APPENDIX A

METHOD STATEMENTS

Risk Assessments and Safety Method Statements:

Introduction

Causeway Geotech Ltd are a site investigation company who carry out the sampling, testing and reporting of soil parameters with regard to their suitability for their intended use.

The works are normally of short duration and are carried out by small teams of highly specialised and competent operatives, a minimum number of two, one whom is appointed Team Leader (Site Agent).

The methods of work are repetitive in as much as there are standard procedures for most operations.

The Company has produced an index of generic risk assessments, which cover the core hazards and risks associated with their activities; these have been amended for this project to include site specific hazards.

Where appropriate, the risk assessments have been developed into Safety Method Statements for the core works of the Company.

Systems and procedures are in place whereby the generic documentation can be developed to include, and take account of, any significant site-specific hazards identified.

The relevant precautions are outlined in the applicable Risk/COSHH Assessment, as well as good industry practice, i.e. the wearing of appropriate clothing, suitable footwear, gloves and eye protection.

Should other activities be encountered, the Senior Site Supervisor in the first instance,
Should consider the hazards and risk involved and ensure the necessary preventative
Action is taken. Thereafter, referral should be made to the project Company Director, who may in turn involve other parties as necessary.

This is in compliance with the recommendations contained within the Approved Code of Practice for the Management of Health and Safety at Work Regulations and Project Construction Phase Plan 2011.

The task specific RAMS documents are presented in the following pages.

Additional measures have also been taken considered with regards to the Covid-19 pandemic. These are presented in the following pages.

MARINE SPECIFICS

Location for mobilization/demobilisation of works: Port of Mostyn.

All items within this risk assessment introduction are operationally orientated rather than site orientated so will be pertinent to both works areas for the duration of this project.

The works shall include the sinking of boreholes with sampling and in-situ testing and will include:

- Overwater sonic drilling in overburden material
- Overwater rotary drilling in bedrock
- In-situ and laboratory testing and reporting

For this phase of the project the boreholes are to be drilled from one jack-up barge.

The platform will be certified and are registered as:
Ocean Crest Marine: ***OCM50 (standard deck size 9m x 12m)***

Vessels for the Project:
OCM Supporter: Will be tasked as dual-purpose Crew Boat for all personnel transfers and a general Work Boat to ferry any supplies to/from the barge as required.

The overwater sonic drilling will be undertaken by a Eijelkamp Fraste CRS XL140 Duo Rotosonic rig. This is capable of sonic drilling in the overburden with follow-on rotary drilling in bedrock where encountered.

Relevant certification for all CGL and OCM plant is provided in Appendix I of this document. This will include details of all guards and safety systems present on the drilling apparatus.

TIME PERIOD

It is planned that the site works will commence on 4 July 2022 and will take approximately 3 weeks to complete. A detailed programme is presented separately in Appendix E.

EQUIPMENT

All holes will be located using GPS technology (example: Trimble R10s GNSS receiver employing VRS network). The centre of the moonpool will be within the lateral tolerance specified by the Engineer.

All plant and equipment when not in use (e.g. transit between exploratory hole locations) on the jack-up will be securely fastened or sea-stowed (welded and/or chained) to the deck

The Barge Master will be competent and trained in the operational use of the specific jack-up used on the project. All manoeuvring procedures will be under the guidance of the Barge Master in conjunction with the Vessel Master and will be in accordance with operator's manual.

Once the Jack-up has been manoeuvred into position it will be secured by lowering the legs under the instructions of the Barge Master. Should further securing be required by means of anchoring the Barge Master will issue instructions accordingly.

The jack-up will be manoeuvred into location by means of the Support Vessel (OCM Supporter)

The moonpool hole is of 300mm diameter steel construction within one of the pontoons. The sonic drill string will remain in position within the moonpool throughout the drilling operations.

