



Black Rocks Harbor Saba

Tender Documents - Volume 2 Employer's Requirements
Part 1a: Scope of Works and General Requirements

Public Entity of Saba

8 December 2023

Project	Black Rocks Harbor Saba
Client	Public Entity of Saba
Document	Tender Documents - Volume 2 Employer's Requirements Part 1a: Scope of Works and General Requirements
Status	Final version 02
Date	8 December 2023
Reference	118421/23-019.713
Project code	118421
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TABLE OF CONTENTS

1	INTRODUCTION	7
1.1	General	7
1.2	Project background	7
2	SCOPE OF WORKS	9
2.1	Scope Fort Bay Harbor Upgrade	9
2.2	Scope Black Rocks Harbor new build	9
2.2.1	Black Rocks Harbor new build - Package A	10
2.2.2	Black Rocks Harbor new build - Package B	11
2.2.3	Black Rocks New Harbor - Package B - optional items	12
2.2.4	Construction alternatives	12
2.3	Contractor's responsibility	12
2.4	Port and other regulations	13
2.5	Project stakeholders and interfaces	13
2.6	Permits and approvals	15
3	DEFINITIONS AND ABBREVIATIONS	16
3.1	General data and requirements	16
3.1.1	Horizontal reference	16
3.1.2	Vertical reference	16
3.1.3	Dimensions	16
3.1.4	Level definitions	17
3.1.5	Site conditions	17
3.1.6	Language	17
4	CONTRACTOR'S DOCUMENTS	18
4.1	General	18
4.2	Master Document Register	18
4.3	Expected Deliverables	18
4.4	Review of Contractor's Submissions	19
4.5	The Contractor's Designer	20
4.6	Detailed design, method statements, planning and as-built documents	21

4.6.1	Detailed design	21
4.6.2	Method statements	22
4.6.3	Equipment, mobilization and demobilization	22
4.6.4	Working, Record and As-Built Drawings, and Operating and Maintenance manuals	23
5	SITE, WORKS AND PROGRAMME CONSTRAINTS	24
5.1	Mobilisation and demobilisation	24
5.1.1	Mobilization	24
5.1.2	Demobilization	24
5.1.3	Temporary demobilization and remobilization	25
5.2	Site area and access	25
5.2.1	Site area 1 (Black Rocks) and site area 3 (Fort Bay)	25
5.2.2	Site area 2 (Black Rocks)	25
5.2.3	Site area 4 (Fort Bay)	25
5.3	Benchmarks and reference points	25
5.4	Setting out of works	26
5.5	Site data, surveys, investigations and studies	26
5.6	Condition survey	26
5.7	Existing services	26
5.8	Third party approvals and notices	27
5.9	Communication with relevant authorities	27
5.10	Access of Contractor's personnel	27
5.11	Archaeology	28
5.12	Damage and interruptions to existing facilities/ areas	28
5.13	Laws, rules and regulations	28
5.14	Disposal licences, permits and approvals	28
5.15	Marine Regulations and Navigation	29
5.16	Sunken plant/ caissons	29
5.17	Abatement of pollution and nuisance	29
5.18	Contractor's equipment	30
5.19	Site cleanliness	31
5.20	Works off-site	31
5.21	Security	31
5.22	Sub-Contractors	31
5.23	Notice board	31
5.24	Protection of completed works	31
5.25	Marking of the working area	31
5.26	Exclusion zones and access limitations	32

6	CONTRACTORS SITE	33
6.1	Contractors site compound(s)	33
6.2	Site utilities	33
7	FACILITIES FOR THE ENGINEER	34
7.1	Engineer offices	34
7.2	Survey and Associated Equipment	35
7.3	Boat	35
8	TAKING OVER	36
8.1	General	36
8.2	Completion inspection	37
9	CONTRACT PROGRESS CONTROL	38
9.1	Programme	38
9.2	Progress	38
9.3	Progress videos and photographs	39
9.3.1	Worksite progress video records	39
9.3.2	CCTV	39
10	HEALTH AND SAFETY	41
10.1	General	41
10.2	Design	41
10.3	Site safety	41
10.4	Health and Safety plan and emergency response programme	41
10.5	Health and Safety file	42
10.6	Risk Assessments	42
10.7	Warning signs	42
10.8	Visitors to the Site	43
10.9	First aid and emergency procedures	43
10.10	Training	43
10.11	Precautions against fire	43
10.12	Personal protective equipment	43
10.13	Diving operations	44
10.14	Inspection scope	44

11	ENVIRONMENTAL REQUIREMENTS	46
11.1	Overall approach	46
11.2	Environmental Impact Assessment (EIA)	46
11.3	Construction Environmental Management Plan	47
11.4	Environmental inspection and monitoring	48
11.5	Environmental nuisance	48
	11.5.1 Pollution	48
	11.5.2 Tidiness of sites	49
	11.5.3 Vibration, noise and dust	49
12	QUALITY ASSURANCE	50
12.1	Introduction	50
12.2	Materials	50
12.3	Reports, returns, drawings, etc.	51
	12.3.1 Daily returns	51
	12.3.2 Daily forecast	51
	12.3.3 Weekly progress summary	51
	12.3.4 Two-week work plans	51
	12.3.5 Monthly progress report	52
	12.3.6 Drawings of temporary works	52
	12.3.7 As-Built drawings	52
	12.3.8 Returns and drawings in triplicate	53
13	STANDARDS, MATERIALS AND EQUIPMENT	54
13.1	Standards and alternative Standards	54
13.2	Statutory requirements	55
13.3	Material supplies	55
13.4	Sampling and testing of materials	55
13.5	Copies of orders	56
13.6	Manufacturer's instructions	56
	Last page	56
	APPENDICES	Number of pages
-		

1

INTRODUCTION

1.1 General

This document deals with Volume 2 Part 1a: Scope of Work and General Requirements.

1.2 Project background

In September 2017 Saba has been struck by hurricanes Irma and Maria. The Fort Bay harbor on the southside of the island was severely damaged by hurricane Maria. After the hurricanes the Public Entity Saba secured funding from the Central Government of the Netherlands to improve the harbor infrastructure on Saba. The aim is to realize a harbor that is hurricane-resistant and future-proof and also creates opportunities for further economic development of the island.

At an earlier stage of the harbor project, the current harbor, Fort Bay Harbor (Figure 1.1), was considered to be developed into a future proof sea port. However, among other reasons it was found that the hurricane wave conditions at this location are extremely severe, which increases the construction costs and the probability that damage occurs during hurricanes. Therefore, an alternative site, known as Black Rocks, is considered for the development of a new harbor (Figure 1.1). Hurricane wave conditions at Black Rocks appear to be attenuated due to a lower gradient of the sea bed slope.

Considerations about the available space at the Black Rocks site, future expansion possibilities, the mixing of small boats versus cargo vessels in the current harbor and the associated impact on the navigational and land-side safety and overall attractiveness of the harbor, lead to the conclusion that the existing Fort Bay Harbor will be retained for cargo vessels (roro) and at Black Rocks a green field harbor will be created for small vessels (fishery, marine park, dive shops, ferry and recreational vessels). Black Rocks Harbor must also be suitable for use by roll on-roll off vessels in case of emergency.

Figure 1.1 Location Fort Bay and Black Rocks



2

SCOPE OF WORKS

The scope of the contract to be signed with the successful contractor following the tender procedure is the detailed design and construction of the items described in this chapter.

2.1 Scope Fort Bay Harbor Upgrade

The main items of the Works for Fort Bay Harbor Upgrade are shown in Figure 2.1.

The scope of the Fort Bay Harbor Upgrade consists of the following works:

- Container yard expansion: this comprises the levelling and pavement of an area of approximately 20 m x 70 m, with a ramp, connecting the lower-level existing storage yard with the new container yard.
- Installation of four reefer plugs at the container yard expansion.
- Revetment container yard expansion. The shoreline protection in front of the existing container yard that exists of 4 m³ Accropode™ shall be extended over a length of circa 70m and tied in to the shore.
- Roll on-roll off ramp expansion. The existing roll on-roll off ramp will be widened from 10 m to 15 m.
- Dredging and seabed clearance within the harbor basin. An area of approximately 5,000 m² will be dredged and cleared to a level of -5mSD.
- Single point mooring facility.

Figure 2.1. Items Fort Bay



2.2 Scope Black Rocks Harbor new build

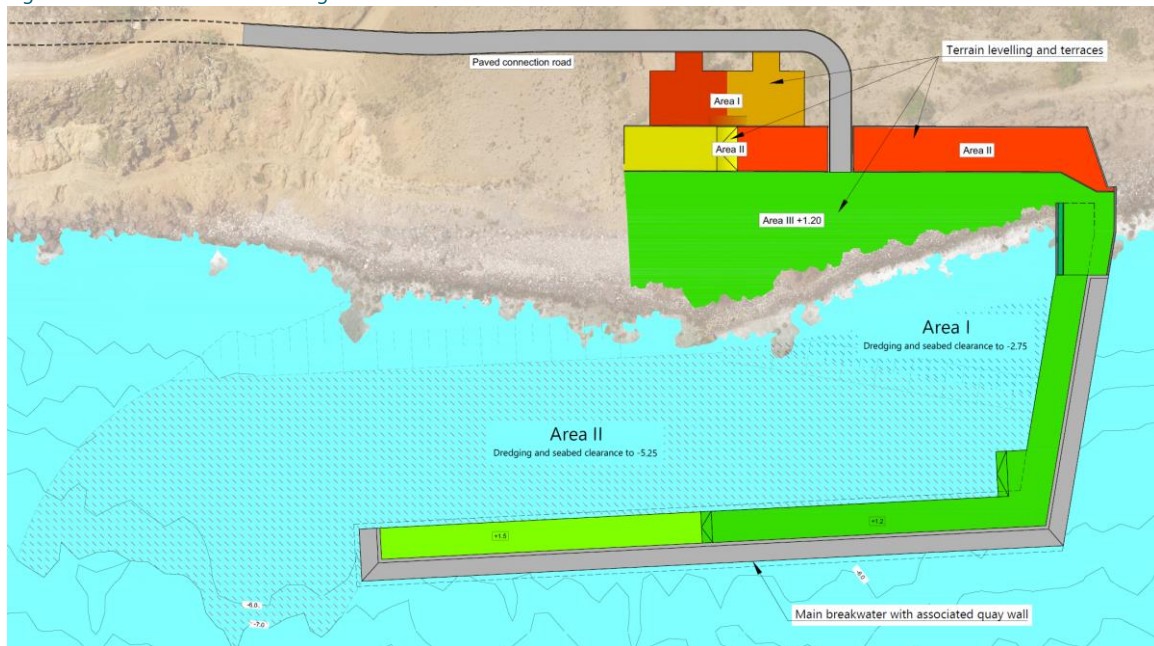
The scope for Black Rocks Harbor is divided in Package A and Package B.

2.2.1 Black Rocks Harbor new build - Package A

The main items of the works for Package A are shown in figure 2.2. The scope of Package A consists of the following works:

- All items for Fort Bay as described in Section 2.1.
- Main breakwater with associated quay wall. The main breakwater has a length of approximately 250 m. An emergency roll on-roll off ramp is included. The performance of the main breakwater in relation to wave overtopping during daily conditions and stability during hurricane conditions of the designed main breakwater shall be verified with physical model tests.
- Dredging and seabed clearance of the harbor basin (partly). The dredging works involve three parts:
 - the inner harbor with a dredging depth of -2.75 mSD (Area I).
 - the entrance channel and the outer harbor basin with a dredging depth of -5.25mSD (Area II).
 - dredging works for the construction of the main breakwater.
- Paved connection road. The connection road with a total length of about 800 m connects the main breakwater with the concrete paved road at Fort Bay. About 200m of the connection road is part of the contract. The works for the road include the road, street lights and slope protection measures.
- Terrain levelling and pavement, including construction of terraces on the land slopes. This comprises an area of approximately 3,700 m² divided in different terrace heights. The areas shall be paved with concrete and there shall be retaining walls between the terraces.
- Measures storm water drainage and run-off water measures hill side. These measures shall deflect any storm water from the catchment area around the harbor area.
- Drainage harbor area. This includes the drainage of the entire harbor area, including the main breakwater and the terraces.
- Harbor hardware: Mooring bollards, cleats, navigational aids, safety items.
- Utilities:
 - Utility ducts, covers and sleeve pipes shall be included in the main breakwater for water supply, data and electricity.
 - Low energy lighting on all marine infrastructural surfaces.
- Two 100 m³ water tanks including pipelines.
- Environmental mitigation works:
 - Coral relocation. All protected corals within the footprint area of the harbor and the high-risk zone shall be relocated. The high-risk zone is projected to have a radius of 100 meters west and 25 meters south and east of the harbor.
 - Environmental monitoring.

