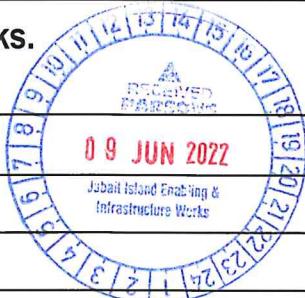


**PROJECT: Jubail Island Development Infrastructure Works.**

**New Collective Contract - Package -2.**

**METHOD STATEMENT SUBMITTAL**



SUBMITTAL NO: DTF/P2/0008

Rev.00

Date: 08/06/2022

MS: MS/JID/P2/ELE/003

PREVIOUS SUBMITTAL STATUS: N/A.

We hereby submit the following for your approval:

**Subject: Method Statement for the Installation of 12 Nos- 225mm OD HDPE Electrical Duct Pipes Under Channel By Horizontal Directional Drilling Works.**

Attached Documents:

1. Method Statement (MS)
2. Inspection Test Plan (ITP)
3. Check Sheet
4. Risk Assessment (RA)

Follow Safety comments mentioned inside the Submittal . Cable pulling ropes to be provided for space ducts . Entry and exit Remarks: Pit location shall be as per 35m- 50m away from high tide point for main channel crossing .

**FOR CONTRACTOR**

Reviewed By:

Name: Eng. Shadi Mohamed

TITLE: Technical Manager



SIGNATURE:

DATE:

**ENGINEER'S REPLY:**

- APPROVED
- APPROVED AS NOTED
- REVISE AND SUBMIT
- REJECTED



**APPROVED BY:**

## **'SUBMITTAL REVIEW COMMENTS**

JUBAIL ISLAND DEVELOPMENT INTERCHANGE WORKS PACKAGE-1B		CONTRACTOR: GULF CONTRACTORS LLC	
SUBMITTAL TITLE: Method Statement for installation of 12Nos. – 225mm OD HDPE Electrical Duct		SUBMITTAL REF: DTF/P2/0008_Rev.00	
		MS REF: MS/JID/P2/ELE/003	
S. No.	Spec. Div/Sec/Clause No. Ref.	PIL Comments	Contractor's Response
1	MS/JID/P2/ELE/003. Rev.00	<p><b>General Comments:</b> Review of this document shall not relieve the Contractor from his duties, responsibilities and contractual obligations to whatever discrepancies, errors or inaccuracies found in this document.</p> <p>This Submittal is considered as a live document which will be revised when necessary to comply with current site condition.</p>	
2	MS/JID/P2/ELE/003. Rev.00	<p><b>Drawing References and Standard:</b> Approved Shop Drawing shall be attached in this submittal along with References and Standards.</p>	
3	MS/JID/P2/ELE/003. Rev.00	<p><b>Tools and Equipment's:</b> Quantity of each item shall be mentioned.</p>	
4	MS/JID/P2/ELE/003. Rev.00	<p><b>Personnel and Responsibilities:</b> HSE roles and responsibilities to be identified. HSE Manager's roles and responsibilities to be identified.</p>	
5	MS/JID/P2/ELE/003. Rev.00	<p><b>Refer to the Comments mentioned on</b> <b>Method Statement page Nos. 4,17</b> <b>ITP page Nos. 1, 2</b> <b>EHS page 6, 8, 10, 12,</b></p>	
6	MS/JID/P2/ELE/003. Rev.00	Pulling ropes to be provided for spare ducts	
7	MS/JID/P2/ELE/003. Rev.00	Pit locations shall be about 35m-50m away from high tide point for main channel crossing.	

Reviewed by Assistant Resident Engineer/Resident Engineer  
**PARSONS**

(Signature & Date)

**Note:** This form shall remain attached to the submittal throughout its review and shall be kept as a permanent record.

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# METHOD STATEMENT

## FOR THE INSTALLATION OF 12nos- 225mm OD HDPE ELECTRICAL DUCT PIPES UNDER CHANNEL - BY HORIZONTAL DIRECTIONAL DRILLING WORKS



DTF No.	0008
DATE:	08-06-22

To be approved by PM

Revision Schedule								
Issue Date	Rev.	Revision Details	Prepared By	Sign	Reviewed By	Sign	Approved By	Sign
08/06/2022	0	-	M. Sharafi		Shadi		A. Attar	

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## 1. INTRODUCTION

The project involves the installation of 12nos- 225mm diameter HDPE duct pipes (bundled), as part of **JUBAIL INFRASTRUCTURE WORKS (PACKAGE 2) FROM JUBAIL SOUTH TO SAADIYAT ISLAND** Project.

The purpose of this method statement is to list the details of HDD operations involved in various sizes of pipeline utility crossing construction in order to reflect the basic methodology of the planned pipeline installation and possible interference with surrounding structures and third party activities.

### Definitions:

Client : Abu Dhabi Sewerage Services Company (ADSSE) *ADPC*  
 Contractor : Gulf Contractors (GCC) *ADSSE*  
 HDD Subcontractor : Tatco International Boring & Installation, LLC (TATCO) *KML*

### Abbreviations

DA	Drilling Assembly
HDD	Horizontal Directional Drilling
HSE	Health, Safety & Environment
ROP	Rate of Penetration
PPA	Pipe Pull in Assembly

### 1.1 Scope of Works

One of the key components of the project is the channel crossing involved where Horizontal Directional Drilling technology shall be used to install 12nos-225mm diameter (bundled) of HDPE duct pipe section which specification is yet to be provided by the Contractor during the engineering phase and prior to the construction of HDD works at Jubail South to Sadiyat Island, Abu Dhabi UAE.

### 1.2 Reference Documents

- |   |                                   |                              |
|---|-----------------------------------|------------------------------|
| a | HDD Designed Profile              | To Follow                    |
| b | Task Risk Assessment              | Attached                     |
| c | Inspection & Test Plan            | To Follow                    |
| d | Geotechnical Investigation Report | To be provided by Contractor |

### 1.3 Summary of Execution

The following sequence of activities has been summarized for the site preparation, drilling and installation works involved in the present HDD pipeline crossing construction under channel regardless of responsibility distribution:

- Construct HDD work area and site access road
- Mobilize HDD Rig spread and auxiliary equipment to work area and set up at the HDD location (HDD-1)
- Prepare and set out survey system at entry section and at exit area.

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- d. Calibration of steering tools ✓
- e. Execute the pilot hole with 6 3/4" down hole motor considering hard strata and 9 7/8" drill bit to punch out at designed exit point. ✓
- f. Confirm exit position and exit angle and break off DA string ✓
- g. Connect 18" reaming tool and conduct borehole reaming pass in reverse mode until reamer emerges at exit point. ✓
- h. Disconnect reaming tool and trip drill string through borehole back to exit point. ✓
- i. Repeat steps (g) and (h) above with 24" reaming tool. ✓
- j. Repeat steps (g) and (h) above with 30" reaming tool. ✓
- k. Repeat steps (g) and (h) above with 36" reaming tool. ✓
- l. Repeat steps (g) and (h) above with 42" reaming tool. ✓
- m. Repeat steps (g) and (h) above with 48" reaming tool. ✓
- n. Perform borehole cleaning and calibration passes with 42" reaming tool as required. ✓
- o. Disconnect reaming tool and hook-up the 12nos- 225 mm OD HDPE duct pipe section. ✓
- p. Place the 12nos- 225 mm OD HDPE duct pipe (bundled) section on roller supports, aligned with the HDD borehole ✓
- q. Connect the 12nos- 225mm OD pre-fabricated HDPE pipe (bundled) section to the HDD rig via PPA, pull head and the drill string. ✓
- r. Install the 12nos- 225mm OD HDPE pipe (bundled) sections by pulling inside the borehole until pull head reaches the pre-defined position at HDD entry pit (at rig side) allowing for subsequent tie-in operations to commence. ✓
- s. Dismantle the HDD machine from work area. ✓
- t. Re-instate site area as required. ✓
- u. Relocate the machine to next line (HDD-02) at the same location for the HDD works intended for another 12nos - 225mm OD HDPE (bundled) electrical duct. ✓
- v. Repeat steps (c) to (t) above for HDD -2. ✓
- w. Mobilize/ Relocate all the HDD equipment to the next location (LOCATION-2) ✓
- x. Repeat the same process from step (a) to (v) for LOCATION-2 and LOCATION-3 ✓
- y. Upon completion of the HDD execution at location-3, dismantle and demobilize all HDD equipment from work area. ✓
- z. Re-instate site area as required. ✓

#### 1.4 Site Preparation

Prior to mobilization of HDD related equipment to the HDD site location the site will be prepared to enable delivery, set-up and operation of all equipment with maximum efficiency and safety during the execution of the works.

Without the consideration of the responsibility distribution issues, the task of site preparation will tackle the following issues

- Site Inspection and marking of relevant points ✓
- Stabilization of the HDD rig location in case necessary ✓
- Preparation of stringing area for HDD pipeline section if required ✓
- Provision of supply lines for water, communications, electricity ✓
- Installation of rig anchor for HDD drilling rig according to Subcontractor's design ✓

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## 1.5 Site Inspection

It is expected that the construction site has been pre-surveyed by Contractor at both sides of the channel crossing prior to implementation of any other activities. Furthermore, all nearby underground services shall be located and marked; their corresponding elevation difference from ground level / seabed levels shall be defined in cooperation with the affected service operator or owner and all data shall be recorded in detail and provided to Subcontractor.

The area provided for HDD equipment set up around the intended HDD entry point shall be of sufficient size to accommodate all the required equipment and site facilities. The minimum size of the rig area shall be 40m x 60m. The detailed layout will be provided by the HDD Subcontractor prior to site preparation.

Exact entry and exit points intended HDD borehole shall be clearly marked and exact coordinates shall be recorded and submitted to HDD Subcontractor prior to the arrival of equipment on site. Exact survey requirements shall be marked on a drawing for each site location completed.

Structure for anchoring is likewise necessary for clenching the drilling rig and resisting the forces generated throughout the drilling process, particularly during pullback of the HDD pipeline section. The rig anchor is normally made of sheet piles or pipes buried in the ground. The detailed design and specification of the rig anchor, which will be based on calculations of pull loads expected for the drilling operations, shall be provided by HDD Subcontractor prior to site set up.

## 1.6 Manpower & Responsibilities

### A EPC Contractor

#### ➤ Project Manager /

shall identify resource and plant level requirements, General superintend the day to day site activities, Coordinate forward planning, Generally review monitor and report on progress, Liaise with consultants, Attend regular meetings with consultants, Be fully aware of contract requirements, Ensure that health safety and environment policy is adequately observed, Maintain financial awareness, Ensure site staffs execute the contract as required by the Authorities and in accordance with the specification, Ensure timely submissions for approval as required by the contract, Ensure all procedures as required by the contract are followed.

such as:-

- Site safety and security
- Fire prevention
- Health and hygiene
- Environmental matters
- Housekeeping
- EHS implementation and enforcement

#### ➤ Project HSE Manager /

The Project EHS Manager along with the Site EHS Personnel takes the following responsibilities:

- Monitoring the implementation of the EHS program.
- Conduct periodical inspection on site, and direct appropriate corrective action.

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- Conduct the investigation in case of accidents, incidents and near misses, and forward the reports to GCC and COMPANY Management and-or concerned authorities.
- Prepare inspection reports for the Project Manager to review and to take action.

