

ENVIRONMENTAL IMPACT ASSESSMENT INITIAL SKELETON

For Proposed Port Zeus Harbour Development at Cayman Brac, Cayman Islands



Prepared for FS Inc.
July 8th, 2022

Preliminary Report



AMR Consulting Engineers

Unit 219 Cannon Place,
PO Box 10962
North Sound Road
George Town, Grand Cayman
Cayman Islands KY1-1007
345-949-2716
info@amr.ky

ENVIRONMENTAL IMPACT ASSESSMENT FOR PROPOSED PORT ZEUS HARBOUR DEVELOPMENT, CAYMAN BRAC, CAYMAN ISLANDS

8TH APRIL 2022

Prepared by AMR Consulting Engineers (Cayman Engineering Ltd.) on behalf of FS Inc. in support of their application for a Coastal Works Permit under the National Conservation Law (2013). No part of this report may be reproduced without the written permission of FS Inc. Should the document be cited, the formal citation should read: *AMR Consulting Engineers (Cayman Engineers Ltd.) 2022. Environmental Impact Assessment for the Proposed Port Zeus Harbour Development, Cayman Brac, Cayman Islands*

Table of Contents

Table of Contents	i
List of Figures	ii
List of Tables	iii
Acknowledgements	iv
Executive Summary	1
1. Project Description	8
1.1. Introduction	8
1.1.1. Preamble	8
1.1.2. Project Overview	8
1.1.3. Project Location	11
1.1.4. Project Schedule/Phasing	11
1.2. Construction Phase Footprint / Site Plan	13
1.2.1. Specifications	13
1.2.2. Project Implementation Schedule and Activities	14
1.2.3. Resources Consumption	14
1.2.4. Waste Streams	14
1.2.5. Upset Conditions	14

List of Figures

Figure 1: Master Plan: Port Zeus Marina Development.....	10
Figure 2: Phase 1 and 2 of the Port Zeus Marina Development Project	12

List of Tables

Table 1: Implementation Schedule (Phase 1)	11
Table 2: Proposed Spatial Allotments	14

Acknowledgements

This Environmental Impact Assessment (EIA) was prepared by AMR Consulting Engineers. The principal author was Schmarrah McCarthy with contributions from Mr. Matthew Manning and Mr. Alex Moroney (Geological/Physical Baseline), Specialist Team from Coastal Dynamics Ltd. prepared and reviewed data from the Benthic Survey the team consisted of Milshah Ramkisson (Benthic Ecologist – BSc, MPhil, PhD candidate), Anjali Johnson (Senior Environmental Scientist - BSc, MSc) and Michelle Cazabon-Mannette (Project Manager- BSc, MSc, PhD).

Mr. S. Phelgar, PE(SC) of ATM undertook the Marina and Harbour Flushing Study.

Schmarrah McCarthy prepared the Physical Baseline, and

Mr/Ms XXXXX XXXXX assisted with the identification of floral species and avifauna at the site.

Mr. Tyrone Rose coordinated the field sampling of sediment and water, and the analytical testing for water and sediments. The following laboratories conducted analyses:

1. Water Authority Cayman undertook Fecal coliforms analysis, Biological Oxygen Demand and Oil and Grease.
2. EMSL Analytical: Total Suspended Solids (TSS), nutrients, Metals (in sediments)

Mr/Ms XXXXX XXXXXX assisted in the analysis of sand samples.

Ms. Lucy McLaughlin assisted with the review and copy editing of the final report.

The authors also wish to acknowledge contributions from FS Inc. to the project description, and stakeholders who took the time to comment on the proposal.

Executive Summary

FS Inc wishes to develop an onshore marina complex and is in the process of submitting for a Coastal Works Permit for the development of the facility on 23.9 acres (9.7 ha) [Block 95B Parcels 99, 101, 106, 107, 114, 115, 119, 120, 255, 262, 273, 298, 299] of coastal land fully owned by FS Inc. at West End, Cayman Brac, Cayman Islands. This application will be made in accordance with the National Conservation Law (2013).

With respect to National Conservation Council Directive for Environmental Impact Assessments Section 43 of the National Conservation Law Natural Resources Conservation Act (1990) it is our understanding that the proposed project will highly likely require an Environmental Impact Assessment (EIA) as it can be considered to be a major work and is listed within Schedule 1 (Activities Considered for Environmental Impact Assessment) 5 (vi) Ports, harbours, yacht marina and inland waterways which permit the passage of vessels. Consequently, AMR Consulting on behalf of FS Inc. formally request a Screening Opinion for the proposed project.

As per the submittal process for the Application for a Coastal Works Permit (ACWP), certain documentation has currently been accrued:

- i. Bathymetric Survey of the offshore coastal waters that border the coastal margins of the site (Block 95B Parcels 106, 107, 119, 120, 255, 262, 298 & Cemetery Road/Scotts Dock) using sonar.
- ii. Topographic survey of the full site area including the MHWM.
- iii. Geotechnical Investigation of the landside of the project (Not a requirement for ACWP).
- iv. Full Drone Survey of the landside area (Not a requirement for ACWP)
- v. Preliminary design of the harbour embayment and onshore marina
- vi. Project Definition document
- vii. Master Plan for the proposed development (Not a requirement for the ACWP)
- viii. Flushing Simulation Report for the proposed embayment and marina

The accrual of other information is also being undertaken:

- i. Wave Study (commenced 5th April 2022), permission granted for their installation 8th of February 2022.
- ii. Benthic Survey

We do understand that the scope of any EIA will be at the discretion of the Environmental Assessment Board (EAB), we would however like to submit this skeleton EIA document and some supporting information with respect to this request to demonstrate to the EAB that the project will be undertaken with the required environmental sensitivity.