Figure 2.2. Items Black Rocks Package A

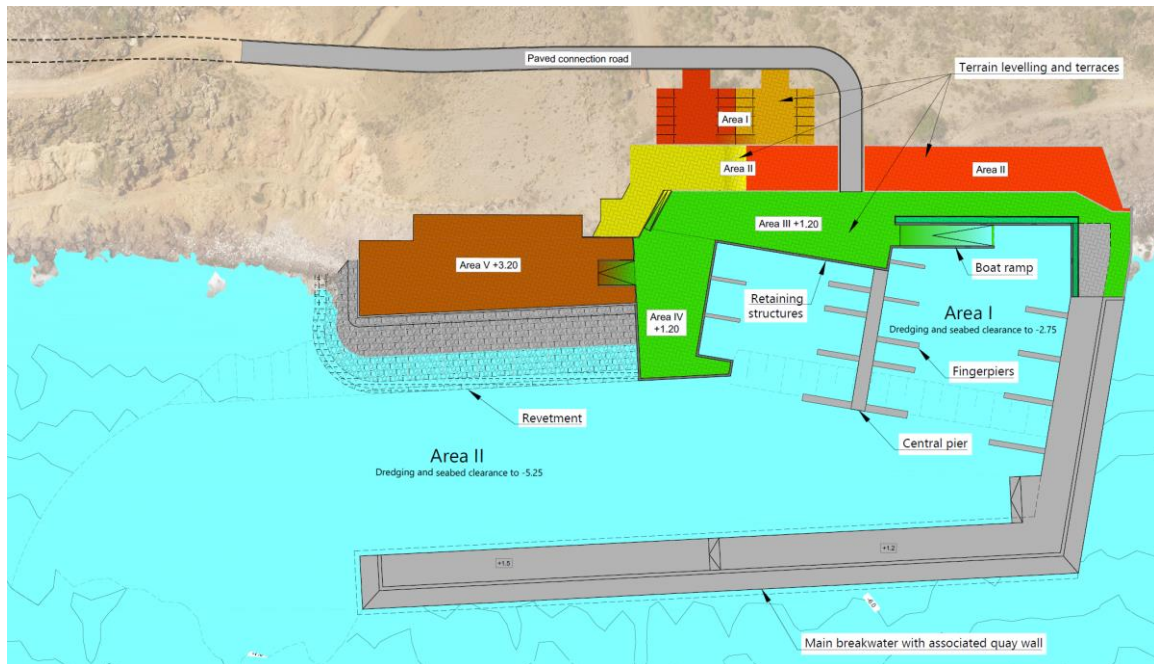


2.2.2 Black Rocks Harbor new build - Package B

The works for Package B are shown in Figure 2.3. The scope of Package B consists of the following works:

- All items of Package A.
- Retaining Structures at the innerside of the harbor. The length of this retaining wall is approximately 210 m and the retaining height varies between 3.7 m and 5.5 m.
- Terrain levelling and pavement, including construction of terraces on the land slopes. Additionally to Package A an area of approximately 1,600 m² will be leveled and paved (approximately 5,300 m² in total).
- Reclamation and revetment. An area of approximately 1,900 m² is leveled and paved with concrete. The area is partly reclaimed from the sea re-using dredged or excavated material. A revetment with a length of approximately 90m will protect the land reclamation against hurricanes and daily hydraulic conditions.
- Dredging and seabed clearance of the harbor basin. The dredging and seabed clearance is extended in front of the Package B retaining structures.
- Central pier. A central pier with a length of 40 m and a width of 4 m is positioned in the center of the inner harbor.
- Finger piers. Fifteen finger piers with a length varying between 10 m and 16 m shall provide docking and mooring facilities. The width of the finger piers is between 1 m and 2 m.
- Boat ramp. An inclined flat paved structure for launching and retrieval of small ships is located at the back end of the inner harbor.
- Drainage harbor area. Additionally to Package A this includes the drainage of the reclamation area and the drainage at the retaining structures of the inner harbor.
- Harbor hardware: Additionally to Package A this includes mooring bollards, cleats, navigational aids, safety items at the retaining structures of the inner harbor. Additionally 12 boat lifts are included in the inner harbor.
- Utilities. ducts, covers and sleeve pipes shall be included in the retaining structures, central pier and finger piers as well as low energy lighting on all marine infrastructural surfaces.
- Utilities:
 - Electricity: electrical cables.
 - Water: water lines.
 - Data cables.
 - Pedestals.
 - (Street) lights.

Figure 2.3. Items Black Rocks Package A and B



2.2.3 Black Rocks New Harbor - Package B - optional items

- Column Jib crane with a loading capacity of 25 tons at 6 m.

2.2.4 Construction alternatives

The Employer has based the reference design on a caisson type structure, for technical and environmental reasons. (Technical: robust design in extreme hurricane wave climate, off-site construction possible avoiding use of scarce local resources, Environmental: small footprint, offsite construction). For above reasons it is expected that the Contractor will base his proposal on a caisson-type structure. However, alternative designs may be submitted **instead of the reference design**.

In all cases the Contractor shall ensure that:

- All Employer's requirements regarding the design, quality, environment, permits etcetera are fully met.
- Alternative design should fit in the EIA and provided permits.

2.3 Contractor's responsibility

The Contractor shall be fully responsible for all aspects of the design of the Works, and for providing such materials, workmanship and whatever else may be necessary or desirable to meet the Employer's Requirements. The Contractor shall as a minimum comply with the requirements, design criteria and technical specifications set out in the Employer Requirements. These requirements, design criteria and specifications are mandatory, unless otherwise expressly stated herein.

The Contractor shall consider in the design and construction, the infrastructure maintenance required to achieve an optimum lifetime cost and to minimize the extent/frequency of maintenance and its disruptive effect to future operations.

The Contractor shall consider in the design and construction, the environmental impact of used methods, equipment and materials in order to minimize the impact during construction and future operations of the harbor.

The Contractor shall be fully responsible for the execution of the Works and he shall consider all aspects related to the execution like workability of equipment, (environmental) site conditions, (environmental) monitoring, rehandle of materials etc.

Notwithstanding that the Contractor shall follow the requirements, performance specifications and technical specifications set out in Volume 2, the Contractor shall convince itself that his design is adequate and that the Works will be suitable for the purpose intended. Thus, the Contractor's compliance with the minimum requirements, performance specifications and technical specifications set out in Volume 2 shall not relieve him of his responsibility or liability under the Contract.

2.4 Port and other regulations

Contractor shall organise and adhere to port regulations, permit conditions, EIA and all other local and international applicable regulations, see also 2.6. The documents available at the time of tendering are included in Volume 5 and are provided only as a guide.

2.5 Project stakeholders and interfaces

The project stakeholders presented in Table 2.1 below shall be considered by the Contractor in its design and implementation. However, its contents shall not be construed as all inclusive, hence the Contractor is fully responsible to evaluate and include any other necessary interfaces in addition to the ones listed in the below tabulation as he considers necessary. The Contractor shall prepare his own project stakeholder list and manage it during the execution of the Works at his own risk.

Table 2.1 Project stakeholders

Number	Stakeholder	Stake
1	Harbor project team Public Entity Saba	Representative team of the future owner
2	Public Entity of Saba (PES)	Owner of the project
3	Planning Bureau - Public Entity of Saba	Governance with site and building permits
4	Harbor Master Fort Bay	Safety and interferences with regular ship movements at Fort Bay Harbor and adjacent coast
5	Ministerie van Infrastructuur en Waterstaat - Rijkswaterstaat Zee en Delta	Authority for Law maritime management BES / Law nature management BES, co-financier
6	Saba Conservation Foundation (SCF)	Local NGO organization that manages the marine park of Saba
8	Local fishermen, dive boat operators, boat owners	Current local users of Fort Bay Harbor and future users of Black Rocks Harbor.
9	Saba Statia Cable System (SSCS)	Owner offshore cables
10	SABARC (Saba Archaeological Center)	Local archaeological organization
11	(Adjacent) land owners	No disturbance of their activities/ assets
12	Adjacent businesses (for Fort Bay),	No disturbance of their activities/ assets
13	Safety partners (Police, fire department, ambulance etc.)	All safety related items
14	Coast guard	Maritime safety and rules
15	Existing services	Existing services shall remain operational during the Works
16	Saba Electric Company (SEC)	Utility providers. No disturbance of their assets
17	Customs and immigration	Governance with law and rules
18	Immigration and Naturalisation Service (IND-CN)	Responsible for the implementation of aliens' policy

The project interfaces presented in table 2.2 shall be considered by the Contractor in the preparation of its design and throughout the Works. However, such table and its contents shall not be construed as all inclusive, hence the Contractor is fully responsible to evaluate and include any other necessary interfaces in addition to the ones listed in the below tabulation as he considers necessary. The Contractor shall prepare his own interface management plan and shall follow it during the execution of the Works at his own risk.

Table 2.2 Project interfaces

Number	Category	Description
1	Area/ access interface	Interfaces related to the Site and harbor access.
2	Utilities and Services	The Contractor to allow in its designs and construction execution, the existing services, utilities and other existing infrastructure at Fort Bay Harbor.
3	Fort Bay Harbor operations	Interfaces between the Works and the existing harbor infrastructure including vessel movements, access to the harbor, etc., have to be fully implemented and considered by the Contractor.
4	Road connection – local contractor	Connection to gas station and future connection uphill
5	Surrounding land owners Fort Bay/Black Rocks	Interfaces with the shared use of roads and services
6	Marine Park operations	All marine activities will take place in the Saba Marine Park.

2.6 Permits and approvals

The Employer has submitted a combined permit application for the Law on marine management BES, Law on nature management BES, 'Bouwbesluit BES', Marine Environment Ordinance Saba and Nuisance Ordinance which is included in Volume 5.

The Contractor shall follow all stipulations following from the already submitted permit applications. All communications for the already submitted permit applications shall be via the Employer.

The Contractor is responsible for obtaining all other relevant design approvals and permits from the relevant authorities. The Employer wishes that the design approvals be undertaken based on a co-ordinated approach. Within fourteen days of the Commencement Date, the Contractor shall submit a detailed methodology and action plan to attend to the approvals process. The Register and action plan should list each approval required and the relevant authorities required for each approval along with a target date of submission to the authorities. The Register shall be subject to both the Engineer's and Employer's agreement. The action plan should detail interdependency of any such permits and approvals.

3

DEFINITIONS AND ABBREVIATIONS

The International System of Units, SI units, shall be used throughout all of the project documents. Drawings, submittals and reference documents shall be in the English language.

The used definitions and abbreviations used in the Employer's Requirements are presented in Table 3.1.

Table 3.1 Definitions and abbreviations

Definition, abbreviation	Description
DWL	design water level
ANSI	American National Standards Institute
ASTM	American Society of Testing Materials
BS	British Standards
EN	European Norm / Eurocode
CD	Chart Datum
SD	Saba Datum
MSL	Mean Sea Level

3.1 General data and requirements

3.1.1 Horizontal reference

The horizontal reference coordinate system is local Saba Island grid.

The conversion from the local Saba Island grid to the UTM grid is included for information in Volume 5.

3.1.2 Vertical reference

The vertical reference datum is Saba Datum (SD), which historically has been set to match MSL. Based on recent measurements, SD is set at 0.09m below MSL (MSL = +0.09 m SD).

3.1.3 Dimensions

All dimensions, distances and levels of the designs are indicated in the metric system (SI). All detailed measurement for calculation and working drawings shall be in the metric system.

3.1.4 Level definitions

There are several definitions concerning the level. The following definitions apply:

Design level

The design level is defined as the level after design lifetime.

Construction level

This is the expected level at the moment of handover. The level is not a fixed level since it is time dependent. Nevertheless, construction levels are determined to indicate the approximate levels at the moment of handover. Construction levels include an allowance to compensate for residual settlements (the consolidation settlements that have not occurred during construction) and the long-term effects between the moment of handover and end of the design lifetime.