➤ **Construction Manager /**

shall be responsible for construction works and equipment distribution.

such as:-

- Ensure all procedures as required by the contract are followed.
- Observe procedures as required by the contract and develop further procedures with Consultant.
- Carry out Site Weekly / Monthly Work progress meetings.
- Involve in resolution of potential areas of conflict.
- Will co-ordinate work activities among work teams on site especially in view of Health, Safety Environment.
- Will co-ordinate with Project Engineers a full-approved (MSRA) Method Statement & Risk Assessment to establish working Methods; explaining the sequence of operations to outline potential hazards at each stage, and indicates precautions to be undertaken.

➤ **Project Engineer /**

- Competent person (Civil) shall ensure that all works are carried out according to approved Method Statement and approved shop drawings (if required). He shall direct
- The Surveyor for the setting out lines & levels in concurrence from
- The Construction Manager, He is responsible for the construction
- Works shall delegate a named site supervisor who shall ensure that this procedure is fully implemented including documentation till completion.

such as:-

- Enforce adherence to Safe Work procedures and Risk assessment control measures.
- Instruct employees working under them on safety rules, regulations, standards. And to the Job performers for the PTW System.
- Assist/ conducts tool box talks topics which was given by Health and Safety Officer.
- Report all incidents to EHS dept.

➤ **The QA/QC Engineer /**

- shall ensure that platforms erected for inspection have a green tag prior to use
- shall consult with HSE engineer and obtain approval prior to carrying out Inspections in confined areas. Inspections.
- shall be carried out in line with Risk Assessments related to that activity.
- shall ensure the work is carried out according to the requirement of this Method Statement. He shall ensure that all ITP requirements are met and shall conduct surveillance inspection as the work is in progress.

➤ **Surveyor /**

- shall ensure that all surveying equipment being used are calibrated and having valid calibration certificate and shall carry out the setting out for the level and location.

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➤ **Manpower**

- they are responsible for executing site works,
- they shall execute the works as instructed by engineer.
- Attend tool box talk, special briefings regularly and co-operate in HSE related issues with their co-workers.
- Must undergo site EHS orientations before start of the work.
- Shall not do any work without work instruction from the concerned supervisor.

**B HDD Sub-Contractor (TATCO)**

- Site Manager / Site Superintendent - Responsible for overall project duration, proper implementation of project procedures, manpower, equipment and other resources to deliver the project with quality and client satisfaction. Shall be at the site during HDD operation is in progress.
- HSE Engineer – Shall coordinate and work in close coordination with the Contractor's HSE Engineer. Shall ensure that all HSE requirements as provided by the Contractor shall be properly implemented at site to avoid damages to the work, environment, properties and public in totality.
- Construction Manager - In charge on supervision for proper procedure from the start to finish of the project. Coordinates to the concern department or person when any job site problem may occur to avoid cause of delay. To ensure the project quality he must be on site during HDD operation.
- Driller / Rig Operator - Constant communication to the site superintendent and to Guidance in-charge. Responsible for the timely checking of the rig to ensure safe execution. Coordinates with the Site Superintendent and to the Construction Manager regarding technical issues while in the process of execution.
- Guidance In-charge - In charge of guidance and monitoring the alignment, inclination, azimuth, and depth of drilling to be able to drill the approved drilling path.

**2. SITE MOBILIZATION & SET UP**

Arrangement of all related drilling equipments on site location require a work site area of approximately 2400 square meters. The drilling rig mainframe will be positioned on the designated drill centerline of the crossing. The position of entry to start drilling will have been previously surveyed and approved. Positioning of the drilling rig will enable the support equipment to be in its proper location.

The equipment required for execution of construction works involved in drilling and installation of the product pipe section can be mobilized to site by HDD Subcontractor as soon as the site preparation has been completed as described above.

The provided scope of equipment includes as a minimum but is not limited to the following listed items (HDD core equipment):

➤ <b>Drilling Rig:</b>	<b>HK 250T</b>	Manufacturer : Herrenknecht
		Year Manufactured : 2005
		Max. Pull force : 2500 kN

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- Hydraulic power pack and control cabin
- Mixing and cleaning systems for generation and recycling of the drilling fluid
- High pressure pump for transfer of drilling fluid to the drilling tools down hole
- Drill pipes and drilling tools including drill bits, reamers, steering tools etc.
- Stores and cleaning tanks
- Spare parts and workshop facilities

The volume of items to be mobilized to construction site will include all consumables required for the drilling process, secondary machinery and vehicles required for support of the drilling process (i.e. trucks, excavator, crane etc.), site storage facilities, fuel and lubricants for all equipment in use and other miscellaneous parts and items.

The detailed order of equipment mobilization to site and the final layout will be chosen in accordance with the specific requirements of the project and with the status of preparatory works taken into consideration. In any case the HDD drilling rig is the key item of the operation should be placed on site first and all other equipment will be arranged around the rig in most efficient way (see Figure 1: Typical Site Set up layout). After a site inspection has been conducted at both rig side and pipe side, a detailed equipment layout is prepared for rig side.

After all of these set up has been taken into consideration, the rig will be anchored to the ground as appropriate in order to provide for a load proof connection able to sustain the required pulling force which reflects the maximum output of the chosen HDD rig. All other equipments will be placed in accordance with the approved equipment layout / set up plan.

General Rig up operation is considered complete when all the required plant had been positioned enabling the hook up and connection of hydraulic, electrical and fluid lines and the establishment of mud containment pit with its required cleaning systems.

A period of 3-5 days will be required for bringing all the related plant on site. During this period survey requirements for the drilling activities will also have been mobilized.



Figure 1: Typical Site Set up layout

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### 3. SURVEY TOOLS

Survey preparation activities will commence even as rig up operations are being undertaken. Several survey systems have been considered for the drilling works. However, both Para Track 2 system and TK tracker systems (ref. to Appendix 1) has been chosen depending upon the suitability of the actual site condition. option for the present project.

Para Track 2 system uses a very low amperage AC current to create a magnetic field for independent verification of tool positioning. AC guide wire signals travel deeper and are stronger, enabling greater accuracy of bore control at depth.

This survey system will provide real time data as pilot hole drilling progresses. The down hole survey probe positioned several meters behind the drill head transmits continuous data to the surface through a hard wire connection. All data from the downhole survey system terminates in the drillers control cabin and is processed by the pre-installed interface, computer and software package monitored by the downhole surveyor in charge.

Likewise, TK Tracker system is equally a suitable option for the present project especially for the minor crossings. This survey system is available in house with Subcontractor and can be utilized at any time during the project in case the HDD supervisor in charge considers this as required.

This survey system will provide real time data as pilot hole drilling progresses. The down hole survey probe positioned several meters behind the drill head transmits continuous data to the surface through a hard wire connection. All data from the downhole survey system is recorded and monitored by the downhole surveyor in charge.

The requirement for directional changes to the drill bit configuration will be advised by the surveyor on shift and relayed to the driller who, using his display monitor, will orient the drill head to the required offset position. Repositioning of the drill head will be required for directional changes for approximately 20 – 30% of each joint drilled. The remaining length of each drill rod will be progressed in a full rotational mode.

### 4. PILOT HOLE DRILLING

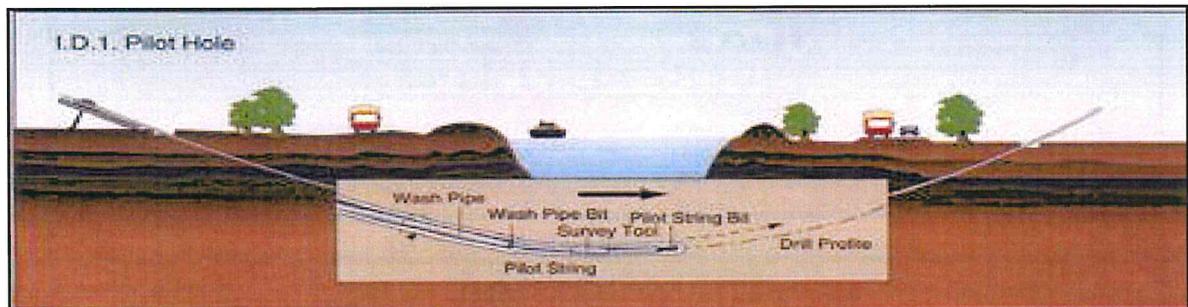


Figure 2: Sample Illustration of typical Pilot Hole drilling

The determination of the type of drilling tools to be deployed depends on the ground condition information previously supplied by the Contractor and the formations encountered on site.

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Soft formations will require a jetting system to be used whereas harder type strata will require the use of a drill motor to drive a drill bit. Whichever system is used drilling mud pumped from the surface through the drill string will be utilized either as a direct cutting jet or to drive the internal spiral stator of the motor.

The drilling assembly (DA) will comprise the non-magnetic drill collars, survey probe, drill bit and motor or jet sub. The use of non-magnetic drill collars offers the probe a neutralized magnetic environment spaced clear of the drill bit and standard drill pipe being attached behind as drilling progresses.

Directional changes of the drill head is achieved by the inclusion of a bent sub or housing contained within the drill assembly.

It is to be noted that the alignment of the bend in relation to the probe must have been accurately set on the surface prior to the assembly of the DA and start of drilling.

The orientation of the bend will always be known through the drillers console as the drilling progresses allowing the driller to correct as required.

Drilling process will progress under the direction of the down hole surveyor and the driller following the pre determined azimuth and inclination requirements achieving the designed profile. With each drill pipe inserted mud pumping will cease allowing stability to the probe, a survey taken and data plotting. Pull through and connection of the survey wire will be made ensuring the electrical link between down hole probe and surface survey package is maintained.

Through all stages of the pilot hole drilling fluid will be pumped to ensure maintenance of appropriate penetration and better hole cleaning is realized.

All the equipment associated with the pilot hole process will be detached from the drill string when the drill head exits from designated ground point. Excluding the survey system, the drill pipe now on site will maintain its position from entry point to exit point in preparation of the reaming phases.

## 5. REAMING PROCESS

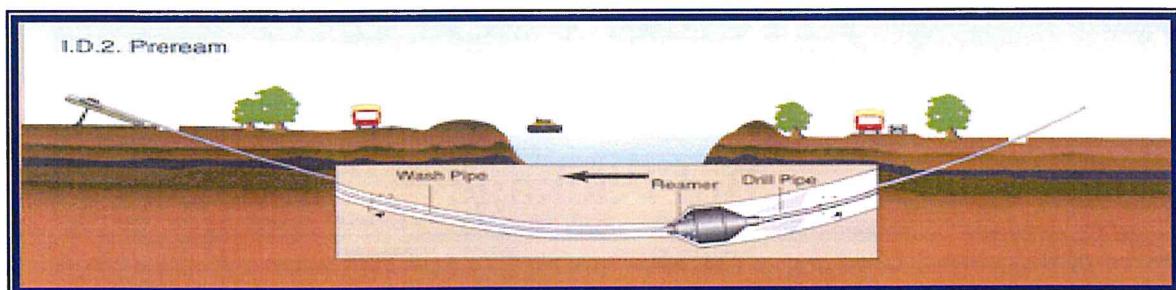


Figure 3: Sample Illustration of typical Pre-Reaming

The type of equipment and the reaming stages after completion of pilot hole will be dependent on the expected ground condition. Reamers differ in designs in relation to the ground strength however the utilization and staging will remain similar for all types of ground condition.

