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# **METHOD STATEMENT TITLE**

Rev: A

# Predrilling works within 10m from nearest track

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### 1. Introduction (Overview of the operation/works)

This document provides an overview of the method statement for predrilling of foundation works for the area which is 10m within from the track and OHL where EDOC is also required according to the latest BUGN2023/21 (Issue/Rev:1.0). This MS would focus on the predrilling of bifurcation area.

The predrilling works will be commenced after the works areas declared as construction areas (CAs). The method statement covers first the access to the designated works area and the procedure related to predrilling with details of sub-contractor attached. It details the responsible personnel including managers, engineers and workers for executing the construction activities. Furthermore, it included the plant and equipment to be adopted and detailed set up on site. Lastly, it includes the safety and environment and quality control requirement to ensure the construction is safe and robust. Relevant drawings, job hazard analysis can be found in the appendix.

# 2. Reference Documents (Identify relevant documents by name and reference number)

- Practice Note PNAP -24
- Practice Note RC No.14
- MTRCL-New Works Design Standards Manual -Section 3-Railway Engineering
- Hong Kong Transport Services Business Unit Requirements and information for contractor
- Hong Kong Transport Services Unit Railway Safety Rules
- MTRCL Working Paper No.6-Railway Protection- Revision B-December 2022
- MTRCL Contract 1701 Oyster Bay Station and Associated Works-(S2) Scope-Vol 4 (Book 4 of 9)
   Appendix AM-Clients Rules and Procedures for Working Within or Adjacent to the Railway
- MTRCL Contract 17-1 Oyster Bay Station and Associated Works Instructions TO Tenders, and
- MTRCL Contract 1701 Oyster Bay Station and Associated Works Contract Data
- BUGN2023/21 (Issue/Rev:1.0)

### 3. Details of Sub-Contractor/Specialist Sub-Contractor

- Drilltech Geotechnical Engineering Ltd
- Lam Geotechnics Limited

### 4. Responsibilities for Activities described within Method Statement

CSHK is responsible to inspect and carry out the construction works. The following persons, as listed in the table below, will attend the specific tool-box talk and be responsible for the activities:

Company	Name	Position		
CSHK	Vincent Li	Construction Manager		
	Nana Chung	Assistant Construction Manager		
	Johnson Chun	Senior Engineer		
	David Lam	Senior Engineer		
	Man Hin Li	Assistant Engineer		
	Siu Kei Cheung	General Foreman		

### 5. **Programme and Working Hours** (Start & finish date of operation/works)

The major site works will be target to commence on May 2024 and target to be completed by Nov 24 based on the latest agreed programme. When the work area is declared Construction Area, the general working hours will be from 08:00 - 19:00 daily, from Monday to Saturday. However, it may be required to carry out works from 19:00 to 23:00 and Sunday and Public Holidays in case of essential speeding up of the working process but it will subject to the CNP application approval.



### **6. Plant, Equipment & Material** (Identify type, model and specification of MAJOR plant & equipment)

All plants and equipment will be inspected prior to the mobilization on site to ensure that they are in good working condition and comply with the current regulations.

The major plants and equipment will be deployed to carry out the works are as follow: -

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Plant / Equipment	Quantity		
Mobile Crane at South Road	1		
Drill rigs	12		
Crane Lorry	2		
Generator	3		

Manpower	Quantity
Rigger	5
Banksman	5
Skilled labour	12
Crane operator	3
Drilling rig operator & labour	12

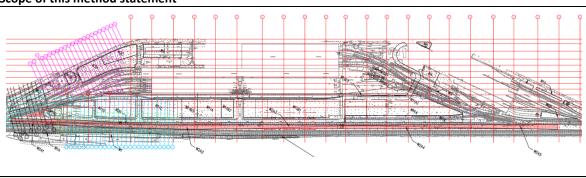
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# 7. Construction Methods / Construction Sequence Drawings

### 7.1 Preparation Work/Perquisite prior drilling

Prior commencement of pre-grouting/pre-drilling work, method statement for utility detection, site formation and site clearance should be covered and approved by separate method statements/EDOC.