Fill level

The fill level is the level directly after placing of the fill. The level is a theoretical fill level if no settlements have taken place yet. The fill level is higher than the construction level; the difference is an allowance to compensate for the consolidation settlements after placing.

Where not specified, levels referred to in this document are design levels.

3.1.5 Site conditions

The Contractor is deemed to be familiar with the environmental and other conditions in the Project Area that may influence his work and/or schedule. Saba is a small island with limited infrastructure and services and is dependent on Sint Maarten for international air and sea travel. The Black Rocks site is located on a remote part of the island without services and with an unpaved road connection.

The Contractor shall acquaint himself with the daily, seasonal, annual and extreme characteristics of winds (hurricanes as defined in section 3.1 of volume 2, part 1b), waves, tides, currents etc. as well as with water and air quality, rainfall, humidity, temperature, sunshine, etc, and the presence of (protected) flora and fauna. The site is located in a seismic and hurricane region.

All equipment necessary for the Works shall be proportioned, arranged and rated to operate satisfactorily in the prevailing temperature, climate and environmental conditions.

Any deviation from any climatic conditions shall not entitle the Contractor to request or receive additional remuneration, unless explicitly stated otherwise in these Employer's Requirements.

The Contractor is deemed to be familiar with the geotechnical conditions on the Site. The Factual Geotechnical Analysis report is included in Volume 5. Additional soil investigations report will be provided during the tender.

3.1.6 Language

All documents to be issued by the Contractor shall be in English unless otherwise explicitly mentioned in these documents.

4

CONTRACTOR'S DOCUMENTS

4.1 General

The Contractor is responsible for the Design and Planning of the Works. The Contractor shall submit the design for approval of the Engineer. The Contractor shall establish and operate a Quality System to verify that his work is in accordance with the requirements of the Contract and the Tender Documents. His design and planning shall include provisions for interfaces with other parties, and he shall carry out various completion and inspection activities.

The Contractor's design activities shall consist of a Detailed Design including Construction Method, Method Statements, Construction Planning and As-Built Documents. The Contractor shall provide, as part of his Contractor's Documents, complete and clear detailed specifications and drawings which describe all items and materials which will be incorporated into the Works, details of the fabrication and construction of the Works, and the maintenance regime for the Works in accordance with these Employer Requirements.

The Contractor shall design the Permanent Works and the Temporary Works.

Source files shall be provided in a format to be agreed on Engineer's request. Drawings shall be delivered in pdf and Autocad (.dwg) format.

Contractor shall not start any execution Works before his design and the Contractor's Health and Safety Plan has been approved by the Engineer

4.2 Master Document Register

Contractor shall draft a Master Document Register to list all documents he produces for the Project and which shall be the main working document to register the status of all documents. At the start of the Contract, Contractor shall draft a Master Document Register for Engineer's review and approval. The Master Document Register shall be updated on a weekly basis.

4.3 Expected Deliverables

The Contractor shall submit deliverables including, but not limited to, the following:

- Contractor's Project Management Plan.
- Contractor's Quality Control Plan.
- Contractor's Health and Safety Plan.
- Emergency Response Programme.
- Design Process Control Plan.
- Construction Environmental Management Plan (CEMP).
- Storm Water Pollution Prevention Plan (SWPPP).
- Environmental monitoring plan, including weather station, MetOcean (waves, currents) and water quality monitoring.

- Storm Water Pollution Prevention Plan (SWPPP).
- Waste management plan.
- Hurricane evacuation plan.
- Mobilization and demobilization plan.
- Overall and detailed planning of the works.
- Survey plan with:
 - Topographic in and out surveys, interim surveys.
 - Bathymetric in and out surveys, interim surveys.
 - Existing structures.
 - Coral surveys (in, intermediate and out surveys).
- Basis of Design Report for all design items.
- Detailed Design Reports.
- Physical modelling test plan.
- Physical modelling report.
- Positioning plan.
- Material specifications and testing schedules.
- Material Approval Sheets.
- Subcontractor Approval Sheets.
- Equipment specifications.
- Equipment approval sheets.
- 'For construction' specifications.
- Method Statements for all items of the scope.
- Risk and opportunities Assessments for all items of the scope.
- Daily Reports.
- Daily Forecasts.
- Weekly progress summary.
- Two-week work plans.
- Monthly Reports.
- Overview of requested as built drawings and documents.
- As-Built Drawings.
- O&M manual.
- QA/QC documents including all test certificates.
- All approvals obtained from various authorities.
- Coral relocation plan.
- Cashflow analyses of project.
- Simultaneous Operations Plan for all activities in the Fort Bay Harbor.

The above list is not exhaustive and shall be considered as a minimum expectation from the Contractor. It is accepted that some of the documents listed may be encapsulated within other deliverables.

4.4 Review of Contractor's Submissions

The Engineer will undertake a detailed review of the Contractor's design, to verify compliance with the Employer's Requirements. The design will be verified by a third party company.

Design/ drawing production shall optimise the use of up to date version of AutoCAD software.

The Contractor shall accept full responsibility for the adequacy of the design, including any design/ details prepared by or on behalf of the Employer. Any approval, consent or acceptance by the Engineer and or the Employer, of any proposal or submission by the Contractor in respect of any obligations or requirements imposed by these Employer's Requirements shall not relieve the Contractor of any of his duties or responsibilities under the Contract.

The review of the Contractor's Deliverables by the Engineer shall result in documents being:

- **Code 1: No comments** – Consent as submitted without comments/ notation; construction can proceed.
- **Code 2: Accepted with comments** – Consent subject to implementation of comments/ notation; construction can proceed only with the agreement of the Engineer.
- **Code 3: Not in compliance with Employer's Requirements** – No consent and being subject to full re-submission in response to the comments/ notation; construction cannot proceed.
- **Code 4: Review not required.**

Regardless of the approval given by the Engineer, the Contractor is responsible for obtaining all design approvals from the government authorities, relevant third parties and stakeholders.

The Contractor shall allow a minimum of twenty-eight (28) days for the first Engineer's review for each submitted document. The Contractor shall allow a minimum of seven (7) days for reviews of subsequent submissions.

No partial submissions or submission of document sections only will be considered for review. If large submissions are made, the Contractor will indicate the order in which consents are to be given by the Engineer and increase the review period accordingly. The Contractor's programme shall include adequate time for consents to be given by the Engineer. All documents submitted shall be fully checked and approved in accordance with the Employer's Requirements.

For equipment and materials to be used in the Works, the Contractor shall select the vendor(s) considering compliance with the specifications and other requirements of the Contract. In any case, all selected vendors shall be subject to approval by the Engineer.

The Engineer shall examine and review the Contractor's detailed plan as to the actual sequence of operations to be implemented by the Contractor and may require the Contractor to revise it in order to satisfy the requirements herein. Revisions shall be made entirely at the Contractor's expense and shall not constitute grounds for a claim for additional monies or an Extension of Time for Completion of the Works.

Commencement of the work for any part of the construction is only permitted after approval of the relevant drawings and calculations by the Engineer.

4.5 The Contractor's Designer

Prior to any design works commencing, the Contractor shall submit for approval a Design Process Control Plan as to how he intends to manage, control, programme and carry out the necessary design work in accordance with his obligations under the Contract.

Design shall be carried out by the designers named in the Contract. The Engineer may approve the use of alternative designers if the Contractor can demonstrate to the satisfaction of the Engineer that the proposed alternative designer has equivalent competence and relevant experience to the named designer and carries the professional indemnity (PI) insurance required by the Contract.

There shall be a nominated project lead designer, who shall be responsible for the management and production of the design work assigned. The project lead designer shall work closely with the Contractor's engineering manager to ensure works and design are carefully coordinated and programmed. e

The approval of the designer(s) shall be subject to the specific written approval of the Engineer.

As construction proceeds, and as part of any procedures implemented for offering up elements of the Works for acceptance, the Contractor's designer shall verify the adequacy and accuracy of that element of the Works in accordance with the approved design, as described elsewhere in these documents.

The Engineer reserves the right to withdraw consent already issued, or part thereof, where a later Contractor's Document or design submission so necessitates.

4.6 Detailed design, method statements, planning and as-built documents

4.6.1 Detailed design

The Contractor shall prepare detailed designs of the elements or parts of the Works, including the construction method and phasing and temporary works. The Contractor may use the Reference Design prepared by the Engineer for identification and further detailing of the elements of the Works and shall verify and check the Reference Design should he consider to copy certain items from it. The Contractor shall prepare the Design of the Works and is responsible for the Design.

For each element, part or system, the Contractor shall prepare and submit to the Engineer the following:

- Detailed design documentation to include as a minimum:
 - A description of the element or part.
 - Detailed technical specifications for the materials and workmanship.
 - Reports on tests and investigations carried out.
 - Details of the provisions made for external interfaces.
 - Construction staging and design of temporary works if required.
 - A reference list of calculations.
 - A document plan including a list of drawings.
 - All documents required for permitting.
- Calculations containing:
 - A review of the assumptions and design philosophies adopted.
 - A table of the design criteria, loads and load combinations used.
 - A short and concise description of each method of analysis used.
 - A reference list with a short description of any computer software relied upon in the design.
 - All calculations required for permitting.
- For each analysis carried out the contractor shall submit a table summarising the governing criteria, loading and main results which are relied upon in the detailed design. The table shall be fully referenced to the original calculation sheets.
- Detailed design drawings:
 - Cross sections and views, including details;.
 - Construction staging.
 - Formwork drawings and rebar drawings.
 - Dredging and excavation plans including re-use of dredged materials
 - Monitoring plans.
 - All temporary works to be applied for the works.
 - All drawings required for permitting.
- Detailed soil balance sheet.

The Contractor shall at least submit monthly detailed design progress reports.

All reports shall be prepared and structured in a way that facilitates their checking. For this reason, the following items shall be included at the beginning of each monthly design report:

- A detailed table of contents.
- A brief description of the applied calculation method.
- The applied starting points concerning among others safety coefficients.
- Reference to the applied codes, and

All other information that is considered necessary for design review.

Software input and output shall be delivered on paper and digitally as part of the design reports.

4.6.2 Method statements

The Contractor and all Sub-Contractors shall prepare detailed and specific method statements prior to the commencement of work on Site, which shall reference the Contractor's Health and Safety Plan, Calamity Response Programme and Hurricane evacuation plan.

The method statement will identify the specific methods to be used to control the risks identified.

The Contractor shall co-ordinate the preparation of method statements where the activities and risks relate to one or more Sub-Contractors and other relevant parties and stakeholders.

The method statements provided to support a programme for acceptance, shall include full particulars of the methods, timing and sequence of construction including the use and design of Temporary Works, Materials, Plant and equipment proposed by the Contractor.

Method statements shall contain sufficient information to enable the Engineer to assess any likely detriment to either the proposed or the existing works or to the Employer's overall objectives.

The Contractor shall submit method statements to the Engineer twenty one days in advance of carrying out items of work to allow for the period for reply with acceptance or rejection of the method statements. Work shall not commence until the Engineer has accepted the relevant method statement. The Contractor shall carry out the work in accordance with the accepted method statement.

Method statements submitted for acceptance shall include, but are not limited to, the following matters:

- Surveys and Investigations.
- Site access and security.
- Extent of Working Areas and protective barriers.
- Interfaces with other contractors, port operations and adjacent sites.
- The design and construction of all temporary works.
- How the environmental impact of the activities are to be minimised.
- Contractor's equipment requirements, siting and mode of operation.
- Labour requirements, organization chart and supervision responsibility.
- Delivery and storage of materials.
- Provision of access to third parties.
- Details of the construction sequence.
- Details of construction yard, construction, transport and installation for caisson and/or other main breakwater elements.
- Details of working methods.
- Detailed programme with key dates.
- Result of any consultation with third parties.
- Contingency plans in the event of weather delays, flooding, other difficulties or emergencies.
- Testing and verification procedures for acceptance of Works
- Emergency procedure for on and offshore oil spillage

4.6.3 Equipment, mobilization and demobilization

The Contractor shall submit an equipment plan for acceptance prior to mobilization of any equipment. The equipment plan shall include specifications of all land and marine equipment, the description of the Works to be carried out, key people, permits and certificates.

