
PROJECT BRIEF

For

PLDT DOMESTIC SUBMARINE CABLE PROJECT - AREA 2

MARINE SURVEY FOR CABLE ROUTE DESIGN AND ENGINEERING

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DEFINITIONS

PURCHASER	PLDT Inc.
CUSTOMER	Wuhan FiberHome International Technologies Phils. Inc. (Fiberhome)
EXCUTION CONTRACTOR	EGS (Asia) Ltd. (EGS) and EGS (Asia) Inc.
BAS Requirement in Shallow Water	EGS will perform the Burial assessment survey with gravity cores and CPTs. Fiberhome will perform the Burial Assessment along the proposed route.
Beach Landing Areas	500m wide corridor, centred on the BMH and extending from 250m inland of the BMH to the lowest astronomical tide datum level or the low water mark at the time of survey. This is also referred to as the onshore area.
Burial Area	From BMH to 200m WD
Burial Depth	2m
Chart Datum	All soundings will be reduced to Mean Lower Low Water (MLLW) for this project.
Sampling Frequency	Beach probing 1 per 10m (nominal) Diver Probing & Sampling 1 per 25m (nominal) Inshore Grab Sampling 1 per 500m (nominal) Shallow Water Gravity Core 1 per 10km (nominal)
CPT Frequency in Shallow Water	1 per 4km (nominal, to 3m depth) to 200m water depth.
Inshore Water Areas	Waters shallower than 20 metres
Shallow Water Areas	> 20m to 200m (MLLW)
Deep Water Areas	Water depths greater than shallow water limits
MLLW	This is the arithmetic mean of the lower low water heights of each tidal day observed over a specific 19-year Metonic cycle
Survey Corridor Width	<ul style="list-style-type: none">• BMH to 200m water depth – 500m• >200m water depth – 3 times water depth; max 1km

ABBREVIATIONS

AC	Alter Course
AS	Alignment Sheet
BAS	Burial Assessment Survey
BJ	Beach Joint
BMH	Beach Manhole
CD	Chart Datum
C.M.	Central Meridian
cm	Centimetre
CPT	Cone Penetrometer Test
dd mm.xxx	Degrees minutes. decimal minutes
DGPS	Differential Global Positioning System
DTM	Digital Terrain Model
DTS	Desktop Study
EEZ	Exclusive Economic Zone
GPS	Global Positioning System
GcGPS	Globally Corrected Global Positioning System
HDD	Horizontal Directionally Drilled
HSE	Health, Safety & Environmental
HWM	High Water Mark
ID	Identification name/number
IFSR	Infield Selected Route
IS	In service
kHz	Kilohertz
km	Kilometre
kPa	Kilo Pascal
KP	Kilometre Post
Lat	Latitude
Long	Longitude
LP	Landing Point
LWM	Low Water Mark
m	Meter
MV	Motor Vessel
MAG	Magnetometer

MBES	Multibeam Echosounder
MSL	Mean Sea Level
MLLW	Mean Lower Low Water (MLLW)
NA	Not Applicable
nmh	No measurable height
NU	North Up
OOS	Out of service
OV	Overview Chart
P	Planned
PC	Planning Chart
PEP	Project Execution Plan
PLGR	Pre Lay Grapnel Run
POW	Plan Of Work
POL	Point On Line
P-RPL	Preliminary RPL
ROV	Remotely Operated Vehicle
RPL	Route Position List
RTCM	Radio Technical Commission for Maritime Services
SBES	Single Beam Echosounder
SBP	Sub-bottom Profiler
SDMP	Seabed Data Management Package
SOW	Scope of Work
SSS	Side Scan Sonar
SVP	Sound Velocity Profile
TM	Transverse Mercator Projection
TW	Territorial Waters
UCS	Unconfined Compressive Strength
USBL	Ultra Short Baseline
UTM	Universal Transverse Mercator Projection
WD	Water depth
WGS84	World Geodetic System 1984

1. INTRODUCTION

The following Project Brief is provided as a survey action plan for the cable route surveys for the PLDT Domestic Submarine Cable Project - Area 2.

The PLDT Domestic Submarine Cable Project - Area 2 project is comprised of 3 point to point segments.