The following have been identified as hazards along with the proposed measures to be taken:-

Falling Overboard - onto water
All personnel on the jack-up platform are to wear floatation jackets at all times whilst working. A lifebelt is also available on the jack-up and the small boat.

Sinking of Jack-Up
There will be a single small boat (OCM Supporter) available for rescue at all times.

Injury to Staff
Should an accident or injury occur on the jack-up or work boat, a first aid kit will be available for minor injuries. The OCM Vessel Master and all CGL Site Engineers/Lead Drillers are first aid qualified and will administer initial first aid. A Neil Robinson type cradle stretcher will be located on the Safety Boat (OCM Supporter) and if required for casualty evacuation it will be delivered to the barge and the casualty will be securely strapped in and lowered from the barge by use of derrick and rope to the safety boat or lifeboat if tasked. If the injuries sustained are major the emergency services will be tasked to transport the crew member from the barge to hospital.

Other Seafarers
The jack-up barge will have the correct shapes (Ball-Diamond-Ball) and lights (Red over White over Red) for static underwater works. The jack-up platform and workboats will be fitted with UHF radios.

Casing Broken-Off above the seabed
In the unlikely event of the casing breaking off above seabed level, the Head Bailiff will be contacted, and divers engaged with underwater cutting equipment. They will be deployed to cut off the casing before the jack-up moved to its next location.

Power Failure to Vessel during JUB movements
In the unlikely event of power failure in either of the above manoeuvres, the barge will be jacked up on location until such times as the vessel repair have been actioned.

Accessing Jack-up from Crew Boat
Transfer will be directly from the Crew Boat (OCM Supporter) generally at 08:00 and 18:00 daily, unless the tidal regime inhibits safe access/egress at these times. During this manoeuvre due care and attention must be paid to instructions given by both Barge Master and the Vessel Master.

Craneage during Rig Assembly

All craning operations, the supply of banksmen and supervision will be carried out by an approved supplier (Hugh Simpson Construction Ltd). They have forwarded their Lift Plan including method statements and risk assessments, these are included for review in Appendix J.

Diesel Storage and Replenishment

Diesel will primarily be stored in a double bunded bowser at the land compound. When diesel is required to be transported from on-shore areas to the jack-up, it will be done in sealed containers. These will be securely winched from the Work Boat (OCM Supporter) to/from the jack-up as and when required and under the strict instructions of the Barge Master and handled and stored in a safe location during and after the operation. A COSHH cabinet will be provided on the deck of the barge for storage of all drilling fluids, lubricants, etc.

Uneven Seabed

During the positioning and stabilizing of the barge, the Barge Master must be made aware of the potential unevenness of the riverbed and should deploy best practices for checking the stability of the barge at all times.

Non-operational overnight periods

During times when the barge is unmanned it may be necessary to conduct a visual check of the barge out of working hours; this would occur from the riverbanks with no requirement to board the barge. The pre-loading of the barge will be a key indicator as to the expected stability of the barge at each exploratory hole location. By preloading the full weight of the barge onto 2 legs, before then stabilizing on all 4 legs, we can be confident a suitable bearing stratum has been reached. The barge leg penetrations will be checked at the start and end of each shift to monitor any minor settlement that occurs throughout the drilling operations. By utilising this knowledge, the Barge Master will be able to decide whether the barge needs to be monitored overnight.

METHOD STATEMENT – BARGE MOBILISATION, BARGE MOVEMENT, ACCESS, EGRESS

Method Statement activity	**Barge Ops (Mobilisation, movement, access, egress)**
Method statement number	**CGT_MS90**
Revision	**Rev A02: November 2021**
Relevant Risk Assessment	**Ocean Crest Marine RA / CGT_RA99**

Barge Mobilisation

1. Barge will be mobilized using the methods identified within the lift plan with appropriately trained Lift Supervisor and Slinger(s)/Signaller(s) present. All personnel will be briefed on the Lift Plan by means of a Tool Box Talk prior to operations commencing.