The Contractor shall submit a mobilization and demobilization plan prior to any mobilization. The plans shall include as a minimum: the mobilization area, the planning of mobilization, description of activities at the home station.

All applicable equipment certificates shall be submitted before any mobilization. All marine equipment shall be under class. All marine equipment shall be equipped, besides the by class compulsory equipment, with electronic chart with the latest survey, positioning by RTK and tide gauge reader.

4.6.4 Working, Record and As-Built Drawings, and Operating and Maintenance manuals

The drawings produced by the Contractor shall include, without limitation:

- General arrangement and layout drawings.
- Detailed drawings.
- Survey drawings and charts.

The drawings shall, without limitation:

- Show how the durability and maintainability of elements will be achieved.
- Show the interface between existing and the current phase of work.
- Indicate the arrangement and details of structures including pre-cast elements, cast-in place items and furniture, bar-bending schedules, types/ quality of materials and protective systems.

Working drawings shall follow recognised international standards for drafting in respect of drawing size, scale, format, etc. The standard shall be proposed by the Contractor.

The preparation of Record and As-Built drawings shall also follow the recognised international standard for drafting, and shall proceed during the installation of the Works:

- To ensure that this requirement is met, the Engineer shall be allowed to inspect the drawings on request.
- In addition to the above general requirements, As-Built drawings shall indicate deviations from original consents.

The drawings prepared by the Contractor, his designers, and any Sub-Contractors/ suppliers, shall be forwarded to the Engineer on digital media with register, and with three 'hard copy' sets of the drawings. Drawings supplied on digital media shall be in AutoDesk AutoCAD (.dwg) and Adobe Acrobat (.pdf) formats. The Contractor shall provide at his own cost documents in the appropriate language if so required for processing permits and approvals.

In addition to the standard drawings and records listed above and as reasonably expected for similar works, the Contractor shall provide an XYZ survey of the completed works, conducted using a drone for the land side works and a multi-beam survey for the marine works.

The scales to be used for drawings shall be 1:1000 or 1:2500 for plans, appropriate other ones for sections, e.g., 1:100, 1:50 and for details 1:20, 1:10 or 1:5, or as approved by the Engineer. The Contractor shall submit two copies of each drawing when required, to the Engineer for approval. The size of the drawings shall be A3.

5

SITE, WORKS AND PROGRAMME CONSTRAINTS

5.1 Mobilisation and demobilisation

5.1.1 Mobilization

The Contractor shall furnish all Plant, Materials, Contractor's Equipment, Temporary Works, Contractor's Personnel and whatever else is necessary for a proper and timely execution of the Works ready to commence the operations. The mobilization shall include the assembly, inspection on requested specifications, preparation and loading for transport of all equipment at the Contractor's home station or any other present location, the transportation of equipment, material and spare parts from the present location to the Site and the unloading, installing, ready for use, of all equipment, material and spare parts and whatever else required for the execution of the Works.

All equipment and not locally produced elements will be inspected before transport from the Contractor's home station or any other present location. The Contractor shall not transport equipment from the Contractor's home station or any other present location before approval of the Engineer.

The Contractor shall provide all information to the Engineer about the equipment he will use minimum 6 weeks before mobilization. The engineer reserves the right to inspect any equipment prior to transport.

The Contractor shall have no permission to mobilize without an approved health and safety plan.

The Contractor shall furnish whatever additional equipment that may be necessary, in the opinion of the Contractor or Engineer, for a proper and timely completion of the Works in accordance with the requirements set forth in the Contract.

The Contractor shall submit a record of all hydraulic hoses of equipment. All old and damaged hoses shall be replaced prior mobilization. Hydraulic hoses shall be replaced at the Engineer's request.

The mobilization is not considered complete until the required insurances and bonds have been paid, and proof thereof has been submitted to the Engineer.

Upon the Contract Date, the Contractor shall immediately commence, continue and complete his mobilization operations with the utmost dispatch and in accordance with the approved work plan.

The mobilization shall be completed in such a way that completion of the Works as specified in the Clauses hereafter will be in accordance with the timing requirements specified for each item of the Works.

5.1.2 Demobilization

Demobilization shall consist of removing from the Site of all Equipment, materials, personnel, staff, temporary facilities and offices furnished by the Contractor to perform the Works as stipulated in the Contract. The Contractor shall leave the whole of the Site in a workmanlike condition to the satisfaction of the Engineer. Any

Plant, Equipment or material of the Contractor and furnished by him to carry out the Works, shall only be removed from the Site after approval hereof by the Engineer. Such approval shall not unreasonably be withheld.

5.1.3 Temporary demobilization and remobilization

The Contractor is deemed to be familiar with the hurricane season and the possibility of occurring hurricane events ((hurricanes events as defined in section 3.1 of volume 2, part 1b). He shall be prepared for such an event and he shall (partly) demobilize and protect the Site.

The Contractor shall leave the whole of the Site in a workmanlike condition to the satisfaction of the Engineer. Any (partly) constructed part of the Works, Plant, Equipment or material of the Contractor shall be protected from weather or any other cause, including hurricanes and the naturally aggressive nature of the environment in which the Works are to be constructed and make good any damage so arising

5.2 Site area and access

The Site is divided in four areas as defined in Definition Drawing 118421-3402. Site area 1 and 2 are located at Black Rocks. Site area 3 and 4 are located at Fort Bay.

5.2.1 Site area 1 (Black Rocks) and site area 4 (Fort Bay)

Site area 1 and 4 include the areas of the Works. Site area 1 and site area 4 may include the Contractor's site compound as well as the laydown area.

In case the Contractor wants to access (parts of) the Works from the sea it may construct a temporary marine (un)loading facility. The location and design of the temporary marine (un)loading facility will be subject to the Engineer's approval.

5.2.2 Site area 2 (Black Rocks)

Site area 2 include the areas of the Works. Site area 2 shall not include the Contractor's site compound or laydown area.

5.2.3 Site area 3 (Fort Bay)

Site area 3 includes the area of Works within the current Fort Bay Harbor and will be simultaneously used by the regular Fort Bay Harbor users.

The Main Pier is available for unloading of barges. The use of the main pier shall acknowledge the time schedule of harbor and jetty occupation by regular harbor users. A typical time schedule of harbor and jetty occupation is provided in Volume 5, but is subject to change. Use of the Main Pier only after approval of the Engineer and the Harbor Master.

5.3 Benchmarks and reference points

The Contractor shall establish, construct and protect temporary survey control points during the period of construction and such marks shall be checked periodically.

The number and location of temporary benchmarks shall be such that the maximum distance from a temporary benchmark to any construction activity shall be 250 metres and in safe locations to avoid disturbance. Temporary benchmarks shall be formed by concreting steel pins into the ground or on top of a pile or similar and shall be of sturdy construction to avoid movement during the Works. Control points shall be regularly traversed to ensure accuracy is maintained.

On and near the Site several temporary benchmarks exist, which will be shared for information after Contract award. The Contractor is responsible for erecting his own benchmarks and verifying the correctness of the existing temporary benchmarks.

5.4 Setting out of works

See volume II part 2.

5.5 Site data, surveys, investigations and studies

Site and marine data, surveys, investigations and studies, in the form of previous site investigation documents and reports are included for information only in Volume 5.

The Contractor shall at his own risk, be responsible for assessing the adequacy and relevancy of the site information, investigations and studies provided, for seeking any additional data which may be available, and for undertaking any additional surveys, investigations or studies which may be necessary for the design and construction of the Works.

5.6 Condition survey

The Contractor shall carry out a visual and photographic condition survey of all elements of the existing structures, facilities and adjacent areas, not being demolished, or as otherwise required by the Engineer, within two (2) weeks of the Commencement Date and prior to the commencement of any demolition or construction work and shall include an aerial photographic and video survey. The survey shall be undertaken in conjunction with the Engineer. The originals of the survey report and the photographs shall be handed over to the Engineer within two (2) weeks of the completion of the survey, one copy retained by the Contractor, and one copy handed over to the Employer at the same time.

The strength and stability of the existing structures shall be guaranteed during construction and after completion. The Contractor shall submit his analysis and calculations proving to meet these requirements.

5.7 Existing services

No warranty is given as to the accuracy or completeness of any information on existing services, in and around the Site, included in the Contract. The Contractor shall by his own representations to the relevant authorities and entities, determine the extent and location of the existing services and utilities. All such services information shall be recorded on a copy of the Contractor drawings and a copy given to the Engineer and the Employer.

The Contractor shall inform the relevant authorities and third parties prior to commencing any works within the vicinity of existing services and shall comply with all the restrictions imposed by them.

The Contractor shall execute the Works in such a manner that he does not damage or interfere with existing services on or near the Site. If damage or interference is so caused or suspected, whether before or after work has commenced, the Contractor shall immediately notify the relevant authorities and third parties.

Where the Contractor is deemed to have caused the damage he shall make immediate repairs to the approval of the Engineer and relevant authorities and third parties. Where it is considered necessary the authorities and third parties may carry out the repairs at the cost of the Contractor. Additionally, the Contractor will be responsible for any Statutory Penalties and damages enforced by the relevant authorities and third parties affected.

The Contractor shall make his own arrangements for any diversion or removal of services, which he may require for his own convenience or method of working, and shall obtain the prior approval of the Engineer to such arrangements.

The Contractor shall, by his own representations to the relevant authorities, determine the likelihood and extent of betterment works initiated by and executed concurrently with the Works and shall make allowance for such work in programming his own work.

5.8 Third party approvals and notices

The Contractor shall coordinate all of his operations with the Fort bay Harbor Master, the Employer, the Engineer and all other relevant third parties as required.

The Contractor's responsibility shall be to design, carry out and complete the whole of the Works, and to comply as a minimum with the requirements of each and every relevant statutory, regulatory and utilities authority and third parties.

The obligations of the Contractor to comply with all permits, licences and consents for implementing part of the Works are set out in the Conditions of Contract.

Should the Contractor for any reason whatsoever cause such approvals, permits, consents, etc., to be withdrawn, the Contractor shall be fully responsible for their reinstatement or re-issuance, irrespective of whether such were originally procured by the Employer.

The Contractor shall not commence dredging, reclamation, excavations, earthworks, shore protection, drainage, access, demolition, temporary works or any other works until he has obtained written approval from the relevant statutory, regulatory and utilities authorities and third parties, and a copy of that approval has been submitted to the Engineer.

The Contractor shall obtain approval in advance for the lighting and mooring of all floating equipment and for the lighting of Temporary Works or marine plant from the relevant authorities.

5.9 Communication with relevant authorities

When requested, the Contractor shall provide to the Engineer copies of all correspondence between the Contractor and local authorities, utility companies, environmental groups or other organisations and the Employer.

The Employer shall be invited to all meetings with relevant stakeholders and sufficient notice should be provided prior to the meeting date. Records of meetings shall be undertaken to validate outcomes, actions and agreement.

5.10 Access of Contractor's personnel

The Contractor shall be responsible for obtaining all necessary permissions, and completing all necessary temporary works required for the access of Contractor's Personnel to the Site. The Contractor shall be

responsible for ensuring that his employees, and his Subcontractors, obey all regulations regarding the conditions of access to the Site.

The Contractor shall give written notification in advance to the Engineer of any arrangements that he has made with third parties to make use of land outside of the Site.

5.11 Archaeology

The pre-Columbian occupations at Black Rocks date back to 3484 BC, making the site by far the oldest known on Saba to date. Use of the site appears to have been as a staging ground for fishing. Two ship cannons were located during a maritime survey in the Black Rocks Area. The full Archaeology report can be found in volume 5.

The cannons are relocated by a third party to a nearby dive site (Big Rock Market).

5.12 Damage and interruptions to existing facilities/ areas

The Contractor shall provide and erect approved supports to protect structures or works requiring support as a result of the Works and remove the same on completion. A condition survey including video footage of adjacent structures shall be carried out by the Contractor in the presence of the Engineer both before and after the provision of supports. The Contractor shall be responsible for the reinstatement or repair of any adjacent structures damaged as a result of the execution of the Works.

The Contractor shall be responsible for the financial cost and time impact of any:

- Physical damage caused to the existing port facilities/ infrastructure and adjacent areas resulting from operations.
- Interruption caused to the port operations or third parties.