The Project is defined by a Master Plan, that outlines the proposed phases. Phase 1 (8.8 acres Harbour Embayment at White Bay, Cayman Brac) and Phase 2 (23.9 acres Landside Marina and Development Area) being the subject of the ACWP in support of which this skeleton EIA has been prepared.

Phase 1 within the Master Plan, Formation of the Marina Entrance, focuses primarily on the development of a safe navigable protected entrance to the marina area which will include the following design elements and works.

Refurbishment and Revitalization of the existing Scotts Dock. The current Port Authority controlled Scotts Dock will be renovated, rehabilitated, and reduced in length. Presently, Scotts Dock is a rubble filled rock spit that extends perpendicularly from the shore for approximately 420 feet (usable about 320 feet). Local rock was used to form the dock and placed directly upon the seabed and affects an area of seabed more than 72,000 square feet. The dock is used by the Port Authority and for the exportation of rock aggregates to Grand Cayman, currently only the western side (leeward) of the current rock spit dock is used. Currently, the docks upper surface is simply rolled aggregate that is suitable for heavy equipment traffic.

It is proposed that the dock will be reduced in length to 280 feet removing the excess overspilled rock fill to its northerly end and around the perimeter. The dock will then be sheet piled to either side, topped with capping beams and a trafficable upper concrete roadway of approximately 50-foot width which will reduce the current seabed footprint to approximately 15,000 square feet. The removed fill material will be placed upon the adjacent land for later use as described below.

The dock will be raised and have the necessary mooring points for tying vessels. The dock will have the ability to moor vessels to both sides. These improvements will make the dock safer, improve its functionality and remove large volumes of rock fill from the seabed. No dredging works will be undertaken to the west side of the dock. These works will affect access to the pier during the revitalization works.

Construction of New Finger Pier/Rock Spit. To create a safe and protected entrance to the proposed marina, it is proposed to construct a new rock pier that runs parallel with the revitalized Scotts Dock. This will Create a one hundred-twenty-foot-wide entrance to the proposed Marina. This new pier will be approximately 300 feet and use sheet piles to either side, infilled using previously excavated material (as mentioned above), topped with capping beams and a trafficable upper concrete roadway of approximately 40-foot width. Mooring points will be added to the western side of the pier.

Dredging and Excavation of New Marina Entrance. For successful entry from the sea to the proposed Marina, dredging will be required to gain access. The depth of the Marina will be approximately 14 feet below the Mean Low Water Mark (MLWM). It is thus proposed to dredge the proposed marina entrance area to 16 feet below MLWM. These dredging works will affect approximately 67,000 square feet of the seabed of which 25,000 square feet were beneath the previous footprint of Scotts Dock. Currently, this offshore area is defined as a Port Anchorage Area within the Cayman Brac and Little Cayman Marine Parks Brochure (effective date 12 March 2021), where anchoring is permitted.

Over several years, beach sand has accreted to the windward side (East) of the Scotts Dock as would be expected from the prevailing winds and currents. It is proposed to transfer all this sand material to the windward side of the New Finger Pier/Rock Spit.

Dredging will be undertaken by mechanical means and all turbidity will be readily controlled by placement of screens between the two finger rock piers (Scotts and New). These dredging works should not affect the current access to the pier. The bulk of the dredged materials will be retained on site, if both suitable and practical, and used within the project works.

Phase 2 within the Master Plan, the Marina, focuses primarily on the development of an inner basin that will provide a safe permanent recreational boat mooring area that includes the following design elements and works.

Proposed Onshore Marina. The Marina (Inner Basin) has been designed and configured to create a variety of moorings (Slip-Mix) for approximately 105 vessels and provide areas for later development. The works will involve the excavation of approximately 8.8 acres of land to provide a boat draft of a minimum of 12.5' below MLWM. Much of the excavated material will be retained on the site and to land owned by FS Inc directly to the south of West End Road East.

The existing site (approximately 23.6 acres) is used for industrial purposes (storage of aggregate for exportation) and was stripped of most of its native vegetation many years ago.

Part of the Marina works will also be the extension of the revitalized Scotts Dock, continuing the east facing bulkhead onshore for approximately 500 feet, running parallel with the existing Cemetery Road.

Within the Marina, an area has been left aside (0.8 acres), for the construction of a small facility to house the Harbour Master and staff, Port Authority Office and a Customs and Border Control Office. The intention is to enhance the current facilities (or lack thereof) and give direct oversight for the Port and Marina operations.

From the findings of the geotechnical investigation the underlying bedrock dips from south (H) towards the northern coastline (L) with the upper face of the rock being approximately + or – 2'-0" from MLWM. Consequently, the marina excavation will yield approximately 130,000 cubic yards of rock and fill material. Some of the excavated rocks will be used to construct the embayment if boulder of a sufficient size can be quarried, with the remainder used to fill the site and create terracing to the south of the road. None of the excavated material will be exported from the owner's property.

The marina walls will be formed from a combination of steel sheet piles and concrete bulkheads with a continuous concrete capping beam interconnected to a continuous 18' wide concrete/paved promenade that follows the shape of the marina. During construction of the bulkhead and promenade works, the necessary service infrastructure will be placed.