Scope of this method statement



General layout for W2

Scope of predrilling under this method statement is marked as red above. Detail shall refer to appendix

### 7.2. Logistics Arrangement: Plant, labour and material

### 7.2.1 Labour Access to W2

During Mar 2024, when the vehicular access bridge is not ready for delivery, we would temporarily utilize west gate via the west level crossing to deliver the plant and material. When delivering from West gate, escort vehicle with CPs would be deployed to escort the labours. CP(T) would be stationed at the West Gate to check the vehicular height and direct the traffic and communicate with the yard master continuously. Apart from the construction vehicles, shuttle escorted by escort vehicle would be arranged to directly carry the workers from West Gate to the Container Village at W11 and W7. We would utilize the East gate once the vehicular access bridge is ready to use after May 2024. Similar safety procedure same as West Gate would be deployed.



The detail of general logistics should refer to the submitted security and traffic management plan.

At W2 bifurcation area, labour would access the working area during NPH (0800-0830,1130-1200, 1300-1330, 1730-1800 of each day) from Gate 4 to Gate A. CP(T) and WPIC would escort the workers crossing the test track and supervise the whole drilling operation by the workers. We propose to start the predrilling works prior the erection of RP fencing which is subjected to final approval from the depot. All workers are required to pass the RSI training and EDOC would need to be approved for working in the area. Nonetheless, we would hold regular workshops with RP/Yard master to go through current works within all CAs in order to identify and review any impact upon railway and/or depot operation. The rules and procedures for Railway Protection under the Railway Ordinance will be in accordance with Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers (PNAP ADV-33 / APP-24) and MTRCL working paper No.6-Railway Protection-Revision B-December 2022.

Welfare facility with drinking facilities would be provided at W2. Temporary toilets would be provided at W11 near the gate area.

#### 7.2.2 Plant and Material access to W2

Plant and material deliver to site shall be via west gate and west level crossing in the initial stage when the vehicular bridge is not ready. Vehicles will be escorted by escort car with CP(T) after enter to the depot, or from East gate when the vehicular bridge is open for use.

(Details please refer to submission "Traffic Management Plan")



(DETIALS REFER TO TRAFFIC AND SECURITY MANAGEMENT SUBMISSION)

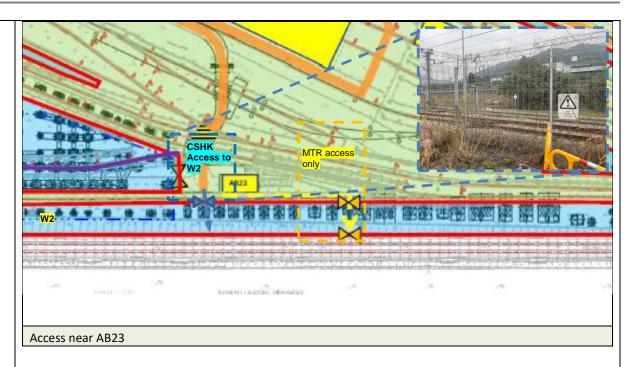
### Method 1 Delivery through MTR Wagon truck

Firstly, for delivery of drilling rigs, drilling rig would be dismantled into different parts and stored at the MTR wagon truck if aviliable. The wagon truck would deliver the dismantled parts into W2 area subjected to final depot arrangement. Labour would unload the parts manually down the wagon and assembled the drilling rigs at the respective area. EDOC to be submitted separately.

### Method 2 Manual handling through gate at AB23

For access to the western side of W2, there will be 2 gates to be set up near AB23. Designated gate will be formed for MTR only to access to main line while there is a separate gate for CSHK to deliver the dismantled parts of the drilling rig across the test tracks. The drilling rig will be assembled on site and certified by RPE. After that, the drilling rig is ready to work. Details of the construction of level crossing shall refer to the separate method statement. EDOC to be submitted separately.



