CO., LTD.

55-2, Dogog-ri, Gyrye-myeon, Gimcheon-city,
Gyeongsangbuk-do, Korea.

complies with the requirements of

ISO 9001:2008

This certificate is valid concerning all activities related to:

**Manufacture and Servicing of Industrial Fabrics
(PET Woven Geotextile, PP Woven Geotextile,
Geotextiles, Geocomposite and Base Cloth)
& Twisted Yarn.**

ANZSIC Code: C 2212, C 2229

9466

Certificate No.

Aug. 31, 2013

Date of this Certificate

Sep. 26, 2014

Certificate Expiry Date

Oct. 11, 2010

Date of Initial Registration

Sep. 26, 2016

*Recertification Due Date

[Signature]

Managing Director/Director



TRANSPACIFIC CERTIFICATIONS LIMITED

Website : www.tolcertifications.com E-mail : info@tolcertifications.com

Accreditation by Joint Accreditation System of Australia and New Zealand (Accreditation No. S26403031N)

11, London Circuit, Canberra, Act 2600, AUSTRALIA

www.jas-anz.com.au/register

* Lack of fulfillment of conditions set out for the issuance of the certificate and timely completion of periodic surveillance audits may render the certificate invalid.

Certification Body  1213

SKZ – TeConA GmbH
Friedrich-Bergius-Ring 22
97076 Würzburg
Germany

EC Certificate of Factory Production Control 1213–CPD–5431

In compliance with Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products (the Construction Products Directive or CPD), as later amended, it has been stated that the construction products

**Geonia DM-10, Geonia DM-15, Geonia DM-20, Geonia DM-25,
Geonia DML-10, Geonia DML-20, Geonia DML-30,
Geonia DML-40**

Geotextile, woven; Raw material: PET
used for the function: S + R

placed on the market by

Daeyoun Geotech Co. Ltd.

#1121, Poonglim Bldg
404, Gongdunch-dong
Mapo-gu
Seoul
South Korea

and produced in the factory

Gyeongsangbuk-do

are submitted by the manufacturer to the initial type-testing of the products, a factory production control (FPC) and to the further testing of samples taken at the factory in accordance with a prescribed test plan and that the notified body No. 1213 - SKZ – TeConA GmbH, Würzburg, Germany - has performed the initial inspection of the factory and of the FPC and performs the continuous surveillance, assessment and approval of the FPC.

This certificate attests that all provisions concerning the attestation of FPC described in Annex ZA of the standard

**EN 13249:2000/A1:2005; EN 13250:2000/A1:2005;
EN 13251:2000/A1:2005; EN 13257:2000/A1:2005**

were applied.

This certificate was first issued on 2012-12-19 and remains valid as long as the conditions laid down in the harmonised standard in reference or the manufacturing conditions in the factory or the FPC itself are not modified significantly.



Würzburg, 19 December 2012

i. V.

Dipl.-Ing. Helmut Zanzinger
Certification Body

**DAEYOUN GEOTECH CO LTD**

NO. 1121 POONGLIM BLDG GONGDEOK-DONG

MAPO-GU SEOUL 121-718

SOUTH KOREA

TEL: +82 2 539 9700 FAX: +82 2 539 9710

DATE: April 1, 2014

CONFORMANCE CERTIFICATE

The undersigned supplier DAEYOUN GEOTECH CO LTD, hereby states under his responsibility that the following product complies with the indicated technical properties:

LC no. / date: LC302NL1401356 / March 27, 2014

PO no. / date: 140325 (HY/2012/07) / March 25, 2014

Delivery docs /date: PACKING LIST DY14-0328-1 / March 28, 2014

ITEM:

DSP15 SILT CURTAIN (150/150KN/M) EXCLUDING FLOATING PART / WITH EYELETS

- 1) 24 SPANS DEPTH EQUAL TO 6M, SPAN EQUAL TO 20M LENGTH
- 2) 10 SPANS DEPTH EQUAL TO 7M, SPAN EQUAL TO 20M LENGTH
- 3) 10 SPANS DEPTH EQUAL TO 9M, SPAN EQUAL TO 20M LENGTH

Manufacturer: DAEYOUN GEOTECH CO LTD



DAEYOUN GEOTECH CO LTD

PRESIDENT S . K . L E E

DAEYOUN GEOTECH CO LTD



Daeyoun Geotech
GEONIA Silt Protector

Project Reference



Daeyoun Geotextile Silt Protector

Date	Project	Client	Consultant	Model	Span	Qty / span
Jun-05	CV/2002/04 Penny's Bay Reclamation Stage 2	Gammon Construction Ltd	Scott Wilson Ltd		5 x 20m 5 x 10m	86 256
May-13	DC/2011/01 Drainage Maintenance and Construction in Mainland South Districts (2011-2015)	World Diamond Eng Ltd	Drainage Services Department	GSP 15	5x20m 3x5m 3x2m 3x13m	1 10 1 4
Apr-14	HY/2012/07 Dual 2-lane carriageway between HZMB BCF and North Lantau Highway	Gammon Construction Ltd	AECOM Asia Co Ltd	DSP15	6m 7m 9m	24 10 10

Appendix B – Location Plan of Silt Curtain and Anchor Block



Silt Curtain and Anchor Block for Submarine outfall (Loaction B)

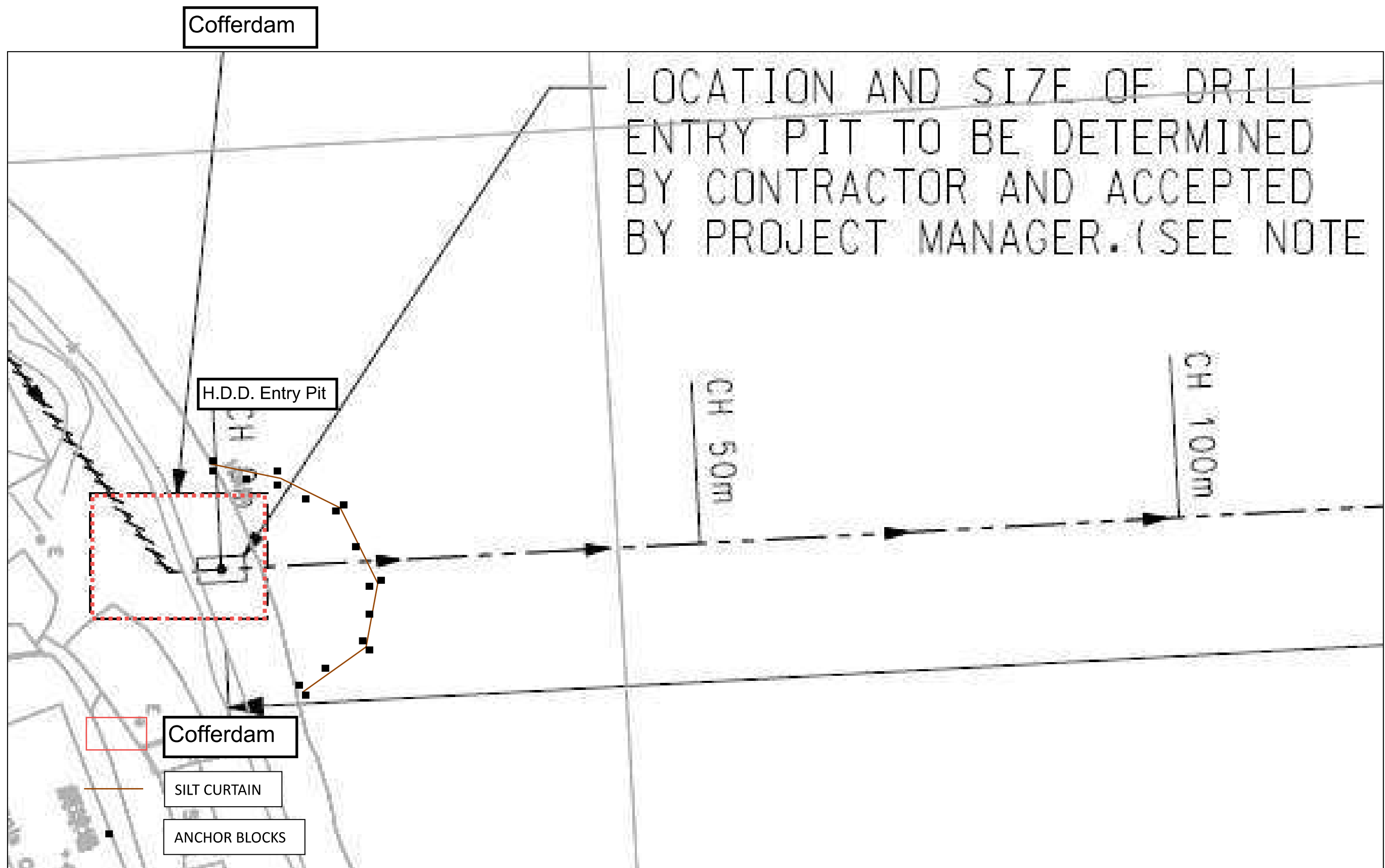
Silt Curtain and Anchor Block for Rocky Shore (Location A)