A large portion of the existing site was mainly used for storage of aggregate fill materials, for later export to Grand Cayman. The site has been previously cleared of much of the native vegetation and the upper surface is now a hard pan. Any remaining native trees that can be successfully transplanted will be relocated within the development parcel.

The scope of the proposed development is given within Section 2.4 of the Project Definition Document¹. The relevant development areas are listed below:

- A. Revitalization of Scotts Dock and New Finger Pier and Dredging of Marina Entrance.** Refurbishment of the existing Port Authority controlled Scotts Dock reducing the current impact to seabed and improve its resilience against storms and provide longer mooring capabilities. Construction of new finger pier to give protected access to the Marina. Dredge between the two finger piers to 12.5 feet below MLWM.
- B. Proposed Onshore Marina:** Excavate onshore an area of approximately 8.8 acres to a level of 10.5' below MLWM. Place bulkheads to the perimeter of the marina, install underground utilities and a continuous concrete walkway. Place underground flushing channel to seabed. 120 Berthing areas will be provided that will have a variety of slip-mixes. Rigid floating aluminium dock pontoons will be used to create the berths and stability will be provided by the patented Seaflex® mooring system.

¹ Port Zues Marina, FS Inc: Project Definition Document, May 2022

- C. Marina Development Area:** Is seen as an integrated area for community, commerce and habitation. There will be throughways for multiple public points of access to the beach where none currently exist. Marina and harbour development will be undertaken using the current Planning protocols. It is proposed that the full site apply for a Planned Area Development (PAD) so that a mixed development use can be considered. The site will be subject to some restrictive covenants with respect to design to keep the village looking cohesive and beautiful. A more detailed Master Plan will be produced to convey the projects vision in more detail.
- D. Port Authority/Marina Harbour Master and Amenities:** This area will become the administrative and security hub for the marina and harbour. The Port Office will deal with the day-to-day business of the facility and will be home to the Harbour Master and his staff, contactable 24 hours a day by VHF channel 16. It will be used by Local Fishermen, Dive Operators, Boat Charters, Ferry Services and visiting Yachtsmen. There will be ice facilities and some areas for storage.
- E. Beach Facilities:** Recreation and restaurant area with parking and main road access, storm water drainage, water, power, cable and connection to remote sewage treatment plant.
- F. Mixed-use Development:** This mixed-use development will be a pedestrian-friendly one, blending residential, commercial and cultural uses. A central open shaded plaza to the main frontage where people can gather with views over the marina. Adequate parking with covered walkways leading to a variety of shops and commercial services including grocery, restaurants, cafes and bars.
- G. Adjacent Government Land:** These areas are seen as development opportunities both for the Government and Port Authorities.

The proposed EIA process for the Port Zeus Harbour/Marina Development at White Bay, Cayman Brac is proceeding according to the schedule outlined in the table below.

Project Development Schedule

Benchmark	Date
Screening Opinion Request submitted to DoE	June 24th, 2022
Mobilization of EIA consultants	July 15th, 2022
Draft TORs submitted to DoE for comments	July 22nd, 2022
Revised Draft TORs submitted to DoE	July 29th, 2022
Draft TORs accepted by DoE(revised)	August 14th, 2022
EIA is submitted to DoE for technical review	September 2022
Public Meeting (date to be confirmed)	September 2022
Verbatim Report Available (date to be confirmed)	October 2022
End of Public Review Period (date to be confirmed)	October 2022
Review of application by the DoE (estimated)	October 2022

Key Stakeholders:

The following stakeholders are believed to have the strongest interest in or influence over the proposed project:

FS Inc.	The project developer
Department of Environment	Oversight and improvement for new environment initiatives
Port Authority	Control of arriving and departing vessels to Cayman ports
District Administration – Cayman Brac	Local Interest in the project and Planning Matters
Ministry of Tourism and Transport	Strategic planning and destination management
Customs and Border Control (CBC)	Regulating arrivals to the marine facility
CI Centre for Business Development	Marketing for new opportunities for local businesses
Local Boat Charter and Dive Boat Operators	Understanding their needs
Cayman Islands Angling Club	Ensuring that the facility has the necessary requirements
Local Utility Companies	Outlining Future Service requirements
Direct Local Community Stakeholders	Understanding their concerns with pollutions and noise
General Public of Cayman Brac	Allaying general concerns, describing benefits and identifying needs

Likely issues of concern for the Stakeholders which will be addressed in the consultation process included: increased traffic, disruption during construction, safety of the site both during and after construction, potential losses of income and biodiversity. Other likely concerns that are being considered are the following:

- Vulnerability of the proposed marina to hurricanes.
- Monitoring of effluent and existing conditions
- Proposed adequacy of future Sewage Treatment Plant (STP) and Treatment of Bilge water.
- Consumption of energy.
- Storage and dispensing of Marine fuels
- Noise, vibration, and dust pollution during the construction works
- Water quality within the Marina
- Proper disposal of garbage (public health issues) during the construction works
- Garbage disposal methods for the proposed project.
- The location of the site adjacent/within the Port Authority Anchorage Area
- Effects on the dunes and their function as a migratory avifauna habitat and wind break.
- Proposed adequacy of parking facilities.
- Potential for traffic congestion on West Side Road.
- Increase in vessel traffic
- Adequacy of nearby fire response capabilities for access to Marina

The Developer believes that there will be many benefits for community stakeholders by creating both job and business opportunities, improved utilities services including sewage treatment plant placed on the developer’s land to the south, removal of existing waste and mechanical debris, security and living standards. In addition, there is the potential for the following positive impacts to occur:

- Allowing adjacent properties to connect to the proposed STP removing the need for septic tanks and effluent boreholes.
- Removing the current industrial site and its aggregate storage usage and heavy equipment use
- Takes advantage of the uniqueness of the site: climate, geography, history, and culture.
- Improve recreational infrastructure and improve tourism infrastructure.

