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UNITED STATES VIRGIN ISLANDS
Economic Development Authority

PC4667 USVI shipyard feasibility study

Final report Rev1.0

PC4667
Confidential

09 May 2024

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PC4667 Volume 1

Sections 0 to 5

Volume 1: Contents

Executive summary (1)

- This deliverable considers the opportunity for a ship repair facility at St. Croix on the United States Virgin Islands (USVI). This is the first of two volumes comprising the market study, site selection, notional arrangement, cost estimate and a view on where financial viability may lie.
- St. Croix's location sees high volumes of passing traffic in all size ranges. Locally-calling vessels are generally smaller in size, and the leisure segment is particularly well represented.
- Opportunities for repair of commercial vessels <574ft (<175m) in length and leisure vessels appear most favorable. High-value repair opportunities tend to be for vessels <328ft (<100m), many of which are likely to be yachts of between 164-328ft (50-100m) in length.
- The preferred site identified during site selection has a waterfront that naturally supports a maximum vessel size of 574ft (175m), but a limit of 328ft (100m) would make best use of existing infrastructure.
- The market study analysis and characteristics of the preferred site have been used to guide the creation of three docking configurations (e.g., principal facilities and resulting market capture and revenue). Along with an indicative estimate of the required CAPEX, associated throughputs and revenue.

Figure E1 – Examples of vessels in the potential markets (Top: 328-574ft (100-175m) commercial vessel, Middle: 164-328ft (50-100m) yachts, Bottom: <165ft (<50m) Commercial vessels, yachts and passenger vessels)

Executive summary (2)

- Docking configurations considered upper vessel length limits of 164ft (50m), 328ft (100m) and 574ft (175m). A CAPEX estimate was produced for each using an international database of cost rates. At a later stage, local quotations are recommended to further validate rates for specialized infrastructure projects on an island location.
- An initial view on financial viability suggested a marginal outlook for most scenarios. Refinement of the financial scenarios, including phasing, purchase of used equipment and assumptions on site remediation costs were then trialed to try and improve the outlook.
- The refined outlook suggested a commercial repair facility with an upper vessel size limit of 328ft (100m) appears most positive. Docking capability for vessels over 230ft (70m) would also be a key differentiator from the nearest competitor yard (Subbase).
- Accommodating vessels >328ft (>100m) in length appears to give a slightly less positive financial outlook; however, strategic influences and stakeholder requirements for docking larger vessels may mean this needs to be considered at the next stage.

CAPEX comparison	Docking configuration 0	Docking configuration 1	Docking configuration 2
Max. vessel size	164ft (50m)	328ft (100m)	574ft (175m)
Initial revenue after ramp-up / year	US$ 23m	US$ 39m	US$ 47m
Long-term revenue / year	US$ 39m	US$ 66m	US$ 73m
Docking facilities	Small travel lift Large travel lift	Small travel lift Large travel lift 100m floating dock	Small travel lift Large travel lift 175m floating dock
Land area	1.07 million sqft (99,000 sqm)	1.18 million sqft (109,700 sqm)	1.18 million sqft (109,700 sqm)
Workforce	Start-up: 180 Initial: 275 Long-term: 355	Start-up: 245 Initial: 340 Long-term: 570	Start-up: 245 Initial: 370 Long-term: 600
Base CAPEX	US$ 50m	US$ 67m	US$ 79m
CAPEX contingency	US$ 12m	US$ 18m	US$ 24m
Payback with financing*	24 to 43 years	19 to 33 years	20 to 37 years
NPV at end of modelling period*	US$ -11 to 20m	US$ 0 to 53m	US$ -9 to 51m
IIR at end of modelling period	3.5% to 7.2%	5.0% to 9.0%	4.3% to 8.3%

Table E1 – Principal information for each docking configuration (after refinement)

(*based upon a 5% discount rate)

Executive summary (3)

- The configuration limiting vessels to 164ft (50m) appeared to have a more marginal financial outlook. However, initial skills and labor availability are potentially more suited to this configuration which would also require less initial CAPEX. The 164ft (50m) configuration is designed to provide the flexibility for larger vessel infrastructure in future phases, if workforce availability and growth ambitions support its development.
- The initial view on financial viability suggests a positive IRR and NPV may be achievable to varying degrees, though the outlook could be considered marginal in many instances. However, securing grant funding or support from the Inflation Reduction Act could transform what is currently a marginal outlook into a more financially viable business.
- In addition to considering standalone financial viability, shipyards create significant direct and indirect income and multiplier effects which support both local jobs and the economy. These benefits may be an important factor in the wider rationale to proceed.
- Based on the findings, a new ship repair facility has the potential to be viable. It is suggested USVIEDA considers additional studies to further validate the CAPEX and investigate the opportunities for alternative funding sources, prior to developing a formal business case with financial models and Pre-FEED (Front End Engineering Design).

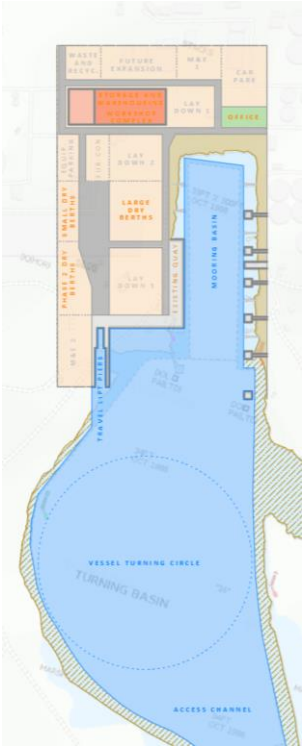

Figure E2 – Initial phase: <164ft (<50m) vessels.

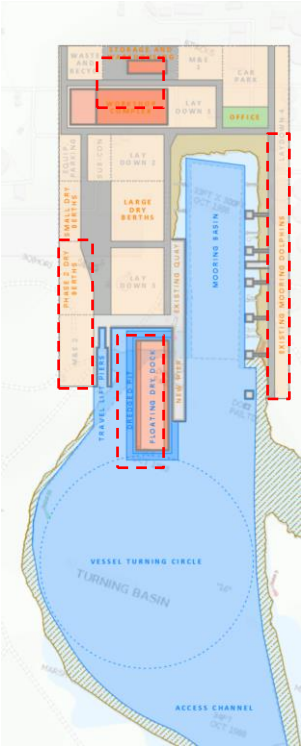

Figure E3 – Second phase: <328ft (<100m) or <574ft (<175m) vessels (expansion areas bounded in red).

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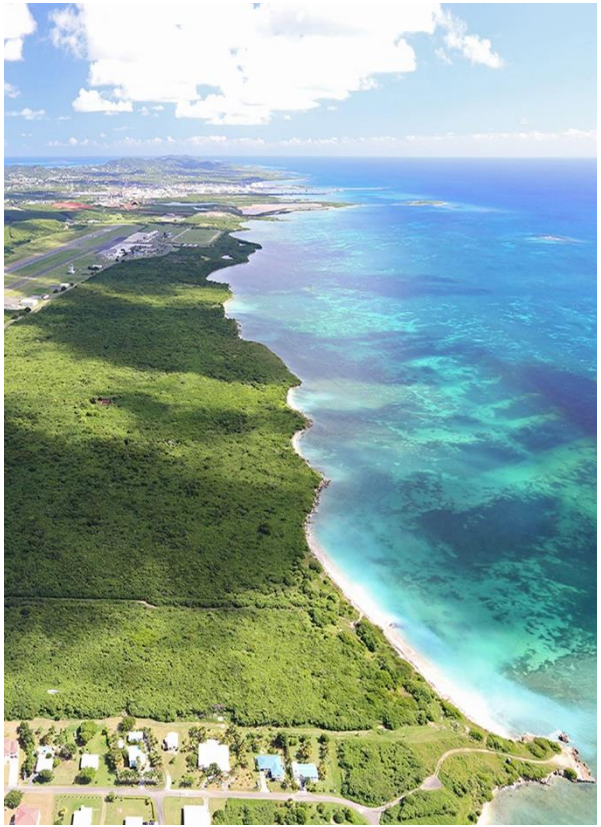
Project overview

- The United States Virgin Islands Economic Development Authority (USVIEDA) are considering the creation of a shipyard in the South Shore Trade Zone (SSTZ) on the island of St. Croix.
- First Marine International (FMI), a company of Royal HaskoningDHV (RHDHV), and supported by Tractus, have been commissioned to carry out a pre-feasibility study.
- The pre-feasibility study scope is designed to provide USVIEDA with the information needed to decide whether there is a market opportunity for a new ship repair yard, and to provide an initial view on where financial viability may lie. This is captured in Volume One of this report.
- Should the opportunity look attractive based on estimated revenues and costs, a decision can then be made by USVIEDA to invest in a subsequent study phase.
- Additional information relating to external drivers, including opportunities and threats, have been included in Volume Two. These relate specifically to military opportunities, the Jones Act, funding schemes, tax incentives, training workforce, economy impact and shipyard operation environmental considerations.



Section 2

Market Study

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Section 2: Market Study

Section 2 contents

2.1 Aim and objectives

The aim of the Market Study is to investigate the market feasibility of a new commercial ship repair facility on St. Croix. The objectives are to:

- Assess current docking demand by evaluating shipping traffic within St. Croix's locality.
- Review prospects for demand growth over 20 years to 2043.
- Provide a summary of the likely competitive environment and intensity of competition.
- Provide a view on market capture potential for a new ship repair facility on St. Croix.
- Give throughput and product mix estimates grouped by major vessel size categories.
- Provide a revenue range for the available throughput along with a view on the market segments showing the best potential.

2.2 Data approach

- Evidence based approach:
  - An analysis of several million satellite and terrestrial AIS vessel movement records over five years has been undertaken.
  - The analysis covers commercial and leisure vessels over approx. 33ft (10m) in length.
  - Vessel calling activity and global trading patterns have been considered.
  - The age and type of each vessel is used to individually estimate propensity to drydock in any one year.
  - Market capture assumptions are then based on proprietary evidence and varied by key stated variables.
- Implicit hierarchy:
  - Vessels are not double counted, e.g., if a vessel is recorded as calling within one day's sailing it is not then also counted further afield in any one year – this way the number of unique vessels, and the repair opportunity they provide, is clear.

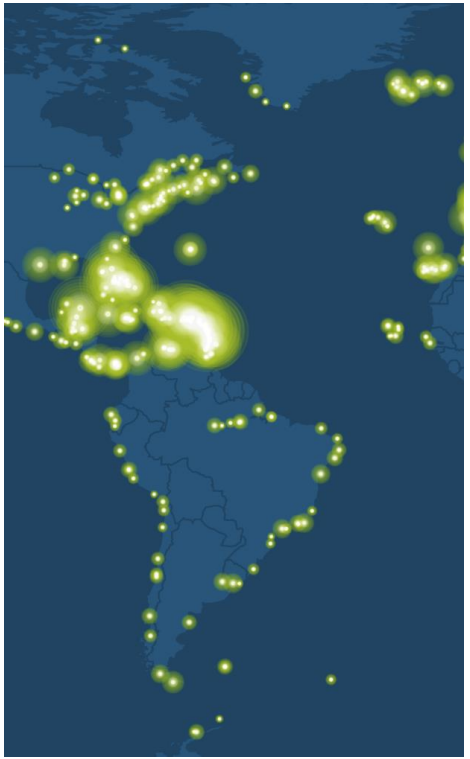


Figure 1 – Intensity of port calls made by vessels identified within two days' sailing of St Croix in 2023.

2.3 Existing repair market and outlook

Longer term prospects for ship repair remain positive based on the following market drivers.

Regulatory requirements provide a baseload for repair yards, in most instances a vessel will visit a shipyard at least once every five years.

Environmental efficiency index will force vessel efficiency improvements though impact on opportunity and docking intervals unclear.

The world fleet has grown rapidly – in 2023 it comprised ≈150,000 vessels. There are ≈20% more commercial vessels trading than 10 years ago.

Global and regional trade growth is likely to continue to support future fleet growth – over 7,000 vessels are being built or on order as of December 2023.

2.4.1 Vessels in the catchment

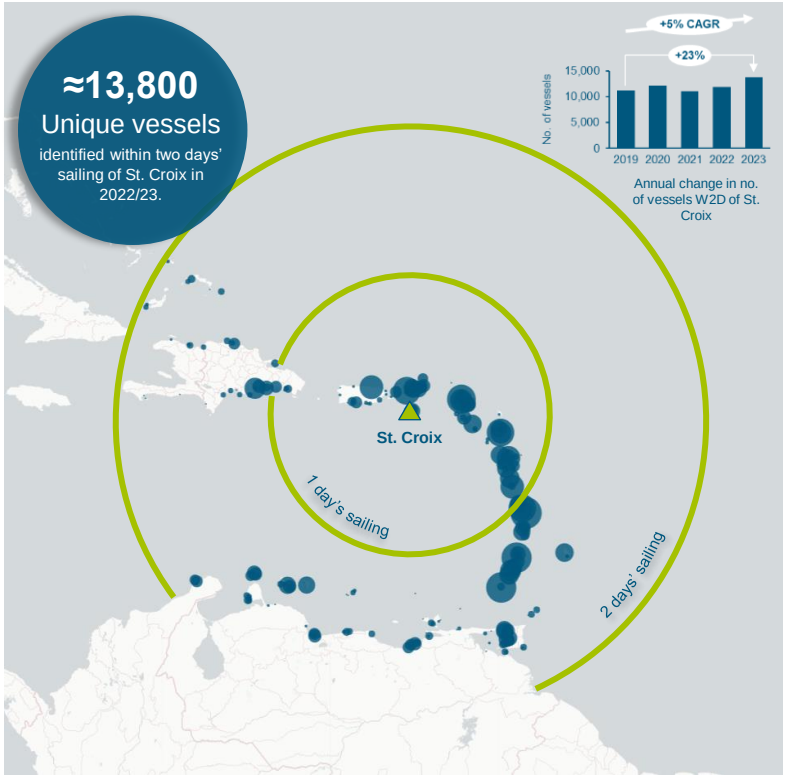


Figure 2 – Calling points of vessels within 2-days sailing of St Croix.

Vessel activity in the catchment

Around 13,800* vessels were identified within two days' (W2D) sailing of St. Croix in 2022/23. Two days' sailing is considered a practical outer limit of a catchment where competitive intensity is reasonably strong.

*Excludes Naval vessels, certain types of offshore platforms, non-propelled vessels and typically vessels under around 33ft (10m) length.

<50% of vessels call at nearby ports

Less than half of vessels identified within one day's sailing called at ports within this area. A large degree of passing traffic is expected due to St. Croix's proximity to the Panama canal.

Regional traffic volumes growing

The number of vessels identified in the catchment over the five-year period has been tracking slowly upwards over time (see inset image on Figure 2)

2.4.2 Size and type of vessels in catchment

≈80% of vessels are 656 ft (<200m) in length

A repair facility catering to ships up to 656ft (200m) in length would accommodate over 80% of vessels currently operating within the catchment. A facility for vessels up to 98ft (30m) in length could accommodate almost 40%.

≈90% of vessels are 106ft (<32.4m) beam

A repair facility catering to ships up to 106ft (32.4m) beam would accommodate over 90% of vessels currently operating within the catchment. A facility for vessels up to 33ft (10m) beam could accommodate over 55%.

Yachts form the largest segment

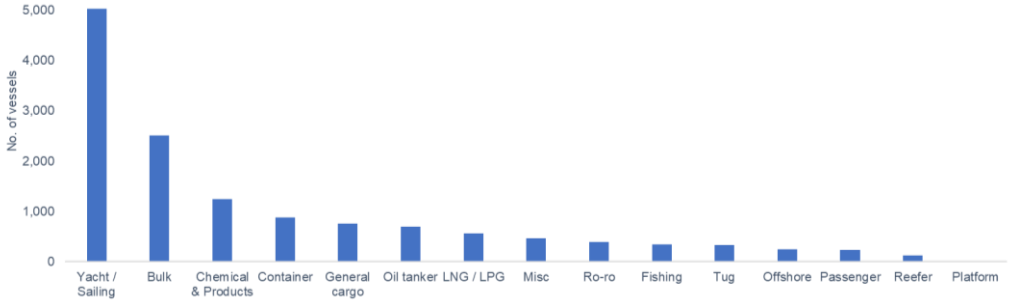


Figure 4 – Type and number of vessels identified in the catchment of St. Croix in 2022/23

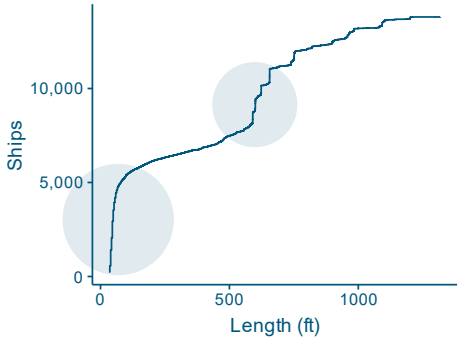


Figure 3 – Length of vessels identified in the catchment of St. Croix in 2023 (W1D and W2D)

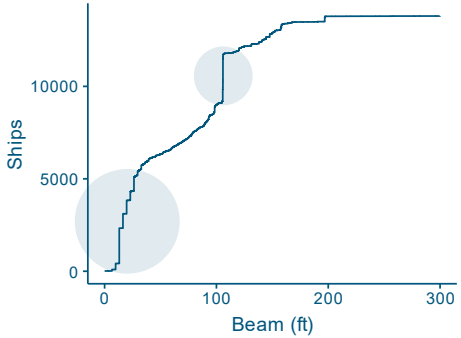


Figure 5 – Beam of vessels identified in the catchment of St. Croix in 2023 (W1D and W2D)

2.5.1 Major nearby load / discharge ports

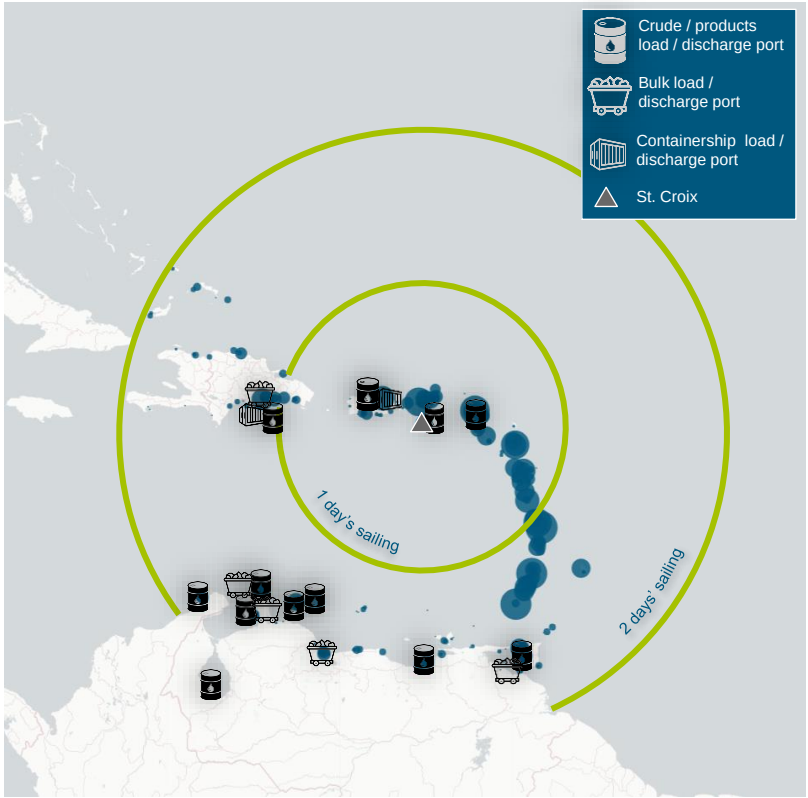


Figure 6 – Major nearby load / discharge ports with associated cargoes

Ports in the region can increase opportunity
Load and discharge ports can be indicative of a ship's end of rotation, in which a ship is more likely to repair.

Tanker ports operate within the immediate catchment
There are load / discharge ports for crude oil and products within one day's sailing. St. Croix is a discharge port for both crude oil and products.

Bulk ports are located within the wider catchment
There are load / discharge ports for iron ore, grain and coal within two days' sailing of St. Croix. Santo Domingo in the Dominican Republic is a prominent coal and grain discharge port.

There are few container ports
Caucedo in the Dominican Republic and San Juan in Puerto Rico are the major container ports in the catchment. Many container vessels are likely to be mid-rotation.

2.5.2 Trading patterns

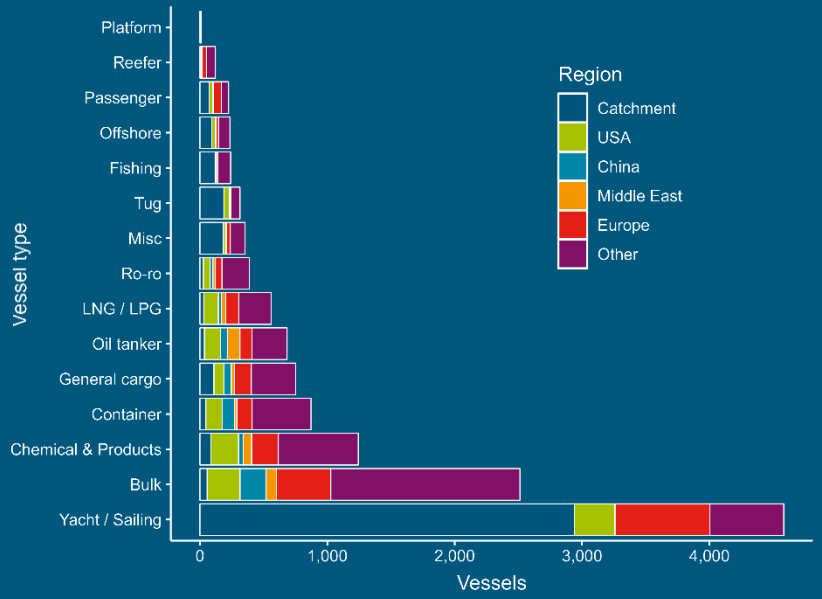


Figure 7 – Trading patterns of vessels identified in the catchment of St. Croix in 2022/23 (W1D and W2D) by no. of port calls[2]

[2] Based on analysing the global trading patterns over a 12-month period of each of the approx. 13,800 vessels identified in the catchment.

Trading patterns influence competitive landscape
A vessel's trading pattern will influence whether competition is likely to be from local, regional or global players.

Some smaller vessel types operate more locally
Many of the port calls by yachts/sailing, tugs, and misc. vessels identified within two days' sailing of St. Croix in 2023 were made within the catchment in the same 12-month period (as shown by the dark blue in the graph to the left). These vessels are considered more likely to repair locally.

Larger vessels trade more globally
Vessels such as bulk carriers, tankers (oil, chemical / products and gas carriers) and container ships trade globally and, in many instances, only a small proportion of their calls are made within the catchment. These will have more repair options available to them.

2.5.3 Example trading patterns

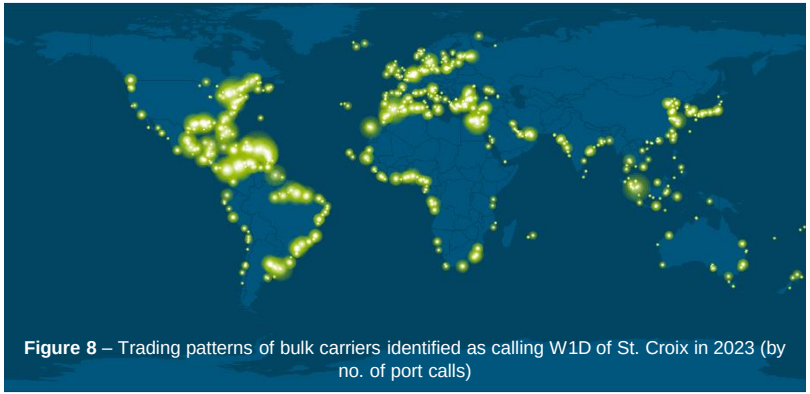


Figure 8 – Trading patterns of bulk carriers identified as calling W1D of St. Croix in 2023 (by no. of port calls)

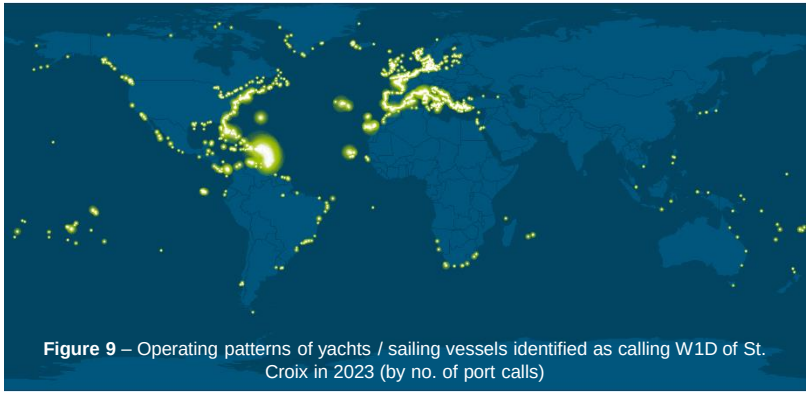


Figure 9 – Operating patterns of yachts / sailing vessels identified as calling W1D of St. Croix in 2023 (by no. of port calls)

Some vessel segments are more exposed to global competition

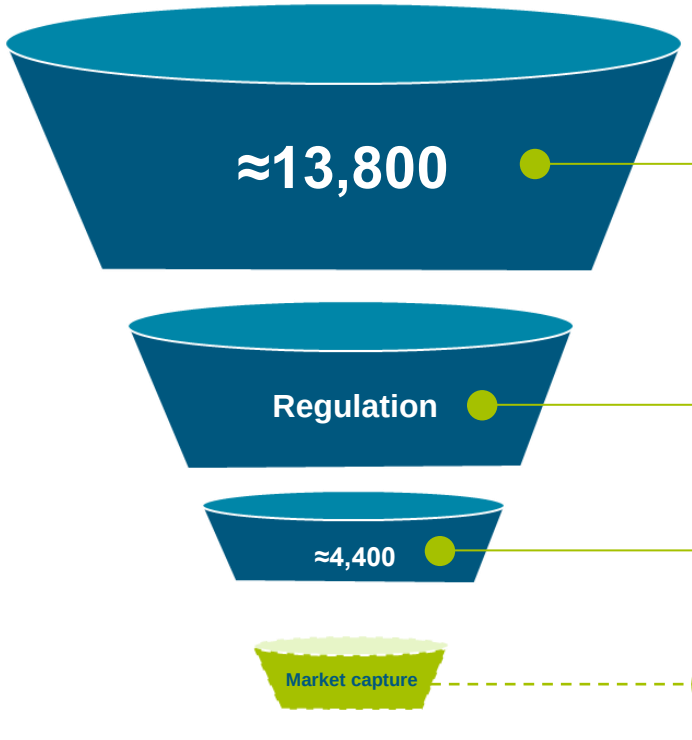
We have undertaken analysis to understand where each vessel identified in the catchment of St. Croix in 2023 also called in the same year.

