(TECHNICAL PART)

TIMORGAP

PRE - BID
SUAI SUPPLY BASE – PHYSICAL SURVEY CAMPAIGN

PACKAGE 2– ONSHORE AND NEARSHORE GEOTECHNICAL INVESTIGATION

January 9th , 2024

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1. PROJECT BACKGROUND

- TIMOGAP new management is currently revisiting and selecting, the SSB Design Review outcomes and its marine infrastructure layout as SSB new project masterplan. Part of it the physical assessment is a critical component of SSB project development study to collect data as design basis or requirement , has been defined as the "Physical Survey Campaign for SSB development Area".
- A prudent approach of this survey is to reassess the current SSB optimization layout with a view to accommodating an intermediate stage. Data consistency from this physical survey campaign will greatly influence the future Detail Engineering Design (DED) of "SSB - Full Development".

- The area allocated for the SSB infrastructure facilities and establishment covers a potential land area of 414 hectares with the development being minimized as much as practical within this footprint.

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2. Purpose of the Onshore and Offshore Geotechnical Site Investigation

The purpose of the onshore and nearshore geotechnical site investigation for the SSB Sual Supply Base project area is to provide:

- Site data and information on the site ground conditions to enable the engineering design of the onshore infrastructure and harbor basin excavation. The specific aims include:
  - Verification of the regional and local geological conditions
  - Assessment of the subsurface geological profile
  - Development of the engineering geological model for the site
  - Acquisition of samples for laboratory testing
  - Assessment of the likely risk associated with any potential geohazards.
  - Interpretation of geotechnical parameters and ground profiles suitable for both proof of concept and detailed engineering design.

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3. Scope of the Onshore and Offshore Geotechnical Site Investigation

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3.1 Scope of the Land (Onshore) Geotechnical Site Investigation

The geotechnical site investigation is to be conducted for the onshore component of the Suai Supply Base project area, the approximate extent of which is shown on Sketch A-1 in Appendix A of TOR Doc. No.: TG-VPIU-SOW-23.008.

The scope of the onshore geotechnical site investigation shall comprise as a minimum:

- **29 x Onshore Geotechnical Boreholes** to provide:
  - Physical samples for visual and tactile assessment (geotechnical logging), and laboratory testing of soil properties
  - In situ testing of soil properties by Standard Penetration Testing (SPT) and Vane-Shear Testing (VST)
- **32 x Cone Penetration Tests** with u2 pore pressure measurements (CPTu) to provide in situ assessment of soil properties, including:
  - 20 x Standard CPTu
  - 12 x Seismic CPTu
- **23 x Test pit excavations** to provide:
  - ✓ Physical samples for visual and tactile assessment (geotechnical logging) and laboratory testing of soil properties, including bulk samples.
- Geotechnical laboratory testing.
- Geotechnical Factual Report

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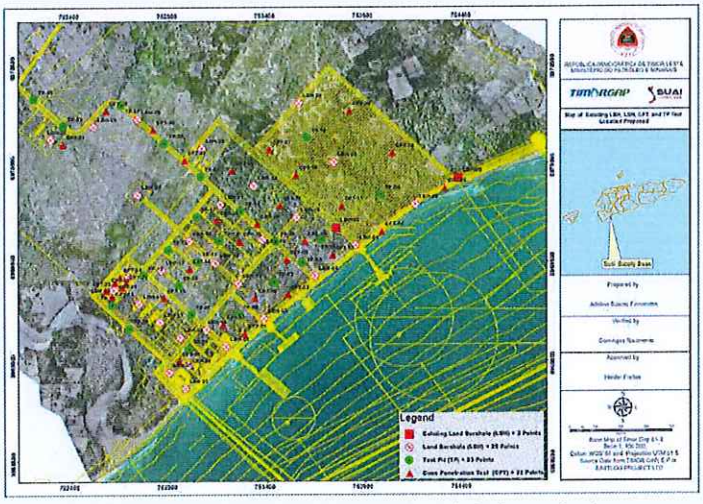

Figure 1. Location of Onshore BH and CPT Geotechnical Investigation

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3.1 Scope of the Land (Onshore) Geotechnical Site Investigation (Continued...)