These matters, in addition to any issues identified in the Scoping Opinion (Terms of Reference [TOR]) will be addressed in the EIA report.

The main objective of the EIA will be to determine whether there are any environmental considerations that need to be considered in reviewing the applications for Coastal Works Permit, and whether there is any environmental reason why the project should not proceed as proposed. At this time, a total of 18 negative environmental impacts have been identified, with importance and relevance ranging from minor through moderate to high.

Half of these (nine) have initially been classified as minor negative impacts:

1. Creation of ecological barriers
2. Conflict with Port Anchorage Area status
3. Change to air quality and noise levels
4. Drainage modification
5. Introduction of pests, invasive or alien species
6. Fuel consumption
7. Demand for municipal services and utilities
8. Impacts on protected species and biodiversity
9. Change to micro-climate

Of the nine classified as moderate negative impacts, two were limited to the construction phase, five were reversible with the removal of structural elements or cessation of causative activities, and two were regarded as permanent. Construction Impacts (short-term effects that will not persist after the completion of construction activities) included construction haulage effects and dredging. Long to medium-term impacts that can be effectively reversed with removal of structural elements or project activities included:

1. Effects of noise (disturbance of wetland birds).
2. Increased lighting near coastal habitats (disturbance of wetland birds).
3. Decline in coastal water quality.
4. Traffic and parking effects.
5. Increased risk (because of the presence of visitors and structures).

The two impacts that are likely to result in a permanent change to the environment were classified as moderate impacts and were relatively acceptable given the benefits of the project.

1. Effects on macro-benthic community. No rare, endangered or protected species have yet been encountered at the site.
2. Removal of the dunes (alteration of topography). The proposed modification has initially been assessed as unlikely to affect the stability of the surrounding areas.

Seven positive effects have been assessed, with rated effect levels ranging between moderate and significant. Stabilization and improvements of the current Scotts Dock, and the improvement to the appearance of the place (visual change) ranked as significant positive impacts arising from the project.

1. Effects on local economies.
2. Development of marine tourism.
3. Provision of a new social amenity.
4. Change of land use.
5. Local resource for fishermen.

The findings of our initial environmental impact assessment currently are that:

- 1. None of the negative environmental impacts identified has been assessed to be significant.**
- 2. Negative environmental impacts can be cost effectively mitigated, and there are good opportunities for environmental enhancement of the performance of the project. These will be outlined further within the environmental management plan of the EIA.**
- 3. There are significant environmental benefits that are likely to accrue from implementation of the project as proposed.**

1. Project Description

1.1. Introduction

1.1.1. Preamble

FS Inc. (the Developer) are proposing to construct a commercial onshore marina that will require access to the sea via a dredged channel. A Masterplan has been written and the economic viability has been assessed by the company all the proposed works are upon property fully owned by the developer. The works will change both the seascape and landscape of the area in question, and consequently the need for an Environmental Impact Assessment (EIA) was realized from the onset. The marine works will also require the approval of a Coastal Work Permit (CWP) to be constructed and an application will be submitted once the successful approval of the Environmental Statement (ES) has been attained. As such, following the Directive for Environmental Assessments Section 43 of the National Conservation Law and after discussion with the Department of the Environment (CIG) it was decided to skip the Screening Opinion and proceed directly to the Scoping Opinion; sufficient plans, descriptions and information were provided for this purpose.

The National Conservation Council (NCC) has requested that an EIA be prepared in support of the proposed application. A Terms of Reference (TOR) for the preparation of this document has been approved by Environmental Assessment Board and is included as Appendix 1.

1.1.2. Project Overview

The Port Zeus Marina Development Project involves development of a *“fully operational marina facility to the Brac and develop a protected onshore marina facility to provide private boat berths for both local and visiting boat owners²”*, at a 24-acre parcel of land on the West End of Cayman Brac located just to east of the existing Scotts Dock and approximately ¼ mile from Captain Charles Kirkconnell Airport, the site is fully owned by the developers, FS Inc. The Project is defined by a Master Plan (Figure 1), which outlines three phases of development, with Phase 1 being the protected inlet, Phase 2 the onshore Marina and Marine side development area (approximately 12 acres each) being partially the subject of the applications in support of which this EIA been prepared. Phase 3 is a future local mixed use residential, commercial and tourism area.

This development represents a \$36.5 million USD investment into building the marina and its associated utility infrastructure including sewerage systems for disposal to a new sewage treatment plant that will be built on the developers' property to the south close to Block 95B Parcel 81. The undeveloped portions of the site will be filled and made ready for development. Road and pathways will be constructed to allow safe access to the beach for the public. This is seen as both an investment in the tourism product of the Cayman Islands providing recreational infrastructure and also an investment in Cayman Brac to provide opportunities for others. With its semi-protected waterfront location and low number of rain-days per year, Port Zeus is seen by the developer as the ideal location for the development of a range of outdoor recreational activities including dining and boating.