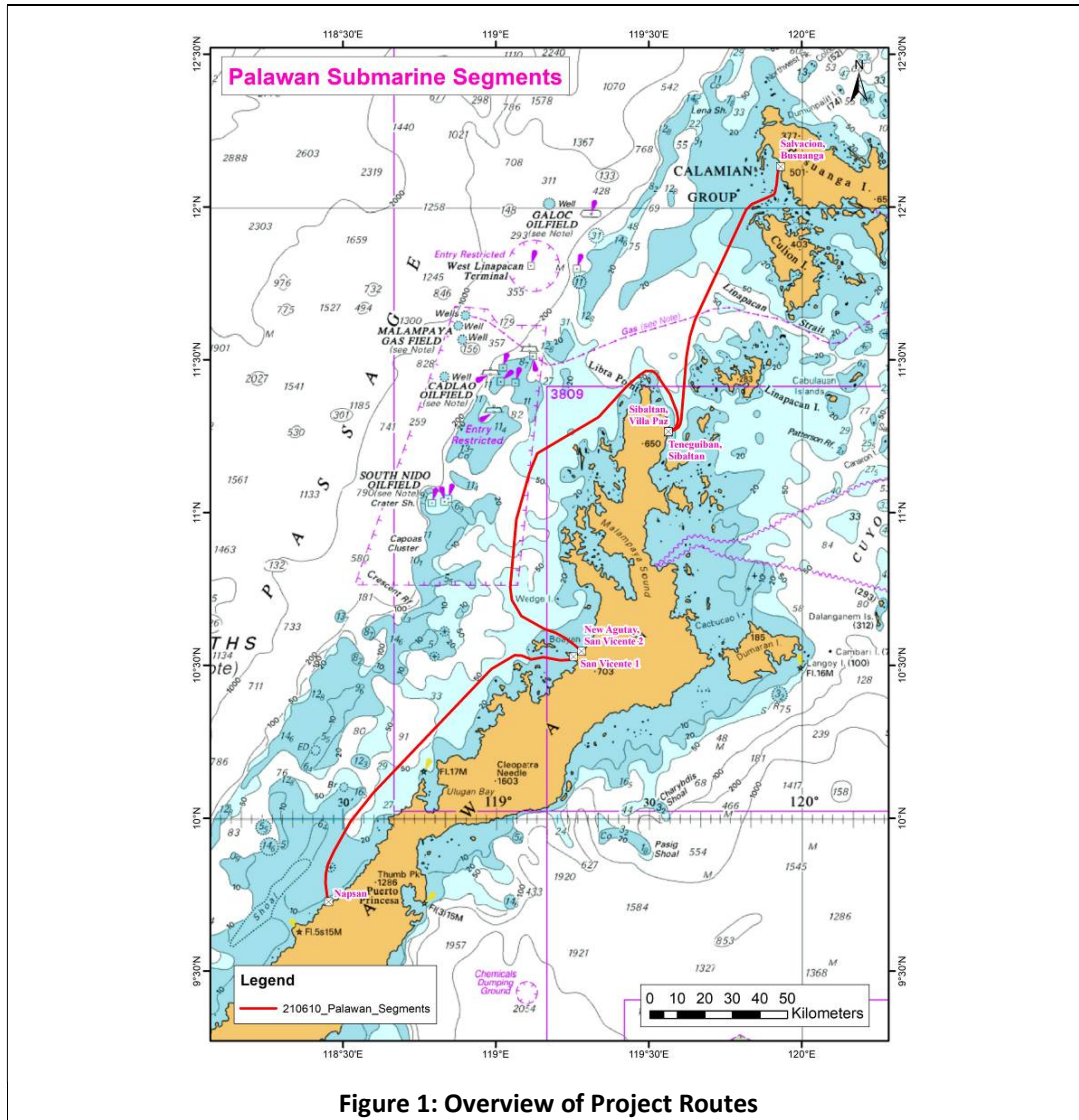


Figure 1: Overview of Project Routes

The purpose of the survey is to provide information for use in the engineering, installation, and subsequent maintenance of the submarine cables. The primary objective of the route survey activities will be to determine water depth, seabed hazards, geomorphology and other oceanographic and anthropogenic data and provide a secure technically and economically viable route for the cable. EGS will work closely with Fiberhome to identify a suitable route

during the survey. Fiberhome will make use of the survey results to support their route engineering process.