2. The barge is assembled in the water. OCM crew will be on the water aboard the OCM Supporter as required. The 6 Duo pontoons will be lowered into the water one at a time; the lifting points for all pontoons are in the center of the pontoon deck. The pontoons will be boarded by OCM crew and tied off to mooring points. The pontoons are then connected by means of the integrated locking system using the C5 Combifloat male pin/female connectors.

3. Once all pontoons are connected, the spud wells are then hoisted into positions and affixed at each of the four corners – again using the Combifloat system of integrated connectors.

4. Once the spud wells are in, the spud legs are then hoisted into position. These will be inserted into each spud well and locked in place as required.

5. Following the spud legs, the next piece of barge plant to be lifted into position will be the hydraulic power pack; lifting eye for the power pack is on the top of the unit. This will be set on the power pack mount onboard the JUB deck.

6. Handrails and kickboards are then hoisted on and erected around the outer perimeter of the barge. Subsequently the hydraulics are connected, the power pack fired up, and the barge will then be jacked-up clear of the waterline. The gangway can then be hoisted into position and affixed to the JUB. Now CGL crew will be allowed to access the barge as required to assist with the loading of the drilling equipment and ancillaries.

7. There will be no requirement for working at height involved in this operation; the OCM crew constructing the barge will be working overwater – with appropriate buoyancy aids on each man.

8. The drilling rig and all auxiliary equipment will be loaded once the barge has been fully constructed (to include double handrail, kickboards and gangway) and is jacked up to the required level.

9. The plant will be arranged on deck according to the deck plan as agreed by the Barge Master. The Barge Master has the right on the day to amend this plan as he sees fit based on the plant and auxiliary equipment which may differ slightly from what has been proposed in terms of weight and dimensions. This will allow the Barge Master to ensure the barge is properly balanced before floating.

10. Barge assembly and loading will take 1-2 days.

Barge Movement

The safe procedure for the movement of the jack-up barge are outlined below.

1. Tow lines to be connected by OCM crew and maintained in position throughout tow and during jacking/spudding operations, until such time as Barge Master is satisfied that the barge is stable in position with spud legs holding firm.

2. Emergency mooring lines/tow ropes to be available on vessel in event of failure of primary line. UHF contact to be maintained between Barge Master and Vessel Master. Towing only to be carried out in conditions deemed favourable by both Barge and Vessel Masters.

3. Tow operation to be carried out by the Support Vessel.

4. Once barge is in the appropriate position as confirmed by the CGL Site Agent using the DGPS positioning system, the Support Vessel will maintain position while the spud legs are dropped.

5. Initially the barge will be pre-loaded on 2 of the spud legs to ensure barge stability and suitable bearing strata beneath the spud legs has been achieved.

6. Once the pre-loading period (nominally 1hr) has been completed, and the Barge Master is happy with the leg penetration and stability, the barge will then be jacked up to the working deck level.

7. A 1m gap will be maintained between the underside of the barge deck and the predicted high tide for that day; this will be adjusted as necessary throughout the completion of each borehole location by the Barge Master.

Barge Access

The safe procedure for accessing the jack-up barge are outlined below.

1. The gangway may be used for accessing those locations adjacent to the existing quay if site conditions allow. The Crew Boat (OCM Supporter) will be used for all personnel transfers for those locations outside of that, with the OCM Vessel Master will be in total charge of all small boat operations and will brief any new crew/supervising staff prior to boarding the Crew Boat (OCM Supporter) for the first time.

2. Only enter/exit at the instruction of the OCM Vessel Master. Three-point contact should be maintained at all times when boarding/disembarking the Crew Boat.

3. When ascending/descending the fixed ladder a fall arrestor and lifejacket/harness system will be made available to be attached to each crew member. This would be fixed to a suitable anchor point on the jack-up barge; it will be tied off to the ladder for easy retrieval by the last man descending at the start of each shift. This will be used for both OCM and CGL staff and any third parties.