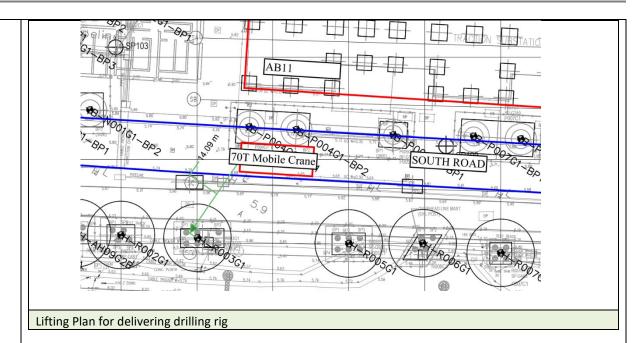


# Method 3 Lifting over test track

We may also make use 3 nights of NTH for lifting/mobilization of material/drilling rigs whereas exact dates are subjected to Depot's final approval. Mobile crane will be used at the South Road. The lifting capacity is reduced to 80% of the mobile crane. Apart from drilling rig, empty water tank and casing with hanger would be delivered to works area also by mobile crane. The LALG certificates would be provided checked prior lifting. The length of casing is limited to 6m. EDOC to be submitted separately.

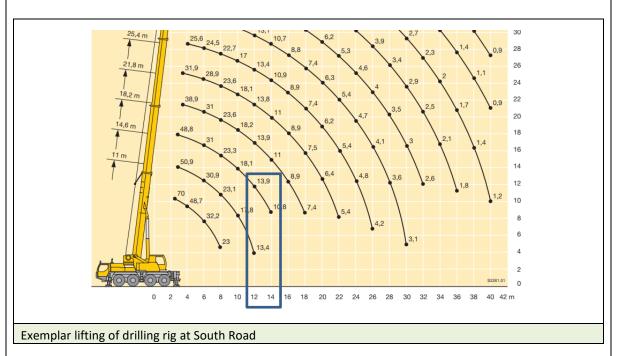
	Stub-shaft Power Take-Off			Air-cooled Diesel (Duetz)
OVERALL DIMENSIONS				
Width	42" (107 cm)	42" (107 cm)	42" (107 cm)	42" (107 cm)
Length	961/2" (244 cm)	103" (261 cm)	103" (261 cm)	961/2" (244 cm)
Height	57" (145 cm)	57" (145 cm)	57" (145 cm)	57" (145 cm)
APPROX. WEIGHT Net				
HQ3-7/8" Hyd. Head	2510 lbs (1140 Kg)	3165 lbs (1440 Kg)	3305 lbs (1500 Kg)	3230 lbs (1460 Kg)
NQ 3" Hyd. Head	2390 lbs (1086 Kg)	3045 lbs (1380 Kg)	3185 lbs (1450 Kg)	3110 lbs (1410 Kg)
For Domestic Shipment				
HQ3-7/8" Hyd. Head	2920 pounds	3575 pounds	3715 pounds	3640 pounds
NQ3" Hyd Head	2500 pounds	3460 pounds	3600 pounds	3525 pounds
For Export				
HQ3-7/8" Hyd Head	3210 lbs (1459 Kg)	3865 lbs (1755 Kg)	4005 lbs (1820 Kg)	3930 lbs (1783 Kg)
NQ3" Hyd. Head	3100 lbs (1409 Kg)	3750 lbs (1700 Kg)	3890 lbs (1765 Kg)	3815 lbs (1730 Kg)
CUBIC DISPLACEMENT Crated for Export	160 cu.ft(4.5 cu.m)	175 cu.(t(5 cu.m)	175 cu.ft(5 cu.m)	170 cu. ft(4.8 cu.m)
Claired for Export	160 cu.11(4.5 cu.m)	175 cu.ii(5 cu.m)	175 cu.ti(5 cu.m)	170 cu.II(4.8 cu.r