Achievement of good penetration rates together with effective hole cleaning as the ground formation is broken down is considered a main requirement in the staging and sequence of the hole enlargement. Quality of the ground formation is also a major factor in staging the increase of the follow up reamer unit to be run.

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High volume of drilling fluid will be pumped in all the reaming phases to ensure maintenance of good annular velocity while quantities are sufficient for transporting the solids out of the hole. All reamer units are attached at the exit side and pulled towards the rig side location. Drill pipes are likewise attached at the exit side behind the reamer as each pipe is removed from the drill rig floor.

Emergence of the reamer at the rig side concludes the reaming phase allowing the next unit to be attached and pulled through. The drill pipe is continually re-attached in each reaming phase and kept in the reamed hole after the completion of each pass. In case the reamer failed to progress as expected then the same reamer unit may be re-run to further improve the quality of the hole.

The reaming procedure will be repeated with different reamers of increasing size until the final borehole diameter required for installation of the product pipe string has been achieved.

Regardless of the reaming tools to be utilized, the stages of reamer tool sizing for the following sizes of pipelines will be as follows:

Reaming Stage	12nos- 225mm OD HDPE Pipe
Ream stage 1	18" reamer
Ream stage 2	24" reamer
Ream stage 3	30" reamer
Ream stage 4	36" reamer
Ream stage 5	42" reamer
Ream stage 6	48" reamer

It is however noted that reaming tools and the tool sizing specified above will only be finalized upon assessing the actual behavior of the soil formation.

Once the final borehole diameter required has been achieved, a series of cleaning passes will be carried out to remove any debris left in the hole. The number of cleaning passes on average would be one (1) however some other drilling may require more depending on the ground formation. In extremely soft formations where reamer units can sink under their own weight the exclusion of cleaning passes can be considered as beneficial.

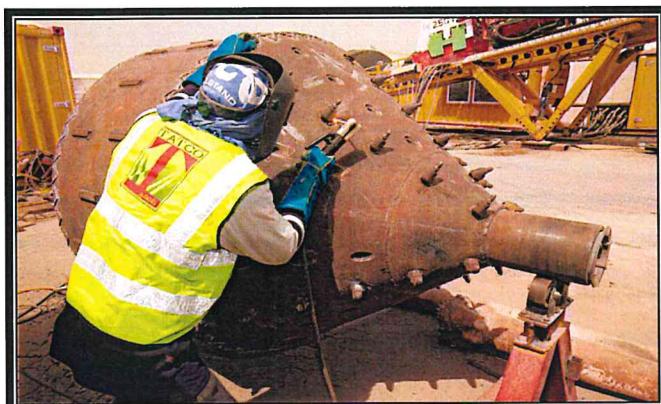


Figure 4: Sample Image of Barrel Reamer

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## 6. PIPELINE RECEIPT

### 6.1 Communications

It is too important to establish communications between the supervisors in charges at both entry and exit sides prior to commencing of any work. These communications remain in place all the way through the execution of the works.

A record of the entry-exit communications must be kept and maintained by the Supervisors and same must be noted in the HDD logs.

The following are the communications etiquette for works held at exit side where there is an interface with the entry side operations:

- The HDD supervisor has to acknowledge and advise of the current status of the work on the exit side. The supervisor has to advise whether it is or it is not suitable for pullback operations to commence.
- During pullback operations, the HDD Supervisor in charge at exit / pipe side shall:
  - Advise the drilling superintendent at entry/ rig side of the readiness of the pipeline and the intention to begin pulling of the product pipeline into the borehole.
  - Start any works involving the pulling process only upon receiving a clear and positive acknowledgement from the drilling Superintendent at the entry / rig side.
  - Advise the drilling superintendent at the exit side on completion of each activity step.

Prior to commencing of pullback operation, a satisfactory check of communication facilities shall be performed and completed. It shall be conducted between all people involved in the operation.

Operations will not commence before a satisfactory check of communication facilities has been completed between all people involved. Upon loss of communications from any party and considering the accessibility of the work location; all operations may continue but the subcontractor ensures quick re-establishment of the communication facilities for safety reasons.

Radio using frequencies will be the primary means of communications during operations.

As a secondary option and back up to the radio communications, mobile phones can be used. Mobile phone can also be used during an emergency or where problems of communication arise in the course of the execution works.

### 6.2 Fabrication & Positioning of Pipeline section

Subcontractor shall receive the specified diameter of pipe section from the Contractor in the position specified exit area as per pipe string alignment plan being part of the overall project design agreed between all parties involved.

The pipeline section shall be fitted with Pipeline Pulling Assembly (PPA) consisting of a HDD pull head, swivel, barrel reamer and several shackles / multi links as required.

Pipeline pulling operation can be initiated upon completion of the final clean passes; given that all required preparation including alignment and final inspection of the steel pipeline section have been finished.

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### 6.3 Connecting the Pipeline to the Drilling Rig

The pre-fabricated and tested pipe sections consisting of 12nos-225mm OD HDPE bundled pipe will be:

- Placed on roller supports at pipe side and aligned in line with the HDD borehole as per design
- Connected to the HDD rig via the Pipeline Pulling Assembly (PPA) and the drill string
- Supported by roller cradles and lifting equipment within the overbend section at borehole exit
- Free and open at the pipe side tail end

After the final borehole cleaning pass and alignment of 12nos- 225mm OD HDPE bundled pipe sections, the Pipeline Pulling Assembly (PPA), consisting of a barrel reamer, a swivel and the pull head which is welded on to the pipeline section will be assembled and hooked up.

The assembly of the PPA, hook-up of 12nos- 225mm OD HDPE bundled pipe sections and the connection between PPA and the drill string shall be done by qualified HDD personnel with assistance for lifting, stabilization, and alignment of all components involved using lifting equipment and roller cradles at the HDD work pad. During those operations support for alignment of the drill string with PPA might be required from pipe side in which case the supervisors in charge on both rig side and pipe side will coordinate the activities via radio communication.

To ensure that the order of activities involved in this stage of the project will run smooth and with minimum risk for all participants a briefing shall be conducted between all parties involved prior work commencement in order to introduce each particular work step to the HDD team both at rig side and at pipe side as well as to any Contractor or third party personnel engaged in the operations and to enable improvement / adjustment of the procedure details in case of corresponding requests or suggestions.

## 7. PIPELINE PULLBACK PROCESS

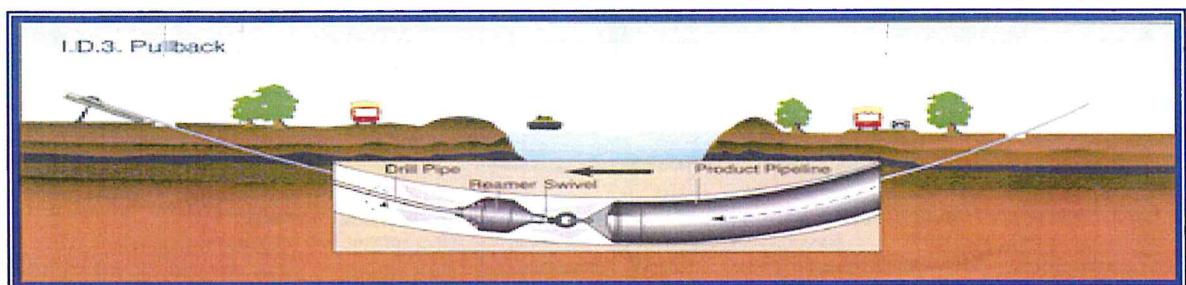


Figure 5: Sample Illustration of typical Pipe Pullback

Fabrication and testing of pipelines must be underway during all stages of the drilling operations. To avoid delays and the risk of leaving the hole open, fabrication of pipelines and its placement on rollers or on the ground with the aid of side booms have to be completed well in advance. A pre-fabricated pulling head will have been welded to the lead end of the pipeline with pulling eye attachment.

The pull in assembly will consist of drill pipe, barrel, swivel and pre-fabricated pulling head which will be attached to the HDD pipeline. The reamer during pull back operations enables cleaning of the hole in the event of collapse in sections of the hole. The drill pipe connected to the reamer also injects fresh drilling fluid ahead of the pipeline as the pull back progresses.

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Pipeline section shall be properly aligned with the HDD borehole before the pullback operation commences. Pipeline Installation will be considered complete when the pulling head emerge from the borehole at the entry point and has reached a suitable position where it can be removed, allowing ease of access for the ongoing works to proceed. Completion of pipe pull back will allow demobilization of all the drilling equipment both on the rig side and pipe side locations.

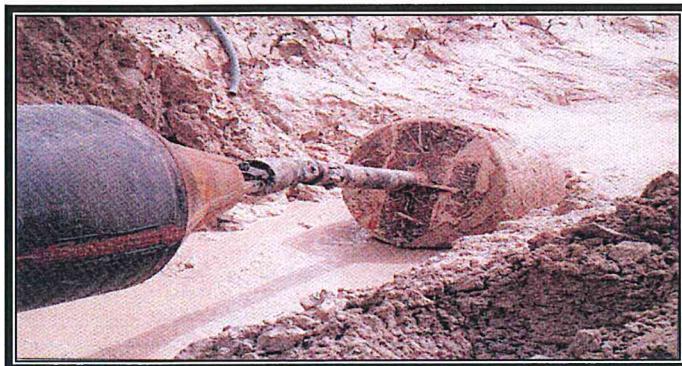


Figure 6: Pipeline Pullback

## 8. DRILLING LOGS

During all stages of the pilot hole drilling, reaming, hole cleaning and pipeline installation the driller will record all noted operational functions. The driller's records are independent to the survey data and information recorded by the down hole surveyor on site. The data recorded by the on-shift driller is considered the definitive log not only for actual drilling activities but also general operational activities with regard to stoppages and delays to the works (refer to Appendix-06)

The driller's logs maybe viewed in the drill cab but must not be removed unless permission is given by the Drilling Superintendent and / or Project Manager as those logs contain crucial data required for progressing operations.

Outlined are the various operational points which are recorded for each drill pipe installed and removed from the hole the data recorded forms the basis for the ongoing works with regard to mud mixing, tooling choice and borehole condition:

- Drill pipe number and length
- Start Time
- Finish Time
- Push and Pull Forces - psi
- Rotary / Torque - psi
- Pumping Volume –L / min
- Pump Pressure - psi
- Time Per Joint
- Comments - general on drilling conditions, stoppages etc.

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## 9. CONTROL AND USAGE OF DRILLING FLUID

### 9.1 Usage and Control

During all phases of pilot hole drilling, reaming, hole cleaning and pullback drilling fluid will be circulated.

The drilling fluid is previously mixed on the surface before being pumped down through a high pressure pumps. The flow range of the drilling fluid will be adjustable depending on the tooling configuration of the particular down hole tool in use and on the actual soil parameters and formation strength as well.

During pilot hole drilling process, the mud pumped down hole will return to the surface and will be held in the mud pit at the entry point. This drilling fluid will then be transferred to the mud cleaning system through an electrical submersible slurry pump. The fluid will be separated from the cut solids of sand and silt by means of a multi screened cleaning system (shaker) and cleaned fluid will then return to the system and be re-used down hole.