- all boreholes and CPTu's shall be assumed to extend to a nominal depth of 30 m below ground level (mbgl), except for two (2) boreholes and four (4) CPTu's that shall be assumed to extend to 50 mbgl. Test pits shall be assumed to extend to 3 mbgl. (As shown on APPENDIX C-1 of TOR Doc. No.: TG-VPIU-SOW-23.008.

3.2 Scope of the Marine (Nearshore) Geotechnical Site Investigation

The project marine area is approximately 3,250 m long in an alongshore (southwest-northeast) direction. The width of the survey area in the perpendicular direction varies from approximately 750 m in the south-west, to approximately 1,500 m in the north-east, but has been approximated to coincide with position of the -20 mCD bathymetric contour.

The scope of the marine geotechnical site investigation shall comprise as a minimum:

- **19 x marine Geotechnical Boreholes** to provide:
  - Physical samples for visual and tactile assessment (geotechnical logging), and laboratory testing of soil properties
  - In situ testing of soil properties by Standard Penetration Testing (SPT) and Vane-Shear Testing (VST).
- **37 x marine Cone Penetration Tests (CPT)** with u2 pore pressure measurements (CPTu) to provide in situ assessment of soil properties, including:

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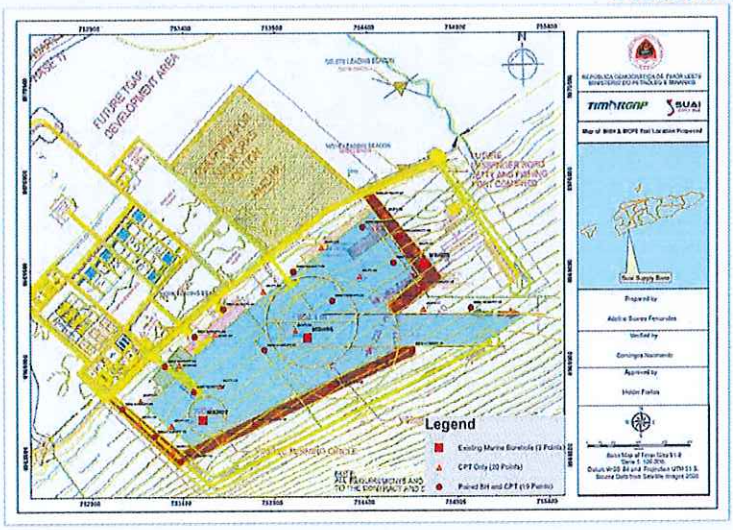

Figure 1. Location of Offshore (Nearshore) BH and CPT Geotechnical Investigation

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3.2 Scope of the Marine (Nearshore) Geotechnical Site Investigation (Continued…)

- 25 x Standard CPTu
- 12 x Seismic CPTu

❖ Geotechnical laboratory testing

❖ Geotechnical Factual Report

The nominal location of boreholes and CPTu's is shown on APPENDIX C-2 of TOR Doc. No.: TG-VPIU-SOW-23.008., based on the current concept layout for the SSB and its infrastructure associated.

4. Specification and Survey Requirements of Onshore and Offshore Geotechnical Site Investigation

4.1 Boreholes with Standard Penetration Test (SPT)

The minimum requirements for shall comprise:

❖ Wash-boring or continuous sampling ('sediment coring') in granular soils and very soft to firm cohesive soils (i.e. less than 50 kPa undrained shear strength), including provision for:

- Standard Penetration Testing (SPT) at the seabed level and thereafter at nominal 1.5 m intervals below seabed, or as otherwise directed by the Company Representative.
- Undisturbed push-tube sampling (U63 or similar[1]) at specified intervals as directed by the Company Representative

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4.1 Boreholes with Standard Penetration Test (SPT) (Continued…)

The minimum requirements for shall comprise:

- Downhole (in situ) vane-shear testing (VST) at specified intervals as directed by the Company Representative.