2. WORK PLAN

The following section describes the technical aspects of the work plan and is designed to provide additional information to the CUSTOMER SOW.

2.1 PROGRAMME OF EVENTS

EGS' latest project PROGRAMME OF EVENTS (also referred to as a Plan of Work or Gantt chart) is supplied with this document to provide the estimated duration and completion dates for the following events:

- Permit / Licence approvals
- Mobilization
- Survey Operations (this may be subdivided into subsections)
- Shipboard Reports
- Provisional Reports
- Final Reports

2.2 PERSONNEL

2.2.1 Contractors

EGS shall ensure that all survey crew are suitably qualified and trained, and, on request, shall provide CVs for proposed crew members for approval, prior to commencement of the survey operations.

EGS will appoint a suitable offshore senior representative, referred to as the EGS Representative, during all operations who will be overall in charge of the EGS survey crew and sub-contractors (if any), and be available at all times when work is in progress.

2.2.2 Representatives

EGS will make provision for up to 4 PURCHASER/CUSTOMER representatives (from Fiberhome and the Purchaser) to be present during all operations on the main offshore survey vessel. Should there be more than 1 CUSTOMER Representative, a Senior Representative will be appointed and he/she will be the main point of contact for EGS enquiries.

There may be as per permit condition that Navy/Security Representative or Fishery Representative will also be on board.

For inshore/landfall survey the survey is performed during daylight hours and the survey team is staying on shore; accommodation, food and transport are not provided for the PURCHASER/CUSTOMER representatives.

2.3 PRE SURVEY ACTIVITIES

2.3.1 Consents and Permits

Application for relevant survey permits and licences will commence upon contract award to allow the maximum possible time for issue.

EGS will obtain the following permits and approvals in order to execute their scope of work:

- Any necessary work permits required by EGS personnel to work in the relevant countries.
- Necessary marine permits and approvals required to survey the route within the Exclusive Economic Zones and Territorial Waters of the relevant countries.

Supporting documentation and active participation from Fiberhome will be required to assist in obtaining the necessary permissions.

2.3.2 Project Management

The EGS Project Manager is appointed on contract award and will assume day-to-day responsibility for the management of the project and the co-ordination of the participating organisations. The Project Manager will be the principle interface between EGS and Fiberhome.

2.3.3 Quality Assurance, Health, Safety & Environment

Prior to mobilisation of the survey vessels, Survey Procedures will be prepared; these procedures will detail the Quality Assurance Plan and Safety Management System, which will apply to all onshore and offshore operations. These procedures are compiled into a Project Quality Manual (PQM), which is to be made available to Fiberhome and on the survey vessels.

2.3.4 Mobilization

Mobilization of the offshore survey vessel will take place in Cebu, Philippines where embarkation of the survey crew will take place. The mobilization will be under the direction of the vessel Party Chief on site; any equipment defects or hazards will be reported directly to the Project Manager for assessment.

2.3.4.1 Vessel Mobilization

During mobilisation in port, the following checks and calibrations will be carried out:

- Check full functionality (voice / email & data), including test messages to Fiberhome's office.
- Check Vessel Certification is valid in class and in date.
- All computer systems will be demonstrated to be receiving data from the various positioning and survey systems. Software checks to demonstrate the operability of the system.
- DGPS health check.

- Gyro calibration conducted by comparison of readings taken simultaneously with measurement of offsets from the vessel's centreline to a baseline of known azimuth on the quayside.
- Offset measurements.
- Multibeam echo sounder calibration will be checked in accordance with EGS QA procedures.
- Motion sensor performance check.
- Towed sensors 'wet tested' to prove operability of the system and of the deployment arrangements.
- The tow-fish positioning system checked and calibrated.
- CPT functionality check on deck and if applicable test in water.

On satisfactory completion of the above, in port mobilisation of the survey vessel will be deemed to be complete.