4. Once at the bottom of the fixed ladder connect the fall arrestor/inertia reel to the person's harness. Climb the ladder with three points of contact at all times as the fall arrestor/inertia reel retracts the fall lanyard. When the person is at the top of the ladder standing safely on the barge, the person disconnects the fall arrestor/inertia reel from their harness and lowers down to the next person. The operation is repeated in reverse for disembarking the barge.

   Note: Persons descending a ladder must do so in a slow safe manner as to not trigger the fall arrestor/inertia reel system.

Barge Egress

The safe procedure for egressing the jack-up barge are outlined below.

1. Transfer from the barge to the Crew Boat (OCM Supporter) will be via fixed ladder and fall arrestor lifejacket/harness system as required.

2. Once all crew are safely in the Crew Boat, they will be transferred to the west riverbank.

3. Only exit the Crew Boat at the instruction of the OCM Vessel Master. The Crew Boat will be exited at the west riverbank. Three-point contact should be maintained at all times with disembarking the Crew Boat. This egress location will be used for both OCM and CGL staff and any third parties.

4. For BH111 and BH113 the egress may be via gangway to the riverbank if site conditions allow.

Refer to: **OCEAN CREST MARINE RISK ASSESSMENT**

CAUSEWAY GEOTECH	Document No:	MS_027
	Primary Author:	N Haggan
	Authorised by:	C Doherty
METHOD STATEMENT	Issue Date:	23rd March 2021
SONIC DRILLING	Issue No:	2
	Date Reviewed:	29/03/2022

Brief Description of Work	Sonic Drilling			
Overview	Sonic Drilling is a common method of forming boreholes through soil and rock strata and is undertaken using a mobile tracked sonic drilling rig. The rigs are diesel powered. Causeway Geotech operate a fleet of various rigs with differing capabilities. Rigs are typically transported to site on rigid 'Beaver Tail' lorries or articulated low loaders along with their ancillary items. Works are carried out by a competent Lead Driller and accompanied by a Support Operative.			
Technical References	UK Specification for Ground Investigation. BS 5930 Code of Practice for Ground Investigations. BS EN ISO 22475-1 Geotechnical Investigation and Testing – Sampling and Groundwater Measurements. Technical Principles for Execution. BS EN ISO 22476-3 Geotechnical Investigation and Testing – Field Testing. Standard Penetration Test. British Drilling Association Health and Safety Manual.			
Who will do the work	Causeway Geotech Limited employees and / or approved sub-contractors			
Task Risk Assessment	GRA 027 – Sonic Drilling			
What training do they need	***Specific Training Requirements***	***Lead Driller***	***Support Operative***	***Comments***
	CSR / CSCS / SafePass Card	✓	✓	
	NVQ Level 2 Land Drilling	✓		
	Manual Handling	✓	✓	
	Emergency First Aid at Work	✓	✓	
	Location of Underground Services	✓		
	Asbestos Awareness	✓	✓	
	Face Fit Tested	✓	✓	
	Abrasive Wheels	✓		
	Other (please specify)			
Main Hazards involved in task	Underground Services Overhead Services Manual Handling Slips / Trips / Falls Lifting Operations	Workplace Transport Impact Injury Noise Entrapment Equipment Failure	Extremes of Climate Occupational Skin Disease Disease Respirable Dust Fumes	
Special Attention	Underground Services, Overhead Services			