### 9.2 Water Supply

Water supply for the drilling fluid mixing operations will be fresh water which will be continuously supplied to site by means of tank trucks delivering the water from the nearest source available to HDD work area. Storage tanks of certain capacity will be available on site in order to provide for a buffer volume enabling mud mixing to continue even in case of short-term interruptions in the supply chain due to logistical or other problems.

### 9.3 Monitoring of Mud Returns

Mud Engineer will be responsible in monitoring the production of fresh mud, the recycled fluid in the mud system and the mud returns from the borehole as well. This will be accomplished at regular intervals throughout the operations. Mud engineer also takes the responsibility of appropriately adjusting mud mixture and measures of additives as might be required to maintain pre-set properties which shall be regularly reviewed and agreed in close coordination with the drilling superintendent on shift.

### 9.4 Drilling Fluid products

Mud mixing will be monitored to suit the ground conditions encountered. The products proposed are as follows:

#### Base Materials

S3 Fluidsol 40 Bentonite

Personnel involved in generation and handling of drilling fluids on site must be aware of the material properties (appendix 2) and shall be equipped with PPE required for the particular works.

The base materials and additives intended to be used for generation of drilling fluid under the present project have been chosen under consideration of their technical properties.

### 9.5 Drilling Fluid Considerations

While drilling progresses mud returns in the holding pit will be checked for solids content and overall fluid weight.

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It is pictured out that fluid returns will be maintained during the pilot hole phase and enable a mixing design to be identified that can be maintained throughout the reaming and cleaning stages. It is likewise expected that mud weights will be high once all reaming stages are completed due to the mud loading up with fine solid content. The magnitude of the mud weight will depend on many factors. The mud weight and resulting density of the fluid will have to be adjusted during the last cleaning pass before pipeline installation in order to optimize the buoyant effect of the pipeline and thereby minimize the friction encountered during pullback stage.

## 9.6 Mud Disposal

Control of the drilling fluids remains an essential factor of the works. Re-use of the mud returns to avoid vast stock piling for later removal is of major concern not only from a cost consideration but also from an environmental consideration. As drilling fluid recycling will be at its highest levels during the reaming and hole cleaning stages these procedures have been adapted to ensure maximum fluid controls exist during these activities.

Solids which are removed from the mud returns will be collected in the holding pit excavated under the mud cleaning shaker unit. These solids will then be disposed to an authorized dump site as per project requirement and specified by the contractor

## 10 Emergency Procedures

In the event of the emergency, contact the necessary Fire/Ambulance/Police on 999.  
Nearest Hospital: Al Salama Hospital, Abu Dhabi (02 6966777)

Emergency Contact Numbers:

- Mr. Ahmed El Attar Project Manager 050 1396133
- Mr. Sherif Sayed Construction Manager 050 7424938
- Mr. G. Nishanth HSE Eng/First Aider 055 3268052
- Safety Manager to be add *Mr Ahmed Farag May*

HSE

Following this, the Contractor will be immediately informed as well as the Contractor HSE representative and all Contractor Emergency Procedures will be followed from this point.

## 11 Personal Protective Equipment's:

- 11.1 High Vis jacket or Coverall with reflective stripes
- 11.2 Safety Shoes
- 11.3 Safety Helmet
- 11.4 Eye protection (Safety Goggles)
- 11.5 Gloves
- 11.6 Dust Mask
- 11.7 Ear plugs

## 12 Emergency Arrangements

- 12.1 First-aid facilities available in site office
- 12.2 GCC First Aider on site
- 12.3 Keep defined access/egress routes clear at all times

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## 13 Risk Assessment and General Control Measures:

- 13.1 Refer to attached Risk Assessment.
- 13.2 Operatives must have received a Site Induction prior to commencing work on site.
- 13.3 All operatives must have received a Toolbox Talk 'TBT' explaining the job specific method and the pertaining risks and register their names and sign on the 'TBT' attendance sheet and before any work starts.
- 13.4 Plant and equipment shall have all the current certification, copy held in site office files.
- 13.5 Site cleanliness and general housekeeping to be monitored to ensure safe access egress.
- 13.6 Adequate welfare facilities to be provided.
- 13.7 Task lighting to be provided as and when required.
- 13.8 Daily monitoring by site Supervisors / Managers.
- 13.9 HSE Engineer to monitor, minimum weekly.

## 14 Attachments:

- 14.1 Risk assessment
- 14.2 Inspection and Test Plan (ITP)
- 14.3 Check Sheet

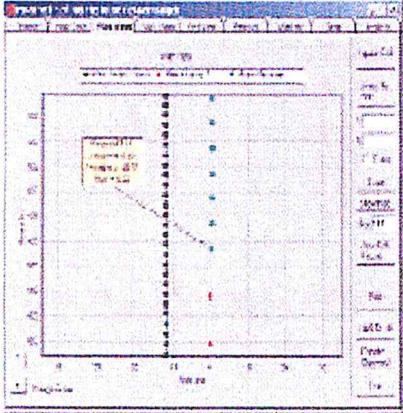
## 15 APPENDICES

- 15.1 Appendix-1 - Para Track 2 / TK Tracker Technical data
- 15.2 Appendix-2 - MSDS of Drilling Fluid Products
- 15.3 Appendix-3 - Technical Data Sheet – HK-250T Rig

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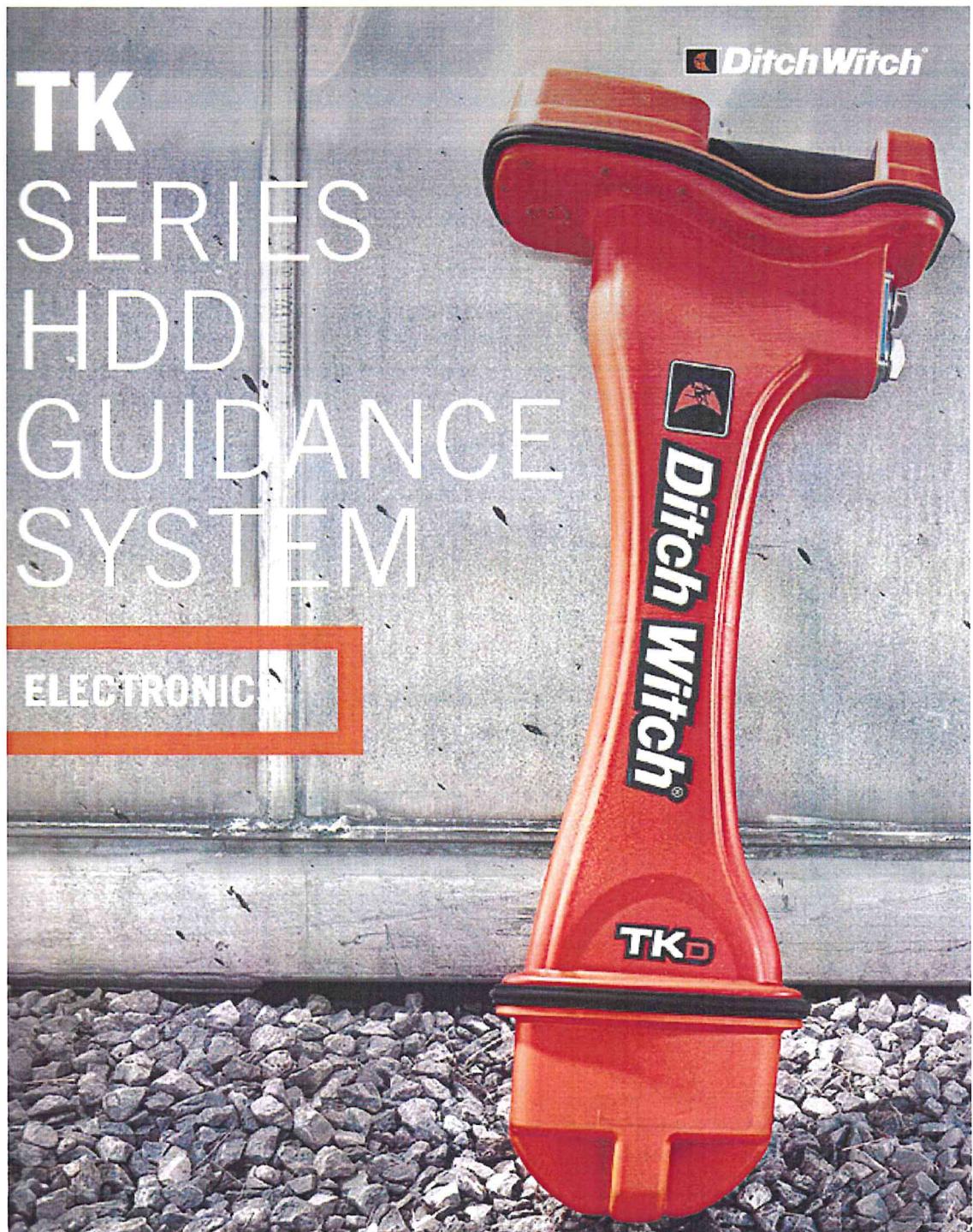
## APPENDIX-1: TECHNICAL SPECIFICATION OF SURVEY TOOLS

Paratrack-2 (Wireline system):

<p><b>The ParaTrack 2 HDD Guidance System</b></p> <p>ParaTrack, a DC or AC secondary locating system, has been operated in the HDD market by Prime Horizontal since 1999. Primarily developed as an underground parallel drilling locating system, its use has been enhanced by development of the Rotating Magnet (RM) Sub and lately by inclusion of Pressure While Drilling (PWD) gauges.</p>  <p>Measuring not only the pilot hole annulus but the internal pipe pressure at the steering tool.</p> <p>The addition of non-wire based magnetic sources allows better approach accuracy for intersecting another bore by developing a known magnetic field down hole essentially to act as a target for final intersect drilling.</p> <p>By measuring the pilot annulus pressure, the driller has much better control of down hole pressures to limit the incidence of formation fractures causing environmental damage.</p> <p>ParaTrack operations gives HDD operators the confidence to plan and execute the most challenging drilled crossings in the market.</p>	<p><b>ParaTrack 2 Survey and Guidance System Specification</b></p> <p><u>VM Enhanced Guidance Probe**</u></p> <p>Shock mounted tri axial accelerometers and magnetometers, temperature sensor and digitizing circuitry contained in 1.750in dia.x 55.3in long beryllium copper pressure barrel. Telemetry and power via single conductor wire line.</p> <table border="0"> <tr> <td>Temperature Rating:</td> <td>100°C</td> <td>212°F</td> </tr> <tr> <td>Pressure Rating:</td> <td>1200 bar</td> <td>17400 psi</td> </tr> <tr> <td>Sensor Accuracy:</td> <td colspan="2"></td> </tr> <tr> <td>Inclination:</td> <td colspan="2">±0.1°</td> </tr> <tr> <td>Azimuth:</td> <td colspan="2">±0.4°</td> </tr> <tr> <td>Tool Face:</td> <td colspan="2">±0.5°</td> </tr> <tr> <td>Length:</td> <td>1256mm</td> <td>49"</td> </tr> </table> <p>Maximum Wire line length: 5000m 16000 ft</p> <p><u>Interface Unit</u></p> <p>Small footprints Probe Power Supply and interface between probe, laptop and driller's display. Face controls mounted in front while all wire connections are side mounted for ease of hook up and worktop organization.</p> <table border="0"> <tr> <td>Input:</td> <td>85-265VAC 50-60 HZ</td> </tr> <tr> <td>Output:</td> <td>48VDC, 50mA-1000mA Power</td> </tr> <tr> <td colspan="2">Power Poised on input and output</td> </tr> <tr> <td colspan="2">Analog Amperage Display</td> </tr> <tr> <td colspan="2">Connection for Secondary laptop used as Driller's Display</td> </tr> <tr> <td colspan="2">Connection for Existing Driller's Display</td> </tr> </table> <p><u>Guide Wire Supply</u></p> <p>Small footprints guide wire supply for location on top of the interface unit in the control cab or on the exit side to power the guide wire</p> <table border="0"> <tr> <td>Input:</td> <td>85-265VAC 50-60 HZ</td> </tr> <tr> <td>Output:</td> <td>3 or 6 Ampsp-pmax</td> </tr> </table>  <p><u>Interface and Guide Wire Supply</u></p>	Temperature Rating:	100°C	212°F	Pressure Rating:	1200 bar	17400 psi	Sensor Accuracy:			Inclination:	±0.1°		Azimuth:	±0.4°		Tool Face:	±0.5°		Length:	1256mm	49"	Input:	85-265VAC 50-60 HZ	Output:	48VDC, 50mA-1000mA Power	Power Poised on input and output		Analog Amperage Display		Connection for Secondary laptop used as Driller's Display		Connection for Existing Driller's Display		Input:	85-265VAC 50-60 HZ	Output:	3 or 6 Ampsp-pmax	<p><u>LCD Driller's Display</u></p> <p><u>Pressure Foot</u></p> <table border="0"> <tr> <td>Length:</td> <td>600mm</td> <td>24"</td> </tr> <tr> <td>Drill Pipe Annulus Gauge</td> <td>350 bar</td> <td>5000 psi</td> </tr> <tr> <td>Pilot Hole Annulus Gauge</td> <td>35 bar</td> <td>500 psi</td> </tr> <tr> <td>Orienting Pressure Sub</td> <td>600mm</td> <td>24"</td> </tr> </table> <p>** Pressure Enabled</p> 	Length:	600mm	24"	Drill Pipe Annulus Gauge	350 bar	5000 psi	Pilot Hole Annulus Gauge	35 bar	500 psi	Orienting Pressure Sub	600mm	24"
Temperature Rating:	100°C	212°F																																																	
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TK Tracker system:

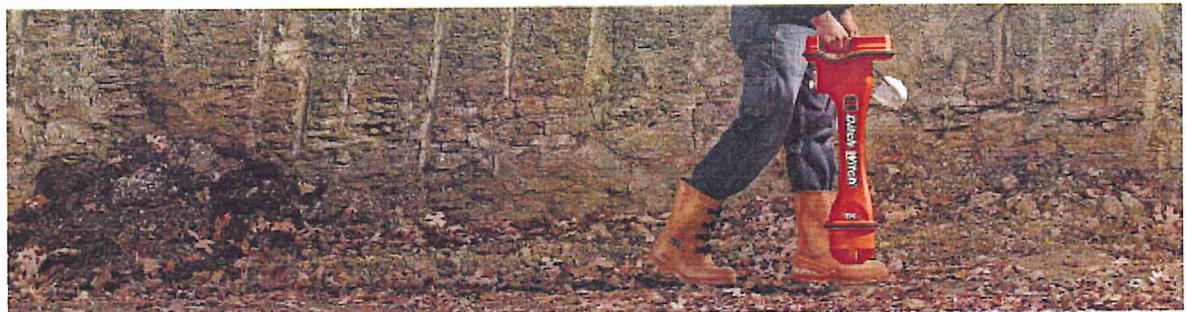


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## TK SERIES HDD GUIDANCE SYSTEM SPECIFICATIONS

	U.S.	METRIC	U.S.	METRIC
<b>TRACKER</b>				
Length, max	13 in	330 mm	Length, max	17.8 in
Width, max	7 in	178 mm	Diameter, max	1.5 in
Height, max	30 in	762 mm	Operating temperature, max	176°F
Operating weight, max	9 lbs	4.1 kg	Pressure, max	60 psi
Operating temperature	-4-122°F	-20-50°C	IP Rating	IP67
Storage temperature	-22-158°F	-30-70°C	Pitch	1% pitch resolution on TX, TXe and TXs 0.1% pitch resolution on TXee
IP Rating	IP65		Roll	24 roll positions
<b>TK</b>				
Depth distance	>70 ft w/H power beacon	>18.3 m w/H power beacon	Operating temperature	-4-176°F
Depth accuracy	+/- 5% over testable range		Battery	-20-80°C
Telemetry radio range	500 ft	152.4 m		Battery status will be communicated in 4 levels at 1 update per 20 seconds.
<b>TKs &amp; TKs</b>				
Depth distance	>100 ft w/H power beacon	>30.5 m w/H power beacon	TX	
Depth accuracy	+/- 5% over testable range	1.8 m	Depth with TX, 29 kHz	40 ft
Telemetry radio range	2,000 ft	610 m	Depth with TKs & TKs, 29 kHz	60 ft
Battery type	C-cell alkaline or C-cell size NiMH rechargeable		TX	12.2 m
Number of cells	4		Depth with TK, 29 kHz	70 ft
Battery life	12 hrs @ room temperature		Depth with TKs & TKs, 29 kHz	100 ft
<b>UNIVERSAL DISPLAY</b>			Battery types	Power stick (blue) 220-1368
TD+ REMOTE VERSION			Lithium "CC" battery kit 220-083	
Length, max	6 in	152.4 mm	Battery life	Battery life is dependent on drill housing. These figures are in a standard dirt housing.
Width, max	6 in	152.4 mm	Standard power	60 hrs
Depth, max	6 in	152.4 mm	H power	16 hrs
TD IN-DASH VERSION			TXs & TXee-H Power	
Length, max	7 in	177.8 mm	Depth with TX, 29 kHz	70 ft
Width, max	7 in	177.8 mm	Depth with TKs & TKs, 1.5 kHz	60 ft
Depth, max	6.5 in	165.1 mm	Depth with TKs & TKs, 12/20/29 kHz	110 ft
Operating temperature	-4-140°F	-20-60°C		21.3 m
Storage temperature	-22-158°F	-30-70°C		18.3 m
IP Rating	IP65			33.5 m
Telemetry range w/TKs & THs	2,000 ft	610 m		
Telemetry range w/TK	1,000 ft	304.8 m		
No batteries		Powered off the rig power only		

Specifications are general and subject to change without notice. If exact measurements are required, equipment should be weighed and measured. Due to selected options, depicted equipment may not necessarily match that shown.



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## APPENDIX-2: DRILLING FLUID - MATERIAL SAFETY DATA SHEETS

### 1. S3 Fluidsol 40 (Bentonite)

**PRODUCT MATERIAL SAFETY DATASHEET (MSDS)**

**S3**  
**F L U I D S**

*High Yield Bentonite for Horizontal Directional Drilling Works*

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**PRODUCT NAME:** FLUIDSOL 40 (MAX)

**PRODUCT & COMPANY IDENTIFICATION**

**SODIUM MONTMORILLONITE CLAY, SODIUM BENTONITE**

**Company Identification:** S3 FLUIDS FZE  
PO BOX: 331179, RAK FTZ, RAK UAE

**Emergency Telephone:** Tel: +971 7 2031 669 / Fax: +971 7 2041010

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**Physical/Chemical Characteristics**

**Appearance and Odor:** Brown /Pale greenish to creamy yellowish, pinkish or white color, No odor

**Boiling Point:** NA

**Specific Gravity:** 2.6

**Solubility in water:** Negligible pH: 8-10

**CAS#** 1302-78-9, EU # 215-108-5

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**Fire and Explosion Hazard data**

**Flash Point:** NA

**Lower Explosive Limit:** NA

**Upper Explosive Limit:** NA

**Extinguishing Media:** Media suitable for surrounding fire

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**Health Hazard Data**

**Route Of Entry- Inhalation:** No

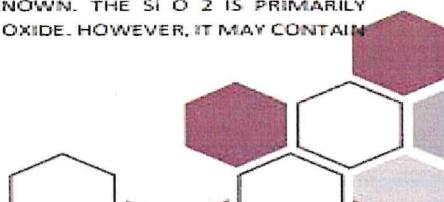
**Route Of Entry - Skin:** No

**Route Of Entry - Ingestion:** No

**Health Hazards, Acute and Chronic:** NO SPECIFIC HEALTH HAZARD KNOWN. THE Si O 2 IS PRIMARILY COMBINED AS A COMPLEX ALUMINOSILICATE MINERAL & NOT AS A FREE OXIDE. HOWEVER, IT MAY CONTAIN A MINOR AMOUNT OF SILICA IN THE FORM OF QUARTZ.

**Carcinogenicity - NTP:** No

**Carcinogenicity - IARC:** No



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### PRODUCT MATERIAL SAFETY DATASHEET (MSDS)

Accidental Release/ Spill: SWEEP OR SCOOP UP SPILLED MATERIAL. PLACE IN CONTAINER MARKED NONHAZARDOUS MATERIALS.

Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.\ Waste Disposal Method: DISPOSAL MUST BE I/A/W FEDERAL, STATE & LOCAL REGULATIONS

Precautions-Handling/Storing: SLIPPERY WHEN WET.

#### Emergency Overview

As part of good industrial and personal hygiene and safety procedure, avoid all unnecessary exposure to the chemical substance and ensure prompt removal from skin, eyes and clothing.

Flammability Rating: 0 – None

Reactivity Rating: 0 – None

Contact Rating: 0 - None

Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

Storage Color Code: Orange (General Storage)

#### POTENTIAL HEALTH EFFECTS

Inhalation: Not expected to be a health hazard.

Ingestion: Not expected to be a health hazard.

Skin Contact: No adverse effects expected.

Eye Contact: No adverse effects expected but dust may cause mechanical irritation.

Chronic Exposure: Long-term inhalation of dust may lead to deposition in lungs in sufficient quantities to produce baritosis.

#### FIRST AID MEASURES

Inhalation: Remove to fresh air. Get medical attention for any breathing difficulty.

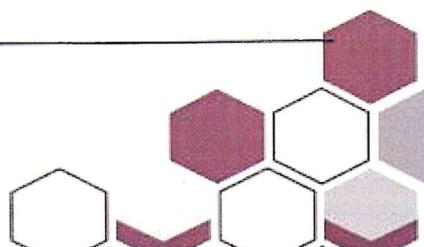
Ingestion: Give several glasses of water to drink to dilute and get medical advice.

Skin Contact: Wash exposed area with soap and water. Get medical advice if irritation develops.

Eye Contact: Wash thoroughly with running water for about 20 min. Get medical advice if irritation/reddishness develops.

#### FIRE FIGHTING MEASURES

Fire: Not considered to be a fire hazard.



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## PRODUCT MATERIAL SAFETY DATASHEET (MSDS)



Explosion: Not considered to be an explosion hazard.

Fire Extinguishing Media: Use any means suitable for extinguishing surrounding fire.

Special Information: In the event of a fire, wear full protective clothing and self-contained breathing apparatus with full-face piece operated in the pressure demand or other positive pressure mode.

### ACCIDENTAL RELEASE MEASURES

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal.

### DISPOSAL CONSIDERATIONS

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

### TRANSPORT INFORMATION

This product is NOT classified as dangerous goods according to international regulations for transport by land, inland waterways, and seas or by air.