Silt Curtain and Anchor Block for PTOSTP (Location C)

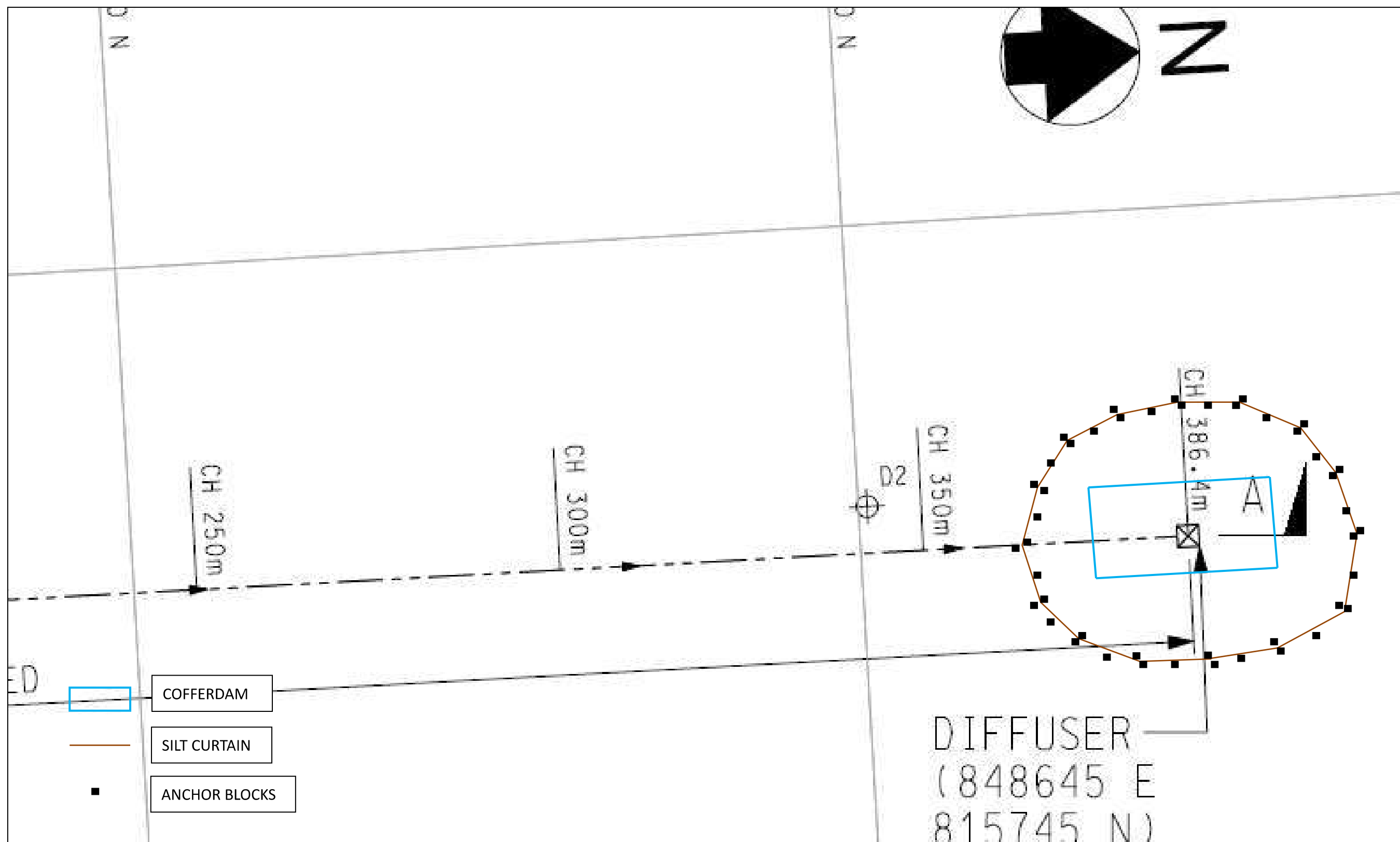
Legend:

- Cofferdam
- Diffuser
- Effluent Pipeline by HDD Method
- Silt Curtain
- Village Sewerage Pipeline
- Site Boundary

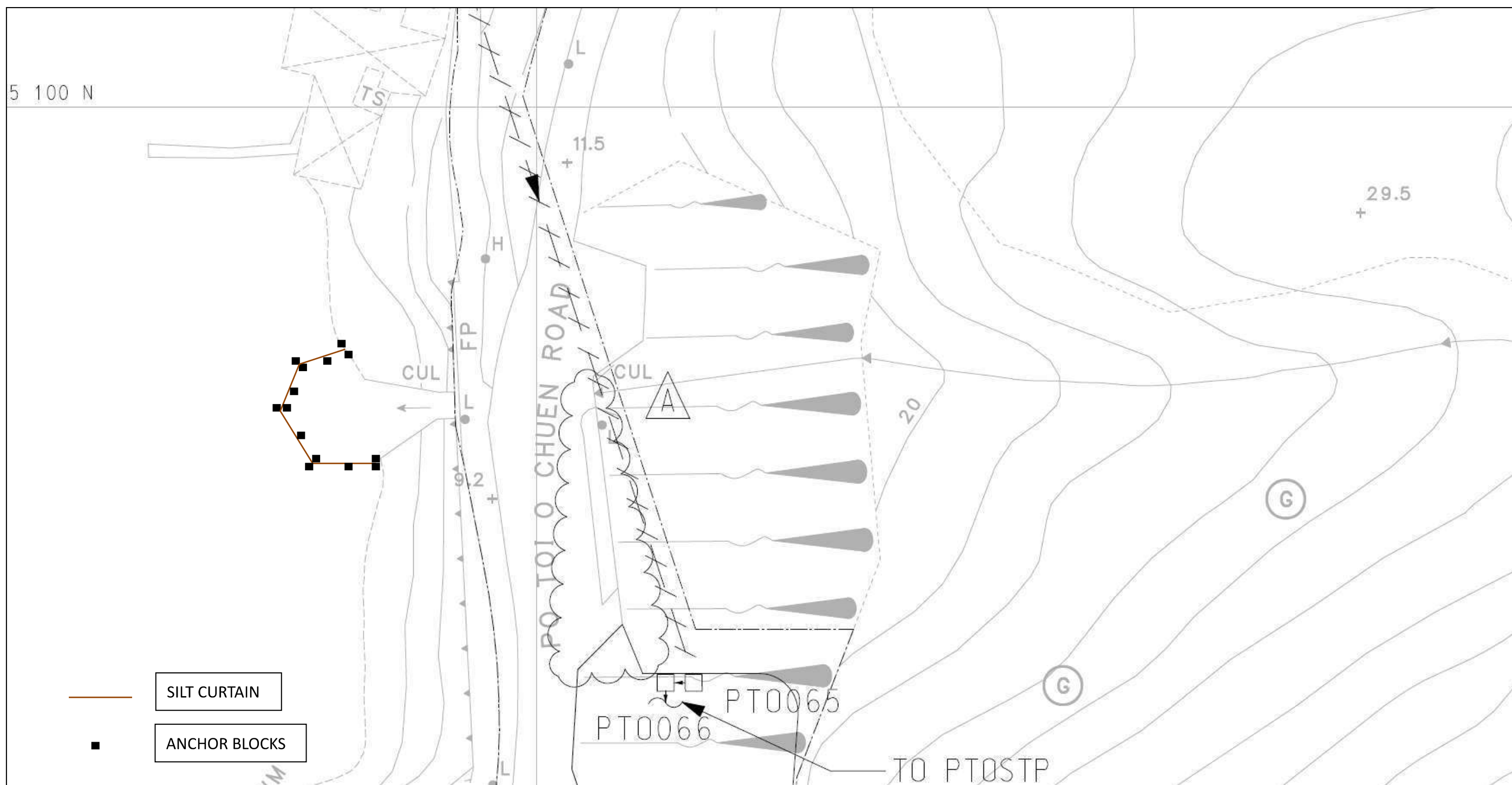
Scale:1:1000(A1)