Where required, the Contractor, in conjunction with the Engineer and any relevant authority, owners or occupiers, shall carry out surveys of the condition of existing properties, main pier Fort Bay, roads, lands, crops etc. which may be affected by the Works. The results shall be recorded in appropriate documents and submitted to the Engineer for approval so that the approved copies constitute a record of the condition prior to commencement.

The Contractor shall undertake all necessary physical repairs, reinstatements of any of the existing facilities, structures or roads and adjacent areas damaged. Any repairs or reinstatements shall be made to the satisfaction of the Engineer and the relevant third parties.

5.13 Laws, rules and regulations

The Contractor shall be responsible for the compliance of his staff with all Government Laws and Municipality by-laws from time to time in force. The Employer shall bear no responsibility for any failure on the part of the Contractor to enforce such rules or regulations.

5.14 Disposal licences, permits and approvals

The Contractor shall be responsible to ensure that all necessary disposal licences, permits and approvals are obtained in respect of any materials that are to be removed to tip or otherwise disposed of hereunder.

5.15 Marine Regulations and Navigation

Throughout the period of the Contract, both within and outside the Contractor's working area and the Site, the Contractor shall fully comply with the Marine Regulations. The Contractor shall install all necessary navigation aids for the safe navigation of his vessels or those of his Sub-Contractors, and vessels belonging to others, throughout the duration of his Contract. The Contractor shall have due regard to all existing navigation channels and shall leave clear all existing navigation lanes.

The Contractor shall be responsible for arranging the issuance of any relevant Notices to responsible authorities and shall supply copies to the Employer, and the Engineer. The Contractor shall be responsible for the provision and operation of appropriate marine and navigation lighting and visual warning systems for construction.

The Contractor shall comply with all instructions of the Harbor Master regarding his craft or floating plant. The Contractor's operations must be conducted in such a manner that they do not interfere with nor obstruct not endanger either the use and working of the waterways, anchorages, wharves, jetties, causeways, and approaches thereto, whether belonging to the Employer or to other persons or any waterborne traffic.

If the Contractor requires the temporary removal/ relocation of existing navigation or mooring buoys, he shall co-ordinate in advance the removal with the relevant authority and owners. Should the removal/ relocation of the buoys be possible the relevant authority will carry out the removal/ relocation and their subsequent replacement. The Contractor shall be responsible for all costs arising from the movement of buoys.

The Contractor shall be responsible for all harbor dues, piloting fees and the like, if applicable.

5.16 Sunken plant/ caissons

Without limiting his obligations and responsibilities under the Contract, the Contractor shall immediately raise and remove any equipment (floating or otherwise) belonging or on hire to him or to any sub-Contractor or to any person employed by him and which may be sunk in the course of the execution and maintenance of the works or otherwise deal with the same as directed by the Engineer. Until the sunken equipment has been raised or removed, the Contractor shall set all such buoys and display at night such lights and do all such things for the safety of navigation as may be required by the Harbor Authority, Harbor Master, the Employer or the Engineer.

In the event of the Contractor failing to carry out the obligations imposed on him by this clause, the Employer may arrange to buoy and light the sunken equipment and raise and remove same (without prejudice to the right of the Employer to hold the Contractor liable) and the Contractor shall refund the Employer all cost incurred in connection therewith. The fact that the sunken equipment is insured or has been declared a total loss shall not absolve the Contractor from his obligations under this clause to raise and remove the same.

5.17 Abatement of pollution and nuisance

The Contractor shall execute the Works in accordance with the relevant codes, standards, laws and regulations. In doing so it shall take due account of the surrounding environment in relation to pollution and nuisance.

The Contractor shall take precautions to minimise nuisance and pollution arising from noise, vibration, light, dust (including that from cement and fly-ash), grit, oil, grease and the like. Items in which applicable limits apply, include but are not limited, to the following:

- Noise.

- Vibration.
- Light.
- Dust.
- Grit.
- Oil.
- Grease.

5.18 Contractor's equipment

The Contractor shall submit to the Engineer, within fourteen days of the Commencement Date, a comprehensive Contractor's Equipment schedule which shall include the proposed dates of departure from the Contractor's home station or any other present location and the proposed dates of arrival on Site of each item.

The Contractor shall not be permitted to mobilise its main equipment to the Site until such time as the detailed design of the main breakwater and the dredging and seabed clearance has been accepted as a Code 1 or Code 2 submission in accordance with Section 4.4.

Hydraulic oil and grease used by the Contractor shall be vegetable based. There shall be no leaking of (split) barges.

All marine equipment, shall be equipped with:

- Electronic chart with latest survey.
- Positioning by RTK.
- Tide gauge reader.

All dredging and auxiliary equipment shall be equipped with XY(Z) indicators and possibilities to store the data. All data shall be transferred to the Employer.

Temporary works requirements

The Contractor shall, on request, submit to the Engineer for his consent, in the form of Temporary Works method statements, all details required by the Engineer to enable him to review the suitability of the proposed Temporary Works.

Details should be submitted not less than twenty-one days prior to starting Temporary Works.

Where such Temporary Works method statement has been requested, the Contractor shall not commence construction on any element of the Works until the Engineer has given consent to the relevant method statements.

The Contractor shall be fully responsible for the sufficiency of temporary works and methods, together with the plant, equipment and tools to be used for the fulfilment of the Contract. The Engineer's approval of such works shall not in any way relieve the Contractor of his responsibility for the proper design, construction and functioning of the Temporary Works.

The location of the Contractor's Temporary Fence's shall be approved by the Engineer. On completion, all temporary fences and structures shall be removed; the Site area cleaned, tidied up and left to the satisfaction of the Engineer.

If a temporary fence has to be erected alongside a footpath etc., it shall be of the type required by and shall be to the satisfaction of the regulating authority. The provision of such fencing shall not reduce the Contractor's obligations under the Contract. Access shall be provided in the temporary fencing as necessary for the use of the occupiers of adjacent lands.

5.19 Site cleanliness

The Site shall be kept safe, clean and tidy at all times. The activities on the Site shall not be permitted to create excessive noise, dust, water pollution, etc., in accordance with the requirements of the clause following.

Failure to comply with the above requirements will result in the Engineer taking whatever action is deemed necessary to ensure compliance, which shall include back-charging costs to the Contractor.

5.20 Works off-site

The Contractor shall give to the Engineer written notice of the preparation or manufacture at a place not on the Site, of any pre-constructed units or parts of units to be used in the Works, stating the place and time of the preparation or manufacture so that the Engineer may make inspection at all stages of the work.

Any units or parts that are prepared or manufactured without such prior notice having been given to the Engineer may be rejected if the Engineer considers that his inspection was necessary during the progress of the preparation or manufacture.

5.21 Security

Access to the Site shall be controlled and maintained by the Contractor at all times and as may be required by the police, the Employer, or other relevant authorities.

5.22 Sub-Contractors

All Sub-contractors proposed to be employed on the Works shall be approved by the Engineer. Engineer will provide a list of available sub-contractors at Saba.

5.23 Notice board

The Contractor will erect two notice boards at Black Rocks and one notice board at Fort Bay. Notice boards shall be in English and shall be displayed in a suitable position on the Site to show the Employer's name together with the name of the Project and the names of the Engineer and the Contractor. The notice boards format and design shall be approved by the Engineer and the relevant authorities.

5.24 Protection of completed works

The Contractor shall protect completed work from damage during subsequent operations, from the weather or any other cause, including the naturally aggressive nature of the environment in which the Works are to be constructed and make good any damage so arising.

5.25 Marking of the working area

The Contractor shall, if required, mark his working areas and all temporary obstruction with buoys, lights, warning notices and/or other means to the approval of the Engineer and relevant authorities. He shall implement safety measures to warn unauthorised craft to keep clear of hazards.

5.26 Exclusion zones and access limitations

Saba Marine Park. The extent of the Saba Marine Park is given in Volume 5. There are strict limitations for activities within the Saba Marine Park.

6

CONTRACTORS SITE

6.1 Contractors site compound(s)

Contractor may construct a temporary site compound(s) to house his Site staff. Construction and operations shall be in compliance with the relevant legislation.

6.2 Site utilities

The Contractor shall be responsible for providing his own utilities (water, electricity, etc) during the Works.

FACILITIES FOR THE ENGINEER

7.1 Engineer offices

At least four weeks before start of Works on site, the Contractor shall provide, erect, maintain and clean to the satisfaction of the Engineer, appropriate accommodation and other office equipment for the exclusive use of the Engineer, the Employer and his assistants. Should the Contractor become aware that the facilities will not be ready for the occupation, it shall propose alternative temporary accommodation arrangements for acceptance by the Employer. Temporary accommodation shall be at the Contractor's cost. Acceptance of the temporary accommodation shall be entirely at the Employer's discretion, and occupied for a maximum of four weeks only.

The facilities shall be as detailed below:

- Conference room (not less than 30 m²).
- General office (not less than 50 m²) with a minimum of four working places.
- Office for the Engineer's Representative (not less than 20 m²).
- Fully equipped kitchen.
- Separate male and female restroom.

The offices shall be substantial, weather-tight insulated and hurricane resistant. Windows shall be openable, weather and dust proof. Windows shall be fitted with sunshades and blinds. These offices shall be lined internally and shall be equipped with desks, plan chests, tables, bookcases, filing cabinets, drawing boards, shelves, stools, chairs, floor coverings and furnishings. Lockable cupboards shall be provided for lever arch files with adequate shelving. They shall be provided with ample water supply, including chilled bottled drinking water and dispenser, water heating appliances, electric lighting, and split unit air conditioning (ceiling mounted, cassette type), water closets, and hand washbasins. The kitchen is to be provided with electric water boiler for hot drinks, microwave cooker, refrigerator. Minimum artificial light intensity shall be 215 lumens/m², with an intensity of 400 lumens/m² in office rooms. Air conditioning shall be provided to maintain a maximum office temperature of 24 °C.

The conference room shall be equipped with a table/tables and chairs capable of comfortably hosting meetings of 15 people. It shall be equipped with a 'smart' projector (to which a laptop can be connected for the purpose of making MS Power Point presentations) and screen, and a whiteboard and large notice boards (for the purposes of displaying A1 drawings and programmes) shall be fixed to the walls.

The office rooms shall be provided with a workstation for each occupant comprising a desk with drawers and a table of the same style and height (in order that tables and desks align in height) for laying out drawings. Desks shall be provided with fully adjustable, rotatable "secretary's" chairs on star bases and a 'fixed' chair for visitors. Each workstation shall be provided with a bookcase. Three tier filing trays and waste paper baskets shall be provided to each workstation.

The offices shall be cleaned on a daily basis and supplied with towels and toilet consumables.

A parking area with a capacity for four vehicles shall be provided adjacent to the office entrance.

The Contractor shall provide details of his proposals for the office for the Engineer's approval and shall commence the erection of these offices as soon as authority is given to proceed with the Contract.

The offices are to have suited locks with keys available to the Engineer and his staff only.

The Contractor shall supply, erect, furnish, maintain and clean the offices to an acceptable standard and the satisfaction of the Engineer for a period of up to two months beyond the issue of the Taking-Over certificate for the whole of the Works.

7.2 Survey and Associated Equipment

The Contractor's own survey equipment shall be, if requested, available for use of the Engineer and his staff from the commencement of work on the Site until two months after the date of issue of the Taking-Over Certificate in respect of the whole of the Works

7.3 Boat

The Contractor shall provide, when required by the Engineer, a certified boat, and qualified boatman, appropriate for use in monitoring construction, including undertaking diving inspections.

TAKING OVER

8.1 General

The relevant part or Section of the Works will not be considered to be substantially completed for the purposes of taking over until the following conditions precedent have been met (to the extent as applicable), along with the provisions of the Conditions of Contract, and the said Section is capable of being brought into continuous full scale operation by the Employer:

- Completion of all of the design and construction of the Works.
- Any outstanding works or defects or remedial works are such that their completion will not interfere with the said full scale continuous operation and public access.
- All necessary permits and certificates shall be available for the Employer's use and occupation:
 - 1 Certification by the Contractor's designer that the Works have been constructed in accordance with the Contract and the certificates have been submitted to the Engineer.
 - 2 Certification by the Contractor's designer that the Works have been constructed in accordance with the Contractor's Documents and the certificates have been submitted to the Engineer.
 - 3 All fencing, gates, barriers and hoardings, both permanent and temporary, shall be in place and complete. Temporary fences and gates shall be provided along the perimeter of each completed area to physically delineate the Contractor's areas under construction from the areas handed over to the Employer.
 - 4 Any associated work that falls outside the physical limits of the Section, but which is necessary to allow the Section to come into full operational use, will be required to be completed.
 - 5 The Contractor has supplied to the Engineer As-Built Drawings and Operating and Maintenance Manuals, as described elsewhere in the Employer's Requirements, appropriate to the Section of the Works being taken over.