The images to the left reiterate that some sectors, such as bulk carriers, are likely to be subject to more international competition and have more repair options available to them.

Yachts operate more locally and also in Europe

Many yachts / sailing vessels operate within the catchment of St. Croix, but a proportion also visit Europe and the U.S. and as such have several seasonal repair options available to them. We have taken this into account in the later market capture analysis and assumed a lower likelihood of repair for these vessels.

2.5.4 Estimate of existing docking demand - 2023



Number of unique vessels identified in the catchment (W1D / W2D) of St. Croix in 2023.

Each vessel is required to dock to maintain Class requirements. FMI proprietary research into docking intervals has been applied (further detail in market study Appendix 1). This considers the type and age of every individual vessel.

Total number of vessels in in the catchment (W1D / W2D) of St. Croix considered likely to require dry docking per annum.

The ≈4,400 total includes vessels that call in the immediate vicinity of St. Croix and those within two days' sailing. It comprises both vessels that remain largely in the region and those that trade more globally. In the subsequent market capture analysis this is considered.

2.6.1 Regional competition

Figure 10 – Map of sample regional competitors

- Analysis has been undertaken of a small sample of regional competitors to better understand their market focus, repair throughputs and apparent levels of utilisation.
- Some floating docks within the region did not provide reliable data due to their moving nature.
- Dock statistics are indicative based on analysis of satellite and terrestrial AIS data*.

Curacao Shipyard		
Dock size	919ft (280m) × 151ft (46m)	630ft (192m) × 85ft (26m)
Avg. no. of commercial dockings annually	20	14
Main vessel type(s)	Products tanker	Chemical / products and LPG
Longest vessel in dock	814ft (248m)	525ft (160m)
Avg. annual dock utilisation (days / %)	63	50
Top customer (beneficial owner)	Fragmented	G.W. Pritchard-Gordon

Table 1 – Indicative dock statistics for commercial vessels (2019-23) – Curacao shipyard

Subbase Drydock (St. Thomas)	
Dock size	223ft (68m) dock
Avg. no. of commercial dockings annually	12
Main vessel type(s)	Yachts
Longest vessel in dock	184ft (56m)
Avg. annual dock utilisation (days / %)	20
Top customer (beneficial owner)	Unknown (due to yacht focus)

Table 2 – Indicative dock statistics for commercial vessels (2019-23) – Subbase drydock

*Some vessels below 100GT may not be picked up by AIS.

2.6.2 Demand drivers and growth potential

Segment	Forecast growth per annum
Bulk	3.0%
Chem/Prod	1.5%
Container	1.5%
Fishing	2.0%
General cargo	1.0%
LNG / LPG	3.5%
Misc.	2.0%
Offshore	1.5%
Oil^	-1.0%
Passenger	2.0%
Reefer	-2.0%
RORO	1.5%
Tug	2.5%
Yacht / sailing	3.0%

Table 3 – Forecast growth per annum in the number of vessels, shown by segment

Seaborne trade growth continues

Despite recent downgrades, tonne-mile trade growth to 2030 is forecast to be around 1.6%*.

Domestic and regional GDP growth

GDP growth in both the USVI and much of the wider region is also expected to remain positive

Renewables driving offshore growth

Medium to long term prospects for the renewables sector are positive as countries strive for net zero

Some sectors are expected to decline

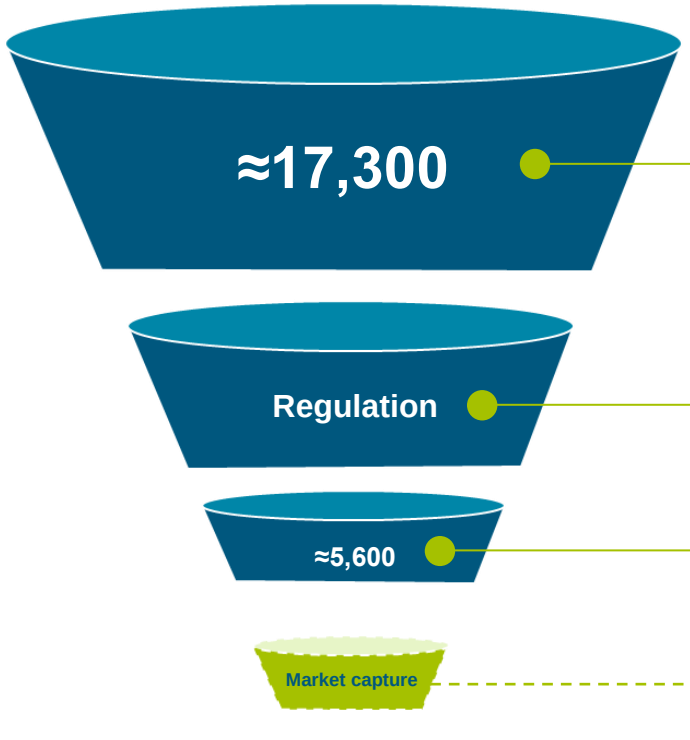
Reefer demand continues to decline as trade is containerised, as well as a move away from oil.

Passenger and yacht likely to stay buoyant

Prospects are positive and tourism growth is expected to continue post-Pandemic.

* UNCTAD (United Nations Conference on Trade and Development)
^ The oil trade is expected to grow in the shorter term but to decline in the longer term.

2.7.1 Projected docking demand - 2033



Based on the market growth rates highlighted in the earlier pages, this is the forecast number of unique vessels which could be calling / passing in the catchment (W1D / W2D) of St. Croix in 2033.

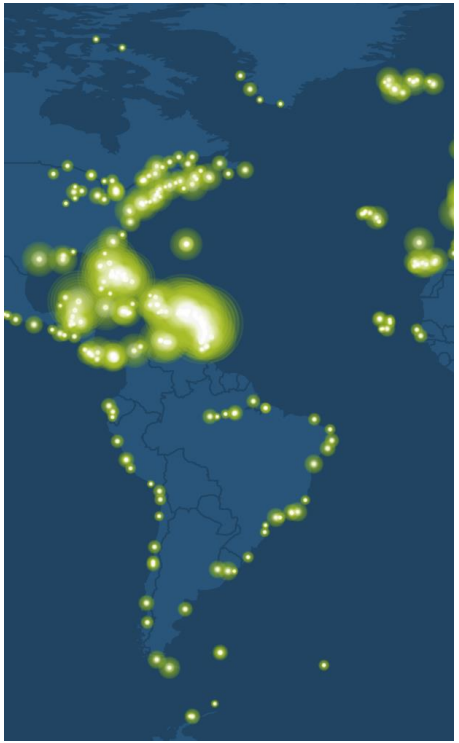
Each vessel is required to dock to maintain Class requirements. FMI proprietary research into docking intervals has been applied. This considers the type and age of every individual vessel.

Total number of vessels in the catchment (W1D / W2D) of St. Croix considered likely to require dry docking per annum by 2033.

The ≈5,600 total includes vessels that call in the immediate vicinity of St. Croix and those within two days' sailing, as well as those that remain largely in the region and those that trade more globally. In the subsequent market capture analysis this is segmented.

2.7.2 Market capture

Our approach to market capture considers proprietary evidence, locality of vessel calling patterns, the competitive context, the characteristics of the vessels themselves, whether they are domestically, or U.S. owned / operated and their trading patterns.



Base capture rate

A base capture rate of available docking demand is set for vessels calling within one day's sailing of St. Croix. Whilst this base rate can vary hugely between facilities globally and can be much higher or lower, 15% is a reasonable starting point. A lower capture rate is set for vessels calling further afield, as well as those only passing.

Adjustments to base capture rate

Several variables are then considered and have been used to alter the base capture rate up or down for each individual vessel in the data. These are described in Appendix 2.

2.7.3 Maximum available market potential at St. Croix

Size (FMI groups)	Length ft (m)	Beam ft (m)	Max. throughput available (no. of vessels)		
			2022/23 Estimate	2033 Forecast	2043 Forecast
Small 0 A	33-98 (10-30)	<106 (<32.4)	205	273	363
Small 0 B	98-164 (30-50)	<106 (<32.4)	31	40	51
Small I	164-328 (50-100)	<106 (<32.4)	27	33	41
Small II	328-492 (100-150)	<106 (<32.4)	17	19	23
Medium I A	492-574 (150-175)	<106 (<32.4)	7	8	10
Medium I B	574-656 (175-200)	<106 (<32.4)	29	36	44
Medium II	656-820 (200-250)	<106 (<32.4)	8	10	11
Large I	656-820 (200-250)	106-144 (32.4-44)	5	5	6
Large II	820-984 (250-300)	144-164 (44-50)	7	9	10
Large III	>984 (>300)	>164 (>50)	2	2	3
Total [6]			**338**	**435**	**562**

Table 4 – Available market potential estimate and forecast by size group

Potential for ≈330 unconstrained dockings of all sizes in 2022/23

This is the total number of repairs estimated as available to a facility in St. Croix. However, it may be sensible to only target a proportion of this demand.

The product mix is yacht-focused

Yachts / sailing vessels account for around 60% of vessels of all sizes in terms of market capture. In the Small 0A segment, they account for almost 90% of vessel types.

Docking demand potential could grow to >430 in 2033 and >560 in 2043.

[6] Rounded

2.7.4 Market potential visualized

Most docking opportunities are for vessels up to around 30m in length. The following graphs provide a profile of the length and beam characteristics of the vessels estimated as forming the available market for St. Croix as of 2023 and up to 2043.

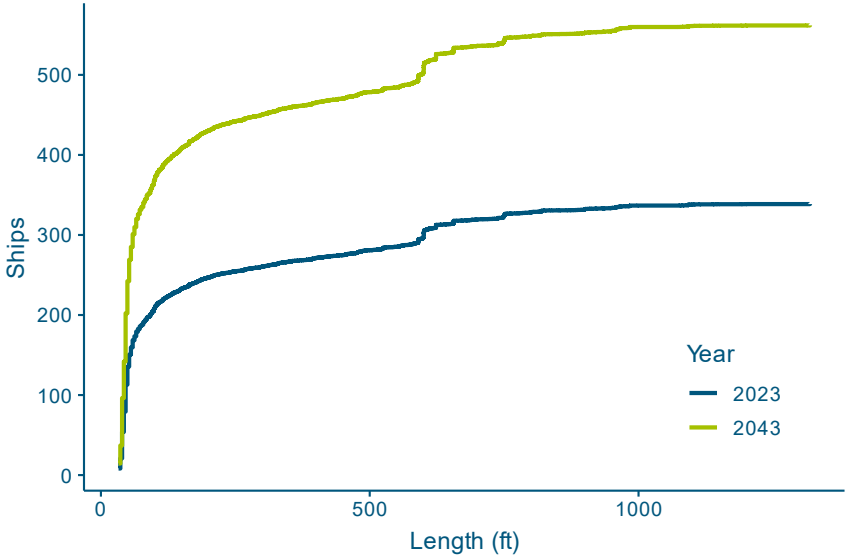


Figure 11 – Length profile of cumulative potential market capture (current)

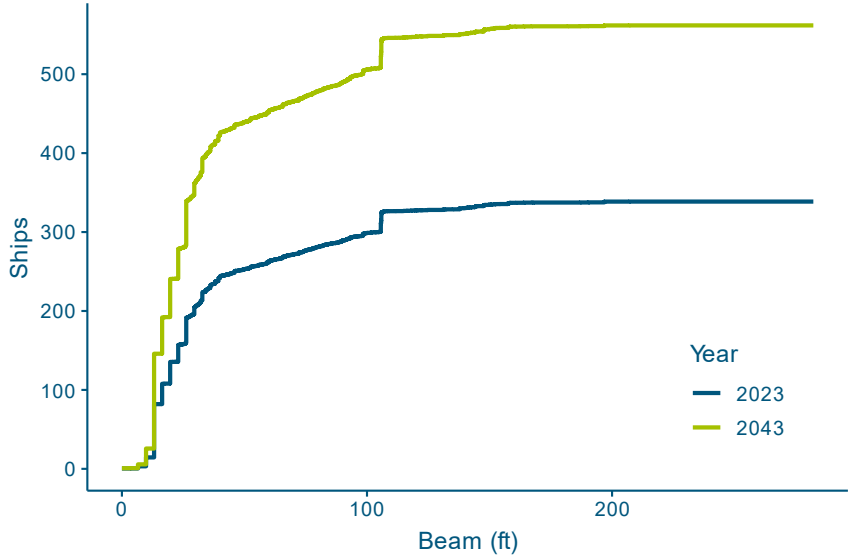


Figure 12 – Length profile of cumulative potential market capture (2043)

2.7.5 Maximum available revenue potential

Size (FMI groups)	Revenue potential (US$ million)		
	2023	2033	2043
Small 0 A	9.8	12.8	16.6
Small 0 B	9.3	12.1	15.9
Small I	19.7	25.6	33.5
Small II	6.4	7.5	8.8
Medium I A	4.8	5.6	6.7
Medium I B	19.1	23.5	29.2
Medium II	6.0	7.1	8.4
Large I	4.2	4.6	5.1
Large II	7.5	8.8	10.7
Large III	2.7	2.8	2.9
Total for all sizes*	89.5	110.4	137.8
Total^	**98.4**	**121.4**	**151.5**

Table 5 – Available revenue potential estimate and forecast by size group

*Rounded
^All revenues are based on 2023 values excluding inflation and including 10% uplift for afloat / other repairs

Unlikely to target this entire market

It is important to note that whilst this section estimates the maximum revenue available, it is unlikely to be feasible for the proposed St. Croix facility to capture this entire market. Subsequent stages will refine this and allow us to form a view on the proportion of revenue for St. Croix.

Afloat repairs likely to add revenue

A further 10% of revenue from afloat / non-docking related repairs is assumed. This figure varies by shipyard.

Max. revenue potential ≈US$ 98m in 2023

The values have been calculated based on assumed average revenues outlined in Appendix 3. The proportion of this that is considered practical to target will become clearer in subsequent stages.

There is the potential for revenue to grow as the market grows to ≈US$ 151m in 2043

2.8 Summary

- Our research provides an independent view on the market potential for a commercial ship repair facility at St. Croix.
- Around 13,800 commercial and leisure vessels have been identified as either calling or passing within two days' sailing of St. Croix in 2023.
- Around 60% of these vessels are under 574ft (175m) in length, with yachts and bulk carriers comprising the largest segments. Based on age and type profiling, around 4,400 vessels are estimated as likely to require docking per annum. Many of the cargo carrying vessels identified trade globally and have many repair options available.
- Continued growth is envisaged across many market segments over the next decade, potentially boosting the requirement for dry dockings per annum within the catchment to over 5,600.
- Based on vessel trading patterns, calling proximity to St. Croix and other factors; it is estimated the equivalent of around 330 scheduled dockings could be available to a facility in St. Croix in 2024, assuming the entire market were to be captured.
- By far the largest segment is for yachts of under 98ft (30m) in length.
- Available demand has the potential to grow to over 430 dockings by 2033. These numbers reflect total market availability. The proportion of available docking demand targeted is shaped by the practicalities of the site arrangement and where financial viability appears most likely.

Appendix 1: Docking interval assumptions

Type	% likelihood of docking per annum by vessel age		
	<10 yrs.	10-15 yrs.	>15 yrs.
Bulk	20	25	40
Chem/Prod	20	25	40
Container	17	20	40
Fishing	30	35	40
General cargo	20	25	40
LNG / LPG	20	25	40
Misc.	30	35	40
Offshore	30	35	40
Oil	20	25	40
Passenger	40	45	50
Reefer	20	25	40
RORO	20	25	40
Tug	30	35	40
Yacht / sailing	40	45	50

Table A1 – % likelihood of docking per annum by vessel age

Regulatory requirements

Each vessel is required to dock to maintain Class requirements. Frequency of docking varies with vessel age, type and use. Recent proprietary research into global vessel docking intervals has been incorporated into this analysis and is summarised in Table A1.

Applied to each vessel in the catchment

For each of the ≈13,800 vessels identified within two days' sailing of St. Croix in 2023, we have identified its age and type, and applied our docking interval assumptions to provide an indication of the number of vessels in the catchment considered likely to require dry docking per annum.

Appendix 2: Market capture levers

Our approach to market capture is based on proprietary evidence, locality, competitive context, the characteristics of the vessels themselves and their trading patterns.

- A base capture rate of available docking demand is set for vessels calling within one day's sailing of St. Croix. Whilst this base rate can vary hugely between facilities globally and can be much higher or lower, 15% is a reasonable starting point. A lower capture rate is set for vessels calling further afield, as well as those only passing.
- The following variables are then considered and have been used to alter the base capture rate up or down for each individual vessel in the data:
  - Vessel calling within one- or two-days' sailing of St. Croix.
  - A non-calling vessel that passes within 1-2 days' sailing of St. Croix.
  - Vessels traded outside of the catchment in the year.
  - Commercial trading vessel spends >30% of its calling time in China.
  - Commercial trading vessel spends >50% of its calling time within the catchment.
  - Yachts that also operates outside of the catchment (W1D) in the year.
  - Vessels are domestically domiciled (beneficial owner).
  - Presence of major established repairers in the region (cruise vessels have been excluded due to the presence of cruise repair specialist at the Grand Bahama Shipyard).
  - Presence of terminal port in the region.
  - Potential 'captive' markets – USVI port tugs and vessels of Tropical Shipping, a key client of St. Croix Port.
  - Vessels likely to be 'Jones Act' vessels (built and flagged in the U.S.)

Appendix 3: Revenue assumptions

Type	FMI vessel revenue assumptions (US$ '000)									
	Small 0A	Small 0B	Small I	Small II	Med. IA	Med. IB	Med. II	Large I	Large II	Large III
Bulk	240	240	344	430	630	630	630	850	850	850
Chem/Prod	240	240	336	420	670	670	670	910	910	910
Container	320	320	392	490	800	800	800	1,200	1,200	1,300
Fishing	120	120	160	200						
General	240	240	280	350	500	500	500	750	750	750
LNG / LPG	400	400	480	600	850	850	850	1,150	1,150	1,300
Misc.	160	160	240	300	750	750	750	900		1,200
Offshore	160	160	200	250	775	775		1,100	1,100	1,100
Oil	160	160	200	250	775	775	775	900	900	1,300
Passenger	240	240	320	400	1,000	1,000	1,000	1,400	1,400	1,400
Reefer	160	160	200	250	500	500	500			
RORO	240	240	300	375	600	600	600	880		
Tug	120	120	160							
Type	**33-39ft 10-12m**	**39-59ft 12-18m**	**59-79ft 18-24m**	**79-98ft 24-30m**	**98-131ft 30-40m**	**131-197ft 40-60m**	**197-262ft 60-80m**	**262ft+ 80m+**		
Yacht	10	20	90	190	370	930	2,400	4,070		

Table A2 – FMI vessel revenue assumptions by vessel type and size group

Variation in repair values

Various factors influence repair values. Older vessels for example are likely to have larger bills than newer vessels. As such we have applied average values based on FMI proprietary databases. This also considers vessel type. Market conditions could typically result in revenue variance of ±20%.

Yacht revenues have been calculated separately and split into appropriate size categories as shown at the bottom of Table A2.

Section 3

Site Selection

1 2 3 4 5 6 7 8 9

Section 3: Site selection

Section 3 contents

3.1.1 Site selection background

The island of St Croix has been selected as the location for the new shipyard, specifically the SSTZ, highlighted in Figure 13.

- The zone stretches for approximately 4.5 miles along the coast and 1 mile inland.
- Some areas are already occupied but there are numerous remaining potential sites.
- Selection of an appropriate site is a critical factor in the viability and long-term success of the shipyard.
- A high-level, desk-based assessment study was used to identify the most promising site to use as the basis for the pre-feasibility study.
- The assessment process is explained next.

Figure 13 – The USVI South Shore Trade Zone highlighted in white

3.1.2 Site selection process (1)

The SSTZ has been divided into four principal areas. Each section is defined by its differentiating features:

Area 1: Airport sites

Characterized by the undeveloped coastline that will be used for sea access.

Area 2: Krause basin sites

Characterized by the channel location for sea access and historical industry.

Area 3: Krause lagoon sites

Characterized by the undeveloped and partially submerged land area.

Area 4: Inland zone

Characterized by lack of sea access and large proportion of existing developments

Figure 14 – The USVI SSTZ areas highlighted in red (1), green (2), yellow (3) and grey (4)

Areas 1 to 3 were assessed using a proprietary site assessment tool.

Site selection process (2)

Data was collected to facilitate the site selection process and aid with the notional layouts. Sources referred to during the process may include:

- Stakeholder meetings (in country)
- Site visit to Krause basin
- United States Censuses Bureau
- Virgin Islands Department of Labor (VIDOL)
- Navionics nautical charts
- Google Earth satellite images
- Metoblue climate data
- U.S. Geological Survey
- USVI Port Authority
- Tidal charts

Figure 15 – St Croix census data

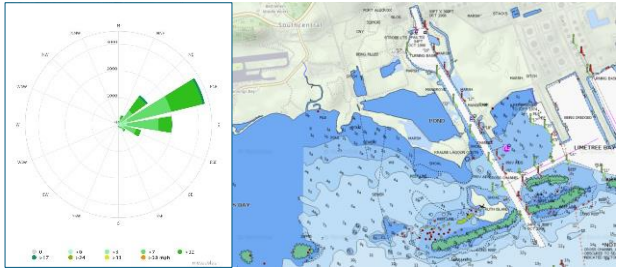


Figure 16 – Wind and Bathymetric data

Figure 17 – Geological map

Figure 18 – Site visit photos

Site selection process (3)

Each area has been assessed based on five principal categories:

Location

Availability of supporting industry and workforce. Access to amenities and attractiveness to ex-pat workforce and visiting vessel crews.

Connectivity

Ability to respond in a timely manner to information, materials and parts requirements. Commuting and international travel for ex-pat workforce, specialists and crews.

Construction

The engineering effort and construction methods required due to the site condition and the subsequent impact on CAPEX costs and construction schedule.

Layout

Ability to lay out the site efficiently and meet the capability and capacity requirements of the markets as they grow and develop.

Approvals and incentives

Appropriateness of the area for a shipyard for example, environmental impact and consideration of additional benefits.

Site selection process (4)

Each category has four criteria (total of 20 criteria across the five categories) as show in Table 6:

Category	Criteria			
Location	Housing	Amenities and leisure	Industrial base	Maritime base
Connectivity	Road links	Rail links	Air links	Telecoms
Construction	Dredging reclamation	Piling and grouting	Existing infrastructure	Site preparation
Layout	Wave protection	Land availability	Waterfront availability	Shape and orientation
Approvals and incentives	Environment	Planning and zoning	Incentives	Data availability

Table 6 – Criteria for each site selection category

- Each criteria has a set definition for what constitutes an area being allocated a rating of poor, moderate or good.
- For each area:
  - A score is allocated to each criteria informed by the data collected.
  - A weighting factor is applied to each score based on the severity and duration of impact.
  - A score for each category is calculated and a resulting overall score.
- The scores are then compared using radar charts.
- Unique advantages and disadvantages of each area will be highlighted.

3.2 Site assessment results (1)

Area 2 is ranked highest with an overall score of 74%.

- Definition of overall scores:
  - >70% is generally an indicator a site may have potential.
  - 60-70% is generally an indicator a site may have some limited potential.
  - <60% is generally an indicator that a site would we challenging to develop.
- A site's potential is also dependent on how well-balanced its category scores are.
- Sites with particularly weak scoring in individual categories, may have less potential than the overall score indicates.
- The common traits, strengths and weaknesses of each site are discussed further in the report.

Figure 19 – Overall area site assessment scores and rankings

Figure 20 – The USVI SSTZ areas highlighted in red (1), green (2), yellow (3) and grey (4)

Site assessment results (2)

As an island location where sites are in proximity, the location score is the same for each area.

- Population of USVI is just over 87,000 based on the 2020 U.S. census.
  - Less than 10% of the USVI population are employed in manufacturing and construction
  - There is an existing ship repair yard on St. Thomas with 35 people employed.
- Population of St Croix is around 41,000, with a labor force of 17,000, with 1,400 unemployed.
- Key insights:
  - When selecting target markets and throughputs, it will be important to be mindful of the demands it may place on the labor force and skills pool.
  - There is further information in skills and workforce in Section 6 of the report.

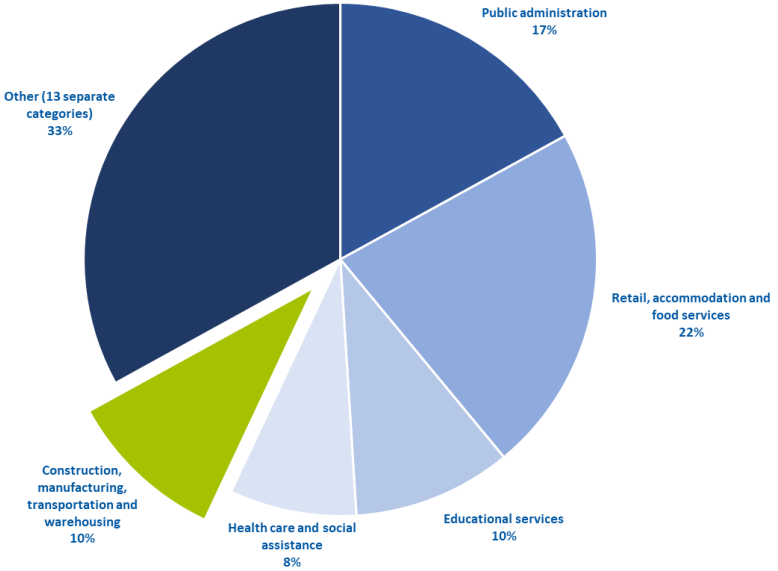


Figure 21 – Top employment categories in the USVI.
Source: Virgin Islands Department of Labor (VIDOL)

Site assessment results (3)

Figure 22 shows distribution of land use zones around the island. A large tourist-based economy should provide an attractive place to live, work and visit.

- The maritime base is mainly ferries and small leisure vessels. There is also a small container terminal adjacent to the refinery loading terminal.
- There is also the potential for existing USVI based shipbuilding, ship repair and related industrial companies to relocate close to, or as part of any new facility (see Section 6).
- The industrial base is mainly oil and rum. It is likely there is a reliance on imports for materials, parts and consumables.
- Key insights:
  - The shipyards size and capability should consider limited industrial and maritime base on the island.
  - The shipyard should have sufficient storage to enable bulk ordering and mitigate against lead times.