Location Plan of Silt Curtain and Anchor Block for Rocky Shore (Location A)



Location Plan of Silt Curtain Anchor block for submarine outfall (Location B)



Location Plan of Silt Curtain and Anchor Block for PTOSTP (Location C)

Appendix C – Inspection Checklists for Silt Curtain

Visual Inspection Checklist for Silt Curtain

Location: _____

Inspection Date: _____

Inspected by: _____

Checked by: _____

Item	Description	Condition		Follow-up Actions?		Remarks
		Yes	No	Yes	No	
1	Any floating debris / refuse within the silt curtain? 隔泥幕內有沒有漂浮的垃圾?					
2	Buoys in good condition? 浮泡情況是否良好?					
3	Tying rope(above sea) in good condition? 水面之繩索情況是否良好?					
4	Water in good condition? 海水情況是否良好?					
5	Others (please specify): 其他（請註明）:					

*The checklist shall be properly signed by the Contractor.

Diving Inspection Checklist for Silt Curtain

Location: _____

Inspection Date: _____

Inspected by: _____

Checked by: _____

Item	Description	Condition		Follow-up Actions?		Remarks
		Yes	No	Yes	No	
1	Tying rope (submarine) in good condition? 水下繩索情況是否良好?					
2	Filter material intact and in good condition? 隔網是否完整? 情況是否良好?					
3	Sinkers in good condition? 墜重物狀況是否良好?					
4	Any Obstruction to water flow between the filter material? 隔網之間是否有物件阻礙水的流動?					
5	Any sea shells to be removed? 是否有貝殼需要清理?					
6	Others (please specify): 其他 (請註明):					

*The checklist shall be properly signed by the Contractor.