A completion inspection shall be held in agreement with the Engineer and a report handed in by the Contractor after provisional acceptance of works.

The Contractor shall protect completed work from damage during subsequent operations, from the weather or any other cause, including the naturally aggressive nature of the environment in which the Works are to be constructed and make good any damage so arising.

The following documentation is to be submitted at handover, not limited to the list below and subject to the approval of the Engineer:

- Design reports.
- All approved As-built drawings, including source files in AutoCAD format and pdf.
- Multibeam survey of harbor area in source file, AutoCAD format and pdf.
- Topographic survey in source file, AutoCAD format and pdf.
- Operation & Maintenance manuals.
- Knowledge transfer documents.
- Design calculations.
- Material approvals.
- QA/QC documents including all test certificates.
- Approved vendor/component list.

- BoQ with unit rates.
- Specifications related to material and execution.
- Guarantees/warranties- Transfer of warrantee and transfer the guarantee (if available) of all related to the asset and its elements.
- Variation Orders (if any).
- Deviations, if any and approval for the same from Engineer & Employer.
- All details required to set-up and/or update the asset in GIS.
- Approvals obtained from various authorities like Municipality, Environmental Agency, Civil Defense etc.
- Value of asset transferred.

8.2 Completion inspection

When the Contractor notifies the Engineer in accordance with the provisions of the Conditions of Contract that the relevant part or Section of the Works is complete and ready for Taking Over, the Engineer will inspect the relevant part or Section and identify to the Contractor any work which does not comply with the Employer's Requirements.

9

CONTRACT PROGRESS CONTROL

9.1 Programme

The Contractor shall prepare a Programme. The Programme shall show as a minimum:

- Key milestones, such as the Commencement Date and the Time for Completion of Sections.
- Any temporary works construction, services diversions, traffic diversions and the like.
- Critical path and float periods.
- Permits and approvals required for the Works, including process periods and requirements.
- Interrelation between activities.
- The work of the Employer or other stakeholders related to the Works.
- The dates when the Contractor will need information and approvals to be provided by the Employer.
- Interface points in the Contract Programme with construction work.
- Manpower resourcing plan.

The work headings to be shown in the Programme shall be the main elements of the Works. The Programme shall clearly show the inter-relationship between design, fabrication, delivery, construction, testing and commissioning of each work heading. Long lead-in items and their lead-in times shall also be identified. The Programme format shall be agreed and approved by the Engineer.

Each work heading shall be split into detailed activities. Work to be undertaken by statutory undertakers and other third parties shall be shown as separate activities.

Each activity shall be uniquely referenced. Bar charts, logic diagrams/ tables and any other necessary tabular and graphical reports shall be submitted to show the following information for each activity on the network:

- Reference.
- Description.
- Duration.
- Indication of periods and duration which the activity cannot take place, for example because of the hurricane season or the spawning season etc.
- Relationship with other activities.
- Early and Late Start and Finish Dates.
- Resources or Unit Production Time.

9.2 Progress

Progress against the programme shall be updated by the Contractor at monthly intervals and presented at monthly progress meetings so that the progress of the Works can be adequately scrutinised by the Engineer. Shorter, weekly progress meetings shall also be held, during which the Contractor shall present weekly 'look-ahead' programmes for review and discussion with the Engineer, along with any other issues that can be discussed with the Engineer in absence of the Employer.

The Contractor shall assess and report progress on each activity and all other input data not more than two days after the scheduled time for an update and prior to the monthly progress meeting.

The Contractor shall submit to the Engineer updated scheduling data (Bar Charts, Tables and USB Memory Drive), showing actual progress and comparison with the programme.

Where slippage has occurred, the Contractor shall give explanations together with his proposals for recovery of critical activities, and these shall be presented by the Contractor on a submitted Programme no later than seven days from this meeting.

9.3 Progress videos and photographs

9.3.1 Worksite progress video records

The Contractor shall, prior to Commencement of Works and during the progress of the Works, have photographs taken of such parts of the Works as the Engineer may from time to time direct at approximately monthly intervals. The Contractor shall provide the Engineer with one digital copy of each photograph taken. Digital albums shall be provided with descriptions of the photos in English. Colour progress photographs shall be included in the Contractor's Monthly Reports.

Similarly, the Contractor shall take work progress videos every month and issue to the Employer and Engineer via digital media. The Works progress videos and photographs will be used to develop material such as:

- Record of key construction and site activities.
- Time-lapse progress videos.
- Training material.
- Promotional, educational material.

Drone flights shall also be undertaken at monthly intervals and following the Completion of the Works, with still photographs and videos recorded of the key construction and site activities (including key milestones).

Following each Section of Completion of the Works, this shall be complemented by an aerial colour video of the Works.

All footage will be handed over to the Employer on a regular basis in a digital format to be agreed with the Employer.

On Work completion all footage shall be handed over to the Employer in a digital format to be agreed with the Employer.

9.3.2 CCTV

Contractor shall provide CCTV (closed-circuit television) monitoring of the construction activities including all marine activities and activities on site by Sub-Contractors. A minimum of 4 locations, to be agreed with the Engineer, shall be selected, but coverage shall comply with the following as a minimum:

- Landside works including the road.
- Marine works.
- Contractor's Marine Vessels used for dredging.

The CCTV shall provide sufficient resolution, Pan Tilt Zoom (PTZ) functionality and performance specifications to allow for remote monitoring of Worksite progress.

CCTV footage shall be streamed live via a controlled and secure network service to allow the Employer to securely access CCTV stream via the internet (minimum of three simultaneous users/ licences).

CCTV footage shall be recorded and handed over to the Employer weekly via a digital format to be agreed with the Employer.

CCTV footage for the entire Work activities shall be recorded and handed over to the Employer on completion of the Works in a digital format to be agreed with the Employer.

10

HEALTH AND SAFETY

10.1 General

The Contractor shall take all reasonable measures to eliminate minimise or otherwise mitigate risks to health and safety of all persons in the vicinity of the Works.

10.2 Design

The Contractor shall, during the design process, consider the hazards and risks that may arise during construction, operation and maintenance of the structures, and design accordingly to avoid risks to health and safety as far as is reasonably practicable. If the avoidance of risk is not possible, then the Contractor shall reduce these risks at source. The designer shall highlight any significant risks to the Contractor with notes on the drawings and design risk assessments.

10.3 Site safety

Initially, the Contractor and Sub-Contractors shall take part in a site safety induction presented by the Employer's HSE Supervisor/ Officer. Once the Contractor has fully mobilised to site, a suitably qualified HSE Supervisor/ Officer employed by the Contractor shall be responsible for conducting the inductions and coordinating with the Employer's HSE Supervisor/ Officer to ensure that induction materials are up to date and relevant. The safety induction shall focus on the actual risks related to the work but always to include traffic safety, working adjacent to water, working near roads, emergency response procedures, hurricane protocol. The safety induction shall be carried out to all workers.

The Contractor and Sub-Contractors shall attend monthly site safety meetings. The meetings will be chaired by the Engineer or his designated representative. The Contractor and all Sub-Contractors shall be represented at senior project management level and by their nominated site safety officers.

10.4 Health and Safety plan and emergency response programme

Prior to construction, the Contractor shall appoint a Health and Safety Officer for the duration of the Works. The Contractor shall prepare a Health and Safety Plan and a Calamity Response Programme covering all aspects of the Works, including the waterside works. This plan shall be submitted to the Engineer for his consent within twenty-one days of the Commencement Date. The Plan shall be maintained up to date. It shall be co-ordinated with other Contractors and operators working on Site or on adjacent sites, including the Employer. The Contractor shall identify, as part of the plan, all potential safety risks and hazards, and his proposed procedure for dealing with them should they arise during construction.

Specific attention shall be given to the prevention of heat-stress, working over and under water (diving operations) and the prevention of fire.

The Health and Safety Plan and Calamity Response Programme shall be produced in a format acceptable to the Engineer and shall include as a minimum the following:

- Contractor's Health and Safety Policy Statement.
- Organisation chart showing key Health and Safety personnel.
- Names and key qualifications of key personnel.
- Duties of key personnel.
- Risk Assessments.
- Methods of monitoring and controlling health and safety.
- Detailed records of all incidents and accidents Including near misses of the last 10 years, including but not limited to LTI's and fatalities. , including additional mitigation measures to prevent re-occurrence of the events.
- Names and contact details of appointed H&S personnel, key medical personnel on Saba, including Saba hyperbaric chamber operators and procedures dealing with emergencies, communication lines and routes to nearest first-aid stations, Saba hospital and other hospitals (SXM or others).

The plan shall be updated as necessary during the construction phase. All safety procedures and advice shall be available in English and in the language of the labour force if not English.

10.5 Health and Safety file

The Contractor shall prepare and maintain a health and safety file, the purpose of which shall be to record all matters relevant to safe maintenance and operation of the completed Works. The health and safety file shall be produced in a format acceptable to the Engineer.

The Contractor and his Sub-Contractors shall maintain detailed up to date records of construction and shall use this information in the preparation of the As-Built Drawings and technical data to be included within the health and safety file.

Any services (electrical, water, drainage, telephone, etc.) found during the execution of the works shall be notified to the Engineer. The Contractor shall record the location of such services on a drawing for later inclusion in the health and safety file.

The Contractor shall ensure that any relevant information to be included in the health and safety file is in the form of self-contained documents. Submission of such documents shall be a condition precedent for the issue of the relevant Taking-Over Certificate along as the other requirements of the Contract.

10.6 Risk Assessments

The Contractor shall ensure that risk assessments are carried out for all work activities on the Site and these are to be included in the Contractor's Health and Safety Plan and Calamity Response Programme. Risk assessments shall be substantiated by Contractor's method statements and kept up to date during the execution of the Works

10.7 Warning signs

Signs warning of the dangers of construction sites shall be prominently displayed around the inside and outside of the Site, to serve as a notice to the Employer's staff and agents who may visit the Site, and the general public who may be present outside the Site. Signs shall include symbols and words.

10.8 Visitors to the Site

Procedures must be developed for the reception of all visitors to the Site that includes recording persons on and off the Site, and suitable Site induction and guidance by experienced staff during such Site visits. Visitors must also be provided with such personal protective equipment as may be required to comply with the accepted Contractor's Health and Safety Plan and Calamity Response Programme.

10.9 First aid and emergency procedures

The Contractor shall ensure that first aid facilities (and ambulances, if applicable), together with trained first aiders, are available in accordance with local legislation and good practice. The Contractor shall take into account in his consideration of requirements, the location and nature of the Site and the type of potential injury therein. He shall also take into account the location of the nearest hospital/ ambulance facility, access to communications and personnel on Site. The Contractor shall address these issues in his Contractor's Health and Safety Plan and Calamity Response Programme.

The Contractor shall acquaint all personnel on Site, including those of the Employer and of the Engineer with any relevant emergency arrangements.

10.10 Training

The Contractor shall ensure that all personnel employed on or about the Works, including visitors, receive appropriate training by way of toolbox talks and the like, such that they understand the risks involved in the works being undertaken, the safe use of tools and equipment, and the relevance of personal protective equipment (PPE).

10.11 Precautions against fire

The Contractor shall take all reasonable precautions to prevent outbreaks of fire on the Works, Temporary Works, and in all offices, stores and other places and things connected therewith or premises adjacent thereto and especially with respect to the safe and secure storage of petroleum products, paints, explosives and all other dangerous or hazardous goods. This shall include the preparation of a fire hazard risk assessment.

The Contractor shall provide and maintain in good order and hold available at all times and in all places connected with the Works a sufficiency of appropriate efficient firefighting equipment together with personnel trained to its use.

The Contractor shall give all authorised Fire Officers or equivalent personnel all necessary facilities to inspect the fire prevention arrangements on the Site and shall at his own cost remove all surplus materials and equipment and take such steps as the Employer may require to reduce the risk of fire.

The Site shall be accessible for emergency services at any time.