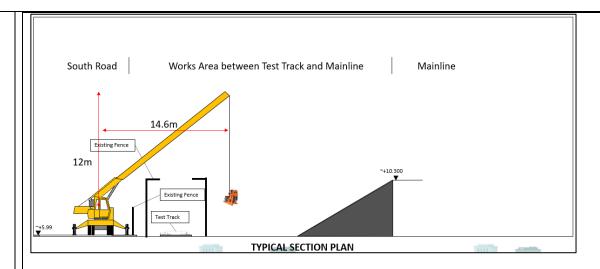


70T Crane lorry adopted at South Road Drilling Rig Weight = 1.5T; Weight of LG = 0.8T Crane lorry lifting capacity at a distance of 15m = 10.8Tx0.8 (FOS of SWL)= 8.64T > 2.3T Ok!

With the existing railway fencing, the loading radius is limited to 15m with boom length around 17m. During the lifting operation, the jib would be almost parallel to the fencing. The setup of crane shall be checked by ICE for 70T mobile crane lifting operation.







Lifting Section for delivering drilling rig

For rigging stabilization, the tiedown straps will be used to tie the drill casings with hanger together; connect the hook with anchoring point is secured (the anchoring point must be structurally sound tested and examined by a competent examiner). The jib length is 18m and lifting angle is around 40

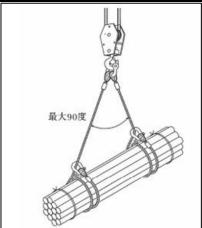
Prevent slipping or displacement of any loose objects or loads during lifting. Double wrap choker hitch method will be adopted.



Lifting point of the drilling rig





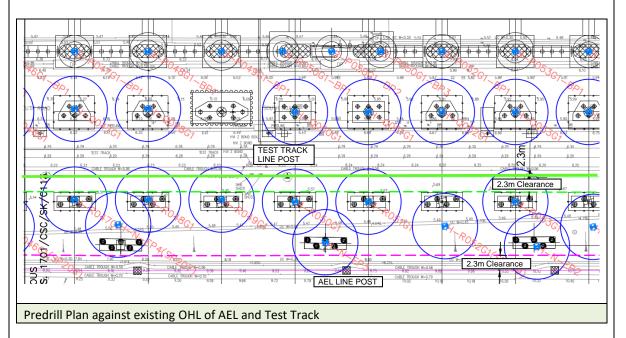


Lifting point and LG of casings

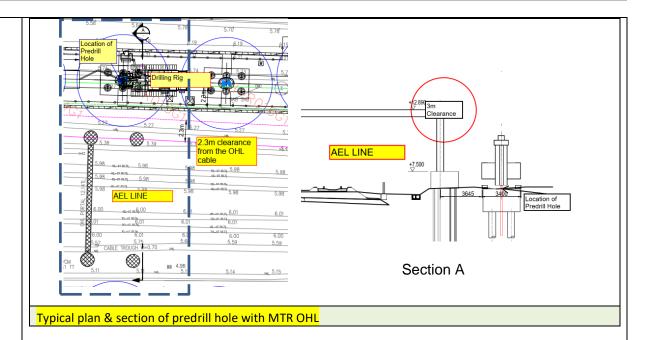
# 7.3 Method of Drilling and sequence

According to PNAP APP-18, pre-drilling should be carried out such that the toe of every pile is within 5m radius form a pre-drilling hole. That means no two drill holes shall sunk simultaneously within 10m distance. Generally working phase shall refer to Appendix D

According to these requirements, each pile group is associated with a predrill number as shown below. The full layout can be found at Appendix D which Predrills holes are marked. It also shown the relationship between the predrill holes and MTR OHL.