The facility will initially serve two main tourism markets: the domestic tourism market and the sea-based tourism market (recreational sea-fishing vessels and visiting pleasure craft passengers). Urban dwellers in the Grand Cayman Area (GCA) are seen as the primary market for the marina facility. According to The Economics and Statistics Office (ESO) (<https://www.eso.ky/2021-population-and-housing-census-report.html>, reviewed on July 12th 2022), the population on Cayman Brac alone was 2,003 persons (47.5% M, 52.5% F) in 2021, which represented 2.9 % of the national population and a reduction in population since 2010 of 4.6%. Grand Cayman, approximately 90 nautical miles to the west, has a population of 67,187 persons, which equates to 96.9% of the national population and has a strong sport fishing culture. The marina will target both domestic boat owners as well as visiting pleasure craft. Phase 2 of the development will seek to develop Port Zeus of Cayman Brac as a port of call for recreational sea-fishing vessels as well as visiting pleasure craft.

² Port Zues Marina, FS Inc: Project Definition Document, May 2022

In the recent past, there have been many plans to develop marina facilities on Cayman Brac for local recreation and tourism. Some of these proposals have applied for CWP's and some have undertaken EIA's, none have materialized (example: MM CB Ltd, Block: 95E Parcel: 13 REM1, 2014).

Historically, marine and port developments on Cayman Brac (permanently settled from 1833) have been complicated. This is due in part to the rugged north coastline and the deep ocean and reefs to the south and the lack of any secure protected deep harbours. Cayman Brac for its population size does have a wonderful maritime heritage. *“Brackers, as they are known, were traditionally a seafaring people who relied on maritime industries such as turtling, merchant shipping, and wrecking for their livelihood. The distinctive Caymanian catboat was invented on Cayman Brac, as was an innovative style of turtle net. After World War Two, many Brac men shipped out on bulk carriers, traveling the world’s sea lanes as sailors, ship’s engineers, pilots, and even captains. Offshore ship-to-ship oil transfer operations brought much-needed income to the Sister Islands during the 1970s and early 1980s. Today, the principal maritime activities are sportfishing along with diving and other watersports.”*³ To this day there are still some active ‘Bracker’ seafarers continuing the islands heritage and Caymanians also continue to celebrate their sea-faring heritage and remember the sacrifices and hardships that the forebearer endured to give the freedoms that they have today.

The location of **Phase 1** within the Master Plan for the Port Zeus Development is given in Figure 1. This phase focuses primarily on the re-development and improvement of the existing Scotts Dock rough stone spit finger pier, construction of new 450-foot-long jetty running approximately 150’ parallel and to the east of the existing Scotts Dock, dredging of channel to provide minimum of 12.5’ depth below MLWM. It includes the following design elements:

1. Removing submerged portions of existing large rock placed to form the existing Scotts Dock finger pier, thus reducing the existing disturbed seabed footprint by 50%.
2. Place removed rock to landward and approximately 200 feet east to be re-used as part of the new Armor Stone Breakwater/jetty.
3. Improve usability and accessibility of existing dock with new bulkheads, fenders, and reinforced concrete roadway.
4. Remove existing naturally accreted sand to the eastern face of the existing Scotts Dock and temporarily remove landward approximately 400 feet to the east.
5. Form new dog-legged Armor Stone Breakwater/jetty using recovered (2.) and new rock materials. Incorporate bulkhead to channel face and continuous concrete walkway to end of breakwater.
6. Dredge proposed channel approximately 125 feet wide (on average) by 500 feet (67,000 square feet) of which 25,000 square feet were beneath the original Scotts Dock. Total volume of material to be excavated/dredged is approximately 16,000 cubic yards, using barge based heavy mechanical excavators.
7. Add navigational lights to new breakwater entrance.

The location of **Phase 2** within the Master Plan for the Port Zeus Development is given in Figure 1. Most of this area has been used for heavy industrial purposes (stockpiling clean aggregate materials for export) for many years. The site (Block 95B Parcels 99, 101, 106, 107, 114, 115, 119, 120, 255, 262, 273, 298, 299) was stripped of most of its vegetation by the previous owner (Scott Development Co. Ltd) approximately 15 years ago, most of the large trees have been removed from the central area of the site. This phase consists of excavating and forming the onshore marina. It includes the following design elements:

1. Construction of onshore bulkheads that follow the complete perimeter of the proposed Marina from the proposed inlet.

³ The Cayman Islands Maritime Heritage Trail, Cayman Islands National Museum 2022

2. Careful removal of mature trees where possible and replant in new landscape areas. Then remove topsoil and surface vegetable matter across the majority of the site extents and stockpile for later re-use off-site.
3. Excavation of soft soil deposits under Marina footprint in layers. Removal of overburden clean sand first and stockpiling on site, then remove any soil contaminated material off-site to be used as general landscape fill within the development later, then remove all remaining soil deposits above underlying soft bedrock. Most of these excavations will be undertaken above the underlying water-table.
4. Excavation/(Dredging) of harder soft rock deposits from beneath the Marina footprint using heavy mechanical equipment (no blasting) profiled to approximately 11 feet below MLWM. Excavated material to initially remain on site and be used as site fill to make up levels then removed from site to the south of the West End Road (Developers' property) and placed in terraces.
5. Flushing Channel to be constructed from new Marina area to outfall within the sea.
6. Construct the proposed marina slip mix using proprietary aluminium pontoon units.
7. Commence the shore side dredging of the connecting channel using land based heavy mechanical excavator equipment. Remove excavated material to pre-determined on-site location.
8. Associated infrastructure (parking and main road access, sewerage system and connection to sewage treatment plant, necessary storm water drainage, underground conduits for water, power and telecommunication cabling).
9. Construct perimeter walkways to marina bulkheads and access points to marina slips.