Inspection Checklist for Installation of Silt Curtain

Location: _____

Inspection Date: _____

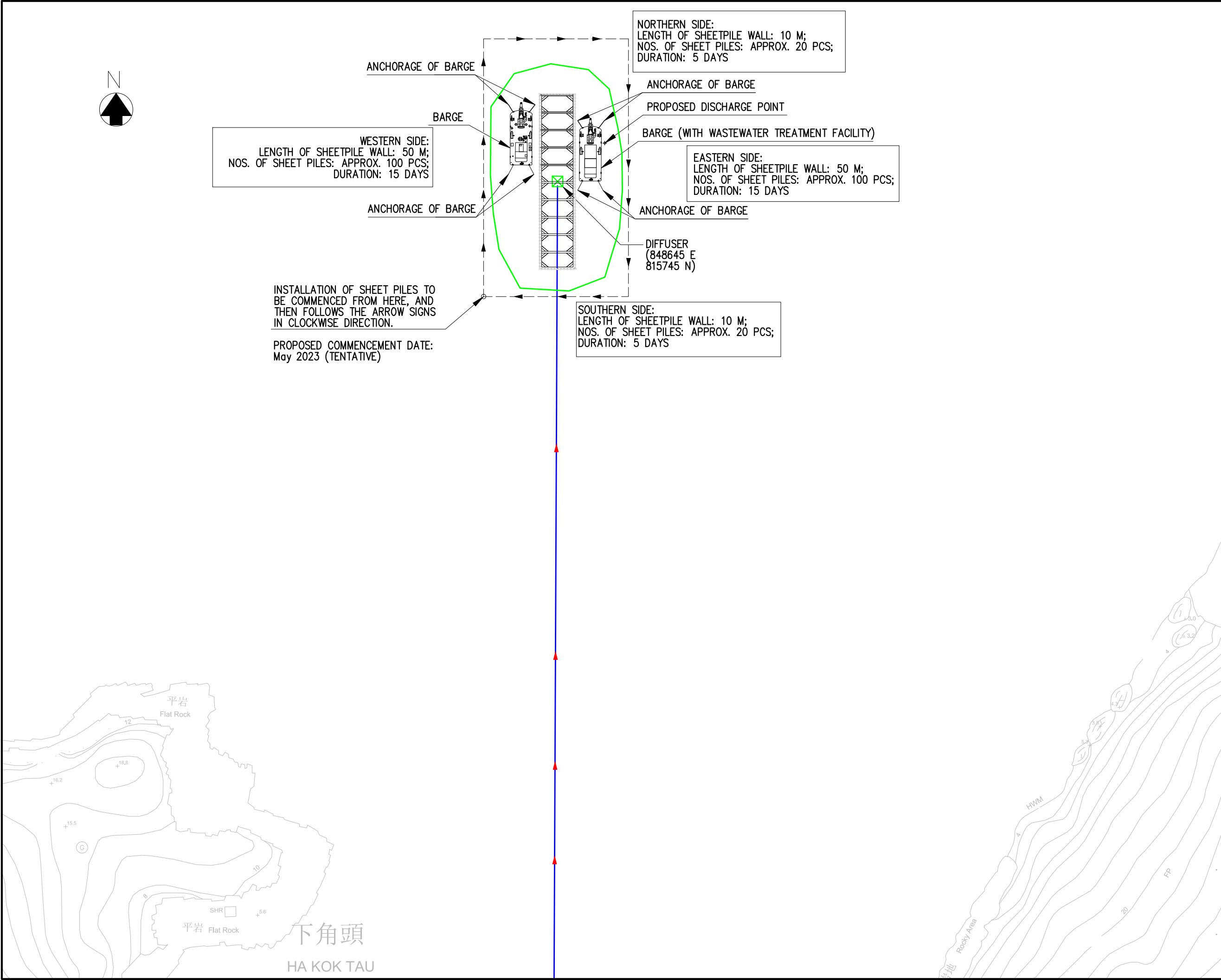
Inspected by: _____

Checked by: _____

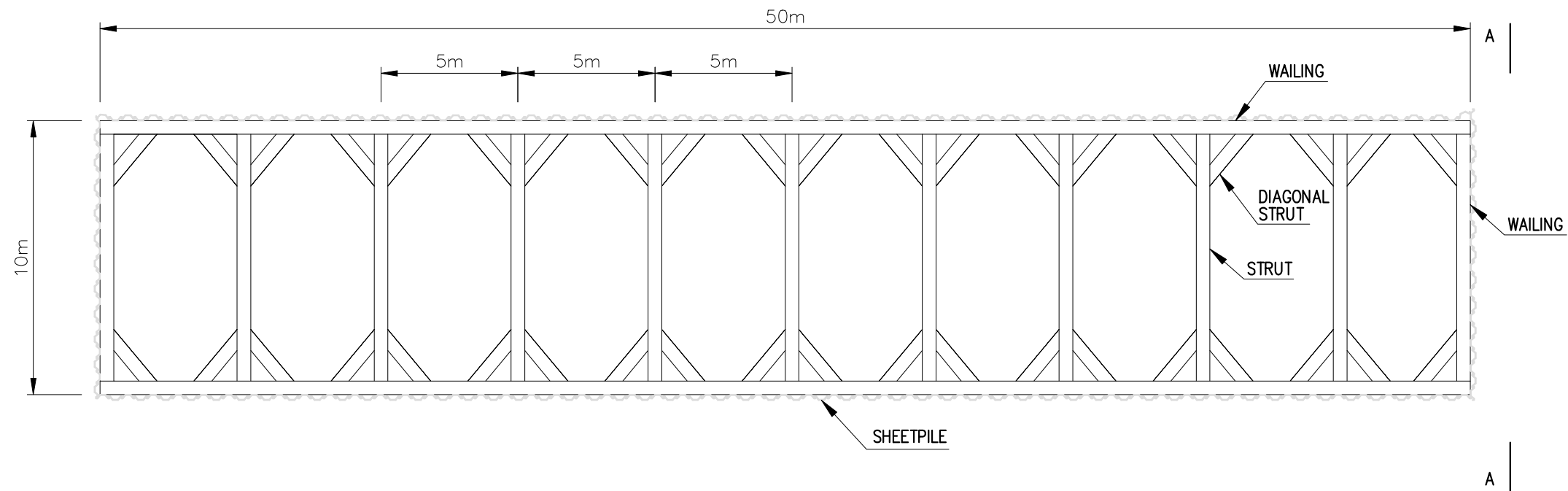
Item	Description	Condition		Follow-up Actions?		Remarks
		Yes	No	Yes	No	
1	Any defects on the product and if the components are complete before installation? 安裝前產品是否有問題，部件是否完整？					
2	Are the anchor blocks and silt curtains in the right positions? 墜重物和隔網是否安放在正確位置？					
3	Are the anchor blocks and silt curtains in good conditions? 墜重物和隔網的狀況是否良好？					
4	Are the connections between the anchor blocks and the silt curtains in good conditions? 墜重物和隔網的連接狀況是否良好？					
5	Others (please specify): 其他（請註明）：					

*The checklist shall be properly signed by the Contractor.

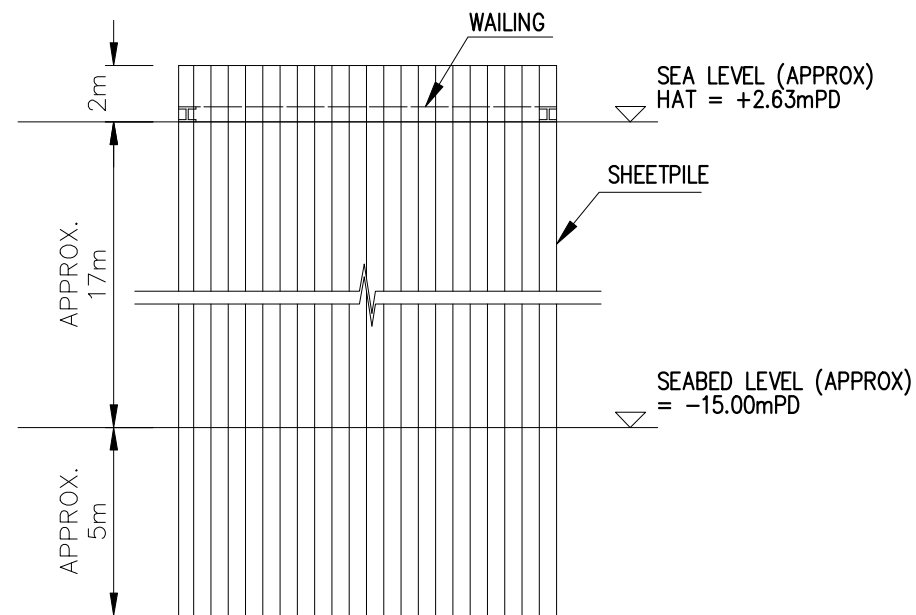
Appendix D –Drawings for Cofferdam Details



LEGEND: <div><div></div>EFFLUENT PIPELINE</div> <div><div></div>FINAL EFFLUENT PIPELINE BY TRENCHLESS METHOD</div> <div><div></div>WORKS LIMIT</div> <div><div></div>DIFFUSER</div> <div><div></div>PROPOSED DISCHARGE POINT</div> <div><div></div>SEQUENCE OF INSTALLATION</div> <div><div></div>SILT CURTAIN</div>	
Contract no.	DC/2019/09
Contract title	PROVISION OF VILLAGE SEWERAGE IN SAI KUNG
Drawing title	PO TOI O – COFFERDAM LAYOUT PLAN
Drawing no.	
	Revision
Scale	



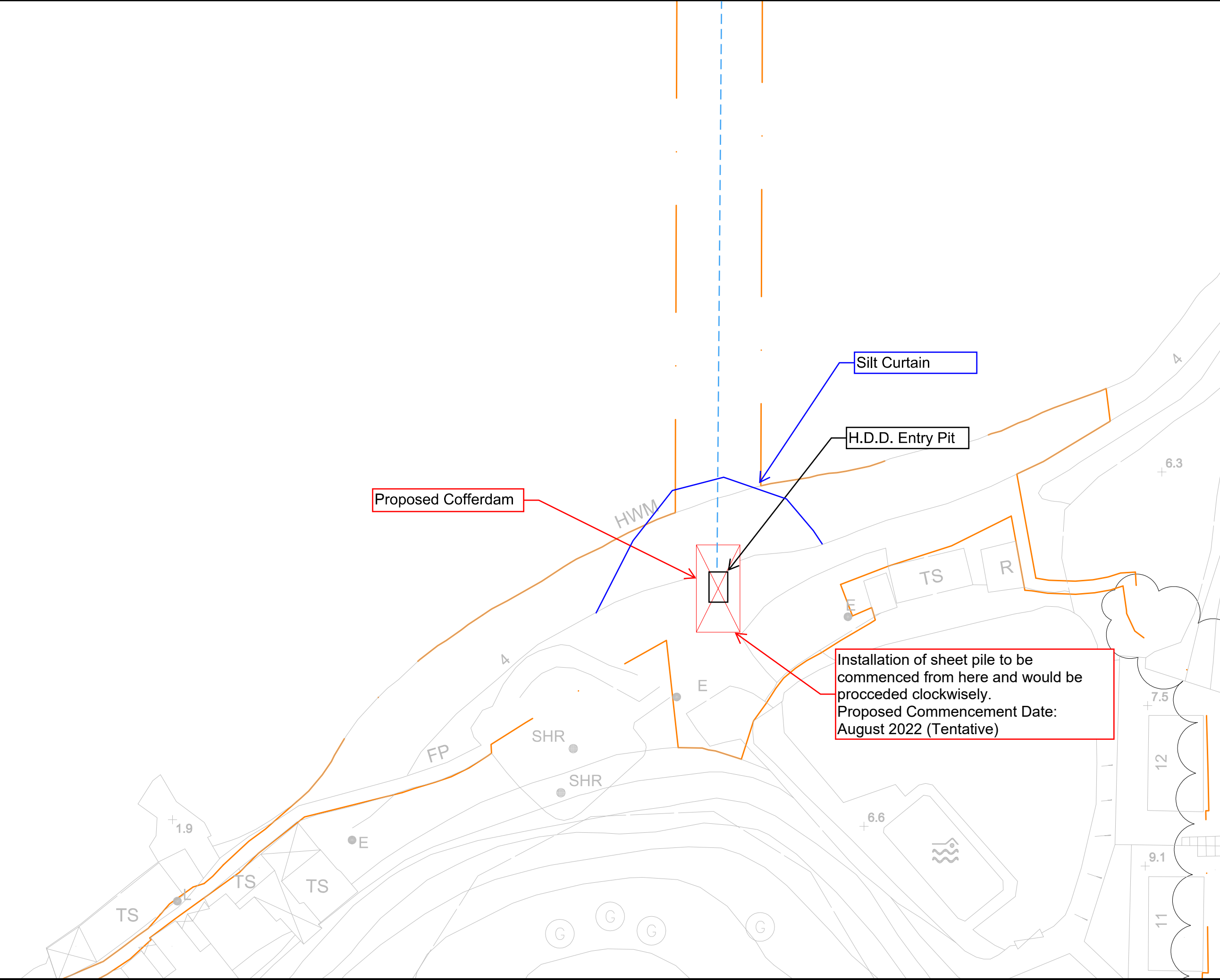
PLAN VIEW







SECTION A-A

- NOTES:
1. TYPE OF SHEETPILE: NSP-IVw;
 2. TYPE OF WAILING, STRUT, AND DIAGONAL STRUT: 356x406x634 UC;
 3. BASE ON THE ACTUAL SITUATION, THE DEPTH OF TOE-IN MAY SUBJECT TO CHANGE.