All pre-drilling works shall be carried out by a specialist contractor who is under the "List of Approved Suppliers of Materials and Specialist Contractors in Public Works" in the Ground Investigation Field Work Category or in the Soil and Rock Testing Category. The sequence of work shall be carried out in compliance with the BD Approved drawings. This scope comprises of land vertical drill holes together with in situ tests for the determination of foundation levels and is described in the general notes of the drawings.

### The works shall include:

- Rotary wash boring and rock coring of pre-drill holes for Pile and Instrumentation (Piezometer / Standpipe/ Inclinometer/ Magnetic Probe Extensometer)
- Standard Penetration Test

Drilling, Sampling and in-situ testing will be performed in accordance with the Material Works (M&W) requirement, Section 24: Ground Investigation.

A Geotechnical Field Technician (GFT) would be provided full-time on-site supervision on ground investigation field works. GFTs shall be provided for all working drilling rig deployed. Separate competent persons (CP(Logging)) would carry out the logging and preparation of borehole logs. CP(Supervision) would supervise on site different stages of ground investigation field according to Appendix 1 (SC-GIFW). The curriculum vitae of the GFT/CP (loggings & supervision) would be submitted separately.

During predrilling, drilling rig would mount parallel to the track direction and the casing would also be lifted in parallel to reduce falling risks to the track area. The operator raises the mast slowly by increasing the pressure of the mast hydraulic cylinder. Then the mast legs would only be fixed at the designated position and safety pin would be inserted to secure and lock the mast in vertical direction before releasing the pressure at the hydraulic jack. During lowering procedure of the mast, the operator should be gradually increasing the pressure of the hydraulic cylinder to hold the mast by which the safety pin at the backstay legs can only be removed. Then by releasing the hydraulic cylinder, The rig mast can gradually lower until it's in a horizontal position.





Step 1 Screw the lifting swivel by manual handling at casing rack end

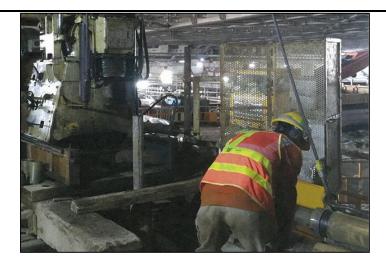


Step 2 Lifting the barrel into installed casing and hold position by pipe wretch for next drilling



Step 3: Repeat procedure of STEP 1 and Screwed into installed drilling rod by manual handing

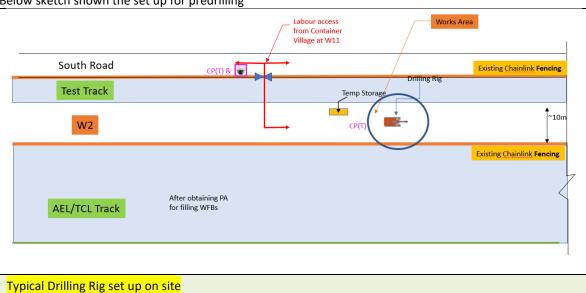




Step 4: Repeat Step 1 to 3 until touch drilling hole bottom

The operator will perform the inspection with checklist "Drill Weekly Checklist". The checklist can refer to Appendix E.

Below sketch shown the set up for predrilling



Generally, the water would be first treated and then conveyed to the Wetsep prior releasing to the nearest gullies. The drainage can refer to below:

For the full layout of water discharge, please refer to the separate method statement of discharge water.

The drill hole will be performed by rotary method using skid-mounted rotary drilling rigs and water as flushing medium. The drilling technique utilized a drill head swivel providing rotation when coupled with drill rods. The ground condition will be checked by the drilling operator, geotechnical field technician with area foreman before mobilise and unloading the drilling rig. The hydraulic feed-type drilling rig with sufficient capacity will be mounted on stable ground, enabling the rig to operate with minimum movement and thus improve the accuracy in drill hole orientation.