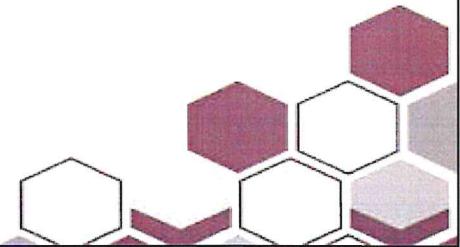
### REGULATORY INFORMATION

The product does not require a hazard warning label in accordance with EC directives on dangerous goods.

### Notification/restrictions status:

EUROPEAN UNION (EU): All components of this material are on the EINECS inventory, or the components are exempt from inventory reporting. USA All components of this material are on the USA TSCA inventory, or the components are exempt from inventory reporting.

**DISCLAIMER:** S3 FLUIDS provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. S3 FLUIDS makes no representations or warranties, either expressed or implied, including without limitation any warranties of merchantability, fitness for a particular purpose with respect to the information set forth herein or the product to which the information refers. Accordingly, S3 FLUIDS will not be responsible for damages resulting from use of or reliance upon this information.



Jubail Island Investment Company	Gulf Contractors Company LLC	Document Reference MS/JID/P2/ELE/003 Rev. No. 00 Rev. Date 08/06/2022 Page	<b>PARSONS</b>
<b>LEAD</b> TOTAL DEVELOPMENT SOLUTIONS	PROJECT: Jubail Island Development – Package-2		المقاولون الخليجيون GULF CONTRACTORS

### APPENDIX-3: TECHNICAL DATA SHEETS OF HK RIGS (250T)

Drilling Rig to use- HK 250T



Technical Data	
Max. Pull Force	2500kN
Max. Push Force	600kN
Revolutions Drilling Motor	0-68RPM
Max. Torque	90kNm
Speed Carriage	0-35m/min
Stroke Carriage	11m
Power Transmission	Rack/pinion
Total Length	14235mm
Min. Mast Angle	8°
Max. Mast Angle	15°

## INSPECTION & TEST PLAN (ITP) FOR HORIZONTAL DIRECTIONAL DRILLING WORKS

SN	Inspection / Test to be carried out	Frequency of Test / Inspection	Acceptance Criteria	Applicable Specification / Standard	Verifying Documents	Inspection Method	Responsibility <sup>1</sup>			Remarks
							Sub Contractor	Contractor	Engineer	
<b>1 Pre-Mobilization</b>										
1.01	Review of Construction Documentation	Prior to start of the activity	1. Review of approved drawings & contract specification. 2. Review of geotechnical report shall represent interpretation of condition, tests and result of analyses conducted by geotechnical engineer.	1. Project / Contract Specification 2. Soil Investigation Report 3. Pipe Specification	Approved Document Submittal	Document Review	R	R	A ✓	
<b>2 Preliminaries</b>										
2.01	Review of Execution Documents	Prior to start of the HDD Execution	As per approved Document Submittal (HDD Method Statement, HDD Designed Profiles, Pipe Stress calculations)	1. Project / Contract Specification 2. Soil Investigation Report 3. Pipe Specification	Approved Document Submittal	Document Review	R	R	A ✓	
<b>3 Site Set-Up</b>										
3.01	Placement of drill rigs and accessories	Upon placement of the rigs and its accessories	Correct placement and positioning of the rigs should be in accordance with the approved site layout plan	Approved Site layout plan	As per approved Site layout plan	Visual	W	W	W ✓	
3.02	Inspection of downhole tools	Upon completion of tools assembly for each drilling stage	Summary of equipment must represent the type and description of the required equipment. Review and comply with inspection check list.	As per Downhole tools manual	As per Downhole tools manual <i>Inspection checklist</i>	Visual	S	S	S ✓	
<b>4 Drilling Activity</b>										
4.01	Calibration of Guidance system	Prior to start of the HDD Execution	Survey tools will undergo a probe diagnostics check. All tools will be roll-tested every 45 degrees during a 360 degree turn. The results will determine which survey tool is the best calibrated tool and if it is within the required specifications for drilling operations.	Guidance system Manual	Calibration Report	Visual	S	S	S ✓	
4.02	Drill Rig Function test	Prior to start of the HDD Execution	Ensure all parts are well functioning and in excellent working condition	Rig Manual	Daily Report	Visual	S	S	S ✓	

## INSPECTION & TEST PLAN (ITP) FOR HORIZONTAL DIRECTIONAL DRILLING WORKS

SN	Inspection / Test to be carried out	Frequency of Test / Inspection	Acceptance Criteria	Applicable Specification / Standard	Verifying Documents	Inspection Method	Responsibility <sup>1</sup>			Remarks
							Sub Contractor	Contractor	Engineer	
4.03	Check Borehole Assembly (BHA)	Prior to start of the HDD Execution	Check the tightness of the connectors between survey probe bent sub, downhole, motor and drill bit. Make sure each part is tightly fitted after assembly.	As per Downhole tools manual	Daily Report	Visual	S	S	S	
4.04	Pilot Hole Drilling process stage-1	(HDD Continuous from start to end of HDD stage-1)	As per approved HDD Profile drawing.	As per approved Drawings	As per approved Drawings	Daily Report	S	W	W	
4.05	Borehole Reaming process (HDD Stage-2)	continuous from start to end of HDD stage-2	As per approved HDD Profile drawing.	As per approved Drawings	As per approved Drawings	Daily Report	S	W	W	
4.05	Borehole Cleaning	Continuous from start to end of hole cleaning	As per approved HDD Profile drawing.	As per approved Drawings	As per approved Drawings	Daily Report	S	W	W	
<b>5 Pipeline Installation</b>										
5.01	Alignment of Pipe section	Prior to start of pipe pullback	As per approved HDD Method Statement / Profile drawing.	As per approved HDD Method Statement / Profile drawing.	As per approved HDD Method Statement / Profile drawing.	Daily Report	S	W	W	
5.02	Connection of Pipeline to the drill rig	Prior to start of pipe pullback	As per approved HDD Method Statement / Profile drawing.	As per approved HDD Method Statement / Profile drawing.	As per approved HDD Method Statement / Profile drawing.	Daily Report	S	W	W	
5.03	Initial tensioning of the pipeline	After connection of pipeline to the drill rig & prior to start of pipe pullback	As per approved HDD Method Statement / Profile drawing.	As per approved HDD Method Statement / Profile drawing.	As per approved HDD Method Statement / Profile drawing.	Daily Report	S	W	W	
5.04	Pipeline Pullback process (HDD Stage-3)	Continuous from start to end of HDD stage-3	As per approved HDD Method Statement / Profile drawing.	As per approved HDD Method Statement / Profile drawing.	As per approved HDD Method Statement / Profile drawing.	Daily Report	S	W	W	

Legend: **H**: Hold point, **W**: Witness, **R**: Review, **S**: Surveillance, **A**: Approval, **TPL**: Third party Laboratory

\* Pipe approval profile  
X may be included

**QA/QC - HORIZONTAL DIRECTIONAL DRILLING CHECKLIST**

<b>CONSULTANT:</b>	<b>Parsons</b>	<b>Date:</b>
<b>PROJECT:</b>	Jubail Island Development - Infrastructure Works Package - 2	<b>Zone:</b>
<b>CONTRACTOR:</b>	Gul Contractors Company	<b>Attached to Inspection Request No.:</b> <b>HDD Sub-Con:</b> TATCO

<b>Location:</b>	<b>WIR No:</b>
<b>Level:</b>	<b>Cainage:</b>
<b>Date:</b>	<b>Form No.: FM/JID/P2/ELE/003</b>

**Check all boxes prior to Drilling works**

Telephone       Water       Electrical       Gas       Overhead Cable

Sewerage       Oil       Street Light       Army cable       Others (specify) \_\_\_\_\_

Trial pit has been dug next to machine anchors

Trial pit has been dug by main Contractor on Machine side, at least 8m away from road or foot path edge and 1.50 meters deep from ground surface.

Trial pit has been dug by main Contractor on pipe side at least 8 meters away from road or foot path edge and 1.50 meters deep from ground surface.

Checked foot path for any marked utilities.

Main Contractor showed drawing of utilities in bore path prior to boring

Main Contractor exposed all utilities mentioned on drawing & also marked on this document.

Other Remarks \_\_\_\_\_

Main Contractor bore reference \_\_\_\_\_

Customer Company Name : \_\_\_\_\_

Job Card Reference Information: \_\_\_\_\_

**Machine Side**

**Pipe Side**

( Mark all utilities exposed by Main Contractor here )

Comments:

**Jointly Prepared by:**

Tatco Int'l. Boring & Installation LLC. Signature \_\_\_\_\_ Printed Name here \_\_\_\_\_

Main Contractor Signature \_\_\_\_\_ Printed Name here \_\_\_\_\_

LEAD TOTAL DEVELOPMENT SOLUTIONS		JUBAIL ISLAND DEVELOPMENT INFRASTRUCTURE WORKS (COLLECTIVE CONTRACT, PACKAGE 2) ENVIRONMENT, HEALTH & SAFETY										جَبَلِ الْأَعْدَادِ GULF CONTRACTORS						
		Installation of 12nos - 225 mm OD HDPE Electrical Duct Pipes Under channel By HDD works.																
No.	MAJOR ACTIVITY (Each process sub divided into major activities)	IDENTIFIED HAZARD (Provide description of hazard associated with each major activity)	RISK (Description of associated risk from hazard identified in column 3)	EXISTING CONTROL (Describe all pre-existing or current control measures If none, state so)				LIKELIHOOD	SEVERITY	RISK	ADDITIONAL IMPROVEMENT in CONTROLS (This must consider practical improvements to existing controls to improve effectiveness and reduce risks further)				LIKELIHOOD	SEVERITY	FINAL RISK	CLOSE OUT DATE
				L	S	R1	L				L	S	R2	DD/MM/YY				
01	Work site preparation	<ul style="list-style-type: none"> <li>Fatigue</li> <li>Adverse Weather (Fog, Dust, Wind blowing, Hot and humid climate etc...)</li> </ul>	<ul style="list-style-type: none"> <li>Personal Injury</li> <li>Fatality</li> </ul>	<ul style="list-style-type: none"> <li>Trained &amp; inducted work force to be mobilized.</li> <li>Ensure the sufficient quantity drinking water inside the equipment and on site.</li> <li>Adequate number of rest shelter should be provided.</li> <li>Adequate PPE should provide including dust mask.</li> <li>Continues stand by supervision.</li> <li>Drinking water facility should be available at all times.</li> </ul>	3	3	9	3	3	9	2	3	6		<ul style="list-style-type: none"> <li>Worker should adhere about ERP</li> <li>Check all the employees are fit for work before starting the activities.</li> <li>First aid facility with certified first aider should be available at site.</li> <li>Carry out TBT in every shift.</li> <li>Follow UAE mid-day break program.</li> <li>All protruding rebars to be protected.</li> </ul>			
															<ul style="list-style-type: none"> <li>Don't touch your eyes, nose or mouth.</li> <li>Cover your nose and mouth with your bent elbow or a tissue when you cough or sneeze.</li> <li>Wear a mask when physical distancing is not possible.</li> <li>Don't touch your eyes, nose or mouth</li> <li>Cover your nose and mouth with your bent elbow or a tissue when you cough or sneeze.</li> </ul>			