10.12 Personal protective equipment

The Contractor shall comply with the following minimum standard requirements for the wearing of PPE, from which there shall be no exclusions:

- Hard hat, reflective vest (except when operating rotating tools), safety boots/ shoes, harnesses (in defined areas), goggles when needed.
- Life jackets when working over or near water.

- Provisions for working in hot climates (goggles with UVB/UVA protection, sunscreen, ventilated clothing and PPE).

The Contractor may be required by the Engineer or the Employer to remove from Site any of his personnel who repeatedly ignore these requirements.

10.13 Diving operations

The Contractor's diving operations shall be carried out in strict accordance with local regulations and the International Marine Contractors Association (IMCA) and relevant environmental, health and safety standards. In the event of conflict, the most stringent requirements shall apply.

The Contractor shall appoint a diving specialist who shall be one clearly identified person or company. Details of the diving specialist's experience, registration, diving rules, references, and evidence of insurance coverage, shall be submitted to the Engineer for assessment of their suitability.

The Contractor shall provide to the Engineer a copy of divers' certificates of training/ qualifications, medical fitness and diving first aid prior to commencing diving operations.

The Contractor shall submit to the Engineer a dive plan or method statement for all diving operations, identifying particular techniques, types of equipment, floating plant, and general arrangements of the Site set-up including the provision of records of performance, for approval prior to commencement of diving operations. Due account shall be taken of water quality in assessing dive requirements.

No diving operations shall be undertaken whilst a vessels engine is running.

Where other simultaneous operations, such as rock placing or dredging, could cause a hazard, particular safe working practices to be adopted must be stated prior to commencing diving operations.

Diving work will be expected to be carried out using surface supplied air with full face masks or helmets, in line with international commercial diving regulations

All divers, when underwater, shall be connected to the surface by means of a safety line.

There shall be a continuous communication line between the diver and the surface.

Safe access to/ egress from the water shall be provided at all times.

The Contractor shall keep the Engineer informed of all diving operations and associated floating plant movements.

The Contractor shall ensure that emergency services including medical equipment, evacuation and access to hyperbaric chamber facilities are available and planned for the duration of the diving operation and that the Engineer is notified accordingly. The Contractor shall also ensure that there is effective communication between the work Site and emergency services and the persons responsible for operations which might present a hazard to the Site.

The Contractor shall provide diving assistance to the Engineer as and when required in the supervising of the Works.

10.14 Inspection scope

During the construction period, the Employer undertakes inspections including, but not limited to, the following scope:

- Compliance with OHS plan and standard operating procedures (as applicable).

- Provision of a Safety induction where the Contractor informs all employees on OHS risks at start of the work.
- Daily toolbox talks to be held.
- Proper use of PPEs in line with the risk profile of the work (e.g., uniform, noise protection, gloves, safety vest, helmet, safety shoes, life jacket, safety harness, goggles, breathing protection, etc.).
- Waste, hazardous material and fuel to be stored in line with MECA requirements.
- Measures to prevent soil contamination in place and soil remediation (if required) before the end of the work.
- Disposal of waste to MECA approved sites only.
- All tools and equipment to be in good state well maintained and properly used.
- Contractor to provide good welfare facilities including drinking water, meals, toilet, restroom, etc.
- Dust not to effect other activities and proper dust suppression (water spraying, fog cannon, etc.) systems to be used.
- Good housekeeping of the Site.
- When working near a road specific measures have to be in place to separate the work site and traffic by barriers/ cones/ signs/ placing of vehicles, etc., and a flagman to be present (more detailed standard to be prepared).

11

ENVIRONMENTAL REQUIREMENTS

11.1 Overall approach

The Contractor shall ensure the Works are executed in compliance with international, national and local environmental legislation.

The Contractor shall comply with the conditions of all relevant Environmental Permits and take responsibility for determining and verifying the requirement for any additional Environmental Permits/approvals required for the execution of the works. The absence of information in these Employer's requirements does not relieve the Contractor of his responsibility for determining and verifying the extent of the permissions required. Copies of any Environmental Permits acquired by the Contractor shall be provided to the Employer and the Engineer.

The Site is located in an environmentally valuable and sensitive area, see 11.2. At all stages of the project, the Contractor shall adopt, as a fundamental principle, and proactively demonstrate, implementation of a close working interface between their engineering and environmental disciplines.

11.2 Environmental Impact Assessment (EIA)

The Environmental Impact Assessment (EIA) Report has been produced to cover the full scope of the Works and is provided in Volume 5.

The main ecological values of the Black Rocks area are:

- Presence of rare, endemic and endangered plant species.
- Presence of reptiles with high conservation status.
- Presence of protected coral species.
- Recognized Important Bird Area.

Terrestrial impacts of the construction of Black Rocks Harbor include:

- Loss of ecological values in the footprint.
- Possible disturbance of birds.
- Impacts on landscape.

Marine impacts include:

- Loss of corals and other marine benthos.
- Increased turbidity levels and possible sedimentation of reefs.
- Possible noise impacts.

Positive impacts can be expected from stabilization and revegetation of eroded slopes.

The Contractor shall adopt the following mitigation measures as indicated in the EIA:

- Save trees that are near the footprint of the Works.

- Excavate and replant trees that are within the footprint of the Works and have a stem circumference at breast height (CBH) of more than 30 cm.
- Protect or replant rare plant species within the footprint of the Works.
- Construct the storm water drainage and run-off water measures before terraces are constructed.
- Prepare a Storm Water Pollution Prevention Plan (SWPPP), including: keeping the Site clean at all times, measures to divert all storm water around the site during the construction works, such that uncontrolled run-off from the Site flushing to the sea is prevented.
- Dust control measures: covering surfaces, water spraying, placing closed fences with a minimum height of 2 m around the Site in order to prevent wind dispersion of particulates.
- Relocate colonies of protected coral species from the footprint area and the high-risk zone to a safe area (see also Volume II, part 1b).
- Screen aggregates for marine construction (bedding layer caissons, revetment) to exclude the fraction of <10 mm to a minimum and with a total content of fines (<63µm) less than 5 %.
- No dredging between 3 days before and 21 days after the spawning season, which for most coral species in the Northern Caribbean occurs in the period July-September.
- A quantitative noise assessment shall be performed for all pile driving activities. Noise reduction measures shall be included for pile driving. Execute pile driving with soft start procedure.
- In case of marine piling: observation of marine mammals with spotter vessel and stop pile driving when sea mammals approach.
- The Contractor shall adopt proactive feedback management in relation to water quality and coral health.
 - Discontinue marine construction within 3 hours after a current reversal.
 - Monitor water quality and coral health.
 - Determine tolerance limits for all Indirect Indicators.
 - Update tolerance limits as the works progress based on coral health monitoring.
 - Primary control to comply with tolerance limits shall be through spill budget control.
 - Predictive numerical modelling is applied to hindcast the location of the plumps from construction operations. The modelling results are compared with the measured effect on coral health.
 - The Contractor shall adapt his activities such that all indirect indicators stay within the tolerance limits.
 - Activities shall be discontinued directly when turbidity levels exceed maximum tolerance limits.
- Execute construction activities above the 50mSD height contour between 8-16 h and no construction activities above the 50mSD height contour between December-March.
- Anchoring is allowed in the 'high-risk zone' as defined in definition drawing 118421-3402.
- Anchoring outside the 'high-risk zone' shall be avoided.
- A detailed mooring plan shall be prepared. Including 3D presentations of anchor lines above the seabed/patch reefs and shall demonstrate that no coral will be damaged.

11.3 Construction Environmental Management Plan

The Contractor shall design, implement and effectively resource a comprehensive Construction Environmental Management Plan (CEMP), compliant with the environmental requirements stated in the EIA, in the Permit, Employer's documents and relevant local, national and international legislation, standards and best practice.

The CEMP shall be submitted within 8 weeks after Commencement date and 4 weeks before start of Works.

The CEMP shall address all topics mentioned in this EIA (terrestrial, water and coral monitoring, numerical modelling, positioning plan, protection of plants, birds, corals, etc, run-off control), working periods in respect of coral spawning, birds, etc.

The CEMP will outline those parties/persons responsible for the implementation and reporting of items (in the CEMP) and describe the mitigation measures and best practice, including those outlined in the EIA that will be implemented during works to avoid/minimise adverse environmental effects.

The CEMP shall be supported by detailed Contractor Method Statements for all activities as well as topic specific management plans, e.g., waste management, noise, pollution prevention plan. These Method Statements will indicate the period within which the contractor shall maintain status on site after completion of civil works to ensure that significant adverse impacts arising from such works have been appropriately addressed.

The CEMP shall not relieve the Contractor of his environmental obligations under the Contract.

11.4 Environmental inspection and monitoring

The Contractor shall prepare an environmental inspection and monitoring plan.

Contractor shall adapt the following inspection and monitoring as indicated in the EIA:

- Indirect indicators for water quality and coral health:
 - Light attenuation.
 - Sedimentation.
 - Corals impacted by construction activities.
 - Currents.
 - Waves.
 - Morphology.
 - Suspended sediments.
 - Turbidity.
 - Temperature.
 - Nearby seagrass bed.
- Monitoring of success of coral relocation.

Installation and running at least 3 months prior to construction commencement.

The Contractor shall install water quality monitoring stations at 1 location.

11.5 Environmental nuisance

Procedures following the Environmental Impact Assessment, Environmental Permit and applicable government, shall be developed to prevent nuisance or inconvenience to the environment, adjacent properties and the general public, keeping places clean and safe.

No materials shall be burned on Site.

11.5.1 Pollution

All forms of noise, vibration, oil, grease and dust pollution from plant, machinery and other sources must be controlled with procedures developed for this purpose. These requirements shall be communicated to all workers during site induction training.

11.5.2 Tidiness of sites

The hazards of the construction work, to all parties, shall be further reduced by maintaining a tidy site. Good housekeeping and good working practices must be implemented on the site at all times.

The Contractor shall keep the site, its surrounds and access roads clear of spoil, spillages and debris arising from the site, including domestic waste.

Footpaths and roads shall be kept clear of deleterious material that may cause hazardous conditions for pedestrians and or vehicles.

11.5.3 Vibration, noise and dust

The Contractor shall use adequate Plant and equipment adopting working methods to minimise the risk of damage to property caused by vibrations transmitted through the ground.

The Contractor ensures that:

- All Plant and equipment is fitted with effective exhaust silencers, maintained in good repair and in accordance with the manufacturer's instructions, and operated as to minimise noise emissions.
- Only 'sound reduced' compressors or other alternatives accepted by the Engineer are used, and any parts fitted by the manufacturer for the purpose of noise reduction are maintained and operated so as to minimise noise.
- Any pneumatic operated percussive tools are fitted with accepted mufflers or silencers which are kept in good repair.
- Any machinery which is intermittent in use is shut down in intervening periods of non-use, or where this is impractical is throttled back to a minimum.
- Stationary equipment (e.g., pumps, compressors, generators) are situated as far as possible from property and acoustic screens are to be erected if required by the Engineer. Other equipment is to be screened if necessary.
- Equipment known to emit noise strongly in one direction is, where practical, orientated so that noise is directed away from noise sensitive areas.
- As far as possible, construction operations should not as noisy as to be a danger to those on or about the works or to be a nuisance to the neighbouring occupants.

12

QUALITY ASSURANCE

12.1 Introduction

The Works (including any investigations, design, construction, provision, erection, setting to work, testing, monitoring and maintenance) shall be executed under the control of a quality assurance system which satisfies the requirements of ISO 9000 and ISO 9001 (or equivalent) and the particular requirements of this document.

The Contractor shall prepare a Quality Plan which shall be submitted to the Engineer for approval. No work shall commence on Site in the absence of such approval.

The Quality Plan shall describe the quality system to be implemented for the Contract. The Contractor's Quality Plan shall describe in detail the quality management policies, organisation, responsibilities and procedures to be applied, and identify the applicable provisions of ISO 9000 and ISO 9001 (or equivalent) to be used. The Contractor's Quality Plan shall be prepared and submitted to the Engineer for approval within twenty-one days of the Commencement Date.

The Contractor's designer shall also operate a quality system, and that system shall comply with ISO 9001 (or equivalent). Such quality system should be part of the Contractor's Quality Plan.

Emphasis shall be placed on planning, verification and timely validation of the submissions and processes at different stages of the project.