Level of Supervision	NVQ Level 2 Diploma in Land Drilling			
What PPE is required	 Clothing	EN ISO 11612 Flame retardant coveralls.	 Foot	EN ISO 20345 S1P rated safety footwear.
	 Head	EN 397 rated safety helmet with chin strap fitted.	 Hand	EN 388 Grade 4.1.1.1 Working gloves.
	 High Visibility	EN 20471 Class 3 clothing.	 Hearing	EN 352-3 SNR 24 helmet mounted.
	 Eye	EN 166 Cat 1F.	 Respiratory	EN 140 P3 (APF20) reusable half-mask (Face Fit Tested).
	 Life Preserver	Task specific – e.g. where working near open quayside or on marine works	 Fall	Task specific
	 Other	Any other PPE as directed by Risk Assessments applicable to main activities being undertaken. Refer to Construction Phase Plan.		
What essential equipment will be involved	Sonic Drilling Rig Drilling Tools / Accessories Sampling Equipment Cable Avoidance Tool Signal Generator PPE		First Aid Kit Eye Wash (1 Litre) Dry Powder Fire Extinguisher Spill Kit Mobile Phone	
Signage \ Barriers Required	Causeway Geotech Limited standard site signage. Requirements for Heras style / Chapter 8 fencing to be risk assessed for each borehole location.			
Action to be taken prior to starting work on site	Utilities plans to be obtained from network operators – Electricity, Gas, Water, Telecoms. IMSF42 Lead Driller Project Task Form to be issued. Check PPE for serviceability.			

System of Work	Stage	Action
	1.	Don all appropriate PPE identified for the activities being conducted.
	2.	Ensure all those involved in process have been briefed on risk assessment, method statement and emergency procedures. Use of IMSF28 is recommended.
	3.	Conduct Daily Before Use Check, daily servicing and ensure all guards fitted and emergency features functioning to rig and ancillary equipment. Report all faults identified.
	4.	Lead Driller to walk the access route to check for any hazards, soft ground, obstacles and signs of buried or overhead utilities e.g. manhole and inspection pit covers, pipeline markers, streetlighting etc. Any hazardous areas should be demarcated with barriers, cones etc.
	5.	Clear immediate borehole location in accordance with Safe Operating Procedure 01 - Safe Digging / Location of Services – including inspection pit to minimum of 1.2m bgl. A pit should always be excavated for self-protection of the drill crew.
	6.	The rig is to be offloaded on flat level ground where possible and done so by trained competent Lead Driller with Support Operative acting as banks person. Remote operation is to be used for all loading, offloading and manoeuvring where this option exists.
	7.	If works are to take place on a slope, prepare the site by excavating a suitable flat bench.
	8.	Manoeuvre the drilling rig over the borehole test location with Support Operative acting as banks person. A suitably sized clear area will be required for safe operation of the drilling rig.
	9.	If possible, position the engine downwind from the borehole so that you are not subject to exhaust fumes.
	10.	Lead Driller to ensure immediate area is clear of unauthorised personnel before proceeding. Any authorised visitors must have the appropriate training and PPE.
	11.	Place timber ‘sleepers’ under hydraulic levelling jack pads to provide adequate support and ensure rig is level.
	12.	Raise the mast using the hydraulic controls so that it is in the vertical position. Ensure that all locking mechanisms are engaged and retaining pins / clips fitted.

	13.	Establish a working area for all tools and equipment away from the immediate borehole area. The Support Operative is always to keep this tidy.
	14.	Textured anti-slip Ground Guard matting should be used to avoid unnecessary damage to ground and reduce reinstatement works.
	15.	Adequate bunding is to be used where risk of run-off from drilling has the potential to cause environmental damage e.g. to run into drains and nearby water courses.
	16.	If required or stipulated, secure the working area with appropriate fencing to prevent unauthorised entry.
	17.	Lead Driller and Support Operative to establish good communications and maintain line of sight when operating to ensure hands are not placed in known entrapment zones.
	18.	Lower the lead length of casing to the ground surface/base of the inspection pit by using drilling rods attached to drill head, or by use of the rig winch.
	19.	With the casing string now in place, the inner sonic barrel can now be engaged.
	20.	With the drill string in place ready for drilling and the interlocking safety cage closed, preparations can now be made to commence drilling.
	21.	All high-pressure water and air connections are checked as part of the daily inspection regime, particular attention is paid to the fitting of all 'whip checks' on connections.
	22.	Once all preparations are complete the drilling process will commence in accordance with standard industry practice for the anticipated geological conditions expected and the drilling system being used.
	23.	The lead Driller will control drilling progress by means of adjusting rotation and vibration frequency.
	24.	Once each length of sample has been taken (typically in 1.5m lengths), the vibration and rotation is to be stopped by the Lead Driller and the Support Operative readies themselves to remove the sample.
	25.	The uppermost rod is to be held in the rig clamps and unscrewed. The drilling team will then lift on the next length of casing using the Manipul® casing lifting assistant and this is screwed on manually or by using the rigs clamps and slow/creep rotation to tighten. A drill rod is then to be placed inside the casing, fed from the top, and screwed onto the drill string that is attached to the barrel.