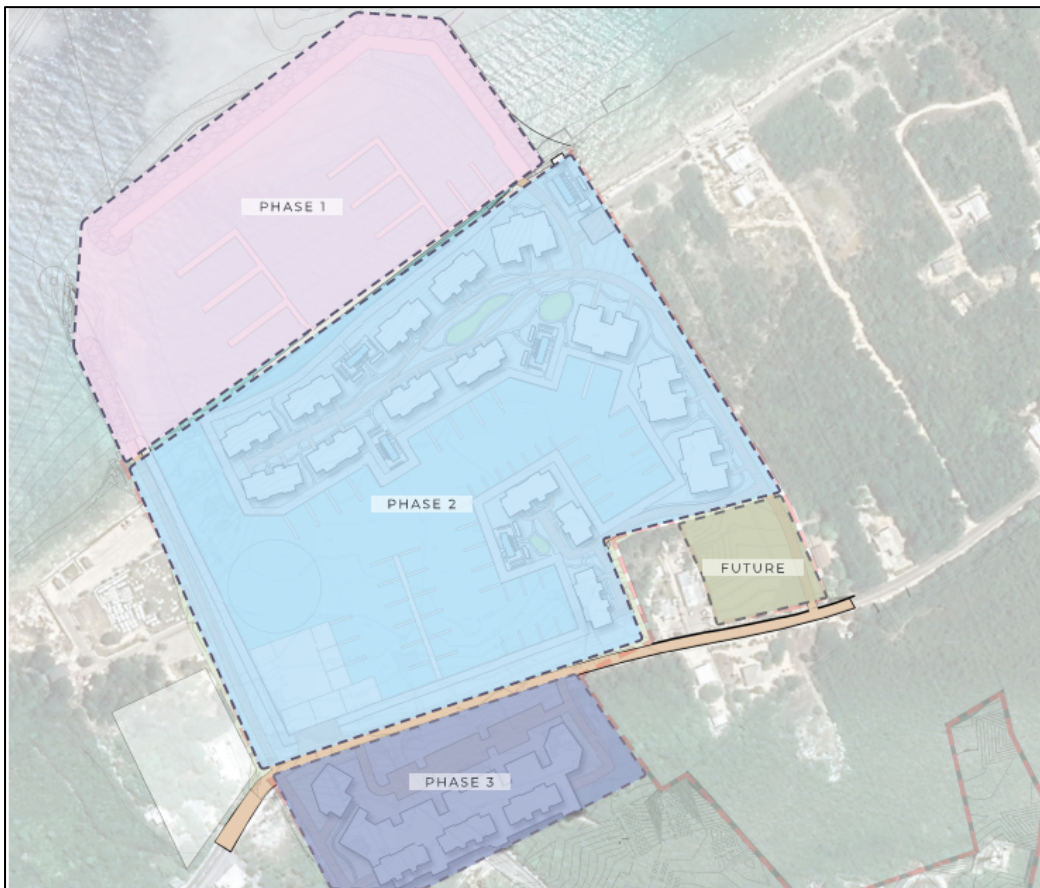


Figure 1: Master Plan: Port Zeus Marina Development

After the approval and implementation of Phase 2, further expansion of the facilities will be the subject of separate applications and any necessary supporting environmental documentation. Consequently, the environmental impacts of these are not specifically considered in this EIA, but only in so far as there would be a cumulative impact in the long term. Plans for subsequent development of the rest of the site are likely to include initially the following components:

1. A Beach Restaurant with beach facilities.
2. Harbour Master and Port Office facility with accommodation for Port Authority/CBC
3. Ice facility, Small medical/safety facility, storage area, restroom with shower/ bath units.
4. Associated infrastructure to accommodate future needs and expansions.

1.1.3. Project Location

The proponent (FS Inc.) has 23.9 acres (9.68 ha) of land composing of several land parcels mostly purchased from Scott Development Co Ltd in an area immediately to the northern West Side Road bordered by Cemetery Road to the West and Block 95B Parcels 297 (Developed), 296, 295 and 294 (all three Undeveloped) to the east. The project location is set to the west side of Cayman Brac approximately 1.25 mile east of the western point of Cayman Brac. FS Inc also owns further property to the southern side of West Side Road. The property is set approximately 0.3 miles northeast of the Captain Charles Kirkconnell International Airport. The parcel is bound in the north by the shoreline of the Caribbean Sea (close to White Bay) and on the south by the West Side Road; a hot paved asphalt public local single carriageway road and the primary connecting road for the northside of Cayman Brac.

The proposed Port Zeus Marina Development is not located within an area of historic interest, nor is it located or close to a designated Ramsar Site (Convention on Wetlands for the conservation of wetlands). Much of the proposed development is limited to a disturbed site that has been previously stripped, requiring minor vegetation clearance and demolition of some existing structures. The existing land use can be considered to be Heavy Industrial; aggregate storage and mechanical equipment movement for the export of aggregate by barge.