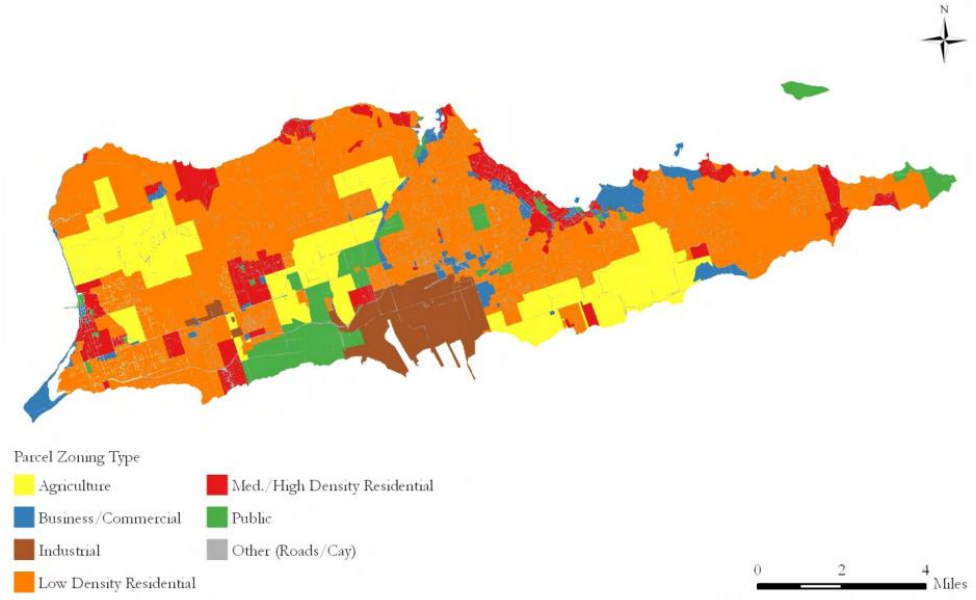
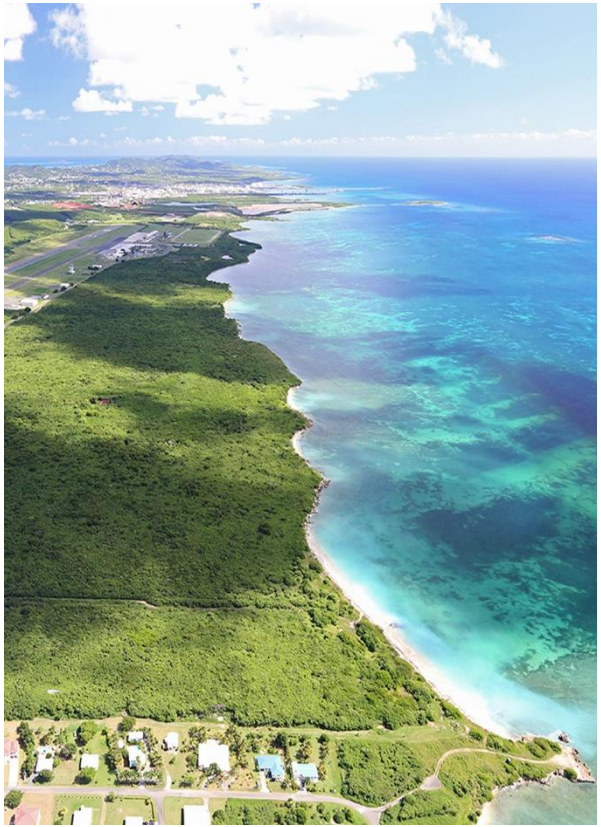


Figure 22 – Zoning type of St. Croix land parcels.
Source: United States Environmental Protection Agency

Site assessment results (4)

- As an island location where sites are in proximity, the connectivity score (for transport and communications) is the same for each area:
  - All sites are less than 1 mile from main highway (Melvin H. Evans Highway).
  - There are no goods or passenger rail services. 90% of commuters use private vehicles.
  - St Croix is 23 miles long by 7 miles wide. The shipyard is no more than a 45-minute drive from residential areas on the island.
  - There is a small airport with connections to larger airports on United States mainland.
  - The Virgin Islands Next Generation Network (viNGN) is a high-speed fiber optic network.
- Key insights:
  - When sizing the shipyard, land area requirements must consider the potential car parking for the workforce size and connections to the main highways that will be required.
  - Materials and parts will likely arrive at the shipyard via road. An offload quay within the shipyard may be possible for very large goods if customs requirements can be satisfied.
  - CAPEX and OPEX could be influenced by the island setting.



Site assessment results (5)

Area 1 is ranked lowest with a score of 64%.

- Area scored strongly in layout category.
- Large plots available but currently very limited waterfront access due to natural water depths.
- Area scored poorly in construction category.
- Large amounts of dredging will be required to create access channel, waterfront mooring and turning areas.
- Unless the area is to undergo a wider maritime development that would provide dredging, the site potential is limited due to the CAPEX burden.
- Most land parcels are designated as public space rather than industrial according to U.S. Environmental Protection Agency (EPA).

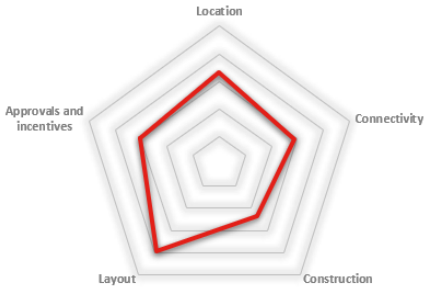


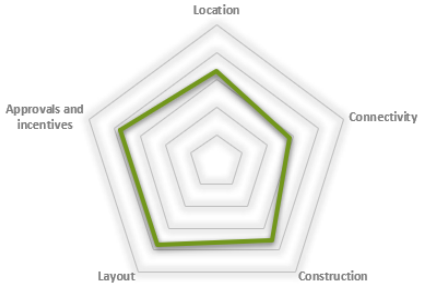
Figure 23 – Area 1 site assessment scores and rankings

Figure 24 – Area 1 highlighted in red

Site assessment results (6)

Area 2 is ranked highest with a score of 74%.

- Area scored strongly in most categories.
- Potential to use existing building and quay to further reduce CAPEX burden on financial outlook.
- Large plots available including an existing industrial site.
- Re-use of a brownfield site often preferred from an environmental and planning standpoint, but some demolition and clearance will be required.
- Targeting markets of vessels <328ft (<100m) (group Small I and below) are most likely to make best use of existing infrastructure and minimize CAPEX.
- Vessels should not exceed 574ft (175m) length for this site to be compatible with existing turning basin, i.e. targeting groups of Medium IA and below.



Area 2

Weighted site score: 74%

Overall site rank: 1

Differentiating criteria:

Minimal dredging/reclamation
Existing wave protection
Previous heavy industry and potentially useful structures
Potential waterfront constraints

Figure 25 – Area 2 site assessment scores and rankings

Figure 26 – Area 2 highlighted in green

Tractus First Marine International Royal HaskoningDHV

Site assessment results (7)

Area 3 is ranked second with a score of 67%.

- Area scored strongly in layout category.
- Large plots available with potential to create a waterfront by dredging to link up with the existing oil terminal waterfront.
- Less dredging is potentially required compared with Area 1, however; the land area is partially submerged so reclamation and ground improvement works may also be required.
- Unless the land area is to undergo a wider development that would dredge and prepare the site, the potential is limited due to the CAPEX burden.

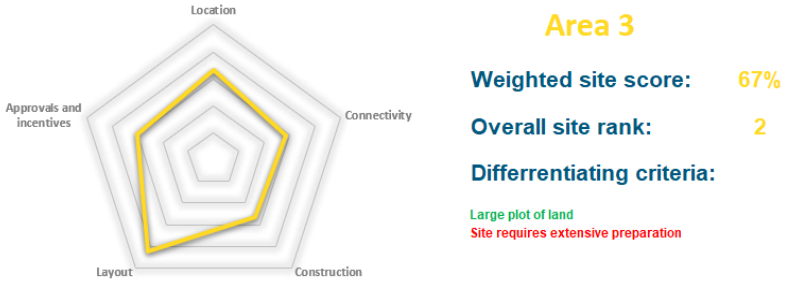


Figure 27 – Area 3 site assessment scores and rankings

Figure 28 – Area 3 highlighted in yellow

3.3 Section 3 summary and conclusions

Area 2 should be used as a basis for the remainder of the pre-feasibility study.

- The opportunity to use the existing waterfront and infrastructure to reduce CAPEX burden, increases the potential viability of Area 2.
- However, the target markets will need to align with the existing capabilities and limitations of the site.
- The workforce pool and island setting, as discussed, will also need to be considered when selecting the target markets and evaluating the CAPEX/financial outlook.

Figure 29 – Area 2 site assessment scores and rankings

Figure 30 – Area 2 highlighted in green

Section 4

Shipyard arrangement, construction and workforce

1 2 3 4 5 6 7 8 9

Section 4: Shipyard notional arrangement, construction and workforce

Section 4 contents

4.1.1 Docking configuration

- The market study has identified the potential market demand which will be used to explore potential docking configurations.
- Based on experience of past projects, the development of facilities to capture the entire potential market is either not practical and/or does not produce a viable financial outlook.
- Instead, a docking configuration is developed. The docking configuration determines which markets the shipyard will target and capacity/type of docking facilities used to do so.
- The docking configuration is the basis for the shipyard and is one of the primary drivers of the financial outlook and viability of the shipyard.
- This section identifies three potential docking configurations options. Configurations are identified by considering:
  - The compatibility/suitability of the site for each size category.
  - Whether the available throughput is likely to justify the docking infrastructure required.
  - The revenue rates of each size category (average revenue per meter of vessel).

4.1.2 Docking configuration site compatibility

Figure 32 – Approximate location in Area 2 to be used for the proposed shipyard

- **Current maximum vessel length: 574ft (<175m)**
  Based upon the existing turning basin diameter of 1,115ft (340m).
- **Current maximum vessel beam: 105ft (<32m)**
  Based upon the existing channel width of 295ft (90m).
- **Current maximum vessel draft: ~30ft (~9m)**
  Based upon the existing channel depth of 34ft (10.4m) (tidal range is generally very small).
- The waterfront is currently compatible with vessels up to Medium 1A size category.
- The waterfront could be modified for larger size category vessels but may require significant additional CAPEX.
- Therefore, docking configurations will exclude vessels of Medium 1B or larger unless the revenue rates are exceptional (evaluated later in the report).

4.1.3 Throughput and docking positions

Size (FMI groups)	Length ft (m)	Average Beam ft (m)	Potential docking facility	2043 throughput available (no. of vessels)	2043 estimated docking positions required
Small 0 A	33-98 (10-30)	20 (6)	Travel lift	363	10.4
Small 0 B	98-164 (30-50)	33 (10)	Travel lift / shiplift	51	1.5
Small I	164-328 (50-100)	46 (14)	Shiplift / dock	41	1.2
Small II	328-492 (100-150)	69 (21)	Shiplift / dock	23	0.7
Medium I A	492-574 (150-175)	82 (25)	Shiplift / dock	10	0.3
Medium I B	574-656 (175-200)	102 (31)	Dock	44	1.3
Medium II	656-820 (200-250)	105 (32)	Dock	11	0.3
Large I	656-820 (200-250)	125 (38)	Dock	6	0.2
Large II	820-984 (250-300)	141 (43)	Dock	10	0.3
Large III	>984 (>300)	174 (53)	Dock	3	0.1

Table 7 – Market capture potential and docking positions required for 2043 by size group

Docking demand for Small 0 vessels will support nearly 12 docking positions by 2043.
Small vessels can be docked using a relatively inexpensive travel lift and dry berths.

Docking demand for Small I/II and Medium IA vessels will support just over 2 docking positions by 2043.
Demand is insufficient to justify a shiplift. However, if there is a size category with a particularly lucrative revenue rate then a floating dock may be justifiable.

Medium IB and above require either a floating dock or a dry dock due to their size.
Unless there is a size category with a particularly lucrative revenue rate then a dock is unlikely to be justifiable.

Docking configuration revenue rate

Size (FMI groups)	Length ft (m)	Average Beam ft (m)	2043 throughput available (no. of vessels)	Average revenue per vessel (US$)	Revenue rate per meter of vessel (US$)
Small 0A	33-98 (10-30)	20 (6)	363	$47k	$3.0k
Small 0B	98-164 (30-50)	33 (10)	51	$314k	$8.4k
Small I	164-328 (50-100)	46 (14)	41	$805k	$11.5k
Small II	328-492 (100-150)	69 (21)	23	$391k	$3.1k
Medium IA	492-574 (150-175)	82 (25)	10	$700k	$4.3k
Medium IB	574-656 (175-200)	102 (31)	44	$659k	$3.5k
Medium II	656-820 (200-250)	105 (32)	11	$727k	$3.2k
Large I	656-820 (200-250)	125 (38)	6	$833k	$3.9k
Large II	820-984 (250-300)	141 (43)	10	$1,100k	$4.0k
Large III	>984 (>300)	174 (53)	3	$1,000k	$3.2k

Table 8 – Estimated docking revenue rate for 2043 by size group

Small 0B and Small I vessels have the highest revenue rate.
Due to the rapid drop-off in revenue rates above this size, the primary docking configuration should provide capability up to Small I. This is likely to be achieved using a floating dock.

Generally, vessel categories of Small II and above have lower revenue rates.
However, it may be worth exploring a second docking configuration which provides capability up to Medium IA using a larger floating dock:

- Medium IA revenue rates are slightly higher than others.
- A larger floating dock would also allow multiple smaller vessels to be docked at once.
- The waterfront is already compatible with Medium IA.

4.1.4 Docking configuration summary (1)

- Generally, the site compatibility, throughput and revenue rate analysis all agree that a sensible upper vessel size limit for the docking configurations is Medium IA. However:
  - The lowest cost docking facilities are for Small 0B and below.
  - The most lucrative revenue rates and highest demand tends to be in the Small I category and below.
- It is therefore suggested that notional waterfront layouts and CAPEX estimates are developed for three docking configurations:
  - **Docking configuration 0 (DC0)**: shipyard with docking facilities for vessels up to Small 0B*
  - **Docking configuration 1 (DC1)**: shipyard with docking facilities for vessels up to Small I
  - **Docking configuration 2 (DC2)**: shipyard with docking facilities for vessels up to Medium IA
- There is insufficient throughput to justify a shiplift, so both DC1 and DC2 configurations will utilize travel lifts and a floating dock for the larger vessels in the configuration. The primary difference between the two configurations will be the size of the floating dock and mooring quay provided for the larger vessels.

*DC0 will only use travel lifts for docking. Oversize vessels at the lower end of the Small I size range (50-60m) may be accommodated on a case-by-case basis.

Docking configuration summary (2)

Size (FMI groups)	Average Length ft (m)	Average Beam ft (m)	Selected docking facility	2043 available market	2043 facility capacity
Docking Configuration 0					
Small 0A	49 (15)	20 (6)	Travel lift	363	360
Small 0B	125 (38)	33 (10)	Travel lift	51	51
Small I	230 (70)	46 (14)	Travel lift	41	8*
Docking Configuration 1					
Small 0A	49 (15)	20 (6)	Travel lift	363	360
Small 0B	125 (38)	33 (10)	Travel lift	51	51
Small I	Max 197ft (60m)	46 (14)	Floating dock	41	41
Docking Configuration 2					
Small 0A	49 (15)	20 (6)	Travel lift	363	360
Small 0B	125 (38)	33 (10)	Travel lift	51	51
Small I	230 (70)	46 (14)	Floating dock	41	41
Small II	413 (126)	69 (21)	Floating dock	23	0^
Medium IA	535 (163)	82 (25)	Floating dock	10	10

Table 9 – Docking configuration and resulting throughput and market capture summary

*Assumes that 20% of Small I vessels up to 197ft (60m) can be accommodated on travel lift
^Small I and Medium IA prioritised over Small II due to higher revenue rates.

Docking Configuration 0

- Small 0A travel lift + 12 dry berths
- Small 0B travel lift + 3 dry berths
- $39.4m revenue by 2043

Docking Configuration 1

- Small 0A travel lift + 12 dry berths
- Small 0B travel lift + 3 dry berths
- Small I floating dock
- $65.9m revenue by 2043

Docking Configuration 2

- Small 0A travel lift + 12 dry berths
- Small 0B travel lift + 3 dry berths
- Medium IA floating dock
- $72.9m revenue by 2043

4.2.1 Notional layout options

- The following steps were taken to provide a view on where financial viability may lie for each of the three docking configurations:
  1. **Plot selection:** Examine SSTZ Area 2 and identify a provisional plot location for the shipyard which makes best use of its principal features.
  2. **Notional layout:** Use a proprietary model to identify the principal characteristics required to support the docking configurations and develop a corresponding notional layout.
  3. **CAPEX estimate:** Input the data and assumptions from the notional layouts into a proprietary model to produce a CAPEX estimate.
- After the CAPEX has been estimated, the financial outlook is produced using the following steps:
  1. **Financial tool:** Input the CAPEX, revenue and other principal assumptions into a proprietary tool to produce an initial view on the financial outlook.
  2. **Refinements:** Consider how the inputs into the financial tool could be improved and generate a set of revised financial outlooks.

4.2.2 Plot selection

Figure 33 – Area 2 is shown in green

- Area 2 is the preferred area from the site assessment stage.
- The area has existing features that can be incorporated into the shipyard such as buildings, infrastructure and dredge areas.
- Area 2 is much larger than is required for a shipyard (the land area is over 10 million sqft (1 million sqm)).
- A plot within Area 2 is required that incorporates the areas principal features.
- The location of the features and subsequent identification of the plot as shown next in the report.

4.2.3 Existing principal features

Figure 35 – Proposed site with existing principal features

The proposed site has the following existing principal features that may be useful:

1. **Old machine shop:** Two bays of approximately 54,000 sqft (5,000 sqm) total with 10t overhead cranes. Refurbishment estimated at US$ 3-4m (estimate provided by site team).
2. **Mooring basin:** 295ft (90m) wide basin with mooring quay on east bank and dolphins on west bank.
3. **Quay:** 459ft (140m) long by 66ft (20m) wide quay. Integrated jib crane rails (crane has been demolished). Dolphin to south provides total mooring length of approximately 656ft (200m).
4. **Channel and turning circle:** Dredge depth of ≈34ft (≈10.4m) with little or no siltation over last 30 years. Vessels of 26ft (8m) draft should be able to regularly access the shipyard with others on a case-by-case basis.

4.2.4 Provisional plot

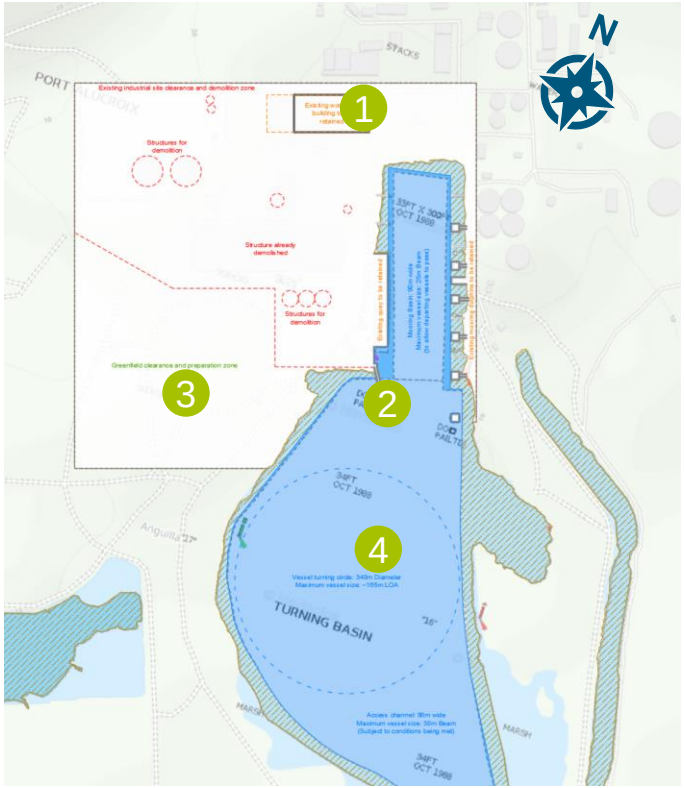


Figure 36 – Provisional plot with proposed principal features

A provisional plot of around 2.7 million sqft (250k sqm) has been selected.

The size and shape of the plot will be refined after the development of the notional waterfront layout.

1. **Brownfield site:** The northern part of the plot is located on a brownfield site incorporating the existing machine shop, quay and basin. Some site clearance and demolition work will be necessary.

2. **Docking facilities:** These will be in the shore area to the south providing direct access to the existing turning basin, access channel and basin. A small amount of dredging will be required in this area to provide the required waterfront shape and depth.

3. **Greenfield site:** The southern part of the plot is located on greenfield land. This area is for primarily reserved for contingency and is not expected to be required.

4. **Turning basin:** The existing turning basin/circle will be utilised, reducing dredging requirements. This is key to keeping the CAPEX to a minimum.

4.2.5 Notional layout (DC0)

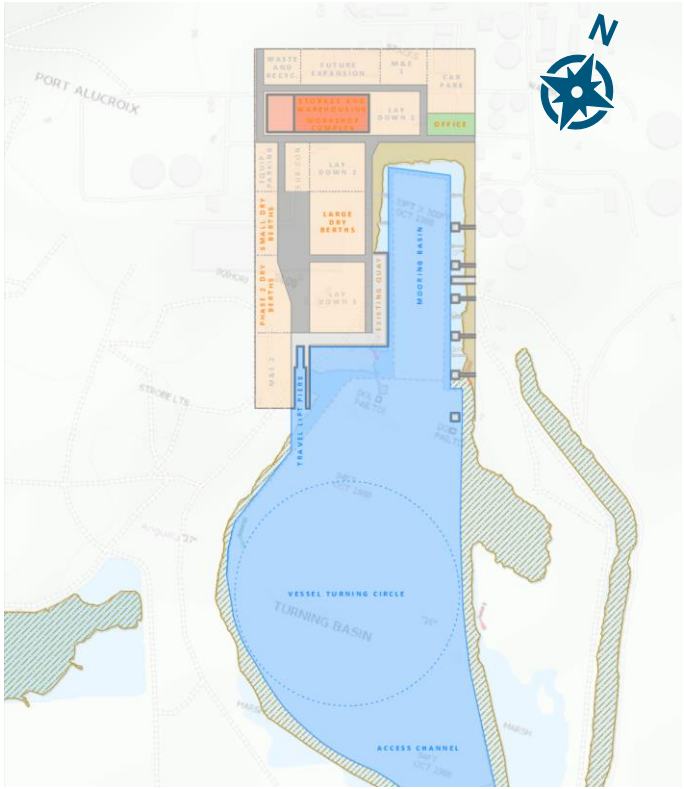


Figure 37 – Notional layout (DC0)

- DC0 notional layout is shown in Figure 37. The arrangement is organized to enable the incorporation of a floating dock in the future.
- The final proposed plot is around 1.07 million sqft (99,000 sqm). The western side of the provisional plot is not required but could be used for future expansion. The plot has been extended slightly north to enable a more efficient arrangement.
- Some of the principal layout characteristics are compared to the other configurations in Table 10.

	Docking configuration 0	Docking configuration 1	Docking configuration 2
Overall land area	**1.07 million sqft (99k sqm)**	1.18 million sqft (109.7k sqm)	1.18 million sqft (109.7k sqm)
Of which dry berths and laydown area	**785k sqft (72.9k sqm)**	812k sqft (75.4k sqm)	812k sqft (75.4k sqm)
Of roads and paved area	**215k sqft (20k sqm)**	274k sqft (25.5k sqm)	274k sqft (25.5k sqm)
Of which buildings (workshops, offices etc.)	**66k sqft (6.1k sqm)**	81k sqft (7.5k sqm)	95k sqft (8.8k sqm)
Dredging required	**5.76 million cu ft (163k cbm)**	7.13 million cu ft (202k cbm)	8.16 million cu ft (231k cbm)
Quay length (inc. travel lift piers etc.)	**673ft (205m)**	984ft (300m)	1,132ft (345m)

Table 10 – Principal layout characteristics by docking configuration, DC0 highlighted

4.2.6 Notional layout (DC1)

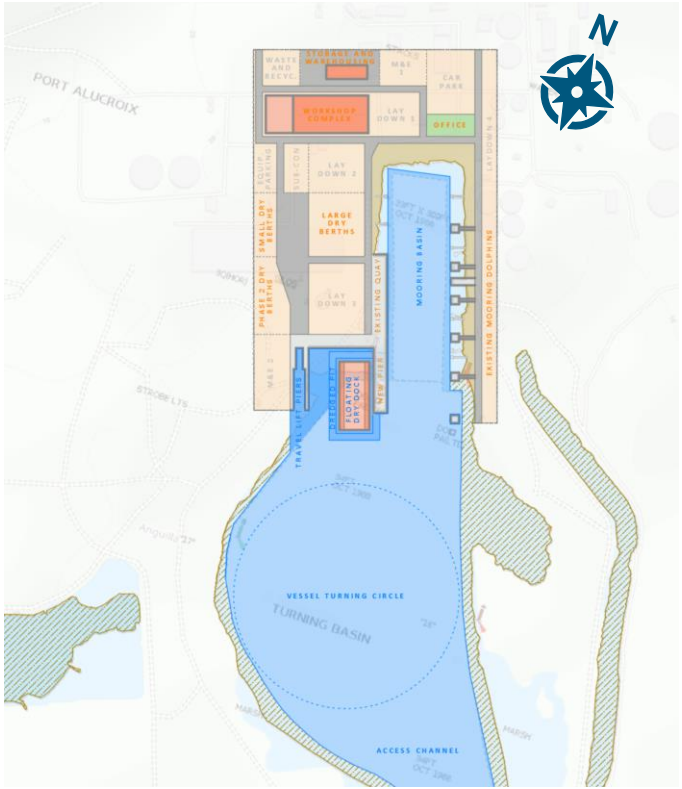


Figure 38 – Notional layout (DC1)

- DC1 notional layout is shown in Figure 38. Compared with DC0, the size of the land area has been increased to incorporate the area adjacent to the existing mooring dolphins, the pier has been extended and a floating dock and dredged pit have been added.
- The final proposed plot is around 1.18 million sqft (110,000 sqm). The same boundaries apply as per notional layout DC0.
- Some of the principal layout characteristics are compared to the other configurations in Table 11.