2.3.4.2 Survey Vessel Sea Trials and Calibrations

The sea trials will include:

- Testing of on-line computer systems to ensure that all navigation systems are being logged and computed with positions being displayed and plotted.
- Verification of navigation systems by conducting a series of analyses of Standard Deviations and residuals.
- Conduct temperature and salinity measurements to confirm the velocity of propagation for the acoustic equipment.
- Wet testing of side scan sonar to check tuning of recorder/transceiver.
- Wet testing of sub-bottom profiler to check tuning of recorder/transceiver.
- Wet testing of CPT system to ensure it functions properly in various water depths.
- Patch Test to ensure all multi-beam components are in operational condition.
- "BOX-IN" calibration to ensure USBL components are in operational condition.
- Checking of interfacing between the on-line computer and survey systems to ensure that echo sounder data is being logged correctly and that sounder, sonar and CTD profiler records are being properly annotated.

2.3.4.3 Operations Reports

The specific calibrations and checks performed during the mobilisation will be presented to the CUSTOMER as either EGS approved ISO documentation and/or system specific calibration reports. These documents are deemed sufficient to allow for the commencement of survey operations.

Subsequently and as time permits the full operations report will be completed. This report will include:

- Daily Progress Reports.
- HSE checks.
- Geodetic Survey Parameter checks.
- Survey Equipment List (capital equipment items only).
- Vessel Offset diagram and checks.
- Survey instrument calibration summaries.
- A statement from the Party Chief / Senior Scientist confirming that the vessel and survey equipment is within specification, fit for purpose and safe to proceed.

2.4 EQUIPMENT LISTS

2.4.1 Topographic and Inshore Survey Equipment List

Survey Equipment	Description	Qty
Positioning Systems:		
Positioning	C-Nav 3050 DGPS System	1
	C-Nav 5000 DGPS System	1
	Norbit GPS Receiver	1
Heading	Azimuth 1000	1
	Norbit Heading System	1
Bathymetric:		
Multibeam Echo Sounder	Norbit iWBMS System	2
Singlebeam Echo Sounder	Odom MK III, Odom Hydrotrac II	2
Motion Compensator	Norbit Motion Compensator System	1
MRU	MRU 5, TSS 1 Heave	2
Sound Velocity Profiler	CastAway CTD	2
Tide Gauge	Valeport Tidemaster	2
Geophysical:		
Side-Scan Sonar System	Klein 3000 system	1
Sub-Bottom Profiler System	Low Voltage Boomer and C-Phone Hydrophone	1
Magnetometer System	SeaSpy	1
Sampling	Van Veen Grab Sampler	2
Diving	Probe bar, GoPro Hero 7, T-bar	3
Data Loggers:	C-View Acquisition Lap top with Maggy Acquisition	1

	C-view Nav Laptop	1
	Qinsy Laptop	1
Topographic:		
Positioning	Topcon RTK GR-5 (2pcs.), Topcon Total Station GM-55	1
Cable Locator	Radiodetection RD8000 Cable and Pipe Locator	1

Table 1: Topographic and Inshore Survey Equipment List – Team 2 Dennis 9

2.4.2 Offshore Survey Equipment List

VESSEL	RV Geo Resolution
Surface Positioning and Navigation systems	Veripos DGPS system, QPS Qinsy Navigation Software, Saturn AHRS10 Surface Heave Motion Compensator , F185+ Heave Motion Compensator
Bathymetry : MBES	Reson 7150 multibeam system
SVP/CTD	Valeport MIDAS SVP Probe, AML “PLUS X” Velocity Profiler, Sippican T5 probe
SSS and SBP	Edgetech 4200MP dual frequency SSS fish. Edgetech DSS2000 dual frequency SSS and Chirp sub-bottom profiler. Hull mounted Geopulse 4x4 Pinger sub-bottom profiler C-VIEW acquisition system.
Magnetometer	Seaspy2 Magnetometer
Underwater Positioning	Kongsberg HiPAP 501 USBL System
Geophysical Operating Software Package	C-View Seabed Data Management Package (SDMP)
Seabed Sampling and MCPT	3m gravity corer; Grab sampler; Datem 3000 MK II MCPT with Piezo Cone (Spare Cones and PCB for Datem System)
Seabed Temperatures	Near-seabed temperature data from the velocity profiling instruments described above.