Workers would be briefed that no canvas shall be erected as sun shield or for any purpose on site at any time not just linking to drilling rig not allow to prevent the canvas from blowing off to other track area. Water tank and wetsep would be provided to recycle the water as much as possible. Water would be treated first at Wetsep and would then be discharged to nearest manhole and discharged finally near the box culvert. Prior approval from Depot is required to discharge into existing manhole in SHD.

When the termination level achieved, the last rock sample shall be obtained under the supervision of the MTR Representative and the depth of the drill hole shall be measured by the MTR Representative.

All the flushing water generated during drilling work will be collected and pumped to sedimentation tank for recycling and will be pumped back to the drill holes

After obtaining the last rock sample and complying with the termination requirement, Geologist shall log the drill hole information with soil and rock description. The logged information shall then be passed to the Geotechnical Engineer Representative for drill hole report preparation.

#### 7.4 Sampling

By using the rigs hydraulics, the drilling carriage is raised and the sampler is screwed and attached onto the anvil adaptor. The carriage is then lowered until the tentative sampling level. The hydraulic cylinder of the drilling rig is lowered and the drop-weight is activated, driving the sampler into the ground. Once the sampling tube has been driven to its full length, the hydraulic cylinder is activated pulling the sampler from the ground.

After retrieval of sample, casing will be drilled for the flushing cleaning of hole before next sampling. Then, sampling will be continued by successively adding drill rods between the sampler the anvil adaptor.

### 7.5 Sample Handling

All Core samples shall be stored in core boxes which shall be of sound robust timber construction and be able to withstand the weight of the cores. The Contract numbers, drill hole number, depth, date of drilling shall be clearly marked on the side, inside and outside lid of the core box with permanent ink. Rope strands shall be attached to the core box for lifting. Core boxes shall be made with rigid separating wooden slats and shall be about 1.0m long. The core boxes shall be stored off site at TY and protected with plastic cover sheet.

# 7.6 In-situ Test

### **Standard Penetration Tests**

For pre-drill hole, Standard Penetration Tests (SPT) will be commenced from 3.0 m below ground level or immediately at the base of the inspection pit and thereafter at the 2.0m intervals in the drill holes within common ground.

The tests will be carried out in accordance with BS1377:1990. The SPT hammer comprises a 63.5 kg donut hammer with automatic trip mechanism and drop height of 760mm. The results will be given on the daily site and drill hole records. The 'N' value given on the drill hole records will be the number of blows required to drive the split barrel sampler through 300mm (after completion of the seating drive). If full penetration is not achieved, the number of blows and corresponding penetration will be indicated accordingly.



### 7.7 Backfilling

Upon completion, drill hole will be backfilled with cement/bentonite grout. With no more water than is necessary to permit the grout to flow or be pumped. On completion of drilling, the drill casing will be withdrawn to the soil/rock interface. A N size drill rod, use as tremie pipe, will be placed to the end of the drill hole. The grout will be pumped into the drill hole via the tremie pipe

### 7.8 Reporting

Recovered cores will be placed in core boxes then labelled with the following information:

- Hole Number
- Box Number
- Depth range of core
- Date of drilling

Daily Site Records will be kept for all activates detailing a chronological diary of the work. Drilling records shall be kept for all drilling activities. The detail of the records kept will depend on the type of drilling works.

The recovered core will be logged by geologist approved as a Competent Person in accordance with PNAP 132, Code of Practice for Site Supervision 2009 and Technical Memorandum for Supervision Plan 2009. Details of stratification are described using the checklist for soil descriptions and the guidelines laid out in GEOGUIDE 3 "Guide to Rock and Soil Descriptions".

All cores shall be stored safely on-site during drilling and sent to lockable container at Tsing Yi for secure storage eventually.