Characteristic	Docking configuration 0	Docking configuration 1	Docking configuration 2
Overall land area	1.07 million sqm (99k sqm)	**1.18 million sqft (109.7k sqm)**	1.18 million sqft (109.7k sqm)
Of which dry berths and laydown area	785k sqft (72.9k sqm)	**812k sqft (75.4k sqm)**	812k sqft (75.4k sqm)
Of roads and paved area	215k sqft (20k sqm)	**274k sqft (25.5k sqm)**	274k sqft (25.5k sqm)
Of which buildings (workshops, offices etc.)	66k sqft (6.1k sqm)	**81k sqft (7.5k sqm)**	95k sqft (8.8k sqm)
Dredging required	5.76 million cu ft (163k cbm)	**7.13 million cu ft (202k cbm)**	8.16 million cu ft (231k cbm)
Quay length (inc. travel lift piers etc.)	673ft (205m)	**984ft (300m)**	1,132ft (345m)

Table 11 – Principal layout characteristics by docking configuration, DC1 highlighted

4.2.7 Notional layout (DC2)

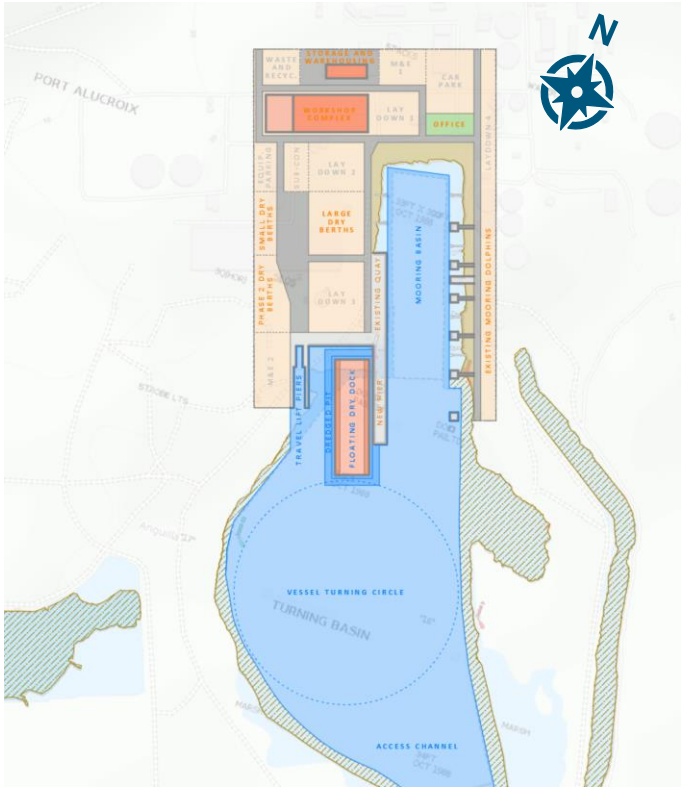


Figure 39 – Notional layout (DC2)

- DC2 notional layout is shown in Figure 39. DC2 notional layout is identical to DC1 except for the larger floating dock/dredged pit area and slightly longer pier.
- The final proposed plot is around 1.18 million sqft (110,000 sqm). The same boundaries apply as per notional layout DC1.
- Some of the principal layout characteristics are compared to the other configurations in Table 12.

Characteristic	Docking configuration 0	Docking configuration 1	Docking configuration 2
Overall land area	1.07 million sqm (99k sqm)	1.18 million sqft (109.7k sqm)	**1.18 million sqft (109.7k sqm)**
Of which dry berths and laydown area	785k sqft (72.9k sqm)	812k sqft (75.4k sqm)	**812k sqft (75.4k sqm)**
Of roads and paved area	215k sqft (20k sqm)	274k sqft (25.5k sqm)	**274k sqft (25.5k sqm)**
Of which buildings (workshops, offices etc.)	66k sqft (6.1k sqm)	81k sqft (7.5k sqm)	**95k sqft (8.8k sqm)**
Dredging required	5.76 million cu ft (163k cbm)	7.13 million cu ft (202k cbm)	**8.16 million cu ft (231k cbm)**
Quay length (inc. travel lift piers etc.)	673ft (205m)	984ft (300m)	**1,132ft (345m)**

Table 12 – Principal layout characteristics by docking configuration, DC2 highlighted

4.2.8 Docking facilities

Figure 40 – Examples of docking facilities

The principal characteristics of the docking facilities are shown below in Table 13:

Facility	Docking configuration 0	Docking configuration 1	Docking configuration 2
Travel lift 1	Suitable for vessels up to Small 0A (98ft (30m) length, 100-200t lightship displacement)*		
Travel lift 2	Suitable for vessels up to Small 0B (164ft (50m) length, 800-1000t lightship displacement)*		
Floating Dock	None	Suitable for vessels up to Small I (328ft (100m) length, 85ft (26m) beam, 5,000t lightship displacement)*	Suitable for vessels up to Medium IA (574ft (175m) length, 105ft (32m) beam, 10,000t lightship displacement)*

Table 13 – Principal characteristics of docking facilities

- Where possible the larger travel lift should also be used for the lower end of Small I, e.g. 164-197ft (50-60m) length vessels.
- Images show examples of travel lifts and associated piers (left and top right image) and floating docks (bottom right image).

***The specifications are preliminary and will need further adjustment and refinement in conjunction with suppliers should the project progress.

4.2.9 Concurrent repair of commercial vessels and yachts

Figure 41 – Layout features for concurrent repair of commercial vessels and yachts

The yard will have a varied product mix including both commercial vessels and yachts .

One of the principal considerations in the layout is organisation and location of the dry berths to avoid wind-blown contamination from the blasting of the commercial vessels affecting yachts.

The shipyard has been laid out with this in mind:

1. **Positioning:** The primary wind direction is from the north-east. The location of the floating dock (where blasting operations for >164ft (>50m) vessels takes place) means that yacht berths have not been positioned west of its location. Yacht berths are to the North or East of where commercial blasting operations will take place.
2. **Segregation:** There will generally be separate dry berth areas for yachts and commercial vessels under 164ft (50m). The floating dock will only either house commercial vessels or yachts at any one time.
3. **Cocooning:** If required, yachts can be cocooned to provide further protection and improve conditions for paint application.

4.3 Estimated workforce requirements

Start-up workforce estimate	Docking configuration 0	Docking configuration 1	Docking configuration 2
Blue collar workforce	130	180	180
White collar workforce	50	65	65
Total workforce	180	245	245

Table 14 – Shipyard operational workforce – start-up estimate

Initial steady state workforce estimate	Docking configuration 0	Docking configuration 1	Docking configuration 2
Blue collar workforce	200	250	270
White collar workforce	75	90	100
Total workforce	275	340	370

Table 15 – Shipyard operational workforce – initial steady state estimate

Long term steady state workforce estimate	Docking configuration 0	Docking configuration 1	Docking configuration 2
Blue collar workforce	340	430	445
White collar workforce	115	140	155
Total workforce	355	570	600

Table 16 – Shipyard operational workforce – long term steady state estimate

- The workforce required to operate the shipyard will vary in size depending on the docking configuration and other factors such as type of work being undertaken. The workforce will also need to evolve and flex as the market throughputs grow.
- The blue-collar workforce will need to be a mix of local permanent staff and subcontractors. Development and training of the workforce is discussed in Section 6.
- Indicative start-up workforce are shown in Table 14.
- After several years, the workforce may need to grow to that shown in Table 15.
- To support the long-term revenues, the workforce may need to grow to that shown in Table 16.
- Based on the employment information from Section 3, availability of a suitable workforce may be a limiting factor to meeting the market demand. Therefore, the phasing of infrastructure could be an option to align with workforce availability and growth strategy/ambitions.

4.4.1 Complementary opportunities – Naval repair

Limited opportunities from U.S. Coast Guard

There are six Sentinel-Class Coast Guard cutters (<164ft (<50m)) based in Puerto Rico. These operate year-round, supporting the work of the USCG in and around the USVI and Caribbean. Specific infrastructure for this small market is not envisaged. However, should an ad-hoc opportunity arrive for emergency repairs or basic maintenance, this class of vessel may be accommodated using the proposed commercial repair facilities.

Naval vessels may require additional capability

Major refit/overhaul of Naval vessels may require additional considerations such as segregation of the yard, additional security requirements, weapons system removal, maintenance and installation etc.

Dedicated repair capability already established elsewhere

For example, one of the Sentinel-Class Coast Guard Cutters underwent a 6-month period of maintenance at the USCG facility at Hawkins Point, Baltimore in 2022.

4.4.2 Complementary opportunities – Commercial shipbuilding

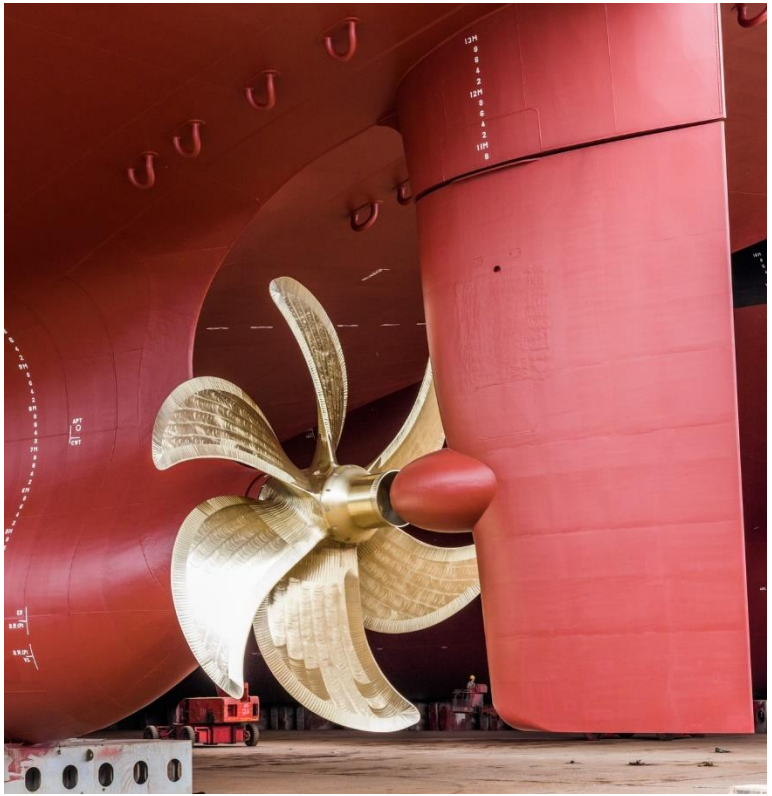
Shipbuilding markets are varied, more volatile and require additional skills, facilities and infrastructure

It is possible to share certain facilities such as launching and mooring. However, in the case of this facility the proposed floating dock would be dedicated to ship repair based on potential market demand.

Construction of vessels >164ft (>50m) would also require investment in separate launching infrastructure and as such is not considered a complementary opportunity.

Construction of vessels <164ft (<50m) could share a number of facilities however construction of dedicated hull fabrication, assembly and outfit facilities and growth of a skilled workforce would be required and would need to be assessed for viability and risk.

Construction of vessels <164ft (<50m) may be worthy of future evaluation, but concurrent construction and ramp-up of two different industries is also higher risk. An area could be reserved for potential future expansion once the repair business is established.



4.5.1 Construction methodology – Marine works

The following methodology is based upon the longest (i.e., most complex) layout, Docking Configuration 2:

- It is assumed that that upon award of contract, the contractor will take up to 3 months to mobilize to site and establish a site compound and offices.
- Site clearance, demolition of the silos and other buildings, will follow mobilization.
- After the site clearance, construction of the main bulkhead using land-based equipment will start.
- Following this, the land west of the travel lift pier will be excavated.
- The construction of the main and travel lift piers may be from floating piling barge. They are assumed to be steel piles with a supporting reinforced concrete deck.
  - The main pier will be constructed first, then the travel lift piers.
  - An overlap of the dredging works and main pier construction has been allowed for.
  - It is assumed that the existing quay is suitable to handle the loads from transferring a crane, and for acting as a temporary load out quay for piles and other materials, onto a barge. No temporary wharf / quay will be required by the contractor.

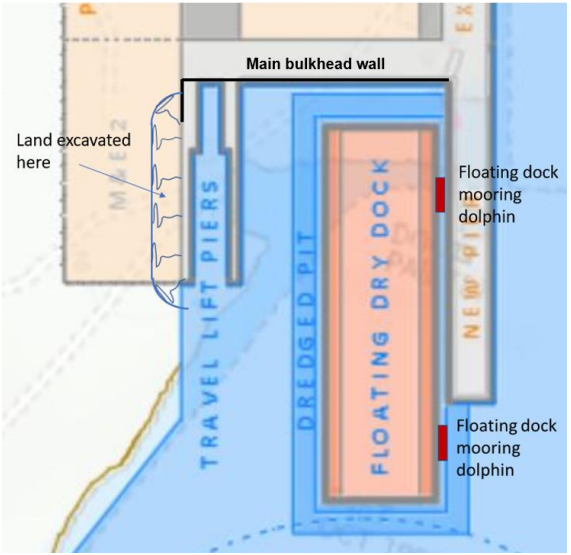


Figure 42 – Site arrangement and construction modifications

4.5.2 Construction methodology – Landside works

After site clearance has been completed, the following work can start:

- Construction of the main offices and the storage and warehousing building.
- Construction of the workshop complex - this is based on reusing the existing steel frame, so this work can start after the removal of the cladding (during the demolition works).
- Gravel paving across the site (starting with Lay down 2).
- Gravel paving will need to be completed in a particular order:
    1. Lay down 2 and surrounding areas,
    2. Northern gravel areas (Lay down 1, etc.), after the completion of the buildings,
    3. Lay down 3, after the completion of the main bulkhead wall behind the floating dock and travel lift areas.
- Following the gravel paving of the berth areas, the roads can be constructed.

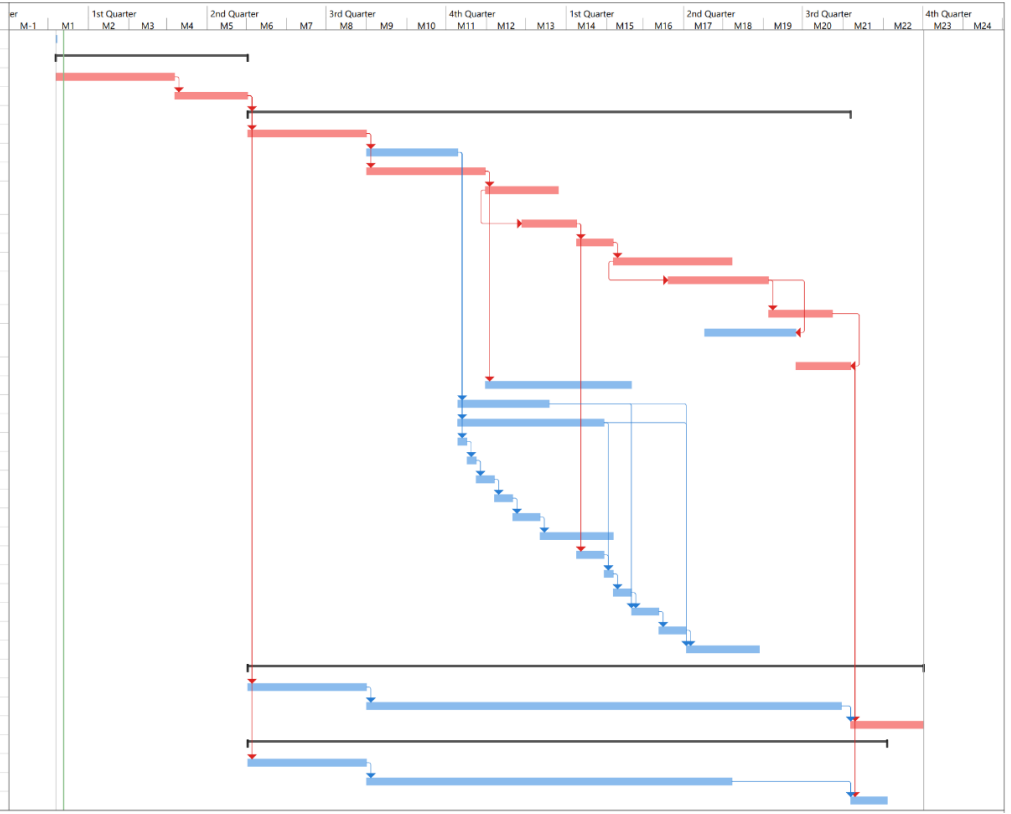
Figure 43 – Northern gravel areas

4.5.3 Construction program (1)

- The construction period is estimated to be 330 working days (66 weeks or 15-16 months).
- The critical path (shown in red on the next page) runs through the marine works, leading into the installation of the floating dock as the final activity.
- It is assumed that that a second hand / used floating dock could potentially be procured and delivered to site in 52 weeks, subject to availability. Lead times can vary significantly.
- The program is based on a 5-day working week.
- No allowances have been made for shutdown periods, e.g. Christmas, New Year, local holidays.

Construction program (2)

ID	Task Mode	Task Name	Duration
1		**USVI Ship Repair Yard Construction Program**	1 day
2		**Pre-award works**	**105 days**
3		Tender construction works contract	13 wks
4		Negotiate and Appoint Contractor	8 wks
5		**Construction period**	**330 days**
6		Contractor Mobilisation	13 wks
7		General site clearance	10 wks
8		Building and silo demolition	13 wks
9		Construct bulkhead wall for floating dock and travel lift area	8 wks
10		Concrete works for bulkhead wall	6 wks
11		Excavate for travel lift western pier	4 wks
12		Dredge floating dock and travel lift area	13 wks
13		Piling works for new pier and floating dock restraint dolphins	11 wks
14		Piling works for travel lift piers	7 wks
15		Concrete works for new pier and floating dock restraint dolphins	10 wks
16		Concrete works for travel lift	6 wks
17		Workshop complex	16 wks
18		Main offices	10 wks
19		Storage and warehousing	16 wks
20		Gravel pavement to Equipment Parking Ar	1 wk
21		Gravel pavement to Sub-con area	1 wk
22		Gravel pavement to Laydown Area 2	2 wks
23		Gravel pavement to Small Dry Berths	2 wks
24		Gravel pavement to Large dry berths	3 wks
25		Roadways, drainage and paving west	8 wks
26		Gravel pavement to Laydown Area 3	3 wks
27		Gravel pavement to Waste & Recycling Ar	1 wk
28		Gravel pavement to M&E 1 Area	2 wks
29		Gravel pavement to Car Park Area	3 wks
30		Gravel pavement to Laydown Area 1	3 wks
31		Roadways, drainage and paving north	8 wks
32		**Floating Dock**	**370 days**
33		Procure Floating Dock	13 wks
34		Manufacture Floating Dock	52 wks
35		Install Floating Dock	8 wks
36		**Travel Lifts**	**350 days**
37		Procure Travel Lifts	13 wks
38		Manufacture Travel Lifts	40 wks
39		Deliver and Commission Travel Lifts	4 wks



Tractus First Marine International Royal HaskoningDHV

4.5.4 Construction workforce

- An estimate has been prepared for the labor force size required to complete this project within the assumed construction program.
- The labor force will probably comprise of a mixture of locally hired, and staff / operatives that the contractor will bring into the Islands. This will depend on whether the contractor is local or from outside of the USVI.
- Figure 44 shows the total labor on site per month, including office and construction staff. The peak is around 120 persons, once site clearance and demolition is complete and construction starts.
- The anticipated workforce of 165 may consist of:
  - Office staff = 19 (onsite throughout)

    Including: site manager, commercial manager, marine works, building and road agents, foremen, plant manager, etc.
  - Support staff = 4 (onsite throughout)

    Including: store men, admin, cleaning, etc.
  - Construction staff = 142 (different trades onsite at different times)

    Including: general laborers, site clearance/demolition teams, piling land/marine teams, barge team, carpenters, fabricators, groundworks, construction workers, etc.

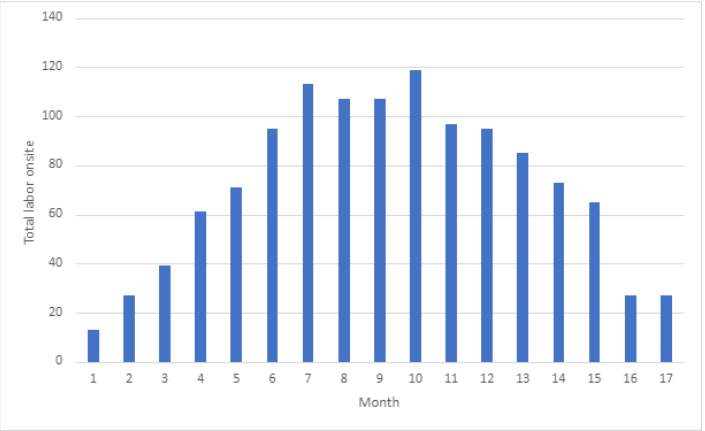


Figure 44 – Site labor force histogram

4.6.1 CAPEX estimate methodology

The CAPEX estimate uses proprietary model to which the following steps are applied:

1. Assumptions about the site are made and input into the model (ground conditions, current water depth etc.).

2. The principal characteristics of the notional waterfront layout are input into the model (land area, building sizes etc.).

3. The model calculates the estimated CAPEX based on international norms:
   - Unit cost rates from a proprietary database of previous shipyard costs^ are applied to the layout quantities, e.g. 656ft (200m) of quay @ US$ 75k per foot (23k per meter).
   - Contractor construction costs (preliminary etc.) are taken as a percentage of infrastructure costs based upon typical industry norms, e.g. Design @ 2% of US$ 70m total infrastructure cost.
   - Production equipment/cranes and other stand-alone items, such as travel lifts and floating docks, are estimated using proprietary parametric models developed using previous project data and quotations.

4. A Monte Carlo analysis is carried out to determine the CAPEX uplift required for various levels of confidence.

The CAPEX estimates exclude the following:

- Taxes
- Third-party costs
- Client internal costs
- Site acquisition and/or lease costs
- External infrastructure up to shipyard boundary
- Workforce accommodation
- Port facilities (tugs, bunkering, slop reception, etc.)

^Construction indices are available to adjust for variation in location however these generally are used for routine construction projects such as residential, hotels etc. Only a small proportion of this project's CAPEX is related to this type of construction.

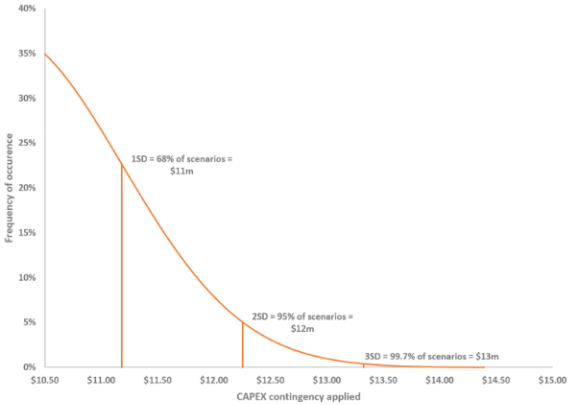
Most of the CAPEX is related to infrastructure works that will likely need to involve international contractors and mobilisation of specialist equipment. This is a similar requirement to previous projects in our cost database, therefore; these rates have been applied to this project without adjustment.

The next stage of work will require validation of these costs through project specific/local quotations for the major cost components.

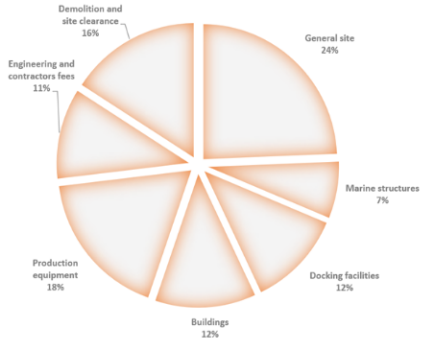
4.6.2 CAPEX estimate (DC0)

	Base CAPEX totals
General site	
Reclamation and dredging	$1.6m
Roads, paving, fencing and open areas	$3.6m
Services, utilities and security	$9.9m
Marine structures	
Quays and piers	$4.3m
Revetments	$0.0m
Breakwaters	$0.0m
Docking facilities	
Shiplift, transfer area and dry berths	$0.0m
Travel lifts	$7.3m
Floating docks	$0.0m
Buildings	
Industrial buildings	$4.0m
People buildings	$3.6m
Production equipment	
Minor production equipment	$1.7m
Major production equipment	$9.4m
Cranes	$0.0m
Other costs	
Engineering and permitting	$1.4m
Mobilisation	$0.9m
Contractors overheads (Prelims)	$4.5m
Demolition and site clearance	$9.9m
Total	**$62.2m**

Monte-Carlo anlaysis of potential CAPEX increase



Principal CAPEX proportions



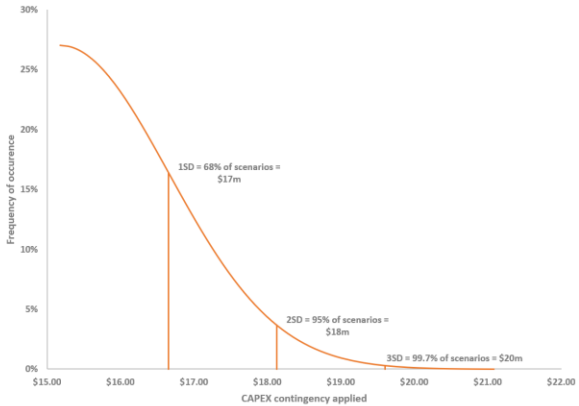
CAPEX contingency options and application to financial scenarios

- **DC0 base CAPEX of US$ 62.2m** excluding contingency.
- General site work represents the highest proportion of costs.
- Demolition and site clearance costs are also high.
- Monte Carlo analysis suggested a **contingency of US$ 12-13m** should be used in financial modelling.

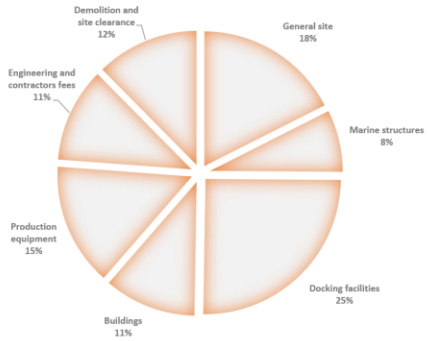
4.6.3 CAPEX estimate (DC1)

	Base CAPEX totals
General site	
Reclamation and dredging	$2.0m
Roads, paving, fencing and open areas	$3.6m
Services, utilities and security	$9.9m
Marine structures	
Quays and piers	$6.7m
Revetments	$0.0m
Breakwaters	$0.0m
Docking facilities	
Shiplift, transfer area and dry berths	$0.0m
Travel lifts	$7.3m
Floating docks	$15.0m
Buildings	
Industrial buildings	$5.5m
People buildings	$4.4m
Production equipment	
Minor production equipment	$1.9m
Major production equipment	$10.6m
Cranes	$0.6m
Other costs	
Engineering and permitting	$2.0m
Mobilisation	$1.3m
Contractors overheads (Prelims)	$6.7m
Demolition and site clearance	$11.0m
Total	$88m

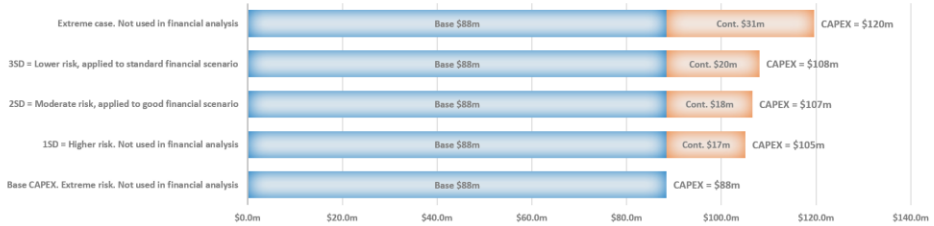
Monte-Carlo anlaysis of potential CAPEX increase



Principal CAPEX proportions



CAPEX contingency options and application to financial scenarios

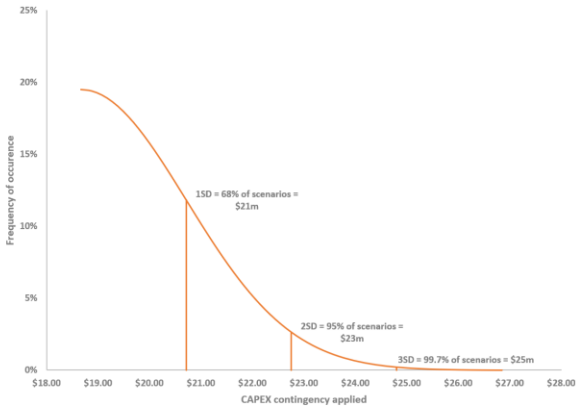


- **DC1 base CAPEX of US$ 88m** excluding contingency.
- Docking facilities represent the highest proportion of costs.
- Demolition and site clearance costs are also high.
- Monte Carlo analysis suggested a **contingency of US$ 18-19m** should be used in financial modelling.