❖ Double-tube or triple-tube diamond-coring in stiff to hard cohesive soils (i.e. more than 50 kPa undrained shear strength) and rock, including:

- SPT, VST and U63 sampling at intervals as directed by the Company Representative

4.2 Cone Penetration Testing

The minimum requirements for cone penetration testing (CPT) shall comprise:

- Electric friction cone penetration testing including use of a piezocone (i.e. CPT with u2 pore water pressure measurements)
- Seismic CPTu with seismic tests undertaken at 3m intervals.
- Piezocone dissipation tests shall be undertaken at selected depths as directed by the Company Representative to provide an indication of horizontal permeability and consolidation characteristics of the site soils. Nominally 3 hours of dissipation testing shall be allowed for at each CPT location.
- CPTs shall be pushed to nominally 30 mbsb, however termination depths may be decreased due to refusal at shallower depths, or increased to below 30 mbsb, as directed by the Company Representative.

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4.2 Cone Penetration Testing (Continued...)

- Note also that the water depth at each CPTU location shall be monitored and recorded during the testing, so that the initial pore-water pressure profile with depth can be known for use in the interpretation of soil parameters.

4.3 Test Pits for Onshore Geotechnical Investigation Only

The minimum requirements for test pit excavations shall comprise:

- Use of a minimum 20-ton excavator, with the following:
  - Narrow, standard and wide toothed buckets
  - Single tine ripper attachment.
- Dynamic cone penetration (DCP) tests to be undertaken to a nominal depth of 3 mbgl immediately alongside each test pit.

Note:
Alternative drilling, sampling and in situ testing methods , CPT and test pit methods may be proposed by the Survey Contractor but may not be used without the prior written consent of the Company or Company Representative.

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5. Survey Equipment

No	Category	Equipment	Quantity (at least No. of Equipment)
1	Onshore and Nearshore BH Drilling	Drilling with SPT machine with drilling depth capacity > 50m fully hydraulic with its accessories .	4
2	Onshore and Nearshore CPT	CPT Machine with its accessories .	1
3	Test Pit	20-ton excavator	1
4	DCP	DCP Machine	1
5	Seismic Cross Hole	BIS-SH-DS, S-Wave Source or Similar	1
6	Seismic Down hole	Sledge Hammer, Surface Source or Similar	1
7	Laboratory Test	All Lab. Equipment refer to the lab. Testing items state in BoQ	1 (As much as required)

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6. Survey Contractor Scope

The Survey Contractor is responsible for:

- Provision of all personnel and equipment, including any subcontractors as required to perform the above marine borehole drilling and CPTu works
- Execution of the fieldwork (including preparation, HSE management, site operations and logistics, geotechnical logging of boreholes)
- Shipment of all samples from site to a nominated certified laboratory, including all the logistics involved
- Engagement and management of a certified laboratory testing (the testing program will be specified and provided by the Company)
- Reporting (daily reports and a Geotechnical Factual Report).

7. Reporting Requirements

7.1 Daily Field Reporting

- Daily field reports shall be compiled by the Survey Contractor throughout the course of the onshore and offshore geotechnical site investigation and provided to the Company / Company's Representative for approval, inclusive of during mobilization and demobilization.
- Daily reports shall be provided in editable native format and portable electronic (*.pdf) format no later than 10 am on the day following the completed shift

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7.2 Geotechnical Survey Report

Post-survey reporting and deliverables shall include a factual site investigation report, delivered in portable electronic (*.pdf) format, with factual data also provided in editable electronic format (e.g. *.xls. *.xlw, *.ags, *.csv etc.) as applicable.

8. Deliverables

- Deliverables shall be provided in portable electronic (*.pdf) formats.
- Geotechnical borehole logs, test pit logs, sub-sampling records and laboratory test results shall also be supplied in tabulated, editable electronic formats (*.xls/*.xlw or comma-/tab-delimited) and preferably in *.ags format.
- CPT results shall also be provided in tabulated, editable electronic (*.xls/*.xlw or comma-/tabdelimited) formats.
- Draft final reports shall be submitted in portable electronic format (*.pdf) within 28 days following completion of the geophysical survey. Final reports shall be submitted in portable electronic format (*.pdf) within 14 days following receipt of Company comments.
- Final reports shall be accompanied by plans, sections, maps and other survey data deliverables supplied in editable geo-referenced electronic formats (e.g. *.dxf. *.dwg, *.shp) **– The Interpretative Final Report Refer to the ATTACHMENT GEOTECHNICALS SERVICES.**

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