The documented procedures shall include for example measures which control and co-ordinate the design process activities of the Contractor, and detail the specific design criteria for the project, including verifications of the designs and implementation in the construction works.

The Contractor shall demonstrate a methodology to accommodate project specific requirements for design changes as applicable.

12.2 Materials

Contractor shall provide a list of all materials that he will obtain from external suppliers and/or need to be custom made for the Project. The following information shall be provided for Engineer's approval:

- Product sheets.
- Applicable quality assurance system.
- Method for factory acceptance test.

Contractor shall facilitate witness of factory acceptance tests by three people representing the Employer and Engineer.

12.3 Reports, returns, drawings, etc.

12.3.1 Daily returns

The Contractor shall supply by twelve noon on every working day (unless otherwise stated in the Conditions of Contract), such daily returns as may be required by the Engineer, which may include:

- A list of the labour and plant employed on the previous day specifying the number employed in each trade and sub-contract labour.
- Labour, including the operatives name and trade, plant and materials used on Dayworks.
- Record of weather (temperature range, humidity, rainfall and wind speed and direction) and sea conditions (tide level and wave height and direction) on the Site.
- Turbidity data from live monitoring points.

These daily returns shall be validated by the site inspection personnel before submission. The procedure is to be agreed with the Engineer.

Turbidity measurements shall be live available online.

Survey data shall be available within 24 hours from survey collection.

12.3.2 Daily forecast

The Contractor shall supply by 09:00 on every working day (unless otherwise stated in the Conditions of Contract), a forecast of the following:

- Weather forecast.
- Turbidity forecast .
- Expected work activities.
- Expected resources.
- Expected deliveries of Plant or Materials.

These forecasts shall be validated by the site inspection personnel before submission. The procedure is to be agreed with the Engineer.

12.3.3 Weekly progress summary

The Contractor shall supply to the Engineer by twelve noon (12.00) on the Sunday of each week (unless otherwise stated in the Conditions of Contract):

- A schedule of the main work items completed in each section of the Works, showing quantitative progress during the previous week and cumulative progress to date.
- Matters that have caused difficulties or problems for the Contractor or third parties, along with steps taken to resolve these difficulties.

12.3.4 Two-week work plans

The Contractor shall supply to the Engineer by twelve noon on the Sunday of each week (unless otherwise stated in the Conditions of Contract), details of all Contractor's intended activities for the coming fourteen days' period, including but not limited to:

- Detailed intended programme of work.
- Summary of Contractor's equipment and labour planned to be used.
- Matters that are expected to cause difficulties or problems for the Contractor or third parties, along with steps to be taken to resolve these difficulties.

12.3.5 Monthly progress report

The Contractor shall submit, not later than the seventh day in every month unless otherwise stated in the Conditions of Contract, to the Engineer a progress report for the previous month that shall include the following items and information:

- Charts and detailed descriptions of progress.
- Change of end date.
- Progress photographs.
- Timelapse videos of the last month's progress (provided on USB stick).
- Status of Plant and Materials.
- Details of Contractor's Personnel and Equipment.
- Schedule of plant on Site including dates of arrival and departure of items.
- Summary of staff and labour employed on Site.
- Quality assurance documents, test results and certificates of Materials.
- Summary of principal materials and manufactured items:
 - Placed on order.
 - Delivered to Site.
- Notices of Employer's and Contractor's claims.
- Record of Site safety and environmental aspects including:
 - Incidents during the reporting month.
 - Lost Time Accidents (LTA) and Lost Time Injuries (LTI).
- Comparison of actual and planned progress based on the marked-up programme submitted at the progress Site meeting amended (if necessary) to indicate agreed revisions.
- Comparison of actual and planned cash flow.
- Matters of significance that have caused or are expected to cause difficulties or problems for the Contractor or third parties, along with steps taken or to be taken to resolve these difficulties.
- Risk register updated for the month and project execution.
- Weather conditions, (daily temperature range, humidity, rainfall and wind speed and direction).
- Data from (live) environmental monitoring points.
- Sea conditions (tide level and wave height and direction).
- List of SME inputs.
- List of local materials as a percentage of the work undertaken in the month reported.

12.3.6 Drawings of temporary works

If requested by the Engineer, the Contractor shall furnish to the Engineer before erecting any part of the Temporary Works, complete drawings of the temporary work and staging required for carrying out the Works. The Contractor shall at the same time, if so required by the Engineer, furnish calculations relating to the strength and anticipated deflections, in respect of such Temporary Works. The Contractor shall also furnish to the Engineer drawings showing the methods proposed for the erection of the various parts of the Works. The Employer will respond to the Contractor's submissions with either consent or rejection within fourteen days of receipt.

The furnishing to the Engineer of any design for any of the Temporary Works and staging shall not relieve the Contractor of any liability or obligation under the Contract in respect of such Temporary Works and staging.

12.3.7 As-Built drawings

The Contractor shall establish and at all times maintain an up-to-date record of as-built details. The primary element of this record shall be in the form of marked up versions of the working drawings. As soon as an

element of work is complete the most recent working drawing of that element shall be used along with the as constructed records to prepare record drawings.

In addition to details included in the Employer Requirements, Contractor's design drawings and specifications, record drawings and any supporting tables and other documents shall include:

- Original ground levels. The Contractor shall, before commencing work on any section of the Works, survey and level the original ground surface and seabed and shall prepare plans and sections for agreement. The Contractor shall provide the Engineer with all co-ordinates and level data in both Autocad (.dwg) and ASCII format.
- Any structure or other obstruction found on the Site.
- Any existing service found on the Site, whether live or abandoned.
- Finished ground levels.
- Settlement records.
- Details of type and properties of materials used including test results.

Upon completion of the Works, the Contractor shall provide one original and two paper copies, of all engineering drawings, survey drawings, manufacturer's drawings, instruction manuals and any other relevant drawings and documents, incorporating all changes made during the performance of the Contract, so that they form a true and accurate record of what has actually been provided or supplied.

Each drawing, document, instruction manual, etc., shall be certified 'Approved – As-Built', signed and dated. Originals of drawings shall be in AutoDesk AutoCAD (.dwg) file format and Adobe Acrobat (.pdf) file format supplied on USB Memory Drive, unless otherwise agreed by the Engineer.

To accompany the drawings and documents the Contractor shall provide a Master Schedule of As-Built drawings and documents. This Master Schedule shall list all drawings and documents produced on the project, recorded in project drawing number sequence and shall state the latest revision number, and where applicable shall indicate that each drawing has been certified 'As-Built'. Where a drawing is not submitted as a record drawing, the reason (e.g., deleted, superseded, etc.) must be stated. The Master Schedule shall be submitted to the Engineer for acceptance prior to submission of the record drawings and documents.

As part of the Taking-Over, the Master Schedule, As-Built drawings and documents shall be completed, certified and provided to the Engineer prior to the date the Engineer issues the final Certificate of Completion.

12.3.8 Returns and drawings in triplicate

A single copy of all reports, statements, returns, diagrams or drawings, etc., that the Contractor is required to submit during the progress of the Works to the Engineer, are, unless otherwise directed, to be furnished to the Engineer with a digital copy on USB memory stick.

13

STANDARDS, MATERIALS AND EQUIPMENT

13.1 Standards and alternative Standards

The design, manufacture, provision, installation and construction of all temporary and permanent works shall comply with the Employer's Requirements, European (ISO) or other internationally recognised Codes of Practice, and all statutory regulations. A consistent, coherent and compatible set of standards shall be used, appropriate to the form of construction and the environment.

Plant and Materials specified to conform to a European Standard or equivalent standard in another Member State of the European Community or equivalent British Standard or equivalent American Standard shall be clearly and indelibly marked with the reference to which they comply wherever possible. Where this is impracticable the relevant advice/delivery notes shall include the reference with which they are to comply. Certificates of compliance shall be submitted to the Employer.

All materials and items of plant shall be of good quality and be able to operate in and withstand the environment in which they will be working.

In the absence of a specified reference code or standard, the Contractor may propose other recognised international codes and standards, and in such a case the Contractor shall provide a copy in the English language and demonstrate to the satisfaction of the Engineer, suitability and equivalence of the substitute codes and standards as well as provide proof of previous successful use. Work specified by reference to the published standard or specification of a government agency, technical association, trade association, professional society or institute, testing agency, or other organisation shall conform to or surpass the minimum standards of quality for materials and workmanship established by the designated standard or specifications.

Where the specific date of issue of the standard is not included with the reference to the standard, the latest edition, including all amendments published and available on the date twenty-eight days prior to the latest date for submission of the Tender shall apply.

Where two or more standards are specified to establish quality, the product and workmanship shall conform to or surpass the requirements of both. In case of conflict between referenced standards, the more stringent shall apply.

Where a standard and a brand name are both specified for a product in the Contract Documents, the proprietary product named shall conform to or surpass the requirements of the specified reference standard.

The listing of a trade name in the Contract Document shall not be construed as warranting that such product conforms to the respective reference standard.

Copies of applicable referenced standards have not been bound in the Contract. Where copies of standards are needed by the Contractor for superintendent and quality control of the work, he shall obtain a copy or copies directly from the publication source and maintain in an orderly manner at the job site available to the Contractor's personnel, Sub-Contractors and the Engineer's staff.

The Contractor shall clearly identify and submit for acceptance any requests to use products conforming to printed standards or publications with a different publication date from that effective under the Contract. The Contractor shall clearly indicate the changes in product or workmanship quality involved in the proposed change, if any, and reasons for the request.

13.2 Statutory requirements

The Contractor shall be responsible for acquainting himself with and observing all current Statutes, Ordinances, Byelaws or Regulations including those relating to safe working practices, training, levies and similar taxes.

In the event of a conflict between the requirements of statutory authorities and of these Employer's Requirements, the highest standard requirement shall take precedence. Any such conflict identified by the Contractor shall be reported to the Engineer.

13.3 Material supplies

Materials will be subject to approval prior to placing orders. Within twenty-one days after the Commencement Date, the Contractor shall submit a report of the suppliers from whom he intends to purchase all materials and plant required for the Works.

Where more than one manufacturer is able to supply any particular material or article, the Contractor shall obtain the whole quantity required to complete the work from one manufacturer or supplier, or inform the Engineer of his intention to multi-source or to any change in source of supply.

The Contractor shall produce a schedule of testing and acceptance criteria for all the suppliers, products and materials submitted, demonstrating conformity with the requirements of the specifications. The Contractor shall propose materials with proven performance in the region whereby priority should be given to using materials with low maintenance requirements and long life span.

Details of the suppliers sufficient to demonstrate of having experience of working on similar projects and have a sound financial history shall be provided.

In addition, the Contractor shall provide the following information:

- Descriptions of the proposed materials.
- Demonstration of conformity of the materials to the Employer Requirements.
- Estimates of the quantities of the materials from each supplier.
- Schedule showing the anticipated delivery dates.

In addition, for the requirements of the Contract, the Contractor is required to provide as part of his scope a joint 10-year warranty with the material supplier(s) and/or subcontractors related to the supply and execution of all materials which become part of the Permanent Works.

13.4 Sampling and testing of materials

Compliance of materials with the Contractor's Documents shall be confirmed by sampling and testing in accordance with the relevant international and local standards and prior to their inclusion in the Works. The Engineer shall be given at least two weeks' notice prior to any external testing of materials and be granted the opportunity to attend should it require.

Testing results shall be made available to the Engineer as soon as possible and prior to their inclusion in the Works..

Materials subsequently supplied shall at least equal the conforming sample in all respects. Any samples not conforming or materials failing to comply with the conforming samples shall immediately be removed from the Site.

The Contractor shall provide and submit samples of materials/ articles to the Engineer and shall:

- Retain samples on Site for comparison with materials/ articles used in the Works and remove these samples when no longer required.
- Prepare samples of finished work.

The Engineer shall have access and use of the laboratory and laboratory staff for carrying out sample testing as it requires.

13.5 Copies of orders

The Contractor shall submit to the Engineer copies of all orders for materials to be incorporated in the Works.

13.6 Manufacturer's instructions

All materials shall be used and installed in accordance with the instructions of the manufacturer or supplier unless otherwise specified in the Employer's Requirements. Copies of manufacturer's instructions shall be provided to Engineer prior to incorporation of the Materials and Plant into the Works.