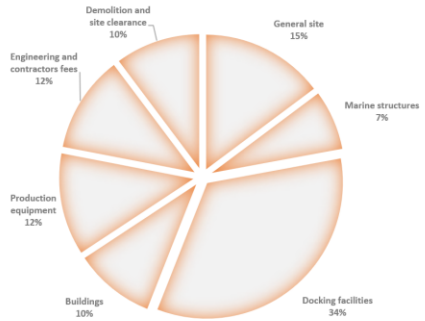
4.6.4 CAPEX estimate (DC2)

	Base CAPEX totals
General site	
Reclamation and dredging	$2.3m
Roads, paving, fencing and open areas	$3.6m
Services, utilities and security	$9.9m
Marine structures	
Quays and piers	$7.8m
Revetments	$0.0m
Breakwaters	$0.0m
Docking facilities	
Shiplift, transfer area and dry berths	$0.0m
Travel lifts	$7.3m
Floating docks	$29.0m
Buildings	
Industrial buildings	$5.5m
People buildings	$5.0m
Production equipment	
Minor production equipment	$2.0m
Major production equipment	$10.6m
Cranes	$0.6m
Other costs	
Engineering and permitting	$2.5m
Mobilisation	$1.7m
Contractors overheads (Prelims)	$8.4m
Demolition and site clearance	$11.0m
Total	$107m

Monte-Carlo anlaysis of potential CAPEX increase



Principal CAPEX proportions



CAPEX contingency options and application to financial scenarios

- **DC2 base CAPEX of US$ 107m** excluding contingency.
- Docking facilities represent the highest proportion of costs.
- Demolition and site clearance costs are also high.
- Monte Carlo analysis suggested a **contingency of US$ 23-25m** should be used in financial modelling.

4.7 Section 4 summary

CAPEX comparison	Docking configuration 0	Docking configuration 1	Docking configuration 2
General site	US$ 15.1m	US$ 15.5m	US$ 15.8m
Marine structures	US$ 4.3m	US$ 6.7m	US$ 7.8m
Docking facilities	US$ 7.3m	US$ 22.3m	US$ 36.3m
Buildings	US$ 7.6m	US$ 9.8m	US$ 10.4m
Equipment	US$ 11.1m	US$ 13.1m	US$ 13.2m
Contractor costs	US$ 6.8m	US$ 10.1m	US$ 12.5m
Demolition and site clearance*	US$ 9.9m	US$ 11.0m	US$ 11.0m
Total base CAPEX (rounded)	**US$ 62.2m**	**US$ 87.5m**	**US$ 107.0m**
Contingency	**US$ 12m to 13m**	**US$ 18m to 19m**	**US$ 23m to 25m**
Revenue comparison			
Initial revenue	US$ 22.7m per year	US$ 39.0m per year	US$ 46.8m per year
Future revenue	US$ 39.4m per year	US$ 66.0m per year	US$ 73.0m per year

Table 17 – CAPEX and revenue comparison by docking configuration

*Demolition and site clearance costs assume that there is no hazardous waste to be removed

- DC1 CAPEX approximately US$ 25m higher than DC0. This is primarily due to the addition of a floating dock and associated facilities.
- DC2 CAPEX approximately US$ 45m higher than DC0 and US$ 20m higher than DC1. This is primarily due to a US$ 14m increase in the cost of the larger floating dock. Other supporting upgrades make up the remaining $5.5m increase.
- DC1 revenue is typically US$ 26m higher than DC0 due to the additional revenue earned from the floating dock.
- DC2 revenue is typically US$ 7-8m per year higher than DC1 due to the additional revenue earned from Medium IA vessels.
- The financial outlook will help determine if the additional revenue justifies the additional CAPEX by comparing various financial metrics for the configurations (e.g. IRR etc.)

Section 5

Financial evaluation and costs

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Section 5: Financial evaluation and costs

Section 5 contents

5.1 Financial outlook methodology

Scenario inputs	Lower scenario	Upper scenario
Construction period	2 years	
Operational ramp-up period	3 years	2 years
Operational modelling period	30 years	
Revenue indexation increase above market forecast	0%	0.5%
OPEX (% of revenue)	90%	85%
Discount rate	5%	
CAPEX contingency basis	3 standard deviations	2 standard deviations

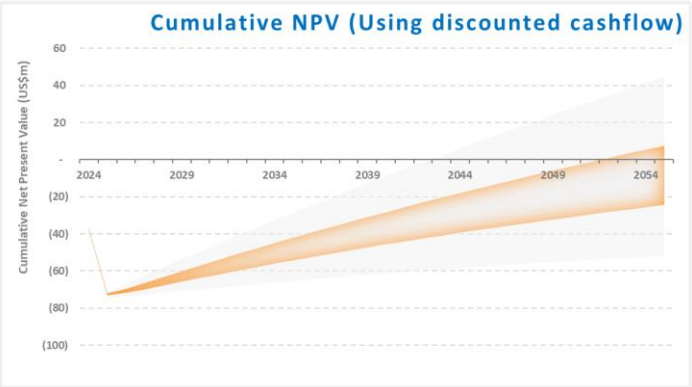
Table 18 – Scenario inputs for lower and upper CAPEX scenarios

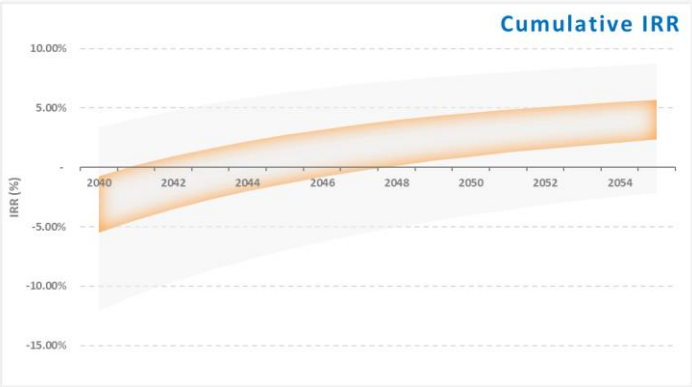
Specific configuration inputs	Docking configuration 0	Docking configuration 1	Docking configuration 2
Initial base CAPEX	US$ 62.2m	US$ 88.5m	US$ 107.0m
Initial revenue (per year)	US$ 22.7m	US$ 39.0m	US$ 46.8m
Future revenue (2054) (per year)	US$ 39.4m	US$ 66.0m	US$ 73.0m

Table 19 – Specific inputs by docking configuration for CAPEX scenarios

- A view on where financial viability may lie has been calculated for each docking configuration using a proprietary tool.
- These were based upon the potential revenue generated by the configuration and the CAPEX cost of the notional layout.
- The model also requires several other input assumptions:
  - The inputs for the lower and upper scenarios applied to each docking configuration are shown in Table 18.
  - The specific inputs for each docking configuration are shown in Table 19.
- The model then outputs the following financial indicators:
  - Internal rate of return (IRR)
  - Payback period (including/excluding financing)
  - Net present value (NPV)
- These figures are indicative and high-level due to the early stage of the project.

5.2.1 Initial financial outlook (DC0)



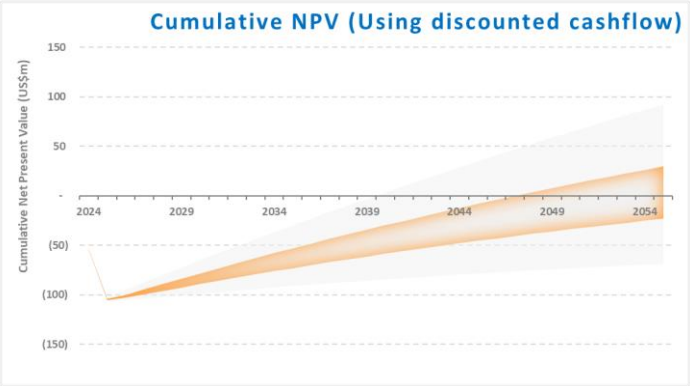


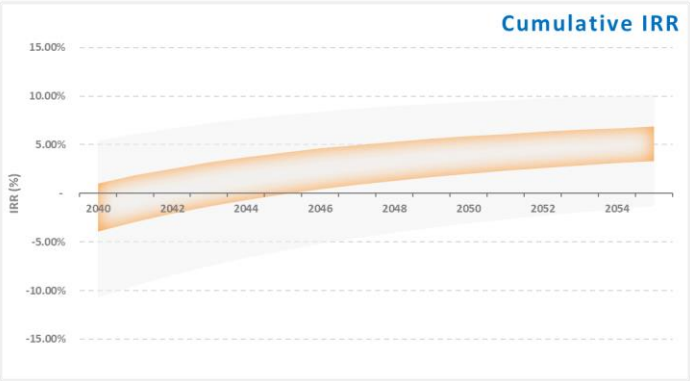
Financial indicator	Lower	Upper
Payback without financing	25 years	18 years
Payback with financing	58 years	29 years
NPV at end of modelling period (inc. discount rate)	US$ -24m	US$ 7m
IIR at end of modelling period	2.3%	5.7%

Table 20 – Initial financial outlook for DC0

- The orange bar shows the range between the upper (more optimistic) and lower (less optimistic) scenarios.
- The more optimistic scenario for DC0 shows a potentially small positive financial outlook with a payback period of 29 years with financing.
- The less optimistic scenario for DC0 shows negative financial outlook with a much longer payback period of 58 years with financing.

5.2.2 Initial financial outlook (DC1)



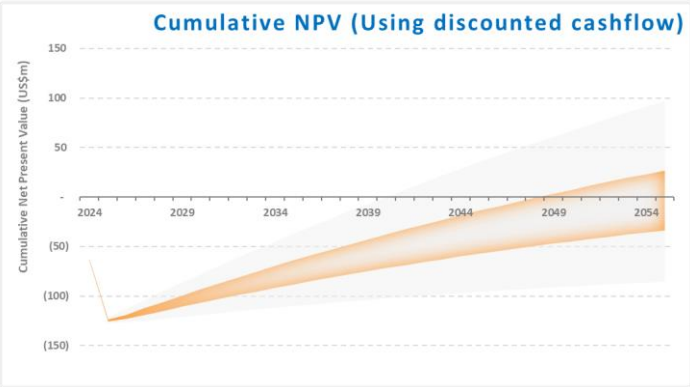


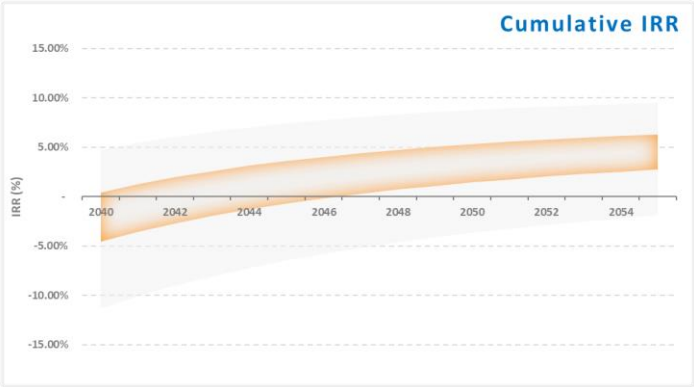
Financial indicator	Lower	Upper
Payback without financing	23 years	16 years
Payback with financing	46 years	25 years
NPV at end of modelling period (inc. discount rate)	US$ -23m	US$ 30m
IIR at end of modelling period	3.3%	6.9%

Table 21 – Initial financial outlook for DC1

- The orange bar shows the range between the upper (more optimistic) and lower (less optimistic) scenarios.
- The more optimistic scenario for DC1 shows a potentially positive financial outlook with a payback period of 23 years with financing.
- The less optimistic scenario for DC1 shows negative financial outlook with a much longer payback period of 46 years with financing.

5.2.3 Initial financial outlook (DC2)





Financial indicator	Lower	Upper
Payback without financing	24 years	17 years
Payback with financing	55 years	26 years
NPV at end of modelling period (inc. discount rate)	US$ -36m	US$ 24m
IIR at end of modelling period	2.7%	6.3%

Table 22 – Initial financial outlook for DC2

- The orange bar shows the range between the upper (more optimistic) and lower (less optimistic) scenarios.
- The more optimistic scenario for DC2 shows a potentially positive financial outlook with a payback period of 26 years with financing.
- The less optimistic scenario for DC2 shows negative financial outlook with a much longer payback period of 55 years with financing.

5.2.4 Initial financial outlook summary

CAPEX comparison	Docking configuration 0	Docking configuration 1	Docking configuration 2
Total base CAPEX (rounded)	US$ 62.2m	US$ 88.5m	US$ 107.0m
Contingency	US$ 12 to 13m	US$ 18 to 19m	US$ 23 to 25m

Table 23 – Initial CAPEX estimate by docking configuration

Revenue comparison	Docking configuration 0	Docking configuration 1	Docking configuration 2
Initial revenue	US$ 22.7m per year	US$ 39.0m per year	US$ 46.8m per year
Future revenue	US$ 39.4m per year	US$ 66.0m per year	US$ 73.0m per year

Table 24 – Initial revenue estimate by docking configuration

Financial comparison	Docking configuration 0	Docking configuration 1	Docking configuration 2
Payback without financing	18 to 25 years	16 to 23 years	17 to 24 years
Payback with financing	29 to 58 years	25 to 46 years	26 to 55 years
NPV at end of modelling period (inc. discount rate)	US$ -24 to 7m	US$ -23 to 30m	US$ -36 to 24m
IIR at end of modelling	2.3 to 5.7%	3.3 to 6.9%	2.7 to 6.3%

Table 25 – Initial financial outlook by docking configuration

- The financial outlook for DC1 is in general slightly better than DC0 and DC2.
- Therefore, the additional investment in a floating dock appears to be justified, however; there may be an optimum upper size limit, i.e. a larger floating dock may need to be justified as a strategic asset rather than through financial analysis.
- However, all configurations show a negative financial outlook for the lower scenarios.
- The CAPEX for the docking configurations will need to be improved if the financial outlook is to be positive for the lower scenarios.
- There are several potential methods of improving the CAPEX which are discussed in the next section.

5.3 Financial outlook refinement

The financial analysis currently indicates a potentially positive outlook in the upper scenario range.

- This section of the report investigates if there are fundamental assumptions or CAPEX costs that can be realistically changed to further improve the outlook.
- Points of investigation are:
  1. **Phasing for market growth alignment:** delaying a proportion of the CAPEX spend until the market can support higher throughputs can have a positive impact on financial outlook.
  2. **Used equipment:** it may be possible to make CAPEX savings by purchasing a used floating dock.
  3. **Modular buildings:** shipyards often reduce CAPEX associated with offices, amenities and support buildings by erecting modular/semi-permanent structures.
  4. **Demolition and site clearance costs:** remediation of the site is a significant financial burden on the shipyard. If the work could be wholly or partially funded from another source this would greatly help the shipyard financial outlook.
- The above changes will also result in a slight reduction in the required contingency.
- The CAPEX impacts of each point are shown next, however; it is highly likely multiple changes will need to be combined to give the less optimistic scenarios a positive outlook.

5.4 CAPEX phasing for market growth

Size (FMI groups)	Length ft (m)	Beam (m)	No. of dry berths required		
			2023	2033	2043
Small 0 A	33-98 (10-30)	<106 (<32.4)	5.9	7.8	10.4
Small 0 B	98-164 (30-50)	<106 (<32.4)	0.9	1.1	1.5
Small I	164-328 (50-100)	<106 (<32.4)	0.8	0.9	1.2
Small II	328-492 (100-150)	<106 (<32.4)	0.5	0.5	0.8
Medium I A	492-574 (150-175)	<106 (<32.4)	0.2	0.2	0.3

Table 26 – Dry berth demand over 20 years

- Demand for Small 0A dry berths will grow from 6 to 11 over the next 20 years.
- Therefore, it may be beneficial to construct 50% of the dry berths around 2033. People buildings and minor equipment could also be phased as the workforce grows to meet the throughput.
- The construction work deferred until 2033 could be around 5% of the CAPEX.
- The demand for other berth sizes only increases marginally; therefore, larger vessel infrastructure and works should be installed in the initial construction phase.
- Phasing will result in some improvement, but the financial outlook for the docking configurations is still negative in the lower scenario.

Note: Re-mobilisation costs may be much higher on an island and therefore phasing may not be as beneficial or even have a negative impact. In the case of the above phasing, the deferred work would be relatively simple and therefore would not involve a costly remobilisation.

5.5 Purchase of used equipment

Comparison of CAPEX	Docking configuration 1	Docking configuration 2
Floating dock specification	Suitable for vessels up to Small I (328ft (100m) length, 85ft (26m) beam, 5,000t lightship displacement)	Suitable for vessels up to Small I (574ft (175m) length, 105ft (32m) beam, 10,000t lightship displacement)
Estimated cost new	US$ 15m	US$ 29m
Potential cost used (based upon parametric modelling of previous broker quotations)	US$ 8m	US$ 13m
CAPEX saving	8%	15%

Table 27 – CAPEX saving by docking configuration (when purchasing a used floating dock)

Horizon Ship Brokers – Search Vessels For Sale

View: Feet Meters Listings per-page: 20 Go More Pages to view: 1 2 3 4

ID	Image	Vessel Type	Length	Beam	Draft	DWT	BHP	BP	Class	Flag	Location	Price US$
14832		58m Floating Crane Barge Vessel 2003 built 2003 - CLT 500 tons	190'	98'	16'					Non US		POR
14744		154m Floating Dock 2010 built China - TLC 6300	505'	79'					CCS	Non US		POR
14611		75m Floating Trans-Shipment Crane 2016 built	246'	56'	7'				ZC	Non US		POR
14531		106m Floating Dock 2024 built Italy - Lifting Capacity 3500	348'	115'	7'					Non US	Italy	POR

- Used floating dock prices are based on figures sourced from several brokerages. The cost varies depending on the age, location, manufacturer and market rates at the time but, in general, a 50% reduction on the cost of a new dock may be possible.
- There may also be other equipment that can be purchased used such as the travel lifts, however, this has not been considered due to the ad-hoc availability.
- A used floating dock will result in some improvement, as shown in Table 27, but the financial outlook for both docking configurations* is still negative in the lower scenario.

*Purchase of a used floating dock only applies to DC1 and DC2.

5.6 Modular buildings

Comparison of CAPEX	Docking configuration 0	Docking configuration 1	Docking configuration 2
People building requirements	20k sqft (1,900 sqm)	25k sqft 2,300 sqm	26k sqft (2,400 sqm)
Estimated cost for permanent buildings	US$ 3.7m	US$ 4.4m	US$ 5.0m
Estimated cost of modular/semi-permanent buildings	US$ 1.8m	US$ 2.1m	US$ 2.4m
CAPEX saving	≈2.5%	≈2.5%	≈2.5%

Table 28 – CAPEX saving by docking configuration (when using modular buildings)

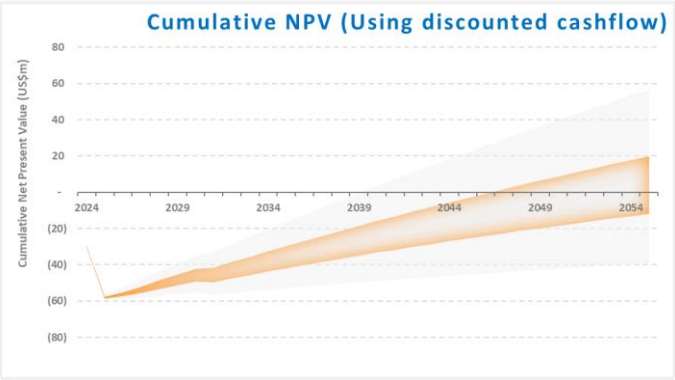
- High-quality modular/semi-permanent buildings are often used in shipyards. The cost varies depending on the specification but, in general, a 50% reduction on the cost of permanent buildings may be possible.
- Modular/semi-permanent buildings also improve the ability to implement the suggested phasing.
- Use of modular buildings will result in some improvement but the financial outlook for both docking configurations is still negative in the lower scenario.

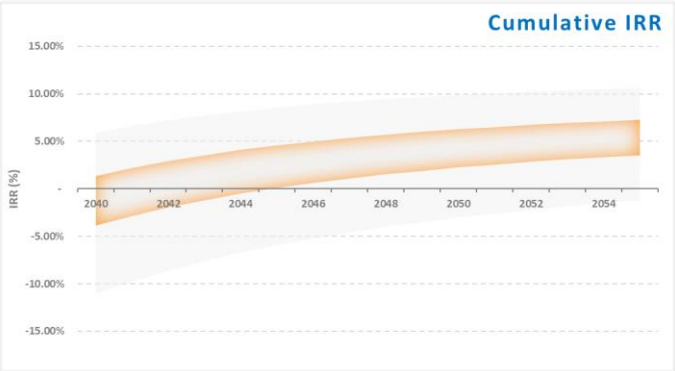
5.7 Site demolition and clearance

Figure 45 – Aerial photograph of the selected plot

- The selected plot is a brownfield site to take advantage of the existing infrastructure that can be refurbished and re-used to save CAPEX.
- However, due to the condition of the site, a US$ 9m to 11m CAPEX allowance has been made (10 to 13% of the total CAPEX) for:
  - Demolition of unwanted structures and infrastructure
  - Levelling and clearance of debris in preparation for new structures
- If the cost of this work could be removed from the CAPEX, it would result in some improvement of the overall financial viability.

5.8.1 Refined financial outlook (DC0)



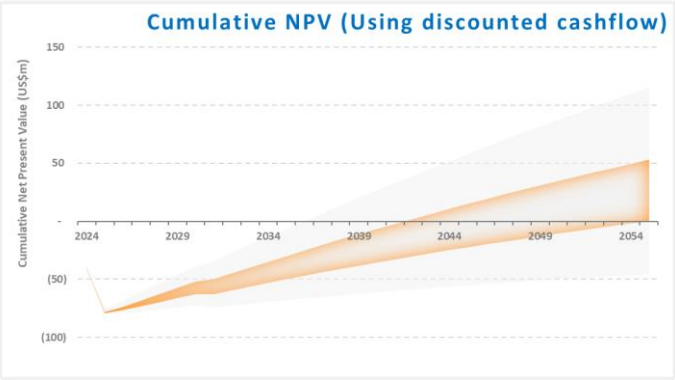


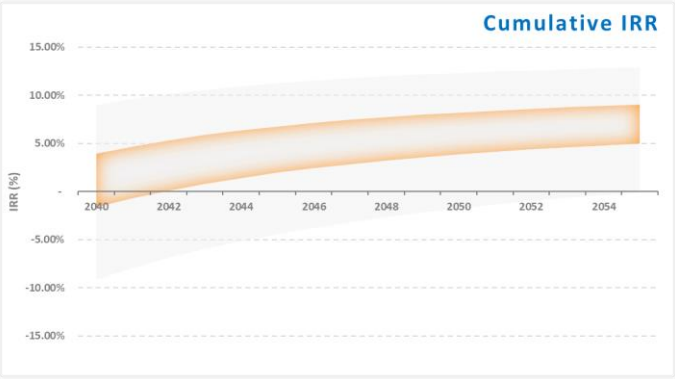
Financial indicator	Lower	Upper
Payback without financing	22 years	16 years
Payback with financing	43 years	24 years
NPV at end of modelling period (inc. discount rate)	US$ -11m	US$ 20m
IIR at end of modelling period	3.2%	7.2%

Table 29 – Refined financial outlook for DC0

- The orange bar shows the range between the upper (more optimistic) and lower (less optimistic) scenarios.
- The more optimistic scenario for DC0 shows positive financial outlook however; even with the refinements in place, including a CAPEX reduction of 20%, the less optimistic scenario for DC0 still shows a negative financial outlook

5.8.2 Refined financial outlook (DC1)



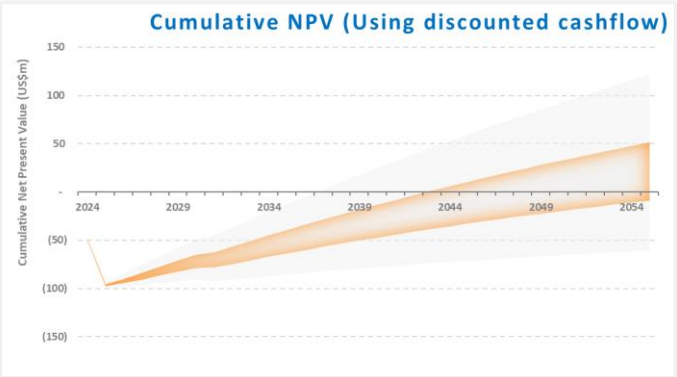


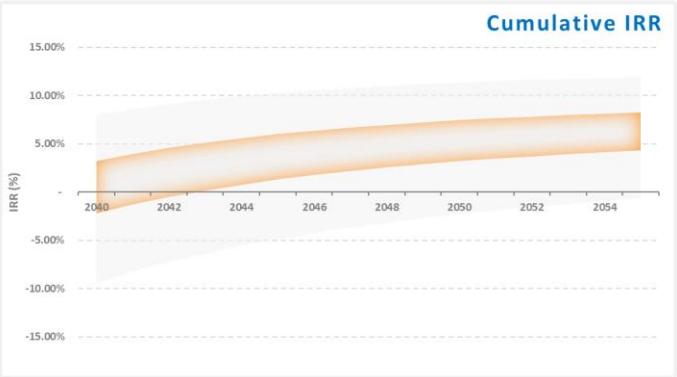
Financial indicator	Lower	Upper
Payback without financing	19 years	14 years
Payback with financing	33 years	19 years
NPV at end of modelling period (inc. discount rate)	US$ 0m	US$ 53m
IIR at end of modelling period	5.0%	9.0%

Table 30 – Refined financial outlook for DC1

- The orange bar shows the range between the upper (more optimistic) and lower (less optimistic) scenarios.
- Both scenarios for DC1 show a positive financial outlook.
- To achieve this, all the stated refinements will be required to reduce the base CAPEX by 25% and around US$ 4 to 5m is deferred until 2033 as part of a phasing plan.