Contract no.	DC/2019/09
Contract title	PROVISION OF VILLAGE SEWERAGE IN SAI KUNG
Drawing title	PO TOI O – DETAILS OF COFFERDAM DESIGN
Drawing no.	
Revision	
Scale	



- LEGEND:**
-  SITE BOUNDARY
 -  COFFERDAM FOR ENTRY PIT
 -  H.D.D. ENTRY PIT
 -  Silt Curtain

DC/2019/09

PROVISION OF VILLAGE SEWERAGE
IN SAI KUNG

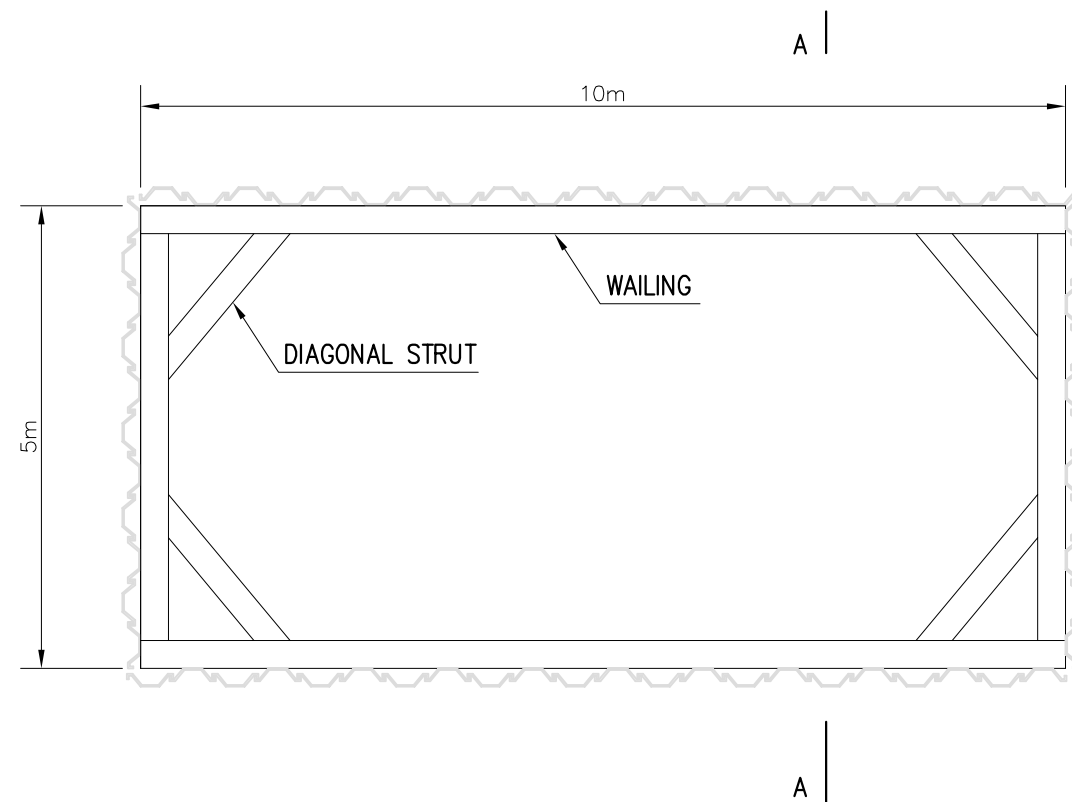
Drawing title

PO TOI O -
COFFERDAM LAYOUT PLAN
(ENTRY PIT)

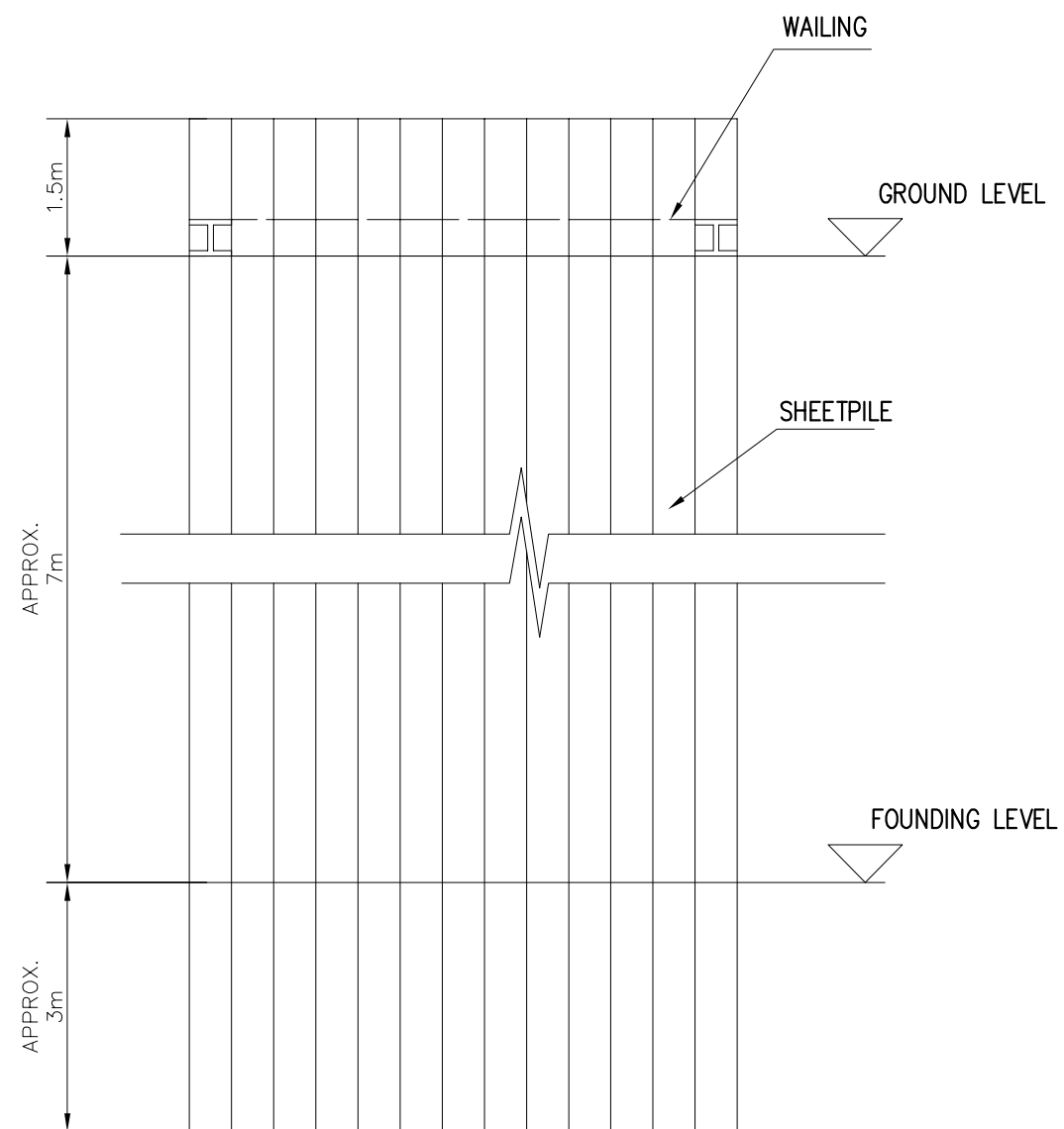
Drawing no.