	26.	Sampling and SPT testing will be conducted in accordance with the current version of the appropriate published standard.
	27.	During drilling the Lead Driller is to monitor all gauges, controls and returns - adjusting rotation, vibration frequency as required.
	28.	If asbestos is suspected of being encountered during drilling or sampling, employees are to consult and act in accordance with Safe Operating Procedure 02 – Suspected Encounter with Asbestos.
	29.	Once specified depth reached the borehole is to be completed in accordance with details on IMSF42 Lead Driller Project Task Form. The options include: • Switching to the GeoborS coring option (see MS_014 Rotary Coring) to advance borehole to required termination depth. • Backfill with arisings and ground surface is reinstated to a condition comparable to before works. • Grouted-up (e.g. by bentonite pellets or with a cement-bentonite grout) and ground surface is reinstated to a condition comparable to before works. • Installation of a groundwater and/or gas monitoring device with a lockable cover placed at ground level.
	30.	Reinstatement works are to be level with surrounding ground to prevent and slips / trips / falls occurring. If reinstatement cannot be completed, then areas must be protected by barriers to prevent slips / trips / falls occurring.
	31.	Lead Driller to complete Driller's Log noting ground conditions encountered, samples taken, in-situ test results, groundwater observations, any operational issues and details of any monitoring instruments installed.
	32.	On completion of works, demobilise the drilling rig by reversing the procedure for setting up. Ensure that there is no contamination of public / private roads with spoil from tracks.
What action will be required on completion of work	All locations to be reinstated to 'As Before' condition. All areas checked and cleared of tools and equipment. All waste bagged and removed from site. All equipment faults / breakages to be reported.	
Emergency Action / Procedures	All employees will comply with any emergency procedures specified during site inductions. Where these do not exist, employees will follow our management procedures.	

CAUSEWAY GEOTECH	Document No:	MS 028
	Primary Author:	J Doxey
	Authorised by:	C Doherty
METHOD STATEMENT *Work in the vicinity of water*	Issue Date:	12/05/2021
	Issue No:	2
	Date Reviewed:	29/03/2022

Brief Description of Work	Working in the vicinity of water			
Technical References	UK Specification for Ground Investigation. BS 5930 Code of Practice for Ground Investigations. BS EN ISO 22475-1 Geotechnical Investigation and Testing – Sampling and Groundwater Measurements. Technical Principles for Execution. BS EN ISO 22476-3 Geotechnical Investigation and Testing – Field Testing. Standard Penetration Test. British Drilling Association Health and Safety Manual. CDM Regs 2016 Section 26			
Who will do the work	Causeway Geotech Limited employees and / or approved sub-contractors			
Task Risk Assessment	GRA 028			
What training do they need	***Specific Training Requirements***	***Lead Driller***	***Support Operative***	***Comments***
	CSR / CSCS / SafePass Card	✓	✓	
	NVQ Level 2 Land Drilling	✓		
	Manual Handling	✓	✓	
	Emergency First Aid at Work	✓	✓	
	Location of Underground Services	✓		
	Asbestos Awareness	✓	✓	
	Other (please specify)			
Main Hazards involved in task	Overhead Services Manual Handling Slips / Trips / Falls Lifting Operations Working in the vicinity of water	Workplace Transport Impact Injury Noise Entrapment Equipment Failure	Extremes of Climate Occupational Skin Disease Disease Respirable Dust Fumes	
Special Attention	Overhead Services Water			
Level of Supervision	NVQ Level 2 Diploma in Land Drilling			
What PPE is required	 Clothing	EN ISO 11612 Flame retardant coveralls.	 Foot	EN ISO 20345 S1P rated safety footwear.