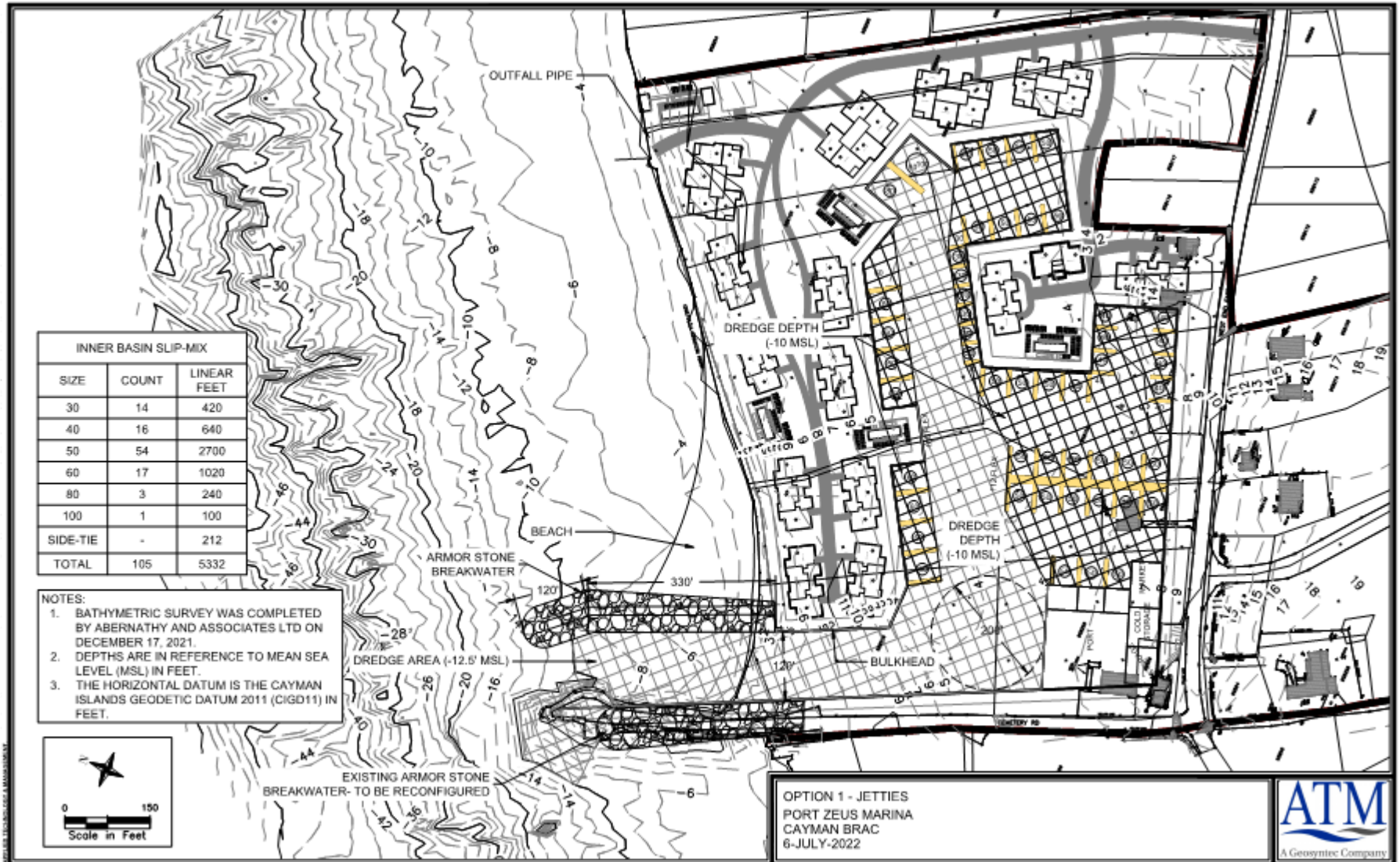
1.1.4. Project Schedule/Phasing

As discussed above, the entire 23.9-acre site will be developed in two main phases. Details of the implementation schedule of the third phase are not yet available and are not the subject of this EIA. It is anticipated that the EIA process and the Environmental Statement (ES) together with the Environmental Management Plan (EMP) will broadly follow the timelines as outlined within the National Conservation Council (NCC) Directive for Environmental Impact Assessment Section 43, National Conservation Law (under section 43(2)(c)). When and if approval (with any recommendations) for the project and formal approval received from the NCC, a formal application will made for a Coastal Works Permit for the development and submitted to the Ministry of Environment. During these processes, it is expected that a Public Meeting will be held (3 weeks after submission of the EIA) on Cayman Brac and the document will be reviewed and commented on by public and private sector stakeholders. A breakdown of the implementation schedule for Phase 1 is given in Table 1.

Project Benchmark	Schedule
Environmental Impact Assessment	August – October 2022
EIA Review Period	October – November 2022
Coastal Works Permitting	November – December 2022
Contractor Mobilization	January – February 2023
Commencement of Construction Contract	March – April 2022
Estimated Construction Time	12 months
Grand Opening of the Facility	May 2024

Table 1: Implementation Schedule (Phase 1)

Figure 2: Phase 1 and 2 of the Port Zeus Marina Development Project



1.2. Construction Phase Footprint / Site Plan

1.2.1. Specifications

1.2.1.1. *Inlet Dredging and Associated Coastal Earth Works*

An initial Report on the Coastal Engineering Aspects of the Port Zeus Marina Development was prepared by Applied Technology and Management Inc in January 2022. This report summarized the necessary field investigations and required design parameters for the project. These included evaluations of the storm surge hazard, coastal wave study, required bathymetry, predicted new shoreline profiles (discussed in Section 3), flushing studies and, geotechnical investigations. All with aim of determining the implications of these for the design of Scotts Dock remediation/rehabilitation, dredging needs, cross-section elevations, filling requirements, new offshore breakwater/finger pier for protection to the marina inlet and possible impacts on the prevailing sediment regime along this section of the coast (White Bay). With the present application and design, the developer proposes to create an onshore marina of ~105 berths for both power and sail boats with a variety of slip-mixes ranging between 30 feet to 100 feet in length (9 m to 30 m).