Table 2: Offshore Survey Equipment List

2.4.3 Offshore Survey Equipment List

VESSEL	RV EGS Surveyor
Surface Positioning and Navigation systems	Veripos DGPS system, QPS Qinsy Navigation Software, Saturn AHRS10 Surface Heave Motion Compensator , Seapath 380 Heave Motion Compensator
Bathymetry : MBES	Kongsberg EM302 multibeam system
SVP/CTD	Valeport MIDAS SVP Probe, AML “PLUS X” Velocity Profiler, Sippican T5 probe
SSS and SBP	Edgetech 4200MP dual frequency SSS fish. Hull mounted Geopulse 4x4 Pinger sub-bottom profiler C-VIEW acquisition system.
Magnetometer	Seaspy Magnetometer
Underwater Positioning	Kongsberg HiPAP USBL System
Geophysical Operating Software Package	C-View Seabed Data Management Package (SDMP)
Seabed Sampling and MCPT	3m gravity corer; Grab sampler; Datem 3000 MK II MCPT

	with Piezo Cone (Spare Cones and PCB for Datem System)
Seabed Temperatures	Near-seabed temperature data from the velocity profiling instruments described above.

Table 3: Offshore Survey Equipment List

3. FIELDWORK PROCEDURES

The standard EGS ISO: 9001 survey procedures are presented in Section 7 of the PQM.

The table below shows the proposed survey coverage that will satisfy the requirement of 20% multibeam overlap and 100% side scan sonar data overlap.

Depth Range	Survey Corridor	Survey Line Spacing	No of Survey Lines	Side Scan Sonar Range	Nominal Vessel Speed	Equipment
250m behind the BMH to 0m	500m	50m	13	NA	NA	Total Station, probes at 10m intervals along CL only. Cable detector to locate existing cables
0m to ± 3 m or inshore limit of survey vessel	Single Swim Pass	NA	1	NA	NA	Total Station, diving equipment (on centreline only), GcGPS. Diving probing & sampling per 25m intervals
± 3 m to 20m	500m	75m	5	100m	3–4 knots	DGPS, SBES, MBES, SBP, SSS, MAG, grab sample per 500m
>20m to 50m	500m	75m	3	150m	4–5 knots	DGPS, MBES, SBES, SBP, SSS, MAG, corer or grab sample per 10km, MCPT per 4km

Table 4: PLDT Domestic Submarine Cable Project – Area 2, Survey Line Plan

3.1 INSHORE SURVEYS (0-20M)

3.1.1 Landing Site Surveys

Beach Manhole (BMH) locations and the cable's landing points should be confirmed with CUSTOMER Representatives on site prior to commencement of survey, based on the DTS report and the survey RPLs.

Conventional surveying techniques combined with the global positioning system (GPS) surveying will be utilised to establish the positions of control points at each of the landing sites as well as the Beach Manhole (BMH) locations and the cable's landing point. All positions recorded using GcGPS are geographic coordinates in WGS 84.

Prior to commencing inshore survey/speed boat survey, a tide gauge will be setup at an area where the place is suitable for the installation. The continuous observation of tide level will be recorded at regular intervals for a survey period. The tidal data will be used to reduce all observations to MLLW.

Features mapped within a 500 metre wide corridor centred on the proposed route will include but not be limited to the following:

- Position of the proposed or established BMH
- Low water mark, relative to MLLW
- High water mark, relative to MLLW
- Other In Service and Out of Service cables or pipelines
- Seawalls, tree lines, sand dunes, fences, beach access points, tracks, roads and signs etc.

All natural and man-made features will be located using a total station setup at a control point. In addition to the features within a survey corridor of 500 metre, the extent of the Landing Site Survey will include 250m behind the BMH. The survey will include positioning of any intermediate alter courses (AC) and Duct End between the Landing Point and the BMH (as identified by the DTS and CUSTOMER Representatives).

All landing site survey data collected will be down loaded from the data collector to a portable computer at the end of each day. The raw survey data will be processed and produce a preliminary map on site. All processed data will be stored in digital format.

Hand Probing will be attempted along the route centre line at regular 10m intervals and to a nominal depth of 2m.

If any existing cables and pipelines lie within the survey corridor, they are to be identified using land magnetometer or cable locator, then being mapped on the drawings.