	 Head	EN 397 rated safety helmet with chin strap fitted.	 Hand	EN 388 Grade 4.1.1.1 Working gloves.
	 High Visibility	EN 20471 Class 3 clothing.	 Hearing	EN 352-3 SNR 24 helmet mounted.
	 Eye	EN 166 Cat 1B helmet mounted face shield.	 Respiratory	EN 140 P3 (APF20) reusable half-mask (Face Fit Tested).
	 Life Preserver	EN ISO 12402	 Fall	EN 361:2002; CE
	 Other	Any other PPE as directed by Risk Assessments applicable to main activities being undertaken. Refer to Construction Phase Plan.		

What essential equipment will be involved	Rotary Drilling Rig	PPE
	Compressor	First Aid Kit
	Drilling Tools / Accessories	Eye Wash (1 Litre)
	Sampling Equipment	Dry Powder Fire Extinguisher
	Cable Avoidance Tool	Spill Kit
	Signal Generator	Mobile Phone

Signage \ Barriers Required	Causeway Geotech Limited standard site signage. Requirements for Heras style / Chapter 8 fencing to be risk assessed for each borehole location.
Action to be taken prior to starting work on site	Utilities plans to be obtained from network operators – Electricity, Gas, Water, Telecoms. IMSF42 Lead Driller Project Task Form with Associated Risk Assessment to be issued. Check PPE for serviceability.

System of Work

Stage	Action
1.	Don all appropriate PPE identified for the activities being conducted.
2.	Ensure all those involved in process have been briefed on risk assessment, method statement and emergency procedures.

	3.	Conduct Daily Before Use Check, daily servicing and ensure all guards fitted and emergency features functioning to rig and ancillary equipment. Report all faults identified.
	4.	Lead Driller to walk the access route to check for any hazards, soft ground, obstacles and signs of buried or overhead utilities e.g. manhole and inspection pit covers, pipeline markers, streetlighting etc. Any hazardous areas should be demarcated with barriers, cones etc.
	5.	Clear immediate borehole location in accordance with Safe Operating Procedure 01 - Safe Digging / Location of Services – including inspection pit to minimum of 1.2m bgl. A pit should always be excavated for self-protection of the drill crew.
	6.	The rig is to be offloaded on flat level ground where possible and done so by trained competent Lead Driller with Support Operative acting as banks person. Trailer wheels are to be chocked. Remote operation is to be used for all loading, offloading and manoeuvring where this option exists.
	7.	If works are to take place on a slope, prepare the site by excavating a suitable flat bench.
	8.	Manoeuvre the drilling rig over the borehole test location with Support Operative acting as banks person. A suitably sized clear area will be required for safe operation of the drilling rig.
	9.	If possible, position the engine downwind from the borehole so that you are not subject to exhaust fumes.
	10.	Lead Driller to ensure immediate area is clear of unauthorised personnel before proceeding. Any authorised visitors must have the appropriate training and PPE.
	11.	Place timber ‘sleepers’ under hydraulic levelling jack pads to provide adequate support and ensure rig is level.
	12.	Raise the mast using the hydraulic controls so that it is in the vertical position. Ensure that all locking mechanisms are engaged and retaining pins / clips fitted.
	13.	Establish a working area for all tools and equipment away from the immediate borehole area. The Support Operative is always to keep this tidy.
	14.	Textured anti-slip Ground Guard matting should be used to avoid unnecessary damage to ground and reduce reinstatement works.
	15.	Adequate bunding is to be used where risk of run-off from drilling has the potential to cause environmental damage e.g. to run into drains and nearby water courses.