ROW #	MAJOR ACTIVITY (Each process sub divided into major activities)	IDENTIFIED HAZARD (Provide description of hazard associated with each major activity)	RISK (Description of associated risk from hazard identified in column 3)	EXISTING CONTROL (Describe all pre-existing or current control measures if none, state so)			LIKELIHOOD L	SEVERITY S	RISK R1	ADDITIONAL IMPROVEMENT in CONTROLS (This must consider practical improvements to existing controls to improve effectiveness and reduce risks further)			LIKELIHOOD L	SEVERITY S	RISK R2	CLOSE OUT DATE DD/MM/YY	
				6	7	8				9	10	11	12	13			
1	2	3	4	5	6	7	8	9	10	11	12	13					
02	Survey Works	Hit by vehicle during survey or road crossing.  Slip, trip & fall	❖ Personal Injury. ❖ Fatality	<ul style="list-style-type: none"> <li>Working area to be provided with hard barrier if the location is near to the road.</li> <li>Mandatory PPE (such as hard hat, safety shoe and reflective vest must be worn by all site persons.</li> <li>TBT to be provided prior to start of work</li> <li>Trained banks man to be deployed to guide vehicles on site.</li> <li>First aid facility to be available.</li> </ul>	2	5	10										
				<ul style="list-style-type: none"> <li>Site to be cleared from debris,</li> <li>Open pits to be barricaded,</li> <li>Surveyor team should not be standing at the edge of excavation or open pit.</li> <li>Induction to be provided prior to start of work</li> <li>Close Supervisions.</li> </ul>	2	3	6										



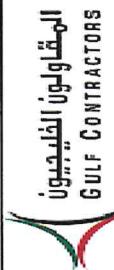
**LEAD**  
TOTAL  
DEVELOPMENT  
SOLUTIONS



**PARSONS**

JUBAIL ISLAND DEVELOPMENT  
INFRASTRUCTURE WORKS (COLLECTIVE CONTRACT, PACKAGE 2 )  
ENVIRONMENT, HEALTH & SAFETY  
Installation of 12nos - 225 mm OD HDPE Electrical Duct Pipes Under  
channel By HDD works.

No.	MAJOR ACTIVITY (Each process sub divided into major activities)	IDENTIFIED HAZARD (Provide description of hazard associated with each major activity)	RISK (Description of associated risk from hazard identified in column 3)	EXISTING CONTROL (Describe all pre-existing or current control measures If none, state so)	LIKELIHOOD	SEVERITY	RISK	ADDITIONAL IMPROVEMENT in CONTROLS (This must consider practical improvements to existing controls to improve effectiveness and reduce risks further)			LIKELIHOOD	SEVERITY	FINAL RISK	CLOSE OUT DATE
								L	S	R1				
1	2	3	4	5	6	7	8	9	10	11	12	13		
03	Manual Handling	Pinch Point	• Struck by hammer while hammering rebar. • Unprotected rebar	• Personal Injury • Tire puncture. • Vehicle banks man shall care about the protruding rebar. • Safety induction to be provided the workers. • Proper supervision.	2	3	6	2	2	4	2	2	6	13

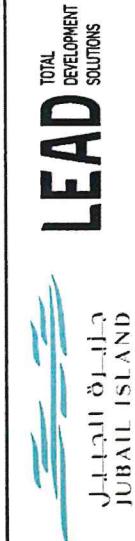


**LEAD** TOTAL DEVELOPMENT SOLUTIONS  
JUBAIL ISLAND

JUBAIL ISLAND DEVELOPMENT WORKS (COLLECTIVE CONTRACT, PACKAGE 2 )  
ENVIRONMENT, HEALTH & SAFETY  
Installation of 12nos - 225 mm OD HDPE Electrical Duct Pipes Under  
channel By HDD works.

No	MAJOR ACTIVITY (Each process sub divided into major activities)	IDENTIFIED HAZARD (Provide description of hazard associated with each major activity)	RISK (Description of associated risk from hazard identified in column 3)	EXISTING CONTROL (Describe all pre-existing or current control measures if none, state so)	LIKELIHOOD L	SEVERITY S	RISK R1	LIKELIHOOD L	SEVERITY S	RISK R2	LIKELIHOOD L	SEVERITY S	RISK R3	ADDITIONAL IMPROVEMENT in CONTROLS (This must consider practical improvements to existing controls to improve effectiveness and reduce risks further)			CLOSE OUT DATE DD/MM/YY
1	2	3	4	5	6	7	8	9	10	11	12	13					
04	Usage of Hand Tools/Equipment	Flying object	<ul style="list-style-type: none"> <li>Overexertion</li> <li>Age ,Size and Physical Abilities</li> <li>and Attitude of Person doing the Task</li> </ul>	<ul style="list-style-type: none"> <li>Damage to the musculoskeletal system of the body.</li> <li>Musculoskeletal disorders' Neck and upper limb disorders</li> <li>Lower limb disorders</li> <li>Back pain and back injuries</li> </ul>	<ul style="list-style-type: none"> <li>Use mechanical lifting aids if possible to reduce prolonged lifting.</li> <li>Apply proper lifting technique.</li> <li>Select suitable personals.</li> <li>Manual handling training.</li> <li>Tool Box Talk must be conducted for safe lifting technique.</li> <li>Close Supervision.</li> <li>First aid facility availability.</li> </ul>	2	3	6	2	2	4						
				<ul style="list-style-type: none"> <li>Personal injuries like cuts, laceration, burn with hot surface of the equipment etc.</li> <li>Impact injury due to fall of the equipment from height and ejected flying object as well.</li> </ul>	<ul style="list-style-type: none"> <li>Use to the right tools &amp; right technique for the job.</li> <li>Competent operatives to perform the job.</li> <li>Manufacturer recommendation will be followed.</li> <li>Trained personals are allowed to use the tools.</li> <li>Does not use damage tools.</li> <li>TBT to be provided.</li> <li>Avoid to wear loose cloths</li> <li>"SAFE To USE" Tag must be on the equipment</li> <li>Proper supervision.</li> </ul>				2	4	8	2	3	6			

No's	MAJOR ACTIVITY (Each process sub divided into major activities)	IDENTIFIED HAZARD (Provide description of hazard associated with each major activity)	RISK (Description of associated risk from hazard identified in column 3)	EXISTING CONTROL (Describe all pre-existing or current control measures (if none, state so))	LIKELIHOOD	SEVERITY	RISK	ADDITIONAL IMPROVEMENT in CONTROLS (This must consider practical improvements to existing controls to improve effectiveness and reduce risks further)			LIKELIHOOD	SEVERITY	FINAL RISK	CLOSE OUT DATE
								L	S	R1				
1	2	3	4	5	6	7	8	9	10	11	12	13		



**JUBAIL ISLAND DEVELOPMENT**  
**INFRASTRUCTURE WORKS (COLLECTIVE CONTRACT, PACKAGE 2)**  
**ENVIRONMENT, HEALTH & SAFETY**  
**Installation of 12nos - 225 mm OD HDPE Electrical Duct Pipes Under**  
**channel By HDD works.**

No.	MAJOR ACTIVITY (Each process sub divided into major activities)	IDENTIFIED HAZARD (Provide description of hazard associated with each major activity)	RISK (Description of associated risk from hazard identified in column 3)	EXISTING CONTROL (Describe all pre-existing or current control measures If none, state so)	LIKELIHOOD	SEVERITY	RISK	ADDITIONAL IMPROVEMENT in CONTROLS (This must consider practical improvements to existing controls to improve effectiveness and reduce risks further)			LIKELIHOOD	SEVERITY	FINAL RISK	CLOSE OUT DATE
								L	S	R1				
1	2	3	4	5	6	7	8	9	10	11	12	13		
05	Excavation for entry and exit pit	Damage of underground facilities.	Property Damage											

• Approved MSA to be communicated / Excavations Checklist to be issued by competent person  
 • Approved MSA to be communicated / Excavations Checklist to be issued by competent person

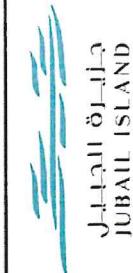


No. IS.	MAJOR ACTIVITY (Each process sub divided into major activities)	IDENTIFIED HAZARD (Provide description of hazard associated with each major activity)	RISK (Description of associated risk from hazard identified in column 3)	EXISTING CONTROL (Describe all pre-existing or current control measures (if none, state so))			LIKELIHOOD SEVERITY RISK	LIKELIHOOD SEVERITY RISK	ADDITIONAL IMPROVEMENT in CONTROLS (This must consider practical improvements to existing controls to improve effectiveness and reduce risks further)			CLOSE OUT DATE FINAL RISK
				L	S	R1			L	S	R2	
1	2	3	4	5	6	7	8	9	10	11	12	13
06	Lifting and Off-loading of equipment and machinery.	Failure of lifting pump by supply cable. Collision with lifted load	Personal Injury Property Damage	<ul style="list-style-type: none"> <li>Clear the lifting place from people and barricade the area using barriers before starting lifting operation.</li> <li>Safety and warning signs should be displayed.</li> <li>Trained / licensed equipment operator to be engaged.</li> <li>Certified lifting appliances (crane, slings) should only be used.</li> <li>Competent &amp; careful supervision.</li> <li>Tool box talk to be given to the work force.</li> <li>Banks man to guide equipment movement on site.</li> <li>Tagline to be used while during lifting. Lifting plan procedure to be followed.</li> </ul>	<ul style="list-style-type: none"> <li>PPE (safety goggles, safety shoes, safety helmet, Ear plugs/ear muffs, Respiratory Protective Equipment.).</li> <li>Certified First aider and first aid box should be available at work place.</li> <li>People should adhere about ERP.</li> <li>Weather monitoring is necessary and tagline to be provided including with beacon light of the equipment.</li> </ul>	<ul style="list-style-type: none"> <li>2</li> <li>4</li> <li>8</li> <li>2</li> <li>4</li> <li>8</li> <li>2</li> <li>3</li> <li>6</li> </ul>						

- P.T.W  
 • Lifting supervisor to be available  
 • Approved lifting plan to be communicated to  
 • The involved persons

8

		JUBAIL ISLAND DEVELOPMENT INFRASTRUCTURE WORKS (COLLECTIVE CONTRACT, PACKAGE 2)										Gulf Island Gulf Island GULF CONTRACTORS						
1	2	3	4	5	6	7	8	9	10	11	12	13	L	S	R1	R2	DD/MM/YY	
No.	MAJOR ACTIVITY (Each process sub divided into major activities)	IDENTIFIED HAZARD (Provide description of hazard associated with each major activity)	RISK (Description of associated risk from hazard identified in column 3)	EXISTING CONTROL (Describe all pre-existing or current control measures If none, state so)				ADDITIONAL IMPROVEMENT in CONTROLS (This must consider practical improvements to existing controls to improve effectiveness and reduce risks further)				LIKELIHOOD	SEVERITY	RISK	LIKELIHOOD	SEVERITY	FINAL RISK	CLOSE OUT DATE
				• Ensure only qualified personnel use equipment check lifting equipment.	• Clear the lifting place from people and barricade the area using barriers before starting lifting operation.	• PPE (overall, safety shoes, safety helmet).	• Safety and warning signs should be displayed.	• Trained / licensed equipment operator to be engaged.	• Careful and competent supervision.	• Competent riggers should be placed for this rigging activity.	• Tool box talk to be given.							
			Falling of the lifted load	Personal Injury	Property Damage							• Lifting gears should be inspected regularly.						
												• Barricade the area using plastic barriers.						
												• Safety signs/ warning to be displayed.						
												• Trained / licensed equipment operator only to be engaged.						
												• Careful and competent supervision.						
												• Working platform of the crane should be stable and firm.						
												• The outriggers to be extended to the maximum.						
			Overturning of the crane	Personal Injury	Property Damage							• First aider and first aid box at work place.						
												• Do not exceed the rated capacity (SWL) of the crane.						
												• Crane should have SWL indicator in functional condition.						
												• Labor excluded from lifting area.						
												• Tool box talk to be delivered to the work force prior to the start of work.						