5.8.3 Refined financial outlook (DC2)





Financial indicator	Lower	Upper
Payback without financing	20 years	14 years
Payback with financing	37 years	20 years
NPV at end of modelling period (inc. discount rate)	US$ -9m	US$ 51m
IIR at end of modelling period	4.3%	8.3%

Table 31 – Refined financial outlook for DC2

- The orange bar shows the range between the upper (more optimistic) and lower (less optimistic) scenarios.
- The more optimistic scenario for DC2 shows a positive financial outlook however; even with the refinements in place, including a CAPEX reduction of 25%, the less optimistic scenario for DC2 still shows a slightly negative financial outlook

5.9 Refined financial outlook summary

CAPEX comparison	Docking configuration 0	Docking configuration 1	Docking configuration 2
Original base CAPEX[7]	US$ 62.2m	US$ 88.5m	US$ 107.0m
Refined base CAPEX[7]	US$ 49.8m	US$ 67.3m	US$ 79.2m
Of which deferred until 2033	5%	5%	5%
Contingency	US$ 11 to 12m	US$ 17 to 18m	US$ 22 to 24m

Table 32 – Refined CAPEX estimate by docking configuration

Revenue comparison	Docking configuration 0	Docking configuration 1	Docking configuration 2
Initial revenue	US$ 22.7m per year	US$ 39.0m per year	US$ 46.8m per year
Future revenue	US$ 39.4m per year	US$ 66.0m per year	US$ 73.0m per year

Table 33 – Refined revenue estimate by docking configuration

Financial comparison	Docking configuration 0	Docking configuration 1	Docking configuration 2
Payback without financing	16 to 23 years	14 to 19 years	14 to 20 years
Payback with financing	24 to 43 years	19 to 33 years	20 to 37 years
NPV at end of modelling period (inc. discount rate)	US$ -11 to 20m	US$ 0 to 53m	US$ -9 to 51m
IIR at end of modelling period	3.5 to 7.2%	5.0% to 9.0%	4.3 to 8.3%

Table 34 – Refined financial outlook by docking configuration

- The financial outlook for all configurations has been improved during the refinement process.
- The financial outlook for DC1 is still slightly better than DC0 and DC2 in general with DC0 being appearing to have the least potential in terms of financial outlook.
- Although DC2 shows a slightly negative financial outlook for the lower scenario there is still very little difference to DC1.
- Therefore, it appears that DC1 may offer the best long financial outlook, however;
  - Workforce/skills limitation may require a phased approach starting with DC0 (similar long term financial outlook to those shown)
  - Strategic influences/stakeholder requirements may require DC2 docking capability.

Volume 1 Next steps (1)

- All three configurations are loosely based around the same layout, therefore; the decision on which one to develop can be deferred until more information is gathered about the potential availability and cost of different sized used floating docks.
- USVI Economic Development Authority (EDA) may also wish to hold further engagement meetings, to gain a sense of where the strategic priorities may lie for its stakeholders, prior to making the decision.
- There are four principal steps at the next stage:

1. Stakeholder engagement, further data collection and validation of costs rates/lumps sums.
2. Development of the design into a masterplan* and refinement of values applied and their phasing.
3. Investigation of potential grant and funding options.
4. Development of a financial model and refinement/validation of the assumptions used.

*A decision on the docking configuration will have to be made prior to the development of the masterplan

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PC4667 Volume 2

Sections 6 to 9

Volume 2: Contents

Section 6

Stakeholder engagement and actions

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Section 6: Stakeholder engagement and actions

Section 6 contents

6.1.1 Introduction and approach

- The following section covers stakeholder engagement and actions, as well as detailing the potential workforce structure of any new shipyard.
- Desk-based research was carried out, researching local education institutes and expanding to those which have established links for further study.
- Information on the current workforce within the USVI is also discussed, including existing industries with relevant or transferrable skills and areas where new companies could be established.
- The potential role that local government, education establishments and industry can play in the development of a new shipyard are discussed, including references to relevant examples.
- Several sources of funding are referenced, demonstrating the areas that the U.S. Government could provide support to develop the new shipyard.

6.1.2 Introduction and approach - Workforce

The following section provides information on an indicative workforce structure for a shipyard conducting repair work in the commercial and yacht sectors*.

- This includes an organization chart providing an overview of senior management roles and departments, as well as those which would typically be subcontracted.
- Indicative roles within each department are then provided, categorized as below:

Category	Description / example
Mission critical position	A position that because of its responsibilities includes non-deferrable services that must be performed despite an emergency closure or curtailment. *e.g. The managing director and senior management need to continue with management of the site, including a skeleton staff. This could include site security, health and safety staff, the dockmaster (to manage any moored vessels etc.) and the maintenance/facilities team.*
Business critical position	A position that because of its responsibilities requires continuous availability, but short outages are not catastrophic. *e.g. Shop floor workforce needs to be on site to carry out repair work at all times of operation, although some shortages (sickness, holidays etc.) would not impact the work substantially. In the event of a site closure, business support roles (e.g. HR, Finance etc.) could switch to working from home to carry out key aspects of the role.*
Business operational position	A position that contributes to efficient business operations but is out of direct line of service to clients. It is mostly internal and supports operational activities. *e.g. Positions which are based in support departments (such as buyers, accounts assistants and IT engineers) that help with day-to-day operations that provide services to business and mission critical positions, such as buying materials, processing invoices etc.*
Administrative position	A position that focuses on office productivity for the business to operate. This is exclusively internal and supports operational activities. *e.g. Supporting positions that help with background data processing and activities; departmental administrators, personal assistants, receptionists, document controllers etc.*

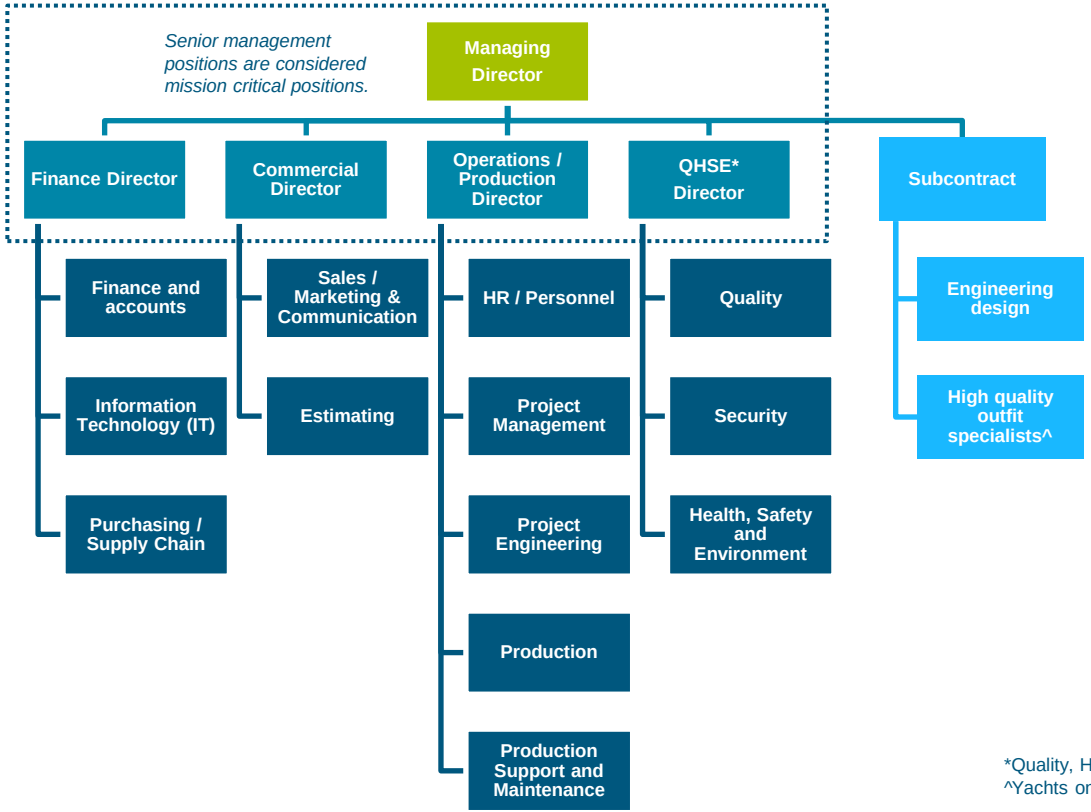
Table 35 – Shipyard job role categories

*See Section 2 Market Study for more information on the proposed sectors and Section 4 Shipyard arrangement, construction and workforce

6.2 Senior management and department organization

Key:

- CEO / Managing Director
- Director
- Department
- Subcontract expertise



*Quality, Health and Safety and Environmental
^Yachts only

6.3 Reporting line job functions (1)

Director	Dept.	Role	Mission Critical	Business Critical	Business Operational	Admin position
Finance	Finance and accounts	Finance manager / accountant		X		
		Accounts assistant			X	
		Admin support				X
	IT	IT manager		X		
		IT engineers			X	
	Purchasing	Purchasing manager		X		
		Buyers			X	
Commercial	Sales / Marketing and Comms	Sales / BD manager		X		
		Marketing and Comms manager				
		Aftersales manager		X		
		Warranty team			X	
		Admin support				X
	Estimating	Estimating manager		X		
		Project accounts manager		X		
		Admin support				X
QHSE	Quality	Quality manager		X		

Table 36 – Shipyard job roles – reporting line functions (continued over page)

Reporting line job functions (2)

Director	Dept.	Role	Mission Critical	Business Critical	Business Operational	Admin position
QHSE	Quality	Quality manager		X		
		Document control				X
		Admin support				X
	HSE	HSE manager	X			
		HSE area leads		X		
	Security	Security manager	X			
		Security team	X			
Production	Human Resources	HR manager		X		
		HR assistants				X
	Project Management	Project managers (yachts)		X		
		Project assistants			X	
	Project Engineering	Project Engineering Manager		X		
		Project Engineers			X	
		Draftsmen			X	
	Production – all vessels	Trade / production managers		X		
		Trade / production supervisors		X		
		Testing and commissioning		X		
		Electronics (e.g. navigation cameras, TVs etc.)		X		
		Electricians		X		

Reporting line job functions (3)

Director	Dept.	Role	Mission Critical	Business Critical	Business Operational	Admin position	Subcontract
Production	Production – all vessels	Welder		X			
		Sheet metal worker		X			
		Pipe fitter		X			
		Pipe welder		X			
		Mechanical fitter (machinery spaces and domestic)		X			
		Fitter / turner / machinists		X			
		Joiner / carpenter / lagger		X			
		Surface preparation and painting		X			
	Production – yachts / luxury vessels	Laminators		X			
		High-quality external painters (inc. fairing)					X
		High-quality exterior finishing (varnishing etc.)					X
		High-quality outfitting (exterior and deck)		X			
		High-quality joinery (interior fit-out and furniture)					X
		High-quality interior finishing (e.g. French polishing)					X
		Yacht spar repair					X
		Yacht riggers (masts and other spars)					X
		Sail maker / marine trimmer					X
		Hydraulics (rigging control, cranes and davits etc.)					X

Reporting line job functions (4)

Director	Dept.	Role	Mission Critical	Business Critical	Business Operational	Admin position	Subcontract
Production	Production Support	Production support manager	X				
		Warehousing, transport and logistics	X				
		Staging / access		X			
		Temporary services		X			
		Riggers / crane operators		X			
		Jigs and fixtures		X			
		Cleaning and protection		X			
		Facilities and maintenance	X				
		Dockmaster	X				

Director	Dept.	Role	Subcontract	Notes
Production	Engineering	Structural engineer(s)	X	Typically, these roles are not required to be full time in a repair yard. Expertise would be brought in on a project-by-project basis.
		Electrical engineer(s)	X	
		Mechanical engineer(s) (complex systems design)	X	
		Naval architect(s)	X	

Table 36 – Shipyard job roles – reporting line functions (end)

6.4 Potential workforce size

- Figure 45 shows the workforce size estimate tables taken from Section 2 of the report.
- These show the potential workforce size for each of the three docking configurations, split in terms of blue- and white-collar workforce.
- The blue-collar workforce will tend to be a mixture of both subcontractor and permanent labor.
- Given the potential product mixes, there may be the need to prioritize training and labor for the largest market segments. E.g., the local workforce could be trained for up to Small I vessels, with subcontractors used for larger vessels.
- Development of a local subcontractor base to support the shipyard, as well as the training and upskilling of permanent workers will be key to the long-term success of the shipyard.
- Examples of where subcontractors can potentially be utilized are mentioned in this section of the report (Section 6); e.g., specialist yacht outfit, pipe manufacturers etc.

Start-up workforce estimate	Docking configuration 0	Docking configuration 1	Docking configuration 2
Blue collar workforce	130	180	180
White collar workforce	50	65	65
Total workforce	180	245	245

Table 14 – Shipyard operational workforce – start-up estimate

Initial steady state workforce estimate	Docking configuration 0	Docking configuration 1	Docking configuration 2
Blue collar workforce	200	250	270
White collar workforce	75	90	100
Total workforce	275	340	370

Table 15 – Shipyard operational workforce – initial steady state estimate

Long term steady state workforce estimate	Docking configuration 0	Docking configuration 1	Docking configuration 2
Blue collar workforce	340	430	445
White collar workforce	115	140	155
Total workforce	355	570	600

Table 16 – Shipyard operational workforce – long term steady state estimate

Figure 45 – Workforce size estimate from Section 2

6.5 USVI existing workforce

Current skills, industries and experience and potential development:

- The USVI have a population of just over 87,000*, however this does not include islanders living off-island, who may be willing to come back for new employment opportunities.
- The USVI have an existing relevant skill-pool in advanced manufacturing, industrial, shipping and marine sectors.
- The established heavy industry (refinery operations etc.) on St Croix could provide experienced workers with relevant skills.
- The labor pool also provides the opportunity for new companies and suppliers to set up in support of a new shipyard, using existing labor and experience on the island. This could include (but not be limited to):
  - Heating, Ventilation and Air Conditioning (HVAC) systems
  - Pipe suppliers
  - Cable manufacturers
  - Electrical and electronic systems (e.g. navigational systems, GPS, computing)
- Given the size of the existing workforce on the islands, VIDOL could play a significant role in supporting the re-training/upskilling of the existing workforce by creating partnerships with local private sector companies to establish apprenticeships, for both young people starting their careers and adults who are looking to retrain.
- If relevant companies do not exist in the fields required, VIDOL and the USVI administration collaborate on promotion of the Islands as a place to set up new companies, or new facilities if part of an existing company.

*https://www.census.gov/newsroom/press-releases/2023/2020-dhc-summary-file-usvi.html

6.6 University of the Virgin Islands (UVI)

Overview of current related Science, Technology, Engineering and Mathematics (STEM) courses:

- UVI currently offers a variety of STEM courses, including mathematics, chemistry, physics and computing.
- UVI operates a Dual Degree Engineering Program*, which provides students the opportunity to complete a BSc in Applied Mathematics and a BSc in their chosen engineering field. This also includes the potential to enroll in a Master of Science degree at Columbia University, following completion of a qualifying undergraduate degree at UVI.
- Partnered/affiliated universities include Florida, South Florida, Columbia and the University of South Carolina.
- These partners provide the following courses which would help support any shipyard established in the Virgin Islands, for example:
  - Industrial Engineering and Operations Research
  - Mechanical Engineering and Engineering Management
  - Operations Research: Engineering Management Systems
- Whilst the above courses will support a shipyard and provide relevant technical knowledge and expertise, their provision of knowledge specific to ship repair, shipbuilding and associated infrastructure does not match those of specialist nautical/marine degrees.
- Another example would be to partner with an existing private company, or local industry player. In Jamaica, the Caribbean Maritime University (CMU) has recently agreed a partnership with German Ship Repair Jamaica (GSRJ) to support the creation of new maritime-specific skills training schemes, including apprenticeships for disenfranchised young people^.

*https://www.uvi.edu/files/documents/College_of_Science_and_Mathematics/engineering/Engineering_brochure2013.pdf
^https://www.jamaicaobserver.com/latest-news/cmu-german-ship-repair-jamaica-enter-training-partnership/

6.7.1 Potential partner institutions

There are several universities within the U.S. who provide relevant courses, a selection of which are:

Texas A&M: Ocean Engineering; BSc, MEngr, MSc and PhD levels.

Webb Institute: Marine engineering, Ship Science and Naval Architecture

New Orleans University: Naval Architecture and Marine Engineering, M.S.E., Ph.D.

University of Michigan: Naval Architecture and Marine Engineering; MSc, Ph. D.

Virginia Tech: Ocean Engineering; BSc, MScT.

Massachusetts Institute of Technology: Naval construction and marine engineering.

6.7.2 Community colleges

- Role in developing a certified workforce:
  - Typically, a shipyard workforce will need training and certification in key skills. These include (but are not limited to): welders, joiners, sheet metal workers, electricians and other production related skills.
  - Community colleges are key resources throughout the U.S., which support shipbuilding and ship repair yards. A good example of this is the Tidewater Community College (TCC) in Virginia, which supports shipyards in the Hampton Roads area.
  - TCC provides a Maritime Technologies course* which specializes in training skills for shipbuilding and repair, including:
    - CAD, Electrical, HVAC, Inside Machinist, Pipefitter, Structural, Maritime Welding etc.
    - Graduates of the course who have also completed a registered apprenticeship will be prepared to apply for a supervisory position within the industry or continue study towards a bachelor's degree.
- Status in USVI:
  - There are currently no community colleges within the USVI.
  - The nearest community college to the USVI is H. Lavity Stoutt Community College in the British Virgin Islands. It has a Marine Technology program**, which includes topics on outboard motors, engines, marine electronics and marine surveying. However, it does not provide training in vital skills such as welding, pipe-fitting, sheet metal working and joinery.
  - There is an existing training facility, known as C-TECH (Career and Technical Education) on St Croix. This provides high school, continuing education and post-high school students with technical related training. This includes providing certification in several key skills related to ship repair; welding, joinery, electrics and others. The 2021-2022 course catalogue also references the potential to establish an Academy of Marine Industry, although progress is unclear***.
  - A key consideration for the USVI is how to develop existing and establish the necessary training and development pathways for the potential shipyard's workforce.

*https://www.tcc.edu/programs/maritime-technologies/#; **https://hlscc.edu.vg/marine-technology; ***St Croix Career & Technical Education (C-TECH) 2021-2022 Course Catalog

6.8.1 UVI's role in training personnel

How the UVI can support and develop skills:

- Negotiating and establishing links with another institution which offers courses such as Naval Architecture, Marine Engineering and Ocean Engineering could be advantageous to the shipyard and the USVI.
- By establishing links with any (or all) of the Universities previously mentioned, training and development pathways can be created for students to gain relevant degrees and return to work in the Virgin Islands, directly contributing to the local economy and skill base.
- Another consideration for UVI would be to create links with experienced and industry-specialist Community Colleges. This could provide an ideal pathway for prospective students to study the necessary skills to become part of the workforce in the shipyard.

Other training providers – local companies with relevant expertise:

- There is already a healthy industrial base on St. Croix, supporting the existing facilities, including the port. Some examples of potential partners / training providers are below:
- Tang How Brothers, Inc.* are a certified provider of welding training, by both VIDOL and VIDOE. The training also includes pipe-fitting skills and can be for beginners, apprentices and experienced personnel.
- My Brother's Workshop^, a not-for-profit organization based on St. Thomas, provides transformational training in many areas, including offering programmes centred on engineering and marine skills to disadvantaged, at-risk and high-risk young people.

**https://www.tanghow.com/services/about-us/; ^https://mybrothersworkshop.org/

6.8.2 Potential funding schemes

Government funding sources, such as U.S. Department of Labor (U.S. DoL) and U.S. Economic Development Administration (U.S. EDA), supporting skills and education:

- Some examples of available funding to support skills development and education are below. Further examples can be found in Section 9.
- YouthBuild*: a fund which provides grants to organizations providing pre-apprenticeship services that support education, occupational skills training and employment services to opportunity youth, aged 16 to 24.
- STEM Talent Challenge**: funding source which operates in each financial year. Provides up to $500,000 with a 1:1 funding match. Applications are currently closed, however is expected to reopen in April/May 2024.
- DoL Building Pathways to Infrastructure Jobs Grant Program***: funding which supports the implementation of the Bipartisan Infrastructure Law. Includes funding to develop and implement local/regional programs and to scale established partnerships.

*https://www.grants.gov/search-results-detail/350828; **https://www.eda.gov/funding/programs/stem-challenge; ***https://www.dol.gov/agencies/eta/grants/apply/find-opportunities

6.8.3 Private sector considerations

Potential role in development of workforce and key skills:

- Private companies could form a key part of creating any workforce for a new shipyard. The new facility could prove to be an “anchor” for creating a related industrial base, serving both the shipyard and other companies in the region.
- For example, an existing manufacturer may wish to establish a facility on St. Croix to support the new shipyard. To establish an appropriately skilled workforce, a company could relocate some of its existing skilled workers to a new facility, who could immediately support shipyard operations but also provide on the job training for trainees, including apprentices.
- Apprenticeships are key to maintaining the skills and numbers of any workforce in a shipyard. They involve on-the-job training and academic study at a college or further education facility.
- Some private companies will already have links to colleges and supporting institutions which can support training and apprenticeships. Creating links and establishing working relationships with companies such as these should be a priority for VIDOL.
- Private sector companies who could be approached to discuss partnering and creating collaborative practices with include Gold Coast Yachts, Tropical Shipping and Crowley.

6.8.4 Private sector development

Attracting private sector companies and partners to establish or develop an existing presence on St. Croix to support the shipyard could be key to its success.

- These could include specialist marine fabricators, pipe manufacturers, electronics providers and others.
- Local government funding and support to establish new facilities, including funding for training, grants etc. can provide incentives and make investment in USVI more appealing and is discussed in Section 9.
- This could lead to the creation of a maritime skills hub on St. Croix, or within the wider USVI.
- An example, the Australian Marine Complex (AMC)* is home to several renowned shipbuilding companies and offshore fabricators. The entire facility includes precincts aligned with the requirements of the facility.
- The AMC also contains three distinct areas, one is known as the Common User Facility (CUF)^. This is an area where supporting infrastructure (workshops, floating dry docks, transportation systems etc.) can be rented/utilized on a project-by-project basis by key suppliers and companies.
- Creation of a CUF on St. Croix or within the wider USVI could help create a flexible maritime hub, able to support the ongoing operations of any potential shipyard. With the correct structure in place, a CUF-type facility could become a regional training center for shipbuilding/repair skills.
- This could include the potential for existing USVI-based shipbuilding and repair companies (e.g. Gold Coast Yachts) to relocate their operations to work within any established CUF-type facility.
- Whilst this would initially not be on the same scale as the AMC/CUF in Western Australia, a similar type of facility could support the ongoing economic development and transformation of St. Croix.
- Further development of a CUF type facility is not within scope of this project and is not discussed outside of this page.

*https://developmentwa.com.au/projects/industrial-and-commercial/australian-marine-complex/about-the-amc;
^https://developmentwa.com.au/projects/industrial-and-commercial/australian-marine-complex/common-user-facility

6.9 Staffing and maintaining a shipyard

General approach in U.S. based and international shipyards:

- Retention of a core workforce and appropriately skilled personnel is critical to the success of any shipyard.
- Both internationally* and in the U.S.**, there is a shortage of such personnel; establishing training schemes and career development pathways is crucial to the success of any newly established shipyard.
- Any potential new facility would need to consider its approach to attracting and hiring of skilled and experienced personnel.
- These personnel could then be used to set up the facility and support the development of the local workforce through on-the-job training, apprenticeships and any local skills collaborations that are established.
- Partnerships with local and national institutions like those previously discussed could form a key part of workforce development.
- Ship repair has similarities to many other manufacturing and associated sectors; automotive*** and offshore*** are good examples to look to for similarities in recruiting and long-term retention of staff.
- Key considerations should be made around competitive salary packages, long-term development pathways, benefits and developing inclusive, modern and rewarding work.

*https://shippingwatch.com/carriers/article16621527.ece; https://news.industriall-europe.eu/Article/984
**https://news.usni.org/2023/02/08/attracting-quality-workforce-biggest-issue-facing-shipyard-experts-tell-congress
***https://www.linkedin.com/pulse/7-effective-retention-talent-strategies-automotive-manufacturing-dn3bc/
****https://www.offshoreenergypeopleandskills.co.uk/public/img/docs/NSTD-Integrated-People%20and-Skills-Strategy-FINAL.pdf

6.10 Section 6 summary (1)

Workforce structure:

- The workforce size and structure will vary, based on the overall strategy for labor and manning that is used.
- This will depend on subcontracting strategies and the overall docking configuration of the shipyard.

Existing workforce:

- The USVI has an existing skill-pool in several relevant areas, which could all provide skills, labor and support to a new shipyard.
- There are opportunities for VIDOL to play a role in supporting the training and upskilling of the existing USVI workforce.

Role of further education:

- Further education will be key in the development of the shipyard workforce. UVI offers STEM and engineering related study routes, however these do not include specialist courses (e.g., marine/nautical degrees).
- Development of a certified workforce is fundamental to the success of any shipyard. Consideration of how the USVI can establish training pathways (e.g., apprenticeships specializing in ship repair skill sets) will be key.
- UVI could consider creating partnerships with existing specialist universities and Community Colleges based on the mainland U.S.

Other training providers:

- The existing St. Croix industrial base supports multiple industries, including the southern port. Understanding any existing training links and programs could support the development of training pathways for any new shipyard.
- Several local training providers have already established themselves in the islands and could be approached as partners.

Section 6 summary (2)

Funding schemes:

- The U.S. DoL and U.S. EDA have many sources of funding for training programs, particularly apprenticeships and youth training.

Private sector considerations and development:

- Private companies could be key in developing a new yard workforce; with existing labor pools and training to support on-the-job learning.
- Establishing links and working relationships with relevant companies in the industry should be a priority for VIDOL.
- There are several funding routes available which could incentivize potential industrial partners to establish in the USVI.
- A Common User Facility could potentially support the ongoing economic development and transformation of St Croix.

Staffing and maintaining a shipyard:

- Global shortages of appropriately skilled personnel means training schemes and development pathways are crucial.
- The approach to recruiting skilled and experienced personnel needs to be carefully considered.
- Similarities to other industries can be harnessed to find examples of how to establish and maintain a skilled workforce.
- Competitive salary packages, long-term development of personnel, benefits and inclusive and rewarding work is crucial to employee retention.

Section 7

Regulation and environmental considerations

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Section 7: Regulation and environment considerations

Section 7 contents

7.1 Introduction

- Ship repair and refit is influenced by rules and standards set by countries and international organizations.
- As an organized, unincorporated U.S. territory, not all U.S. federal laws apply to USVI. USVI have their own governing document, known as the Revised Organic Act, as well as the U.S. Virgin Islands Code (VIC).
- A high-level review of the U.S. federal laws, the U.S. Virgin Islands Code, industry best practice guides and IMO conventions has been conducted for items relating to shipyard operations and ship repair.
- Consideration has been given to best practice within the industry, for environmental performance, waste management, handling of hazardous materials and net-zero practices.
- The following section provides information on how these regulations would influence the shipyard design and ship repair demand, as well as best practice for yard operations.
- The last part in this section look at the idea of a USVI Open Ship Registry, how it has developed so far and an insight into how it could affect the proposed shipyard.