Comprehensive photographs including 360° view of the landfall area should be taken with a log kept of the photograph number and a description of the photograph. Log sheets with

recorded sediment depths and details of substrata, level heights and their coordinates should also be presented.

3.1.2 Diver Swim Survey (0 - ~3m)

A diver swim team using dive depth gauge, video camera and probe will be used to swim along the planned survey central line between the LP and inshore limit of inshore survey vessel or 3m water depth (whichever is deeper), in order to characterise the seabed soil conditions and confirm that the route is free from obstruction.

Seabed level is to be measured and recorded by diver depth gauge at 25m graduation. Geomorphology will be determined by underwater video, bar probing and sediment sampling along the diver swim rope. Bar probing and sediment sampling to be conducted nominally every 25m along the diver swim rope. The diver video will record along the planned line in the survey swath though the quality is ambient visibility dependent. The video must show the seabed conditions along the swim line, ahead of the diver (i.e. not pointing directly downwards) and so that the diver's position relative to the swim line can be seen at all times. The video must show each mark so that it can be clearly read on screen, post survey. At each mark the video camera should be slowly swung left and right once so that the seabed conditions a few meters either side of the swim line are visible.

Any obstruction, potential hazard or suspected feature that may pose engineering constraints to the submarine cable will be located and fully documented.

For each of the diving line, observations must be recorded and the video must be annotated so that it can be clearly understood which line is being surveyed.

The preferred format for the diver swim survey is on DVD. Electronic copies of the logs containing start and end point coordinates (WGS 84 Lat and Lon) for each swim line, bar probe results, water depth records and any diver observations should be kept.

The client may deem that a diver survey is not required if there is sufficient overlap obtained between the topographic and hydrographic surveys.

By agreement with the Purchaser, dive surveys may be dispensed with at sites where visibility or prevailing surf conditions would preclude gathering any meaningful data.

3.1.3 Inshore Geophysical Survey (~3m to 20m)

The Small Boat Survey will extend seaward from the safe working draft limit of the small boat (approximately 3 metres) to the safe working limit of the primary offshore survey vessel. It should be noted that the inshore safe working limits of the small boat are dictated by bathymetry and swell conditions, thus the safe working limit of the boat will be assessed on site with the CUSTOMER Representative. The final decision to undertake the survey will lie with the vessel master and Party Chief. Where possible the main offshore vessel may survey into the near shore area to reduce the small boat survey work e.g. 15m to 20m water depth.

The track-line grid will comprise 5 track-lines, the route centre line and 2 parallel wing lines offset 75m each side. A high-resolution 100/500 kHz side-scan sonar system, high resolution

LVB boomer sub-bottom profiler, and multibeam echo sounding system will be utilised. A tow fish position will be determined by layback calculation.

A side-scan sonar swath of 100m (range of 75m) with the 75m-line spacing will provide multiple (>100%) overlap of the critical centre line with sonar seafloor imaging enabling multiple verification of seafloor obstructions. This survey coverage may be modified at landing sites where it is possible to safely navigate the offshore vessel closer to the shore than the 20m contour. In these cases the offshore line pattern will be extended into the inshore survey zone if the line pattern provides project required data coverage and overlapping.

Whenever possible, the inshore survey will extend 500m into the coverage area provided by the main offshore vessel to provide ample overlap across the survey transition zone. Any seafloor or sub-bottom features that may present a potential hazard or constraint to the submarine cable will be investigated and detailed with an appropriate number of additional investigation track-lines. The proposed route centre lines will be run initially to determine the existence of any potential hazards or engineering constraints to the submarine cable and to enable potential route deviations to be immediately identified.

It is EGS normal practice to perform a marine magnetometer or cable locator survey at each landing point to locate existing cables and map their positions.

Sampling will be undertaken using a hand deployed grab sampler at 500m intervals. In addition to samples taken every 500m interval along the inshore water survey route, grab samples shall also be taken at the five metre (5m) and ten metre (10m) contour by the inshore survey vessel to verify the seabed type.