**LEAD**  
TOTAL  
DEVELOPMENT  
SOLUTIONS

JUBAIL ISLAND  
DEVELOPMENT  
ENVIRONMENT,  
HEALTH &, SAFETY  
Installation of 12nos - 225 mm OD HDPE Electrical Duct Pipes Under  
channel By HDD works.

JUBAIL ISLAND DEVELOPMENT WORKS (COLLECTIVE CONTRACT, PACKAGE 2 )  
ENVIRONMENT, HEALTH &, SAFETY

GULF CONTRACTORS

(10)

S.I. No.	MAJOR ACTIVITY (Each process sub divided into major activities)	IDENTIFIED HAZARD (Provide description of hazard associated with each major activity)	RISK (Description of associated risk from hazard identified in column 3)	EXISTING CONTROL (Describe all pre-existing or current control measures if none, state so)	LIKELIHOOD SEVERITY RISK	LIKELIHOOD SEVERITY RISK	ADDITIONAL IMPROVEMENT in CONTROLS (This must consider practical improvements to existing controls to improve effectiveness and reduce risks further)			CLOSE OUT DATE FINAL RISK	SEVERITY L S R2	DD/MM/YY
							L	S	R1			
1	2	3	4	5	6	7	8	9	10	11	12	13
07	HDPE Welding	Electrocution <i>✓</i>	Personal Injury Fatality <i>✓</i>	• Obtain necessary approval and permits. • Adequate PPE to be used. • Only authorized electrician to perform electrical job. • "SAFE To USE" Tag must be on the equipment • TBT to be provided. • Lockout & Tag out system to be implemented.	2 <i>✓</i>	5 <i>✓</i>	10 <i>✓</i>	1 <i>✓</i>	5 <i>✓</i>	5 <i>✓</i>	1 <i>✓</i>	5 <i>✓</i>
08	Chemical handling	HDPE Waste  Inhaling chemicals	Environmental Contamination.  Personal Injury	• Continues supervision required. • TBT should carry out before the job. • Only trained personal allowed performing the job. • Ground to be protected underneath the working area.	3 <i>✓</i>	3 <i>✓</i>	9 <i>✓</i>	3 <i>✓</i>	3 <i>✓</i>	6 <i>✓</i>	2 <i>✓</i>	3 <i>✓</i>
				• Use suitable respiratory mask during chemical handling • MSDS of chemicals should be available at the place of use & storage. • Chemical cans should handle with care. • Activity is to be carried out under the supervision of competent supervisor. • Working area need to be cordon off to protect other members available in vicinity.	3 <i>✓</i>	3 <i>✓</i>	9 <i>✓</i>	3 <i>✓</i>	2 <i>✓</i>	6 <i>✓</i>	3 <i>✓</i>	2 <i>✓</i>



**LEAD** TOTAL DEVELOPMENT SOLUTIONS

**JUBAIL ISLAND DEVELOPMENT INFRASTRUCTURE WORKS (COLLECTIVE CONTRA ENVIRONMENT, HEALTH & SAFETY**

**Installation of 12nos - 225 mm OD HDPE Electrical Distribution channel By HDD works.**

الْمَلَكُولُونِيَّةُ  
GULF CONTRACTORS

**PARSONS**

الْمَلَكُولُونِيَّةُ  
GULF CONTRACTORS

**JUBAIL ISLAND DEVELOPMENT INFRASTRUCTURE WORKS (COLLECTIVE CONTRA ENVIRONMENT, HEALTH & SAFETY**

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GULF CONTRACTORS



**JUBAIL ISLAND DEVELOPMENT**  
**INFRASTRUCTURE WORKS (COLLECTIVE CONTRACT, PACKAGE 2 )**  
**ENVIRONMENT, HEALTH & SAFETY**

Installation of 12nos - 225 mm OD HDPE Electrical Duct Pipes Under  
 channel By HDD works.

Sl. No.	MAJOR ACTIVITY (Each process sub divided into major activities)	IDENTIFIED HAZARD (Provide description of hazard associated with each major activity)	RISK (Description of associated risk from hazard identified in column 3)	EXISTING CONTROL (Describe all pre-existing or current control measures If none, state so)	ADDITIONAL IMPROVEMENT in CONTROLS (This must consider practical improvements to existing controls to improve effectiveness and reduce risks further)			LIKELIHOOD	SEVERITY	RISK	CLOSE OUT DATE	
					L	S	R1					
1	2	3	4	5	6	7	8	9	10	11	12	13
09	Horizontal directional drilling operation	• Rotating drill Ground collapse	Personal Injury	<ul style="list-style-type: none"> <li>Only trained and authorized persons should be allowed to operate HDD machine.</li> <li>Always monitor the ground condition.</li> <li>Restricting access near to the HDD machine should be maintained.</li> <li>Do not leave the operation station unattended.</li> <li>Continues supervision.</li> <li>Check the equipment on daily basis as per manufactures instruction</li> <li>All operatives should know about ERP.</li> <li>All people should wear adequate PPE.</li> </ul>	2	3	6					
10	Heavy equipment movement	Unauthorized driver	<ul style="list-style-type: none"> <li>Personal Injury</li> <li>Damage of materials</li> <li>Property damages</li> <li>Fatality</li> </ul>	<ul style="list-style-type: none"> <li>Only authorized drivers with valid license allowed.</li> <li>Designated Material/machine storage area to be provided.</li> <li>Allocated separate drivers to every equipment.</li> <li>Induction should be provided prior to start the work.</li> </ul>	2	4	8					

*Tagging system to be implemented for all equipment ( safe to use )*

(12)



**LEAD** TOTAL DEVELOPMENT SOLUTIONS

JUBAIL ISLAND DEVELOPMENT  
RE WORKS (COLLECTIVE CONTRA  
NYMENT) HEATH & SAFETY

JUBAIL ISLAND DEVELOPMENT  
RE WORKS (COLLECTIVE CONTRACT, PACKAGE 2)

المنفذ البحري | المقاولون العرب

**PARSONS**

Installation of 12nos - 225 mm OD HDPE Electrical Duct Pipes Under channel By HDD works.

1	2	3	4	5	6	7	8	9	10	11	12	13
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17	Working in Hot & Humid Climate	Extremes weather	❖ Heat Stress	Frequent break & Isotonic drinks Experienced personal are only allowed to carry out the activity. Alone working prohibited. Buddy system to be experienced. Necessary PPE to be worn. Close and continues supervision. Adequate quantity of cool drinking water to be available.	2	4	8	1	3	3	17-09-2024	

LEAD TOTAL DEVELOPMENT SOLUTIONS			JUBAIL ISLAND DEVELOPMENT INFRASTRUCTURE WORKS (COLLECTIVE CONTRACT, PACKAGE 2 ) ENVIRONMENT, HEALTH & SAFETY										Gulf Contractors																																																																																																			
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11	Inspection	Slip, trip and falls	Personal Injury	<ul style="list-style-type: none"> <li>Only trained and inducted people only allowed to go for inspection.</li> <li>Housekeeping should do on daily basis and site must maintain clean and tidy.</li> <li>All the access and egress should maintain properly.</li> <li>Storage of materials is at designated area only.</li> <li>Need to wear proper PPE at site.</li> <li>Inspection should carry at site only at day light time.</li> </ul>		<ul style="list-style-type: none"> <li>Work area should be leveled and compacted.</li> <li>Adequate warning signage and warning barrier should place at site</li> <li>First aid facility should available at site.</li> </ul>		<ul style="list-style-type: none"> <li>Work area should be leveled and compacted.</li> <li>Adequate warning signage and warning barrier should place at site</li> <li>First aid facility should available at site.</li> </ul>		<ul style="list-style-type: none"> <li>Work area should be leveled and compacted.</li> <li>Adequate warning signage and warning barrier should place at site</li> <li>First aid facility should available at site.</li> </ul>		<ul style="list-style-type: none"> <li>Work area should be leveled and compacted.</li> <li>Adequate warning signage and warning barrier should place at site</li> <li>First aid facility should available at site.</li> </ul>		<ul style="list-style-type: none"> <li>Work area should be leveled and compacted.</li> <li>Adequate warning signage and warning barrier should place at site</li> <li>First aid facility should available at site.</li> </ul>		<ul style="list-style-type: none"> <li>Work area should be leveled and compacted.</li> <li>Adequate warning signage and warning barrier should place at site</li> <li>First aid facility should available at site.</li> </ul>																																																																																																
Notes For Guidance		<table border="1"> <thead> <tr> <th>Designation (As req.)</th> <th>Name</th> <th>Sign.</th> <th>Date</th> <th colspan="15">Occupational Health and Safety Risk Assessment is a defined 5 Step process; Identify, Estimate, Evaluate, Record and Review your findings. Risk = Likelihood * Severity. Evaluation Scale 1- 25:</th></tr> <tr> <th>RISK ZONE Scale</th> <th>Green ≤4 Low</th> <th>Yellow ≤9 Moderate</th> <th>Orange ≤12 High</th> <th>Red ≤25 Very High</th> </tr> </thead> <tbody> <tr> <td>Prepared By: <input type="checkbox"/>Technical Engineer <input type="checkbox"/>HSE Rep/Engineer <input type="checkbox"/>Site Engineer</td> <td>G. Nishanth</td> <td>11/6/2022</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>Reviewed By: <input type="checkbox"/>Project Manager <input type="checkbox"/>HSE Manager</td> <td>Ahmed Farag</td> <td>11/6/2022</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>Approved By: <input type="checkbox"/>Consultant Representative</td> <td></td> <td></td> <td><input checked="" type="checkbox"/></td> </tr> </tbody> </table> <p>Final Risk (R2) must be reduced to a level within the green or yellow zone ≤ 9 for approval and acceptance of the risk.</p>																		Designation (As req.)	Name	Sign.	Date	Occupational Health and Safety Risk Assessment is a defined 5 Step process; Identify, Estimate, Evaluate, Record and Review your findings. Risk = Likelihood * Severity. Evaluation Scale 1- 25:															RISK ZONE Scale	Green ≤4 Low	Yellow ≤9 Moderate	Orange ≤12 High	Red ≤25 Very High	Prepared By: <input type="checkbox"/> Technical Engineer <input type="checkbox"/> HSE Rep/Engineer <input type="checkbox"/> Site Engineer	G. Nishanth	11/6/2022	<input checked="" type="checkbox"/>	Reviewed By: <input type="checkbox"/> Project Manager <input type="checkbox"/> HSE Manager	Ahmed Farag	11/6/2022	<input checked="" type="checkbox"/>	Approved By: <input type="checkbox"/> Consultant Representative			<input checked="" type="checkbox"/>																																																									
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