A1_1:-1000
A3_1:-2000

Revision



PLAN VIEW



SECTION A-A

- NOTES:
1. TYPE OF SHEETPILE: NSP-IVw;
 2. TYPE OF WAILING, STRUT, AND DIAGONAL STRUT: 356x406x634 UC;
 3. BASE ON THE ACTUAL SITUATION, THE DEPTH OF TOE-IN MAY SUBJECT TO CHANGE.

DC/2019/09

PROVISION OF VILLAGE SEWERAGE
IN SAI KUNG

Drawing title

PO TOI O -
DETAILS OF COFFERDAM DESIGN
(ENTRY PIT)

Drawing no.

Revision

Scale

Appendix E –Sectional Properties of Sheetpile, Wailing and Strut

U-type Sheet Pile

Figure 1 is a line graph showing the relationship between Section modulus (cm^3/m) on the Y-axis and Unit Mass (kg/m^2) on the X-axis. The Y-axis ranges from 0 to 4000, and the X-axis ranges from 50 to 250. A series of points labeled I_A , II, III, IV, V_L , and VI_L are plotted, connected by a line, showing a decreasing trend in section modulus as unit mass increases.

Point Label	Unit Mass (kg/m^2)	Section Modulus (cm^3/m)
I_A	~85	~500
II	~110	~800
III	~145	~1200
IV	~190	~2200
V_L	~215	~3000
VI_L	~235	~3500

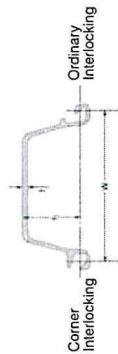
Type	Dimension		Per pile			Per 1 m of pile wall width		
	Effective width mm	Effective height mm	Sectional area cm ²	Moment of inertia cm ⁴	Sectional area cm ² /m	Moment of inertia cm ⁴ /m	Unit mass kg/m ²	
YSP-FL	500	44.5	9.5	184	45.7	61.7	89	123
YSP-FXL	500	47.0	12.7	245	60.3	77.2	121	154

Note:1. The straight web-type sheet pile of SYW295 and SY295 offers joint strengths of 4MN/m and over for YSP-Fl and 6MN/m and over for YSP-EXL



Pile type	Type	Dimension			Per pile				Per 1 m of pile wall width					
		Effective height mm	t ₁ mm	Thickness t ₂ mm	Sectional area cm ²	Moment of inertia cm ⁴	Sectional modulus cm ³	Statistical moment cm ²	Unit mass kg/m	Area cm ² /m	Sectional modulus cm ³ /m	Unit mass kg/m ²		
Pile A	Pile A													
FSP-IV	FSP-IV	400	387	15.5	15.5	194.0	41,600	2,150	1,250	152	485.0	104,000	5,380	380
FSP-V _L	FSP-V _L	500	445	24.3	24.3	267.6	80,500	3,620	2,050	210	535.2	161,000	7,240	420
FSP-V _L	FSP-V _L	500	471	27.6	24.3	286.8	92,500	3,850	2,320	225	573.6	185,000	7,700	450
FSP-V _L	FSP-V _L	500	497	27.6	27.6	306.0	108,000	4,350	2,560	240	612.0	216,000	8,700	480

Note: 1. The statical moment in the above table is the values required for determining weld lengths. These values represent statical moments of area about the neutral axis for one side of a box pile.
2. In addition to the box-type piles (pile A x pile B) shown above, the following 10 box-type piles area also available:
FSP-I_wx FSP-I_w, FSP-II_wx FSP-II_w, FSP-III_wx FSP-III_w, FSP-IV_wx FSP-IV_w, FSP-V_wx FSP-V_w, FSP-VI_wx FSP-VI_w,
FSP-VII_wx FSP-VII_w, FSP-VIII_wx FSP-VIII_w, FSP-IX_wx FSP-IX_w, FSP-X_wx FSP-X_w.

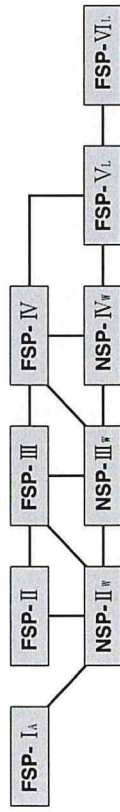


Type	Dimension		Thickness	Per pile			
	Width	Height		Section area	Unit	Moment of inertia	Section modulus
	mm	mm	mm	cm ²	kg/m	cm ⁴	cm ³
FSP-C III	400	125	13	79.63	62.5	2,330	237
FSP-C IV	400	170	15.5	96.76	76.0	4,630	377

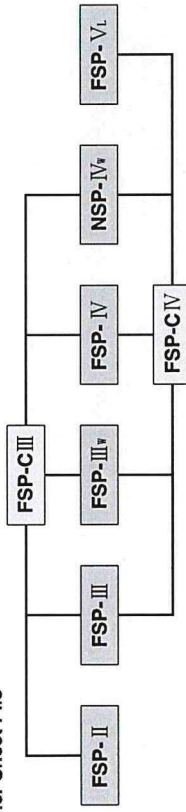
Compatibility in interlocking

The joints of sheets piles of identical type and of the sheet piles indicated by solid lines in the figure below can be interlocked.

● U-type Sheet Pile

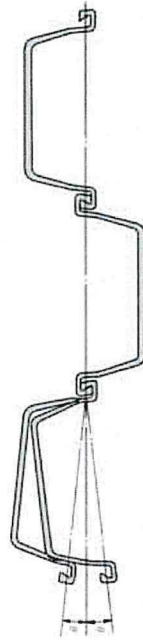


● Corner Sheet Pile



Standard angles of swing

The standard angles of swing for interlocking sheet piles of identical type are shown in the figure below.