3.2 MAIN OFFSHORE ROUTE SURVEY (>20M WATER DEPTH)

3.2.1 General Survey Strategy

The survey will commence based on the latest RPL supplied by the CUSTOMER Representative. The Party Chief will be responsible for compiling a detailed survey line plan based upon this RPL. It is therefore important that this RPL be received in a timely manner. The Party Chief will then provide a copy of the survey line plan to the CUSTOMER Representative for their comment.

The primary purpose of the survey is to determine a viable and secure route for the cable system that is clear of the following:

- Excessive slopes steeper than 5°
- In areas of proposed burial, sea floor conditions that will adversely affect ploughing and burial of the cable.
- Sea currents that will affect cable burial and long-term security.
- Obstacles (outcrops, cable spans, existing cables, pipelines, shipwrecks etc.).

3.2.2 Survey Coverage

Table 4 above shows the proposed survey coverage that will satisfy the requirement of 20% multibeam overlap and 100% side scan sonar data overlap.

Whenever practical, the inshore survey will achieve 500m overlap with the shallow water survey extents at the landfalls.

Track lines will be run so that the position of the side scan sonar fish follows the track line (if possible within 15 metres). Side scan ranges may be increased in areas of strong currents where line keeping is difficult, after consultation with CUSTOMER Representative.

3.2.3 Seabed Sampling

Interpretation of the geophysical data onboard the survey vessel will be used as the basis for selecting seabed sampling locations. Two types of seabed sampling equipment will be employed; a conventional Van Veen or Shipek type grab sampler for obtaining surface samples and a 3m gravity corer. Standard sampling procedure is to deploy the gravity corer and if it fails to obtain a decent sample 2m) after 2 attempts, then the grab sampler is employed. A core is deemed acceptable if 2m of material is recovered. Sample locations will be selected by on board geophysicists in consultation with CUSTOMER Representative. The specified requirement of taking core samples is 10km intervals.

Cores will be cut into 1m sections for photography, description and testing. Core descriptions and logs will follow EGS procedures detailed in the PQM.

3.2.4 CPT Operations

Interpretation of the geophysical data onboard the survey vessel will be used as the basis for selecting MCPT locations.

The Penetration Depth of CPT is 3m in this case, though the contract requirement of burial is 2m water depth to 200m water depth.

The standard push is 3m in thick sediments; however this may be reduced in areas where hard soils/rock is expected to, avoid unnecessary damage to equipment. The standard procedure is to deploy the MCPT and if the first push on any site fails to reach the target penetration (2m, as per proposed cable burial depth), a second push will be carried out at close proximity to confirm the occurrence of impenetrable soils.

The CPT rig shall be lifted off the seafloor and repositioned back down before the second push is carried out.

MCPT locations will be selected by on board geophysicists in consultation with CUSTOMER Representatives. The specified requirement for performing CPT is 4km intervals.

3.2.5 Speed of Sound Corrections

All bathymetric data will be corrected for speed of sound in water which will be determined using a calibrated CTD probe or in deep water, an Expendable Bathy Thermograph (XBT) probe, or a combination of both. Measurements will be taken generally every 24 hours or more frequently in areas where variable velocity is anticipated.

3.2.6 Cable and Pipeline Crossings

In proposed areas of burial attempts, if an in-service cable or pipeline is located within the survey corridor or crosses the planned cable, efforts will be made to determine its location, orientation and burial status.

In the proposed areas of burial, in the event that acoustic methods are unsuccessful in locating known cables and pipelines, a marine magnetometer will be used to try and confirm their position.

Survey lines will be run perpendicular to the existing submarine plant. Three lines will be run centred on the crossing point of the proposed route with the existing plant and offset nominally 200m either side of that point. Lines are to be extended to a sufficient distance (nominally 500 metres either side of the database crossing position) in case the existing plant is out of position. Where the plant is not located with the 3-line pattern, an additional 2 lines will be run with magnetometer to try to locate the plant.

If crossing angle reductions are requested by the Client in the event of the crossed feature is not resolved, this additional work is to be logged as Development.

Where the in-field selected route is within 250 metres from the reported position of an “Out Of Service” (OOS) cable, every effort will be made identify the cable location from the Side Scan Sonar or Sub bottom profile records. If located, the as-found position will be plotted; if the cable cannot be located the reported as-laid position will be shown on the charts. The source of the information used during the lay is to be noted on the charts and in the text. In case if OOS cable is requested to detect with magnetometer, such additional work is to be logged as Development.