7.2 Considerations due to vessels carrying hazardous materials – Cargo (1)

The USCG (United States Coast Guard) recognize three main classes of hazardous cargo (bulk liquids and liquefied gases, packaged cargoes and bulk solids) and the IMO have nine classes:

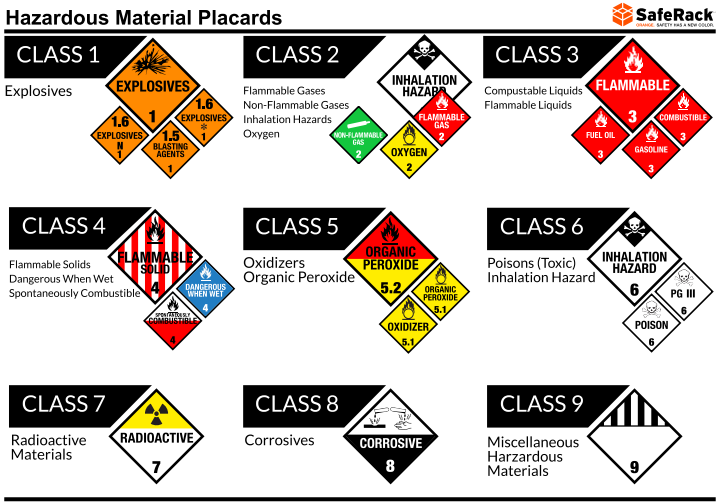

Figure 47 – Hazardous material classes.
Source: https://www.saferack.com/guide-hazmat-placards-un-numbers/

The shipyard will require policies, practices and an emergency plan within an HSE (Health, Safety and Environment) manual and system to deal with any potential emergencies involving hazardous cargo and oil pollution. These should also be used to identify Hazardous Area Classification (HAC) zones on site.

Considerations due to vessels carrying hazardous materials – Cargo (2)

- Under U.S. federal law, 33 Code of Federal Regulations - Part 126, there are design requirements for waterfront facilities handling hazardous cargo, such as;
  - Fire extinguishing equipment/appliances, warning signs and security measures
  - International shore connection (saltwater connection for ship's fire main)
  - Appropriate lighting in working areas
  - Material handling equipment and vehicles suitable for carrying hazardous materials
  - Rubbish and waste material disposal units, suitable for the hazardous material
  - Permit for handling dangerous cargo
- There are also requirements for conducting welding and hot work with a hazardous cargo onboard such as;
  - Any welding and hot work must be in accordance with U.S. standard NFPA (National Fire Protection Association) 51B - Fire prevention during welding, cutting and other hot work.
  - All flammable vapors, liquids and solids must be removed from the working area
  - A gas-free certificate must be issued
  - A Firewatch is required for any hot work on boundaries

Considerations due to vessels carrying hazardous materials (3)

- The IMO Hong Kong Convention for the Safe and Environmentally Sound Recycling of Ships will enter into force in June 2025; new and existing vessels of 500GT or more, engaged in international trade will need a valid International Certificate on Inventory of Hazardous Materials (IHM).
- This will require shipyards to ensure the material and equipment being fitted has a Supplier's Declaration of Conformity (SDC) and Material Declaration (MD), to confirm whether any of the parts contain hazardous material. This is then recorded with the location in the IHM.
- It is recommended that the shipyard has a Quality Management System (QMS) and Quality Assurance (QA) policy that covers the random sampling of materials provided by suppliers.

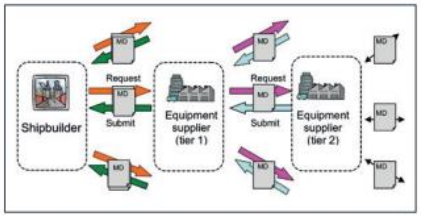

Figure 48 – Supply chain involvement
Source: https://www.imo.org/en/KnowledgeCentre/IndexofIMOResolutions/MEPC%20Resolutions/MEPX.269(68).pdf

- The IHM will need to be updated for any materials or items removed, as a live document throughout the life of the ship.
- Disposal units and/or services need to be provided for hazardous materials, such as;

Asbestos, ozone depleting substances, anti-fouling compounds and systems, lead and lead compounds, mercury and mercury compounds, radioactive substances, PFOS (Perfluoro Octane Sulfonate) - found in fire extinguishing mediums and HBCDD (Hexabromocyclododecane) – a flame retardant additive.

7.3.1 Environmental considerations and regulations – Waste (1)

- Figure 49 shows the main types of waste produced in a shipyard that need to be appropriately disposed of or recycled.
- Analysis of the type and frequency of ships may help the shipyard determine the types of garbage that the ships will bring with them – this will need managing as per MARPOL* Annex V (Prevention of Pollution by Garbage from Ships).
- The shipyard will need a site-wide garbage/waste management plan and system, which should include:
  - A centralized waste collection area
  - Separate containers: hazardous, non-hazardous, scrap
  - Waste and scrap weather protection and securing procedures
  - Hazardous waste storage permits
  - Waste collection permits (if private collection)

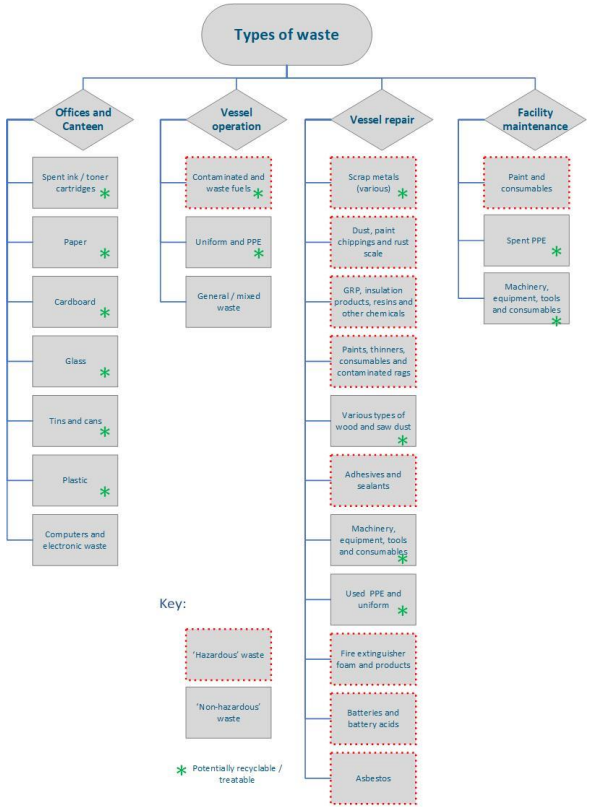

Figure 49 – Types of solid shipyard waste

*International Convention for the Prevention of Pollution from Ships

Environmental considerations and regulations – Waste (2)

The main sources of **wastewater** from the shipyard need to be collected and routed into a managed wastewater system, for example:

Wastewater from the cleaning of vessel hulls – remove particles before entering the system, by passing through a screen to prevent blocking. There should be a dedicated vessel wash-down area prior to the vessel being placed on the dry-berth.

Wastewater from onboard equipment maintenance/servicing – remove acidity (from batteries) or oil and grease. This needs to pass through a neutralization system or an interceptor to separate any oils. Authorized subcontractors may be available to collect contaminated wastewater and complete this processing in their own premises.

Wastewater from the paint process – removing solvents and other containments from spray booths or paint tents creates wastewater. If there are to be dedicated paint facilities, a suitable local wastewater catchment system needs to be designed into the facility.

Environmental considerations and regulations – Waste (3)

Other types of wastewater can include:

Bilgewater from vessels remove contaminants such as grease and oil. This needs to pass through an interceptor or be collected into a dedicated container and disposed of by an authorized subcontractor.

Black (BW) and grey water (GW) (vessels and domestic) – vessel BW and GW should be collected into its own storage tank and transferred ashore using a pumping facility in the shipyard, or the vessel should arrive for MRO (Maintenance, Repair, Overhaul) with empty tanks. Flushing and cleaning of these tanks will be required prior to any work being undertaken. An onsite canteen GW discharge will need to be fitted with a grease trap before entering the mains wastewater system.

Storm water – any storm water associated with industrial activity needs a permit* before being discharged. The shipyard will need adequate stormwater collection and processing facilities with a Storm Water Management Program. 'Online' interceptors will be required so that contaminated surface water is not accidently discharged into the stormwater mains in the event of the interceptor being overwhelmed from a heavy downpour. Segregation of drainage between wastewater and stormwater is paramount in the drainage network design.

*Reference: *Territorial Pollutant Discharge Elimination System (TPDES) Rules and Regulations § 184-45*

7.3.2 Environmental regulations – Pollution

Air pollution

- The shipyard will need to comply with the requirements under Title V of the Clean Air Act (U.S. Federal Law, Region 2) and the Virgin Islands Air Pollution Control Act Rules and Regulations (V.I. CODE ANN. Title 12, §§ 201 - 221 and 1995 Rules and Regulations).
- Depending on the amount and type of emissions produced per year, the shipyard may need a Title V Permit to operate, which includes pollution control requirements.
- A specific pollution control requirement for a ship repair yard is covered by 40 CFR Part 63 which defines the national emission standards for hazardous air pollutants for shipbuilding and ship repair (surface coating) operations.

Noise pollution

- The shipyard will need to comply with the requirements under 19 V.I.C. § 2042 for noise pollution control. A site assessment would determine the distance to any residential areas, then identify any potential sounds that fall within the parameters e.g., power-driven machinery, vehicle loading/unloading, noise disturbance due to vehicle or watercraft maintenance, repairing, overhauling, modifying or testing watercraft (onshore or afloat).

7.4 Applicable IMO and international standards (1)

Port reception facilities –the shipyard should either have facilities to deal with wastes from MARPOL Annexes I to VI, or a management plan arranged with a suitable contractor to collect and dispose of the waste.

AFS (Anti-fouling systems Convention – parties to the Convention are required to prohibit the use of harmful anti-fouling systems (such as TBT (Tributyltin) and biocide cybutryne on ships flying their flag, operating under their authority, entering their port, shipyard or offshore terminal.

OPRC (Oil Pollution Preparedness Response and Co-operation Convention) – this convention does not appear to specifically apply to shipyards. However, the shipyard should have an oil pollution emergency plan.

ISO 14001 – the shipyard should have an Environmental Management System (EMS). This will help the shipyard to improve their environmental performance, through reducing waste and energy consumption. Net-zero solutions such as rainwater harvesting, heat pumps, solar panels and wind power should be included in the design.

Applicable IMO and international standards (2)

- Work will include the replacement of equipment, which will need to comply with IMO conventions:
  - MARPOL Annex I (Oil Pollution Prevention) – generally ships need to be fitted with Oily Water Separators (OWS) to ensure any discharge of bilgewater, particularly from the machinery space, has an oil content within the limits of that country (Europe and Canada have stricter requirements than the U.S.).
  - MARPOL Annex IV (Sewage Pollution Prevention) – generally ships need to be fitted with a Sewage Treatment Plant (STP) or a black water holding tank.
  - MARPOL Annex V (Garbage Pollution Prevention) – all ships need to be able to retain garbage onboard and may be fitted with garbage lockers (possibly refrigerated).
  - MARPOL Annex VI (Air Pollution Prevention) – all ships need to be fitted with either an IMO Tier III compliant engine or an exhaust gas cleaning system.
  - BWM Convention (Ballast Water Management) – From 2024 all ships with ballast water capacity are required to have a BWM Treatment System fitted onboard.

7.5 Effect of International Open Ship Registry designation (1)

The USVI Open Ship Registry launched in February 2022, as part of the "*Revitalization Plan for U.S. Maritime Trade, Commerce, and Strategic Competition*" developed by COPE (Centre for Ocean Policy and Economics)*.

- The plan includes six solutions:
  1. Launch an open international U.S. flag in the USVI
  2. Establish a short sea trans-shipment hub in the Caribbean
  3. Modernize education and training for the U.S. maritime workforce
  4. Create a Maritime Venture Capital Fund (MVCF)
  5. Build public, private and international agency partnerships
  6. Establish a National Maritime Sustainability Strategy

- The USVI registry intends to bolster the existing US-flag registry, by increasing the U.S. tonnage globally. It would allow foreign vessels to join, which is currently prohibited under the US-flag registry.

*https://thecope.org/wp-content/uploads/2021/12/A-Revitalization-Plan-for-U.S.-Maritime-Trade-Commerce-and-Strategic-Competition-NMI-COPE.pdf

Effect of International Open Ship Registry designation (2)

- Vessels would be under U.S. jurisdiction, which would allow further intervention to counter illicit activities before reaching the U.S. coast.
- It is not yet known which organization would be the overseeing authority, e.g. USCG.
- There is limited additional information available about the launch of a second US-flag (other than the COPE report). However, some like the Hudson Institute claim in a paper titled "*Rewriting the Future of America's Maritime Industry to Compete with China*"*, that a second U.S. ship registry would increase the number of U.S. ships in international trade from 85 (early 2023) to 500 within a few years. This would increase the number of vessels requiring shipyard services in the local area.
- There is potential for USVI Open Ship Registry to boost shipyard demand in area, which would benefit the new yard - especially if flag surveys are required. However, it remains to be seen how the second US-flag will develop which should be considered in the next stages of the shipyard design.

*https://www.hudson.org/national-security-defense/rewriting-future-america-maritime-industry-compete-china-michael-roberts

7.6 Section 7 summary (1)

A detailed review of the relevant U.S. federal laws and USVI regulations is required; however, the shipyard and its work/operations should comply with the following as discussed above:

- 33 CFR Part 126 *Handling of Dangerous Cargo at Waterfront Facilities*
- 40 CFR Part 63 *National Emission Standards for Shipbuilding and Ship Repair (Surface Coating)*
- U.S. Virgin Islands Code (Title 12 and 19 as a minimum)
- USVI Territorial Pollutant Discharge Elimination System (TPDES) Rules and Regulations
- IMO MARPOL Annexes I to VI
- IMO AFS Convention
- IMO Ballast Water Management Convention
- IMO Hong Kong Convention for the Safe and Environmentally Sound Recycling of Ships

Section 7 summary (2)

As best practice, the shipyard should have the following:

- Health, Safety and Environment manual and system, incorporating:
  - An Environment Management System according to ISO 14001.
  - An Oil pollution emergency plan.
- Quality Management System and Quality Assurance policy.
- Garbage/waste management plan and system.
- It should be noted, that as the yard will be aimed at the yacht market, in recent years there has been a spotlight of their environmental impact.
- There have been numerous magazine articles and reports highlighting the importance of “shipyards going green”, as Owners and crew members look to choose the premium option of an environmentally considerate shipyard.
- Therefore, incorporating marine industry best practices could be key to standing out.

Section 8

Military Opportunities and the Jones Act

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Section 8: Military opportunities and the Jones Act

Section 8 contents

8.1 Military work considerations (1)

There are several considerations for carrying out work on naval vessels:

- Capabilities required beyond those for commercial work, especially for combatants.
- Cost and schedule competitiveness with other yards that may have greater experience with naval work.
- Proximity to demand and other infrastructure support as compared to other yards.
- Additional capital costs and more complex processes for naval work can negatively influence commercial work processes, performance, and cost.
- This list is further detailed regarding additional complexities of naval work in the following pages:
    1. Physical facilities security requirements
    2. Workforce security requirements
    3. Information systems and data security requirements
    4. Worker health and safety requirements
    5. Environmental requirements
    6. Business systems and processes requirements

Military work considerations (2)

Facility security requirements

There are significant facilities security requirements for conducting shipyard work on U.S. naval vessels. These requirements relate to:

- Perimeter physical barriers
- Perimeter openings control
- Access and circulation control including patrol of water approaches
- Armed security force
- Protective lighting
- Signs and posting of boundaries
- Security force communications
- Antiterrorism measures

- See, NAVSEA Standard Item (SI) 009-72, Physical Security of U.S. Naval Vessels and Crew at Private Contractors Facilities (Plant Protection Plan standard, PPP).
- The shipyard must be able to meet all FPCON level requirements. See, Requirements escalate as Force Protection Conditions (FPCON) escalate, DODI 2000.16, DOD Antiterrorism (AT) Program Implementation.
- Shipyard facility security requirements could have some impact on the ease of movement of people, vehicles, goods, and vessels associated with the South Shore Trade Zone.

Military work considerations (3)

Workforce security requirements

- These requirements relate to pre-hire screening of employees for citizenship and background, badging and access control, monitoring of workforce activities, and systems to allow naval personnel and other navy contractors access to the facilities and ships.
- The following are some related references:
  - Control of access to vessels and facilities by non-U.S. citizens, HQ C-2-0005, NAVSEAINST 5500.3.
  - Control of access to plant and vessels by other government contractors involved with contracted naval work, HQ C-2-0004.
  - Control of access for non-U.S. citizens of hostile and/or communist controlled countries, Department of Defense Industrial Security Manual, DOD 5220.22 M.

Military work considerations (4)

Information systems and data security requirements

These requirements relate to physical and digital security of confidential and classified information, which for example can include repair contracts details and design and equipment/machinery specifications. Following are some related references:

- Department of the Navy Information Security Program, SECNAV M-5510.36, Chapter 11 Industrial Security Program
- Basic cybersecurity standard guidelines: NIST SP 800-53
- System requirements for Confidential Unclassified information (CUI), the minimum standard required of a shipyard doing U.S. Navy work: NIST SP 800-171 and -172
- Standard for information systems with classified information: NIST SP 800-59
- DoD Information Security Program: Protection of Classified Information, Department of Defense Manual 5200.01 Volume 3
- Delivery of software and data to the Navy, HQ C-2-0011: DFARS 252.227-7014
- DFARS 252.204-7012, Safeguarding of unclassified controlled technical information
- DFARS 252.227.7025, Limitations on the use or disclosure of government-furnished information marked with restrictive legends

Military work considerations (5)

Worker health and safety requirements

The U.S. Navy requires compliance to all U.S. worker health and safety laws, general and shipyard-specific, and conducts independent review of procedures and audits to assure compliance in Navy work. Following are some related references:

- Public Law 91 596 (84 Stat. 1590, 29 USC 655) known as the “Occupational Safety and Health Act of 1970”
- 29 CFR 1910, Occupational Safety and Health Standards for General Industry
- 29 CFR 1915, Occupational Safety and Health Standards for Shipyard Employment
- HQ C-2-0016, Department of Labor Occupational Safety and Health Standards for Ship Repair, NAVSEA September 1990, modified September 2012
- S0570-AC-CCM-010/8010 ACN3/A, Industrial Ship Safety Manual for Fire Prevention and Response
- National Fire Protection Association Standard 306 (NFPA 306), Standard for the Control of Gas Hazards
- 10 U.S. Code 7311, Repair or Maintenance of Naval Vessels: Handling of Hazardous Waste
- S6470-AA-SAF-010, Naval Maritime Confined Spaced Program
- NAVSEA 0400-AD-URM-010, Tag-out Users Manual

Military work considerations (6)

Environmental requirements

The shipyard must comply with all environmental regulations specified by U.S. law for industrial sites. The Navy's Supervisor of Shipbuilding will conduct regular oversight and audits to assure the shipyard is complying will all appliable environmental laws. Following are some related references:

- National Environmental Policy Act (NEPA) of 1970
- Clean Air Act
- Clean Water Act
- Toxic Substances Control Act
- Resource Conservation and Recovery act
- Endangered Species Act
- Marine Mammals Protection act
- NAVSEA M-5090.1, Environmental Readiness Program Manual
- 10 U.S. Code 7311, Repair and Maintenance of Naval Vessels: Handling of Hazardous Waste
- DFARS 252-223-7006, Prohibition on storage and disposal of toxic and hazardous materials – basic, Sept 2014
- DFARS 5252.202-9114, Management and disposal of hazardous waste

Military work considerations (7)

Business systems and processes requirements

Depending on the type and size of the contract, the Navy may require the use of specific business procedures and systems. Following are some related references:

- Cost estimating system, DFARS 252.215-7002
- Contractor purchasing system administration, DFARS 252.244-7001
- Cost and software data reporting system – basic, DFARS 252.234-7004
- Accounting system administration, DFARS 252.242-7006
- Material management and accounting system, DFARS 252.242-7004
- Manual, DOD 5220.22 M.

8.2 Jones Act considerations (1)

Being exempt from the Jones Act* has various influences on the potential for shipbuilding and ship repair in the USVI:

Being Jones Act-exempt prevents a USVI shipyard from building or *rebuilding* Jones Act vessels (*rebuild* generally means replacement of 10% or more of the steel weight of the vessel or major structural components with other details as defined by the U.S. Coast Guard).

A USVI shipyard can carry out repair and maintenance on any ship, including Jones Act ships up to the *rebuild* threshold. Therefore, Jones Act exemption does not impact this potential ship repair and maintenance market other than *rebuilds* one way or the other.

The USVI can engage in its domestic trade utilizing foreign-flag vessels at lower cost than using Jones Act vessels. This does not, however, influence the volume of trade or ships engaged in domestic trade. Therefore, being Jones Act-exempt does not influence the potential size of the maintenance and repair market for such ships.

*https://uscode.house.gov/view.xhtml?req=granuleid%3AUSC-2000-title46a&saved=%7CZ3JhbnVsZWlkOlVTQy0yMDAwLXRpdGxlNDZhLWNoYXB0ZXIyNA%3D%3D%7C%7C%7C0%7Cfalse%7C2000&edition=2000

Jones Act considerations (2)

Continued …

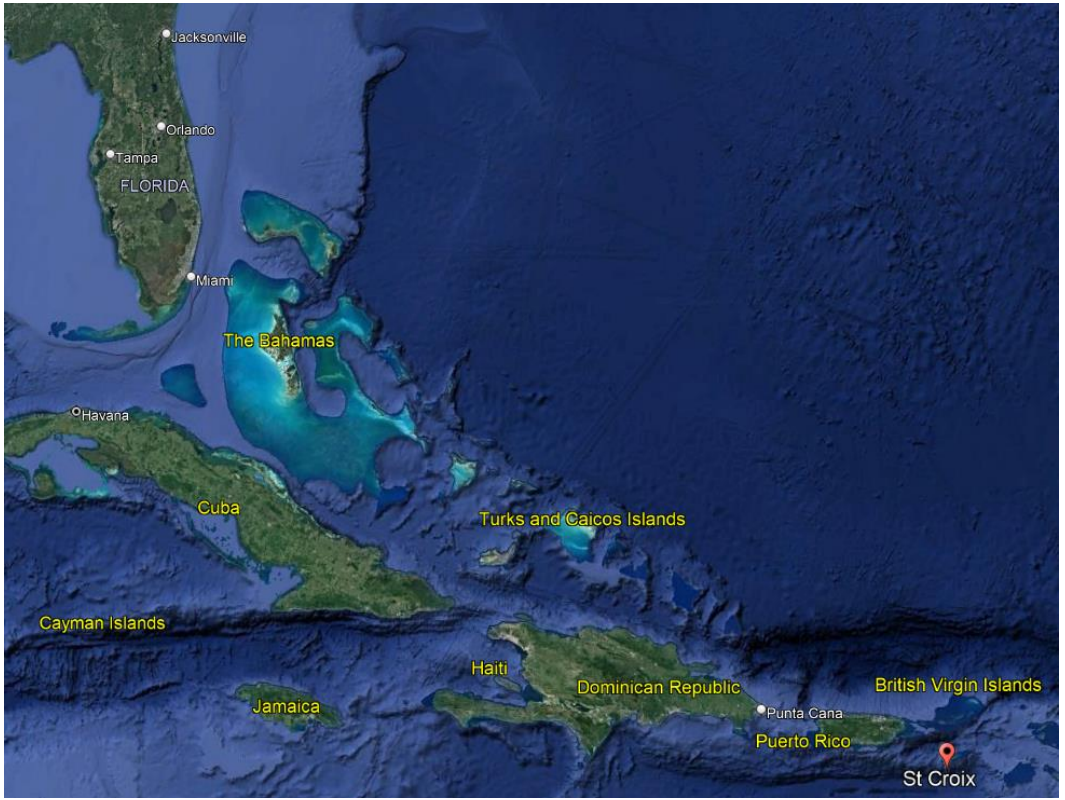
The USVI being Jones Act-exempt allows foreign-flag vessels to pick up cargo at a U.S. port, bring it to the USVI for some sort of processing, and then deliver the processed cargo to a U.S. port, thereby circumventing Jones Act shipping requirements between U.S. ports. This approach has the potential to increase commercial shipping to and from the USVI, and thereby the market demand for commercial ship maintenance and repair in the USVI. This strategy was used with the Limetree Bay Energy refinery.

The Jones Act does not classify the USVI as a *distant foreign port*. A stop-over at a distant foreign port during a cruise is required to exempt cruise ships operating from/to U.S. ports from Jones Act requirements. In this way the Jones Act disincentivizes cruise ships from stopping in the USVI, which potentially reduces market demand for cruise ship maintenance and repair in the USVI.

Jones Act considerations (3)

Continued …

The primary intent of the 96 large (>1,000 GT) Jones Act trading vessels and the 85 large U.S.-flag foreign-trading vessels that have Jones Act exemptions due to “military usefulness” is to provide support for defense operations. In time of conflict requiring transit of such ships in the vicinity of the USVI, such ships would likely use larger Puerto Rican ports as necessary for refueling, resupply, and repairs. Being Jones Act-exempt offers no advantage for the USVI in these such circumstances.

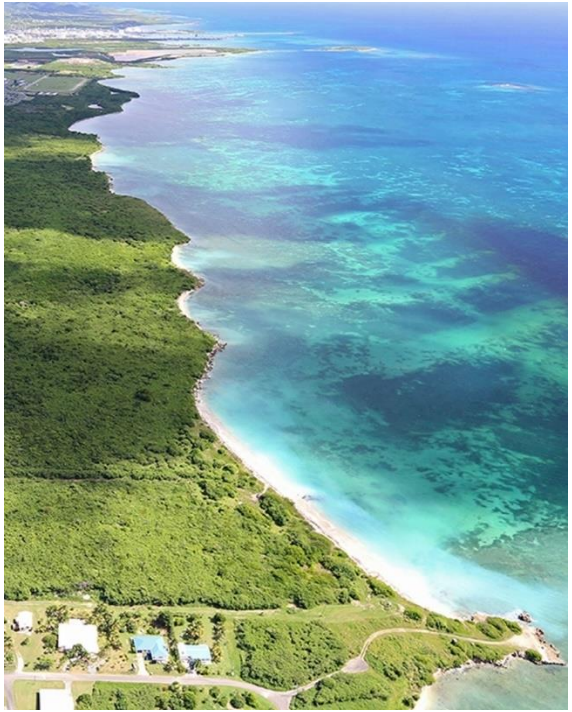


8.3 Section 8 summary

- **Military opportunities:** As can be seen a large number of rules and regulations follow naval vessel maintenance, therefore, to make this a viable option for the new shipyard, there would need to be some form of guarantee from the Navy/USCG, that they would entertain having their vessels maintained in USVI. This should therefore be an aspirational option for the new shipyard, that is worked towards as a goal, should the market be feasible.