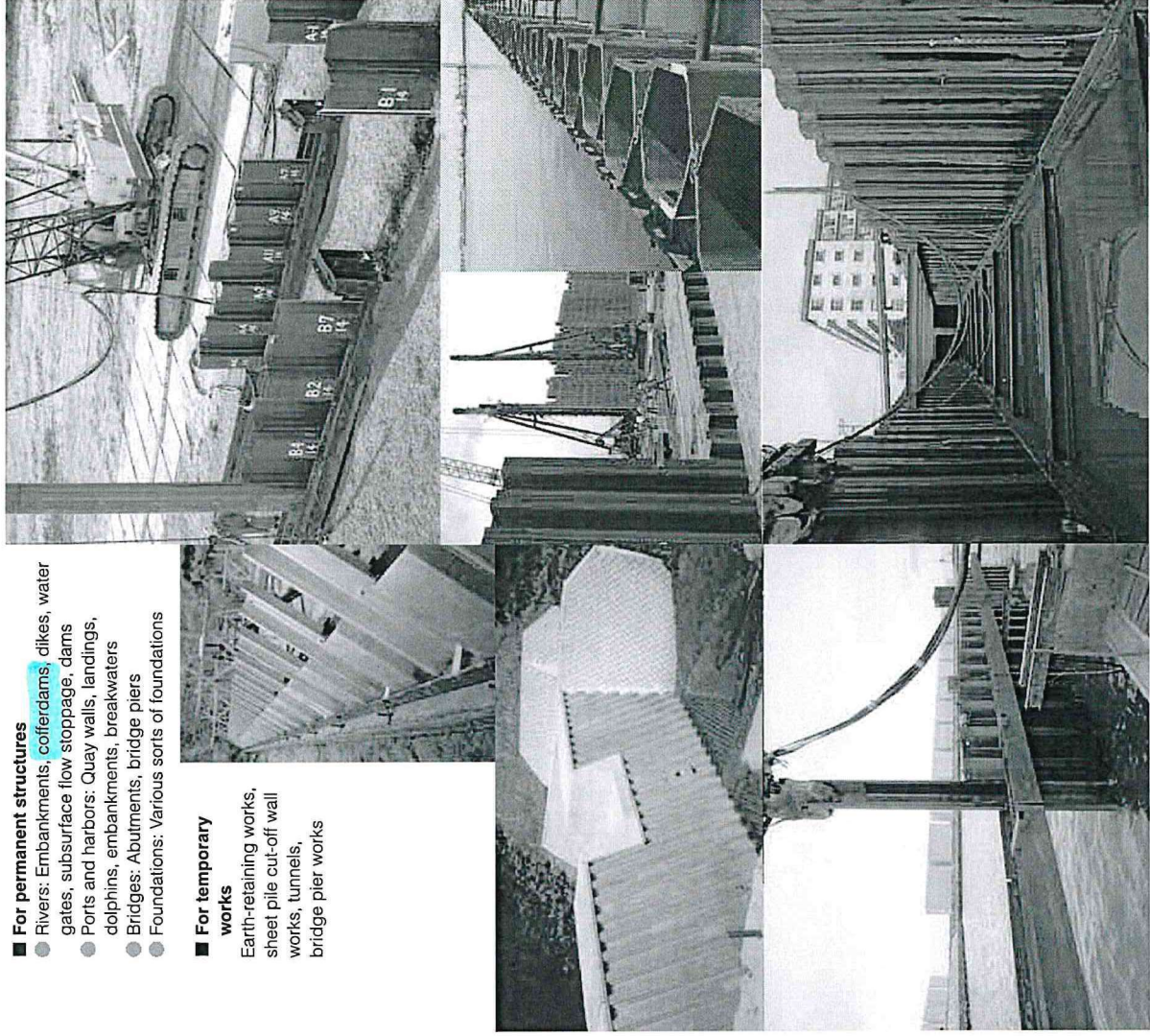


- (1) U-type sheet pile $\theta = \pm 6^\circ$
- (2) Straight web-type sheet pile YSP-FL $\theta = \pm 12.5^\circ$
- YSP-FXL $\theta = \pm 10^\circ$

- For permanent structures
 - Rivers: Embankments, cofferdams, dikes, water gates, subsurface flow stoppage, dams
 - Ports and harbors: Quay walls, landings, dolphins, embankments, breakwaters
 - Bridges: Abutments, bridge piers
 - Foundations: Various sorts of foundations

■ For temporary works

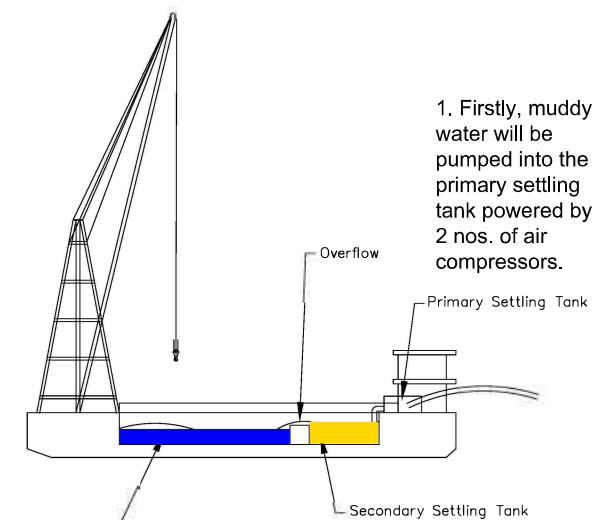
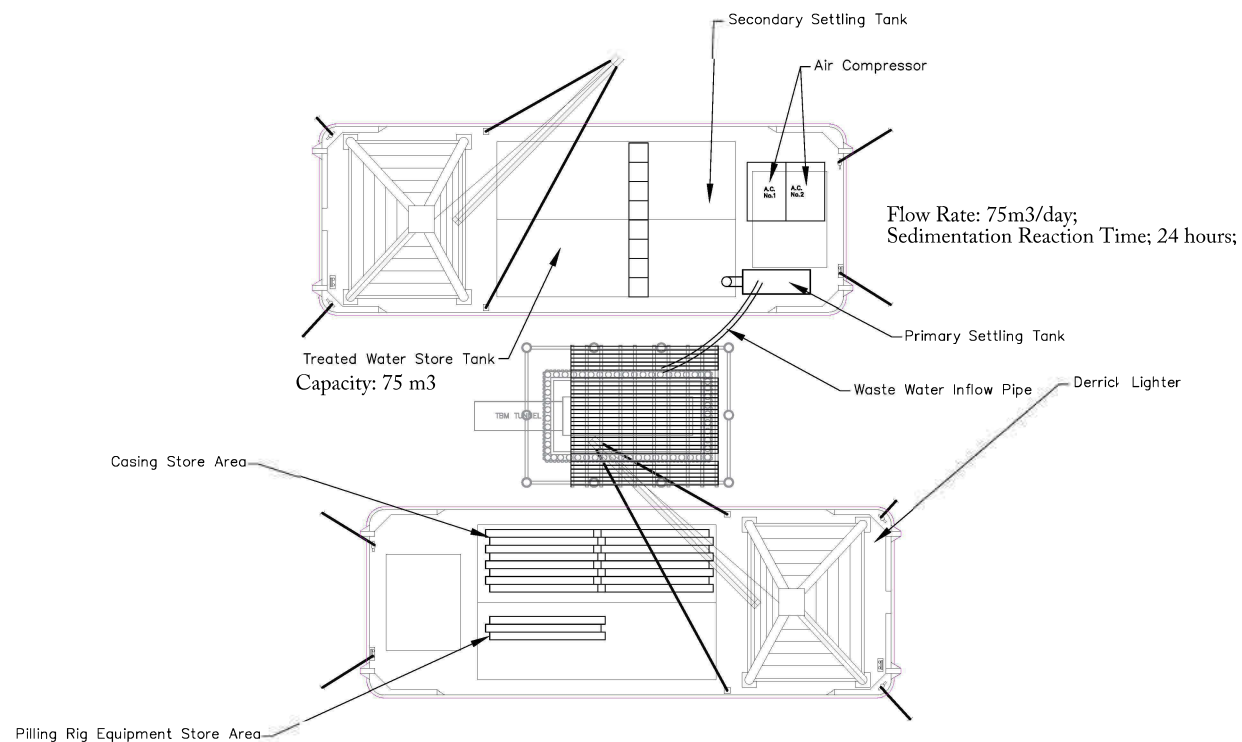
- Earth-retaining works, sheet pile cut-off wall works, tunnels, bridge pier works