	16.	If required or stipulated, secure the working area with appropriate fencing to prevent unauthorised entry.
	17.	Lead Driller and Support Operative to establish good communications and maintain line of sight when operating to ensure hands are not placed in known entrapment zones.
	18.	Lower the lead length of casing to base of borehole by using drilling rods attached to drill head, or by use of the rig winch. Depending on starting depth, additional casing may be required to be lowered down the borehole in the same manner.
	19.	With the casing string now in place, the pneumatic hammer is to be lowered into position and locked into the lead length and attached to the drive head via a string of drill rods.
	20.	With the hammer locked in place and the interlocking safety cage closed, preparations can now be made to commence drilling.
	21.	When a compressor is used, the Lead Driller is to ensure that it is sited remotely with handbrake applied and wheels chocked. A Daily Before Use Check is to be completed, paying particular attention to certification, serviceability, air lines and fitting of 'whip checks', as shown: 
	22.	Once all preparations are complete the drilling process will commence in accordance with standard industry practice for the anticipated geological conditions expected and the drilling system being used.
	23.	The lead Driller will control drilling progress by means of adjusting rotation, feed and flush. The pneumatic hammer will advance the temporary steel casing.
	24.	During this process ejected arisings are returned to surface and dispersed at force. Only those directly involved in the drilling process should remain in vicinity of drill string when percussive drilling is underway.
	25.	Once each length of casing has been sunk to depth (typically in 1m or 1.5m lengths), the air feed pressure and rotation is to be stopped by the Lead Driller and the Support Operative is to isolate the air supply from the compressor.

	26.	The uppermost rod is to be held in the rig clamps and unscrewed. The drilling team will then lift on the next length of casing and screw on manually, using chain wrenches to tighten. A drill rod is then to be placed inside the casing, fed from the top, and screwed onto the string that is attached to the hammer.
	27.	Sampling and SPT testing will be conducted in accordance with the current version of the appropriate published standard.
	28.	During drilling the Lead Driller is to monitor all gauges, controls and returns - adjusting rotation, feed and flush as required.
	29.	If asbestos is suspected of being encountered during drilling or sampling, employees are to consult and act in accordance with Safe Operating Procedure 02 – Suspected Encounter with Asbestos.
	30.	Once specified depth reached the borehole is to be completed in accordance with details on IMSF42 Lead Driller Project Task Form. The options include: • Backfill with arisings and ground surface is reinstated to a condition comparable to before works. • Grouted-up (e.g. by bentonite pellets or with a cement-bentonite grout) and ground surface is reinstated to a condition comparable to before works. • Installation of a groundwater and/or gas monitoring device with a lockable cover placed at ground level. • Temporary casing is left in-situ to permit rotary follow-on coring through the hard strata.
	31.	Reinstatement works are to be level with surrounding ground to prevent and slips / trips / falls occurring. If reinstatement cannot be completed, then areas must be protected by barriers to prevent slips / trips / falls occurring.
	32.	Lead Driller to complete Driller's Log noting ground conditions encountered, samples taken, hammer details, in-situ test results, groundwater observations, any operational issues and details of any monitoring instruments installed.
	33.	On completion of works, demobilise the drilling rig by reversing the procedure for setting up. Ensure that there is no contamination of public / private roads with spoil from tracks / wheels.

What action will be required on completion of work	All locations to be reinstated to 'As Before' condition. All areas checked and cleared of tools and equipment. All waste bagged and removed from site. All equipment faults / breakages to be reported.
Emergency Action / Procedures	All employees will comply with any emergency procedures specified during site inductions. Where these do not exist, employees will follow our management procedures.