Please Note: Although the onshore marina is the subject of this EIA the developer does see that the direct offshore area could have an outer marina basin within an embayment construct upon 'Queens Bottom', that may be of use to fishermen and the population of the Cayman Islands. Whilst such an outer marina basin could be readily constructed, the value of coastal frontage lands would be reduced. If, there was adequate public support and Government desire, the developer would assist in the development of the embayment.

The key design elements associated with the Port Zeus Marina (Figure 2) include:

1. **Remediation/Rehabilitation of Existing Scotts Dock (Phase 1):** existing dock will be slightly realigned to provide a more cohesive and usable dock within the footprint of the existing roughly placed rock structure; this dock has been constructed on Queens Bottom and can now be considered Government land. This realignment has been made to improve the protection of both the dock and inlet to the marina with respect to wind and wave security. Large portions of the existing placed local rock Armor Stone will be removed to reduce the existing seabed impact area; suitable portions of this removed material will be re-used elsewhere (discussed in Section 2 below). From the preliminary cost assessment, the easterly face of the dock will be constructed using steel sheet piles driven into the underlying bedrock to form the foundation for a reinforced concrete bulkhead that will extend from the northern extremity of the Dock, and eventually continue linearly inland to the marina area. The dock surface will be at a level of 5.0 feet above mean sea level (MSL) and will be general formed from a continuous reinforced concrete roadway. The western face of the existing dock incorporates some rough mass filled concrete structures that allow for the docking of barges and offloading and loading operations, there is also a boat slip to the southern end of this side. These concrete structures are utilitarian in nature and whilst serving their purposes are not of a particular high quality of construction or designed for safe methods of working. It is proposed to remove these structures and incorporate new fit for purpose reinforced concrete bulkheads that will increase the productive area of the pier. The finished dock will be approximately 300 feet in length from shoreline and have an operational width of 60'.
2. **New Finger Pier (Phase 1):** the proposed pier will be dog-legged in shape and extend approximately 440' from the existing shoreline. Using suitable portions of the reclaimed Armor Stone (see Section 1 above) the breakwater will be placed upon the underlying rock with soft seabed deposits being removed prior to placement beneath the footprint of the works. The works will be constructed from the shore following agreed procedures to mitigate sediments. The profile of the breakwater will be constructed at a slope of 1: 1.5 giving a final flat upper surface width no less than 15'. This upper surface will be sealed using a continuous 15' wide reinforced concrete walkway with continuous edge thickening to both sides. The upper level of this walkway will be set at 6'-0" above MSL and will continue uninterrupted from the northern point of the breakwater to the shoreline. This finished elevation of the structure is designed to reduce the effect of winds coming from the east and north-east on berthing conditions. The design width of the inlet fairway between Scotts Dock and New Finger Pier is 125' (38m).

3. **Pre-Dredging (Phase 1):** prior to the inlet dredging works the existing accreted sand to the east of Scotts Dock will be harvested mechanically, and stockpiled adjacent to the shoreline approximately 200 feet to the east of the proposed Finger Pier. This material will be used to form a beach that approximately simulates the previous accreted beach to east of Scotts Dock. No sand will be removed from the site and any detritus found within the removed accreted sand will be removed prior to its secondary placement.
4. **Inlet Dredging works (Phase 1):** the dredge area is approximately 67,000 square feet. This area encompasses areas that were previously filled to form the original Scotts Dock (25,000 square feet). The required clear depth of water within the inlet area is 12'-6" below MSL. The anticipated volume of material to be dredged to existing High Water Mark is approximately 16,000 cubic yards within the inlet dredge zone. The dredging operations will be undertaken using heavy mechanical 360° excavator barge mounted, using various dredge attachments including dredge cutters, hydraulic hammers, and traditional heavy-duty excavator buckets with side cutters. All spoil will be directly deposited upon the barge. The barge will be offloaded to articulated dump trucks that will be stationed upon the newly reconfigured Scotts Dock. This material will be placed within the proposed onshore Marina area. Silt curtains and turbidity barriers will be placed seaward of the works and be directly interconnected with the Scotts Dock and new Finger Pier. These containment measures will remain in place until turbidity levels have reached a satisfactory level. All dredged material will be monitored for dust release during the drying process and water sprinklers will be used if dust issues arise. It should be noted that the site has been traditionally used for aggregate storage.

1.2.1.2. *Landside Construction and Associated Earthworks*

	m ²	ft ²	Acres	% Total Area
Marina				
Paved Areas				
Service Areas				
Parking Areas				
Landscaped Areas				
Building Development Areas				

Table 2: Proposed Spatial Allotments

1.2.2. **Project Implementation Schedule and Activities**

1.2.2.1. *Coastal Works Phase 1*

1.2.2.2. *Marina Landside Works*

1.2.3. **Resources Consumption**

1.2.4. **Waste Streams**

1.2.5. **Upset Conditions**