- **Jones Act:** With the USVI being exempt, this can be viewed both positively and negatively. When considering ship repair and maintenance, there is little impact from the Jones Act regulations. However, the USVI, when compared to Puerto Rico, Hawaii and Alaska, can benefit from lower shipping costs, more diverse trade partners and greater access to international markets. Negatives can include security risks from foreign flagged vessels that may not comply with U.S. laws and regulations.

- Ultimately this provides the USVI with more economic opportunities and flexibility, but it also poses some challenges and risks for its maritime sector and security interests. Neither one significantly outweighing the other.



Section 9

Local economy impact and accompanying scope

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Section 9: The local economy impact and supplementary scope

Section 9 contents

9.1 Introduction

This section addresses regional incentives, federal government grants, and economic and employment benefits.

Regional investment incentives:

- Incentive programs have been gathered from four other regional locations that could compete directly with the USVI for attracting direct foreign investment, specifically in marine activities, including; ports and vessel maintenance, repair and overhaul (MRO) facilities.
- A high-level comparative analysis has been developed so that the USVI can understand how it compares with key regional players.

Federal government grants

- A review of federal government grants was undertaken to identify key programs that would match with the port infrastructure development, and potentially act as a funding source for the development work that will be required to build a functioning shipyard.

Economic and employment benefits

- A summary of economic and employment benefits related to a shipyard is also covered in this section.

9.2.1 Regional investment incentives - U.S. Virgin Islands

USVI provides tax incentives through the Economic Development Commission (EDC) and Enterprise Zone Commission (EZC), along with other programs, to attract business investment and support economic development in designated areas.

Tax incentives:

- EDC offers tax incentives with reductions in 90% of corporate and personal income tax, 100% exemption on excise tax, property taxes, and gross receipts tax. The tax benefits in the free trade zone include 20-year exemptions and Jones Act Exemption.
- Eligibility criteria for EDC benefits include full-time employment (minimum number of ten employees and five in financial services, two employees for small business) with 80% of them being USVI residents and investment requirements ($100,000, or for small business $20,000 and purchase or build a home within 18 months).
- EZC provides tax benefits for businesses in historic towns.

Industry focus: USVI emphasizes industries like manufacturing, service businesses, and hotel development.

Trade zone and other incentives:

- South Shore Trade Zone Program (SSTZP) is for a new trade zone located on St. Croix, providing advantageous tax benefits. This trade zone encompasses >300 acres of flat greenfield space with existing utilities. It also offers access to deep-water ports and warehouses near the Henry E. Rohlsen Airport. Approved industries within the trade zone include light manufacturing, assembly, fulfillment centers, bonded warehousing, ship repair services, fuel storage and export, refiners, power production, and air and sea transshipment. Also, business in the USVI receives the benefit of the "Made in USA" label.
- Other incentives include the Small Business Tax Incentive Program, Economic Development Parks, State Trade Expansion Program, and various business support services and financial incentives like TIF, S.T.A.R.S., Hotel Development, etc.

9.2.2 Regional investment incentives - Dominican Republic

The Dominican Republic (the D.R.) offers a wide range of incentives, including tax exemptions, preferential tax rates, and duty exemptions, to attract investment in free zones, industry focus areas, and immigrant investors.

Tax incentives:

- Incentives for companies operating in free zones, include tax exemptions for renewable 15-year periods, such as no income, goods and services, municipal or export or re-export taxes, and no import duties. Business support services, such as incubator programs, export promotion programs, and supplier programs are also available.

Industry focus: The D.R. focusses on manufacturing, logistic operations, the film industry, tourism and renewable energy.

Trade zone and other incentives:

- Special incentives for free zones in the Haiti border region and international financial free zones. There are more than 84 free trade zones.
- Logistic operators benefit from reduced income tax; at just 3.5% of sales made in the local market and import duties.
- Wide-ranging tax exemptions for the tourism industry.
- Incentives for renewable energy investors, such as customs duty exemptions and income tax exemptions.
- Tax exemptions and transferable tax credits equal to 25% of expenditures for the film industry.
- General incentives for manufacturing, including customs duty exemptions and accelerated depreciation.
- Special benefits for immigrant investors with a minimum of $200,000 investment, exemption from import duty, transfer taxes for the first purchase of real estate, taxes on dividends and interest, and 50% reduction on property and capital gains taxes.

9.2.3 Regional investment incentives - Jamaica

The Jamaican Government provides attractive fiscal benefits to investors through a suite of incentives, including tax incentives, Special Economic Zones (SEZs), other industry specific programs, with regulating ministry registration potentially required for accessing certain benefits, such as Product Inputs Relief (PIR) scheme.

Tax incentives:

- Omnibus tax incentives, including reduced corporate income tax, 30% employment tax credits, 100% tax credit and capital allowances, and can carry forward up to 50% of your losses into the following tax year.

Industry focus: Jamaica targets sectors like manufacturing, tourism, agriculture, and information technology.

Trade zone and other incentives:

- Tax relief for headquarters operations, including exemption from personal income tax for expatriate employees.
- Tax exemption for Junior Stock Market listing, with exemptions from corporate income tax for first 5 years.
- Tax relief for designated development areas, including urban renewal bonds and 33.3% investment tax credits.
- Tax relief for bauxite and alumina industries, such as import duty concessions and exemptions on productive inputs.
- PIR scheme allowing duty-free importation of specific items for productive use of agriculture, manufacturing, tourism, healthcare and creative industries. With a relief period of ten years and can extend to five years.
- SEZs benefit from lower corporate income tax, relief from VAT, import duties and transfer taxes, 50% stamp duty payable, R&D (Research and Development) and training credit up to 10%, and can claim specific accelerated capital allowances. To avail the tax benefits:
    - Employ more than 29% of Jamaicans in operations
    - Public companies J$500,000 share capital (minimum).
    - Five Free Zones: Kingston (KFZ) Montego Bay (MBFZ), Garmex, Hayes, and Cazoumar.

9.2.4 Regional investment incentives - Bahamas

The Bahamas offers a low-tax environment and a range of investment incentives, including duty exemptions, tax breaks, and infrastructure support, covering sectors such as hotels, manufacturing, vacation plans, free trade zones, and agriculture, making it an attractive destination for investors.

Tax incentives:

- Relief from customs duties on raw materials, equipment, and building supplies and exemptions from real property taxes for up to 20 years.
- Free trade zones exemption from income tax, property tax, capital gains, import & export trade taxes, stamp duty, repatriation of profits and reduced minimum investment threshold BS$250,000 (from BS$500,000)

Industry focus: The Bahamas incentivizes industries like tourism, financial services, manufacturing, and agriculture.

Trade zone and other incentives:

- Duty-free entry of construction materials for hotels, concessions for machinery and raw materials in manufacturing, supplies for timeshare facilities
- Business Diversity Waiver offering first-year license fee waiver or discount for qualifying new businesses.
- Freeport, Grand Bahama Island, as a tax-friendly, free trade zone with various benefits.
- Other business support services, such as business diversity waiver, family island development, the city of Nassau revitalization, export promotion, etc.

9.2.5 Regional investment incentives - Puerto Rico

Puerto Rico offers a range of tax incentives and benefits for businesses, including low-income tax rates, exemptions on capital gains and property taxes, FTZ advantages, and sector-specific incentives, fostering a favorable environment for investment and growth.

Tax incentives:

- Act 60 provides tax incentives for individuals and businesses relocating to the island; offers 4% fixed income tax, 100% tax exemption on capital gains, 75% exemption on property tax, 50% exemption on municipal license tax, 15 years standard tax exemption period (with potential for renewal), and 50% tax credits for R&D expenditures.

  Eligibility requirements (in certain sectors):

  - $1,000,000 capital (minimum) ($500,000 is accepted for investments in a designated Target Employment Area).
  - One full-time employee and three manufacturing employees.

Industry focus: Puerto Rico provides tax exemptions and benefits for finance and insurance, information technology, creative industries, agriculture, and the energy sector.

Trade zone and other incentives:

- Puerto Rico offers operational security, stability, and protections similar to the United States and the U.S. dollar is the official currency, and capital can be freely moved on and off the island.
- Manufactured goods can be labeled as “Made in USA”.
- Puerto Rico has a large non-contiguous Foreign Trade Zone (FTZ) system, and 98% of the island is designated as an Opportunity Zone like Puerto Rico Foreign Trade Zone, San Juan Foreign Trade Zone, Zona Libre del Sur, etc.

9.2.6 Regional investment incentives comparative analysis (1)

High-level comparative analysis of the local economies:

Criteria	U.S. Virgin Islands	Dominican Republic	Jamaica	Bahamas	Puerto Rico
Tax incentives	- 90% reduction in corporate and personal income tax. - 100% exemption on excise tax, property taxes, and gross receipts tax for 20 years.	- No income, goods and services, municipal or export or re-export taxes. - No import duties in free zones for 15 years.	- Reduced income tax of 12.5% (possible effective rate of 7.5% with the approval of additional credits). - Relief from VAT, import duties and transfer taxes. - 50% of stamp duty payable. - R&D and training credit up to 10%. - Can claim accelerated capital allowances for 5 -15 years.	- Free trade zones exemption from income tax, property tax, capital gains, import & export trade taxes, stamp duty, repatriation of profits for 20 years	- 4% fixed income tax. - 100% tax exemption on capital gains. - 75% exemption on property tax. - 50% exemption on municipal license tax. - Tax credits of 50% for R&D expenditures for 15 years.
Minimum investment	$100,000 (small business: $20,000)	$200,000	J$500,000	BS$250,000	$1,000,000 ($500,000 TEA)
Full-time employment	10 and 5 employees in financial services (2 Small Business). 80% of local residents.	Not specified.	29% of local residents.	Not specified.	1 and 3 employees in manufacturing.

Regional investment incentives comparative analysis (2)

Continued …

Criteria	U.S. Virgin Islands	Dominican Republic	Jamaica	Bahamas	Puerto Rico
Other incentives available	- Small Business Tax Incentive Program - Economic Development Parks - State Trade Expansion Program - South Shore Trade Zone Program - TIF S.T.A.R.S. - Hotel Development	Special incentives to: - Border Region - Logistics - International Financial - Tourism - Renewable energy - Film - Innovation in manufacturing - Immigrant investors	- Relief for headquarters operations - Junior Stock Market listing exemptions - Designated development area benefits - Relief for bauxite and alumina industries - Productive Inputs Relief (PIR) scheme	Special encouragement acts for: - Hotel, vacation plan and time-sharing - Manufacturing industries - Hawksbill Creek Agreement, - Tariff exports - City of Nassau Revitalization - Family Island Development - Business diversity waiver	Special incentives for: - Business stability - Finance & insurance - Information technology - Creative industries - Agriculture - Energy sector
Made in the USA Label	Yes	No	No	No	Yes
Industry focus	- Manufacturing - Service businesses - Hotel development	- Manufacturing - Logistics - Film - Tourism - Renewable energy	- Manufacturing - Tourism - Agriculture - Information technology	- Tourism - Financial services - Manufacturing - Agriculture	- Finance and Insurance - Information technology - Agriculture - Energy - Creative industries
Trade zones	Free trade zones at St.Croix & St. Thomas	More than 84 free trade zone parks	Five Special Economic Zones	Free trade zones at Grand Bahama Island	Foreign Trade Zone (98% is Opportunity Zone)

9.3.1 Grant funding programs

- This section covers the key programs identified from federal government grants that could be a match with this project, and potentially act as a funding source for the shipyard development work.
- 15 grants have been identified which focus on different areas, including:
  - Port infrastructure: port security, container wharves, reducing port emissions.
  - Transport infrastructure: improving efficiency, safety and climate resilience.
  - Large and complex projects.
  - High-quality job development.
  - Boating infrastructure: construct/renovate recreational vessel facilities, electrification of ferries.
- This section also has an appendix with a PDF spreadsheet which includes contact details for these grants. It also covers an extra 10 grants which focus on skills and career development, as discussed in Section 6.

9.3.2 Grant funding list (1)

Grant Opportunities	FY 2024 - Grant value & Date	Description
Port Infrastructure Development Program (PIDP)	Yet to open estimated Feb 2024	This federal grant program provides funding for port and intermodal infrastructure projects, including the construction and rehabilitation of marine terminals. • For FY 2024 PIDP Budget: $230 million is requested for the PIDP for grants to improve port infrastructure. In addition to the funding proposed in this budget, the Bipartisan Infrastructure Law continues to provide additional funding of $450 million in advance appropriations to support critical investments in nation's ports. This provides a total of $680 million. • Read more: https://www.maritime.dot.gov/PIDPgrants
Grant value	$680M	
Program total	$2.25B	
Authority	U.S. Dept. of Transportation (US DoT)	
The Rebuilding American Infrastructure with Sustainability and Equity or RAISE Discretionary Grant program	Deadlines (at 11:59 pm Eastern) FY 2024: Feb 28 FY 2025: Jan 13 FY 2026: Jan 13	This program provides funding for transportation projects that have a significant regional or national economic impact and includes a category for port infrastructure projects. It prioritizes projects with benefits in the areas of safety, sustainability, quality of life, mobility/connectivity, economic competitiveness, state of good repair, partnership and collaboration, and innovation. • In 2022, RAISE awarded 166 projects across 50 states, the District of Columbia, Puerto Rico, the Northern Mariana Islands, and the **U.S. Virgin Islands**. • Maximum Award: $25 Million and no more than $100 million can be awarded to a single State. Up to $30 million will be awarded to planning grants, including at least $10 million to Areas of Persistent Poverty. • Funding Infrastructure Investment and Jobs Act (Pub. L. 117-58, November 15, 2021, "Bipartisan Infrastructure Law," or "BIL") provides $1.5 billion annually for FY 2022 – 2026. • Read more: https://www.transportation.gov/RAISEgrants/about
Grant value	$1.5B	
Program total	$12.5B total over 5 years	
Authority	US DoT	

Grant funding list (2)

Grant Opportunities	FY 2024 - Grant value & Date	Description
Reduction of Truck Emissions at Port Facilities Program	Yet to open estimated Apr 2024	This program aims to reduce truck emissions at port facilities. FHWA will coordinate and provide funding to test, evaluate and deploy projects that reduce port-related emissions from idling trucks, including through the advancement of port electrification and improvements in efficiency, focusing on port operations, including heavy-duty commercial vehicles, and other related projects. This NOFO will result in the distribution of up to $160 million, which represents the combined amounts authorized for this program for fiscal years 2022 and 2023. The actual amount available to be awarded under this notice will be subject to the availability of funds. • 2023: Opportunity Status: Closed; Posted Date: 04/27/2023; Close Date: 07/26/2023 • Read more: https://www.transportation.gov/rural/grant-toolkit/reduction-truck-emissions-port-facilities
Grant value	$160M	
Program total	$400M	
Authority	US DoT	
Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation Program (PROTECT) -	Yet to open estimated Apr 2024	PROTECT is a competitive discretionary grant program through the Federal Highway Administration. It funds projects that make transportation infrastructure more resilient to natural hazards and the effects of climate change, including severe storms, flooding, drought, levee and dam failures, wildfire, rockslides, mudslides, sea level rise, extreme temperatures, and earthquakes. The PROTECT discretionary program offers two types of awards: planning grants and Competitive Resilience Improvement Grants. • The PROTECT program individual award amounts vary. Only 40 percent of award funds can be used for construction of new capacity. • 2023: Opportunity Status: Closed; Posted Date: 04/21/2023; Close Date: 08/18/2023 • Read more: https://www.transportation.gov/rural/grant-toolkit/promoting-resilient-operations-transformative-efficient-and-cost-saving
Grant value	$848M	
Program total	$1.4B total over 5 years	
Authority	US DoT	

Grant funding list (3)

Grant Opportunities	FY 2024 - Grant value & Date	Description
Infrastructure for Rebuilding America (INFRA)	Yet to open estimated Jun 2024	This federal grant program provides funding for infrastructure of national significance, which could include improvements to container wharves. Eligibility requirements for INFRA funding include demonstrating that the project has significant national or regional economic benefits and that it addresses a critical transportation need. To help streamline the process for applicants, USDoT has combined the three applications for the Mega, INFRA, and Rural Surface Transportation Grant (Rural) programs into the one common application under the Multimodal Projects Discretionary Grant (MPDG). • 2023: Opportunity Status: Closed; Posted Date: 06/26/2023; Close Date: 08/21/2023; Annual Award Amount: $1.5 Billion • Read more: https://www.transportation.gov/rural/grant-toolkit/infrastructure-rebuilding-america-infra-grant-program
Grant value	$1.5B	
Program total	$3.5B total over 5 years	
Authority	US DoT	
National Infrastructure Project Assistance Program (MEGA)	Yet to open estimated Jun 2024	U.S. Department of Transportation: This program supports large, complex projects that are difficult to fund by other means and likely to generate national or regional economic, mobility or safety benefits. • 2023 Opportunity Status: Closed; Posted Date: 06/26/2023; Close Date: 08/21/2023; Annual Award Amount: $1 Billion • Read more: https://www.transportation.gov/rural/grant-toolkit/national-infrastructure-project-assistance-mega-program
Grant value	$1B	
Program total	$5B total over 5 years	
Authority	US DoT	

Grant funding list (4)

Grant Opportunities	FY 2024 - Grant value & Date	Description
Strengthening Mobility and Revolutionizing Transportation (SMART) Grants Program	Yet to open estimated Jun 2024	Provides grants to conduct demonstration projects focused on advanced smart city community technologies and systems in a variety of communities to improve transportation efficiency and safety. • The Bipartisan Infrastructure Law (BIL) established the Strengthening Mobility and Revolutionizing Transportation (SMART) discretionary grant program with $100 million appropriated annually for fiscal years (FY) 2022-2026. • The FY23 Stage 1 Notice of Funding Opportunity is now closed. Applications were due at 5:00 PM ET on Tuesday, October 10th, 2023. • Read more: https://www.transportation.gov/grants/SMART
Grant value	$100M	
Program total	-	
Authority	US DoT	
Port Security Grant Program	Yet to open estimated Feb 2024	This grant program supports the development and implementation of security measures at critical infrastructure sites, including marine terminals. It could include surveillance cameras, new control systems, implementation of cyber security protocols, or advanced emergency response technologies. To be eligible for Port Security funding, applicants must demonstrate that their proposed security. measures will enhance the safety and security of their facility. • February 27, 2023: NOFO released. May 18, 2023, 5 p.m. ET: Applications due to FEMA. • Read more: https://www.fema.gov/grants/preparedness/port-security
Grant value	$100M	
Program total	-	
Authority	Federal Emergency Management Agency (FEMA)	

Grant funding list (5)

Grant Opportunities	FY 2024 - Grant value & Date	Description
Building Resilient Infrastructure and Communities (BRIC) grant program	Deadline: 3:00 PM by January 9th, 2024	Aims to categorically shift the federal focus away from reactive disaster spending toward research-supported, proactive investment in community resilience. Projects must reduce or eliminate risk from natural hazards through infrastructure projects, policy development or workforce enhancements. • The fiscal year 2023 funding opportunities for two Hazard Mitigation Assistance grant programs are now posted. For this grant cycle, $800 million is available for the Flood Mitigation Assistance (FMA) grant program and the $1 billion is available to the Building Resilient Infrastructure and Communities (BRIC) grant program. • Read more: https://www.fema.gov/grants/mitigation/notice-funding-opportunities/fy2023-nofo • Apply: https://portal.ct.gov/DEMHS/Grants/Building-Resilient-Infrastructure-and-Communities/Apply
Grant value	$1B	
Program total	-	
Authority	FEMA	
Planning Program & Local Technical Assistance Program FY21-23	Open: There are no submission deadlines. Applications will be accepted on an ongoing basis.	This program helps build capacity, guide economic prosperity and resiliency, and create and retain high-quality jobs. • Read more: https://www.eda.gov/sites/default/files/filebase/files/programs/eda-programs/FY21-23-Planning-and-LTA-NOFO_FINAL.pdf • https://www.eda.gov/funding/funding-opportunities/fiscal-year-2021-2023-eda-planning-and-local-technical-assistance
Grant value	Unknown	
Program total	-	
Authority	U.S. EDA	

Grant funding list (6)

Grant Opportunities	FY 2024 - Grant value & Date	Description
Economic Development Grants Experience (EDGE)	Registration is required for dates that are not displayed.	Starting April 6, 2023, EDGE is Required for EDA's PWEAA Grants. Currently Open to PWEAA, the EDGE Portal is accepting applications for PWEAA Construction and Non-Construction, Research and National Technical Assistance, Short-term Planning, and Local Technical Assistance. • Please register: https://sfgrants.eda.gov/ • Read more: https://www.eda.gov/edge
Grant value	Unknown	
Program total	-	
Authority	U.S. EDA	
Build America Bureau Credit Programs	To obtain information about dates that are not displayed, you need to get in touch with the team.	This is responsible for supporting transportation infrastructure development projects in the United States. The Bureau streamlines credit opportunities and grants and provides access to the credit and grant programs with more speed and transparency, while also providing technical assistance and encouraging innovative best practices in project planning, financing, delivery, and monitoring. The Bureau combines the Bureau, TIFIA and RRIF loan programs, Private Activity Bonds (PABs), and technical assistance all under one roof within the Office of the Undersecretary for Transportation for Policy. • Contact: BuildAmerica@dot.gov • Read more: https://www.transportation.gov/buildamerica/ports
Grant value	Unknown	
Program total	-	
Authority	Build America Bureau	

Grant funding list (7)

Grant Opportunities	FY 2024 - Grant value & Date	Description
Boating Infrastructure Grant Program (BIG)	Yet to open estimated Mar 2024	The purpose of BIG is to construct, renovate, and maintain boating infrastructure facilities for transient recreational vessels at least 26 feet long. • FWS organization, has 8,000 employees and volunteers, spread across the country, from Guam to Georgia, Alaska to Puerto Rico. They are organized into thematic programs and geographical regions, overseen by a senior management team of regional and program heads coordinated and guided by the Director. The Director, appointed by the President and confirmed by the Senate, is charged with managing longstanding organizational responsibilities and furthering the White House's priorities. • Mar 2023:Biden-Harris Administration Announces $20 Million in Grants to Support Boating Infrastructure, Local Communities and Outdoor Recreation • Read more: https://www.fws.gov/program/boating-infrastructure
Grant value	$20M	
Program total	-	
Authority	U.S. Fish & Wildlife Service	
Electric or Low - Emitting Ferry Program	Yet to open estimated Jan/Feb 2024	The Electric or Low-Emitting Ferry Pilot Program provides competitive funding for projects that support the purchase of electric or low-emitting ferries and the electrification of or other reduction of emissions from existing ferries. • **On January 26, 2023, FTA announced $384.4 million in grant awards to 23 projects in 11 states and the U.S. Virgin Islands to expand and improve the nation's ferry service, as well as accelerate the transition to zero emission transportation.** • Read more: https://www.transit.dot.gov/funding/grants/grant-programs/electric-or-low-emitting-ferry-pilot-program-iija-ss-71102
Grant value	$97.6M	
Program total	$250M	
Authority	Federal Transit Administration	

Grant funding list (8)

Grant Opportunities	FY 2024 - Grant value & Date	Description
Clean Ports Program	Release of NOFO around February 2024.	The Inflation Reduction Act of 2022 provides EPA with $3 billion to fund zero-emission port equipment and technology and to help ports develop climate action plans to reduce air pollutants at U.S. ports. This new funding program will build on EPA's Ports Initiative that helps our nation's ports, a critical part of our infrastructure and supply chain, address public health and environmental impacts on surrounding communities. EPA anticipates this new funding opportunity will become available for application through a notice of funding opportunity (NOFO) released around February 2024. NOFO closes around May 2024. Applicants are selected around September 2024. Grants are awarded around December 2024. • Includes stakeholder collaboration/communications strategy to address potential effects of plans on stakeholders, including low income and disadvantaged near-port communities, and describes measures to increase resiliency of ports. $750M of total funding to be spent in nonattainment areas. • Funding available until September 30, 2027. • Read more: https://www.epa.gov/ports-initiative/cleanports
Grant value	$3B	
Program total	$3B	
Authority	U.S. EPA	

9.4 Economic and employment benefits (1)

- In addition to employment generation, a shipyard can have a strong positive monetary impact on its locality. Initially, as the facility develops, many goods and services may have to be imported, even simple items. Over time the proportion of goods and services sourced locally will increase as the local supply chain matures. The local economy will therefore expand directly as a result of the establishment of ship repair.
- Ship repair yards require a variety of goods and services, and the development of the yard will stimulate suppliers to locate close to the yard to support this. Suppliers include those involved in engineering, material stock, housing, catering, utilities, waste disposal, supplies, hotel accommodation, transportation, marine surveyors and pilots.
- Ship repair is a labor-intensive industry and sustains a higher level of employment and economic generation than other more general maritime activities such as shipping.

Economic and employment benefits (2)

- Whilst there is debate about the exact level of economic multiplier stemming from shipyard development, what is not in doubt is that there exists a tangible and substantial benefit to the economy as a whole. An approximation of the total economic value of a shipyard can be quantified by using multipliers*, the size of which depends on the extent that goods and services are locally sourced.
  - View on economic multiplier potential 1-2.5:1
  - View on employment generation multiplier potential 0.5-1.5:1
- Repair yards in smaller, less urbanized areas generally have lower multipliers than those in an established industrial infrastructure, as a greater proportion of supplies and services will have to be imported. As the local supply chain develops over time it is also likely the value of the employment and economic multipliers will increase.

*The results from the following studies in this field that serve as examples:

- A study in the USA has found that almost 60% of the jobs generated by private ship repair result from the “economic ripple” effect in the wider economy.
- Research from Oxford Economics reaches similar conclusions on the employment multiplier for the ports and shipping industry in the UK.
- In Spain, indirect and induced employment relating to the shipbuilding and repair sectors has been estimated to be up to six times the level of direct employment in the sector, as opposed to only one and a half times for the country’s maritime sector as a whole.
- A study in India estimated that each person employed within a shipbuilding yard would generate a further 4.4 jobs outside the yard.
- The U.S. Bureau of Economic Analysis Regional Input-Output Model System (RIMS II) applies a multiplier of 3.7 to shipbuilding.

9.5 Section 9 summary

- **Regional investment incentives:** Incentives across the region offer low or no tax for qualifying activities. Although there are no specific incentives for a shipyard or marine activity in each jurisdiction, each does cover industrial activity or manufacturing. In short, most incentives fall within close range of the other jurisdictions. Key differentiators include items such as “Made in USA” label, cost of labour and scale of workforce.
- **Federal government grants:** Federal grant programs have long been a viable source of funds for strategic projects within the USVI. Based on a review of potential grants that would support a shipyard activity, 25 programs have been identified. The grants are administered by the U.S. Department of Transportation (US DoT), the Federal Emergency Management Agency (FEMA), U.S. Economic Development Administration (EDA), Build America Bureau, U.S. Fish & Wildlife Service (US FWS), the U.S. Environmental Protection Agency (US EPA), and the U.S. Department of Labor (US DoL). Many of these grant programs are on annual or periodic cycles for application and approval.
- **Economic and employment benefits:** The development of a shipyard on St Croix will no doubt drive a great deal of economic activity (direct and indirect) from the construction phase through to the operational phase. As an anchor activity in the South Shore Trade Zone, it may also drive additional related investment.

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