3.2.7 Survey Practice at Alter Course Positions

Where AC angles exceed a nominal 15° along the route (note that in areas of numerous ACs or where deemed unnecessary this criteria may be relaxed after consultation with the CUSTOMER’s representative), survey lines will be run independently for each course heading, subject to feasibility due to weather and sea state conditions at the time of survey. The route centre line for each course heading will intersect the AC location. Using the proposed multibeam systems, a *run in* and *run out* distance of not less than 500m both before and after each AC will be observed.

3.2.8 Survey Speeds

Survey speeds are designed to conform to equipment specifications and ambient weather conditions. After the consultation with CUSTOMER Representative, the Party Chief may adjust the survey speed accordingly. Survey speed guide lines are given in Table 4 above.

3.3 OCEANOGRAPHIC DATA

3.3.1 Seabed Temperatures

Near-seabed temperature data will be available from the velocity profiling instruments.

3.3.2 Meteorology

A comprehensive log of all observed weather will be kept.

4. DATA PROCESSING, CHARTING AND REPORTING

4.1 GENERAL

EGS will perform on-board data QC and provide preliminary image for CUSTOMER Representative's engineering work.

Bathymetric data collected will be reduced to MLLW using predicted tidal data.

4.2 REPORTING

EGS will prepare detailed reports to supplement and explain thoroughly the data that is presented on the charts. The reports will include:

- Operations Report
- Daily Progress Reports
- Shipboard Reports
- Provisional Reports and
- Final Reports

The Reporting Manager and the Project Manager will sign both the Preliminary and Final reports.

The proposed reporting and charting must comply or exceed compliancy with the requirements laid out in the SOW.

4.2.1 Operations Report

The aim of the operations report is to document calibration observations and results, list of equipment, list of personnel, diagrams and other supporting documents. All the above will be provided to Fiberhome. ISO documents included in the report will be presented on calibration completion.

4.2.2 Daily Progress Reports

Reports, in the form of a daily log of events, will be submitted to the CUSTOMER Representative for approval and signing, on a daily basis. The report will include:

- Summary of work completed in the previous 24 hours
- A diary of significant events in the previous 24 hours
- Work planned for the coming 24 hours
- Work progress measured against work programme
- A breakdown of survey time and downtime, with explanations
- A summary of the weather over the previous 24 hours
- Weather forecast for the next 24 hours
- Route development carried out, shown as 'time taken' and 'distance run'.

- The reason for route development
- Any other matters
- Fiberhome and Purchaser's comments

The following naming convention will be used for the electronic DPR file name AND the subject description of any email(s) delivering that DPR file:

{Project}_{Contractor Name}_{Vessel}_{DPR Number}_{Date}

e.g: DSC2_EGS_GR_DPR001_20210701

4.2.3 Incident/Accident Reports

In the event of any major accidents/incidents (including LTI's and near misses), the Party Chief will provide a suitable report (as per EGS HSE Plan) to the CUSTOMER Representative as soon as possible.

4.2.4 Bridge Observation Log

A bridge observation log shall be recorded during the survey operations. Events of passing by ships, cargos, maritime activities etc. would be properly recorded for CUSTOMER's information.

5. SURVEY VESSELS

The main offshore survey vessel for this project will be the RV Geo Resolution or RV EGS Surveyor, while the FBCA Dennis 9 will be used for inshore works.

5.1 ACCOMMODATION

Accommodation and victualing will be provided for a maximum of 4 CUSTOMER/PURCHASER representatives onboard the main offshore survey vessel during the survey operations. Where possible, office facilities shall be provided for the use of the CUSTOMER Representatives comprising desk space, document storage and the facilities to allow the operation of a personal computer in conditions where confidentiality of work in progress can be maintained.

5.2 COMMUNICATIONS

A secure email log-on will be provided for both CUSTOMER and PURCHASER Representatives. It should be noted that the EGS email and phone system is available for use of all people onboard and as such, whilst business communications take preference, the email is also for personal communications. Where conflicts on communications arise, the Party Chief may implement a time-based management of the system.