Preliminary daily site record, in-situ test record and drill hole log will be submitted after the completion of each drill hole for Engineer's comment. A final factual fieldwork report with core boxes, incorporated with Engineer's comment will be submitted.

# **8.** | **Safety** (Risk Assessments)

Risk Assessment/Hazard log attached in Appendix A has been prepared for all general activities. Specific safety procedures and precautions have been developed for all site operatives to follow. The Construction Team Leader together with the Safety Department, will supervise the implementation and make adjustment according to the actual site operations, in order to maintain a safe and amicable working environment.

#### **General Site Safety**

With reference to the Project Safety Plan, the following items need to be instituted through the course of the works described within this method statement. All workers shall receive Railway Safety Induction training and follow Railway Safety Rules (RSR) inside working in the non-Construction Area.

The contractor's person-in-charge (WPIC) shall be present at the work site at all times of work. The responsible person shall ensure that all sources of ignition are removed, all power supplies are isolated, and the work site is in a safe condition before leaving the site. Individual WPIC would be arranged for each works area.



CP(T) or CP (NT) shall be full time looking after the railway safety and report to the SHD Depot Control Centre daily before and after the construction works. Trucks and workers shall be restricted to use a designated route as delivery and worker's pedestrian route within the site which shall be further agreed with the SHD Manager / YM. Details shall refer to separate Logistics and Security management plan.

No construction works shall be carried out within 3.0m from the nearest railway track alignment.

No storage of additional fuel for the rigs/plants is allowed. Fire Marsh would be provided for hot works such as welding if required.

Proper personal protective equipment shall be employed at all times of works.

#### **Risk Assessment**

All the potential hazards, consequences and mitigations will be analysed in the risk assessment attached in the Appendix A.

# **9. Environmental** (Environmental aspect & impact identification as well as mitigation measures)

- General works shall be carried out during normal hours from 0800 to 1900. No works will be carried out after 1900 on weekdays, Sundays and public holiday without approval construction noise permit.
- All chemicals will be placed on drip tray.
- Only regulated NRMM with approved NRMM label to be used on site.
- Sand bags or bund wall shall be erected around the drilling rigs to prevent the excessive water runoff to the surrounding area.
- ULSD diesel will be used in all PME.
- The works shall follow relevant mitigation measures as required under the Environmental Permit (EP) / EP submission and *Contractor's* Environmental Management Plan (EMP)
- QMPE plant to be used if applicable
- Plastic sheet or similar thing must not be erected as sun-shield on site.
- Sun-shield umbrella must be used with 3 ropes fixed, and the sun shield umbrella will be removed if not attended.

# **10.** | Quality Control (Inspection and Test Plan including hold points)

Refer to Appendix B for Inspection and Test Plan.

To ensure the attainment of the required standard of works, the methods of working and the required works standards / acceptance criteria are defined in the method statement, inspection & test plans, and are communicated to relevant staff and workers carrying out the works. Day to day routine inspections of the works will be carried out by the Construction Team Leader, Site Engineers and Foreman as appropriate, to ensure that all works are performed following the requirements of these documents.

Specific quality checks shall be carried out in accordance with the approved Inspection & Test Plan with "Hold Points" at critical elements for confirmation of compliance before proceeding further.

Request for Inspection and Survey Check (RISC) shall be issued to the RSS following inspection of the works by the CSHK's project team. The Inspection & Test Plan for the works (Appendix B) will identify all Hold Points and Witness Points.



Following the Inspection & Test carried out, inspection and / or test records are to be prepared to indicate whether the specified requirements have been met. Records of Inspection and testing will be maintained and kept available for inspection and final handover as appropriate.

# **11. Appendices** (Identify and include additional information in the submission package)

Appendix A - Risk Assessment

Appendix B - Inspection and Test Plan (ITP)

Appendix C - Catalogue for Predrill Equipment

Appendix D – Drawings with marked up

Appendix E – Emergency Contact List

Appendix F - Drill Weekly Checklist