Universal Columns to BS4 Part1 1993 - Dimensions & Properties

Designation	Mass Per metre	Depth of Section	Width of Section	Thickness		Root Radius	Depth between fillets	Ratios for Local Buckling		Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter
				Web	Flange			Flange	Web	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	
		h	b	s	t	r	d	b/2t	d/s	I _x	I _y	r _x	r _y	Z _x	Z _y	S _x	S _y	u
kg/m	mm	mm	mm	mm	mm	mm	mm			cm ⁴	cm ⁴	cm	cm	cm ³	cm ³	cm ³	cm ³	
356x406x634	634	474.6	424	47.6	77	15.2	290.2	2.75	6.1	274800	98130	18	11	11580	4629	14240	7108	0.843
356x406x551	551	455.6	418.5	42.1	67.5	15.2	290.2	3.1	6.89	226900	82670	18	11	9962	3951	12080	6058	0.841
356x406x467	467	436.6	412.2	35.8	58	15.2	290.2	3.55	8.11	183000	67830	18	11	8383	3291	10000	5034	0.839
356x406x393	393	419	407	30.6	49.2	15.2	290.2	4.14	9.48	146600	55370	17	11	6998	2721	8222	4154	0.837
356x406x340	340	406.4	403	26.6	42.9	15.2	290.2	4.7	10.9	122500	46850	17	10	6031	2325	6999	3544	0.836
356x406x287	287	393.6	399	22.6	36.5	15.2	290.2	5.47	12.8	99880	38680	17	10	5075	1939	5812	2949	0.835
356x406x235	235	381	394.8	18.4	30.2	15.2	290.2	6.54	15.8	79080	30990	16	10	4151	1570	4687	2383	0.834
356x368x202	202	374.6	374.7	16.5	27	15.2	290.2	6.94	17.6	66260	23690	16	9.6	3538	1264	3972	1920	0.844
356x368x177	177	368.2	372.6	14.4	23.8	15.2	290.2	7.83	20.2	57120	20530	16	9.5	3103	1102	3455	1671	0.844
356x368x153	153	362	370.5	12.3	20.7	15.2	290.2	8.95	23.6	48590	17550	16	9.5	2684	948	2965	1435	0.844
356x368x129	129	355.6	368.6	10.4	17.5	15.2	290.2	10.5	27.9	40250	14610	16	9.4	2264	793	2479	1199	0.844
305x305x283	283	365.3	322.2	26.8	44.1	15.2	246.7	3.65	9.21	78870	24630	15	8.3	4318	1529	5105	2342	0.855
305x305x240	240	352.5	318.4	23	37.7	15.2	246.7	4.22	10.7	64200	20310	15	8.2	3643	1276	4247	1951	0.854
305x305x198	198	339.9	314.5	19.1	31.4	15.2	246.7	5.01	12.9	50900	16300	14	8	2995	1037	3440	1581	0.854
305x305x158	158	327.1	311.2	15.8	25	15.2	246.7	6.22	15.6	38750	12570	14	7.9	2369	808	2680	1230	0.851
305x305x137	137	320.5	309.2	13.8	21.7	15.2	246.7	7.12	17.9	32810	10700	14	7.8	2048	692	2297	1053	0.851
305x305x118	118	314.5	307.4	12	18.7	15.2	246.7	8.22	20.6	27670	9059	14	7.8	1760	589	1958	895	0.85
305x305x97	96.9	307.9	305.3	9.9	15.4	15.2	246.7	9.91	24.9	22250	7308	13	7.7	1445	479	1592	726	0.85
254x254x167	167	289.1	265.2	19.2	31.7	12.7	200.3	4.18	10.4	30000	9870	12	6.8	2075	744	2424	1137	0.851
254x254x132	132	276.3	261.3	15.3	25.3	12.7	200.3	5.16	13.1	22530	7531	12	6.7	1631	576	1869	878	0.85
254x254x107	107	266.7	258.8	12.8	20.5	12.7	200.3	6.31	15.6	17510	5928	11	6.6	1313	458	1484	697	0.848
254x254x89	88.9	260.3	256.3	10.3	17.3	12.7	200.3	7.41	19.4	14270	4857	11	6.6	1096	379	1224	575	0.85
254x254x73	73.1	254.1	254.6	8.6	14.2	12.7	200.3	8.96	23.3	11410	3908	11	6.5	898	307	992	465	0.849
203x203x86	86.1	222.2	209.1	12.7	20.5	10.2	160.8	5.1	12.7	9449	3127	9.3	5.3	850	299	977	456	0.85
203x203x71	71	215.8	206.4	10	17.3	10.2	160.8	5.97	16.1	7618	2537	9.2	5.3	706	246	799	374	0.853
203x203x60	60	209.6	205.8	9.4	14.2	10.2	160.8	7.25	17.1	6125	2065	9	5.2	584	201	656	305	0.846
203x203x52	52	206.2	204.3	7.9	12.5	10.2	160.8	8.17	20.4	5259	1778	8.9	5.2	510	174	567	264	0.848

Appendix F –Wastewater Treatment Facility on the Barge



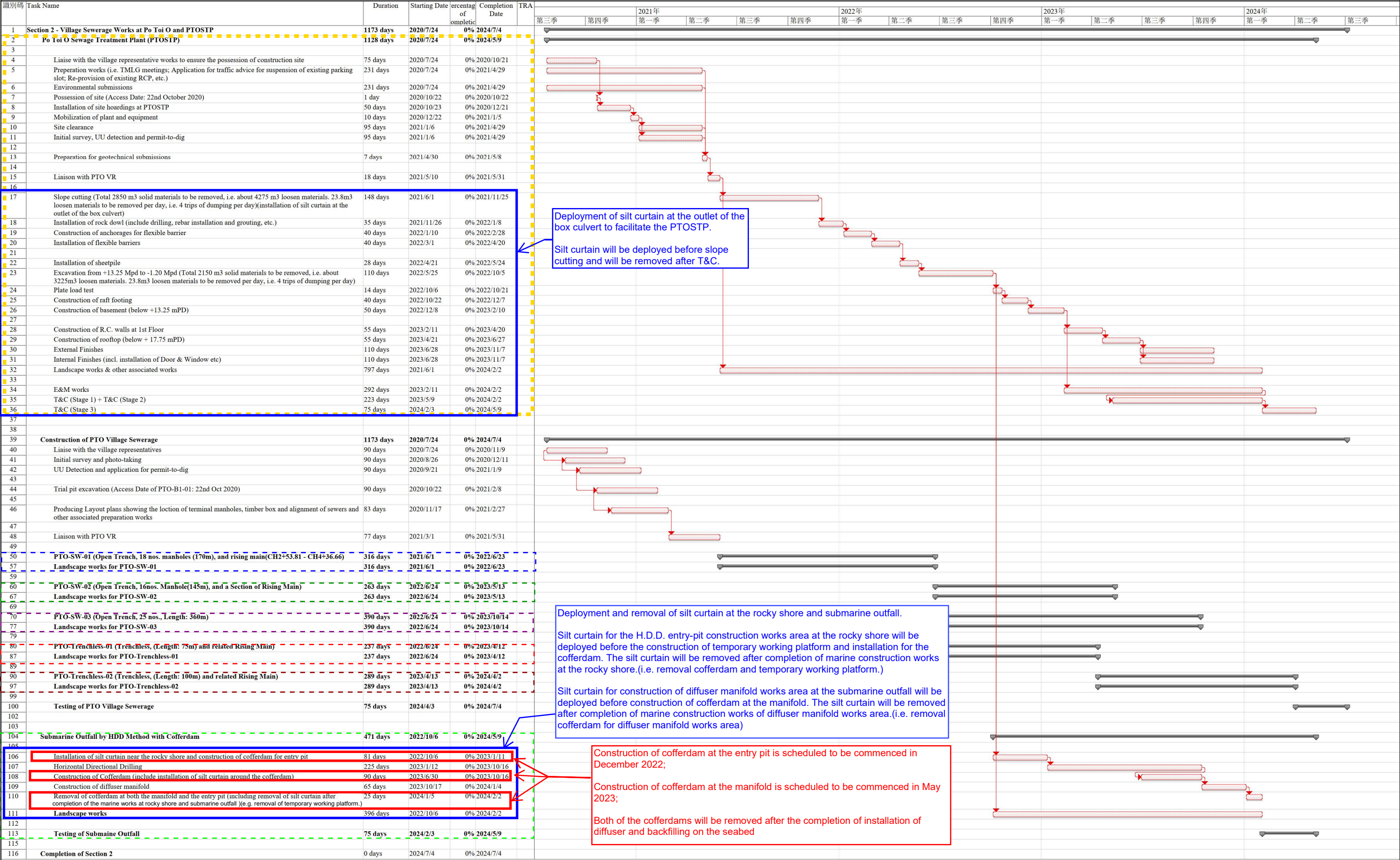
1. Firstly, muddy water will be pumped into the primary settling tank powered by 2 nos. of air compressors.

2. Subsequently, the primarily treated water will flow into the secondary settling tank for further treatment.

3. Finally, the treated water will be stored in the store tank.

Wastewater Treatment Facility on the barge

Appendix G – Works Programme for Po Toi O



Appendix H – Visual Inspection Checklists for Treated Water

Visual Inspection Checklist for Treated Water

Location: _____

Inspection Date: _____

Inspected by: _____

Checked by: _____

Item	Description	Condition		Follow-up Actions?		Remarks
		Yes	No	Yes	No	
1	Any floating debris / refuse in the treated water? 經處理後的海水中有沒有漂浮的垃圾?					
2	Turbidity in the treated water ? 經處理後的海水是否渾濁?					
3	Any debris/refuse in the water body? 水體中是否有垃圾?					
4	Others (please specify): 其他（請註明）:					

*The checklist shall be properly signed by the Contractor.