SOROS ASSOCIATES Australia PTY LTD

Project No. A 0932

Star Terminal Construction Project

BANKABLE FEASIBILITY STUDY

REPORT for Client Review

For
Government of Vanuatu

Date: 6 April 2010

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

1 BACKGROUND

As an island nation Vanuatu is totally dependent on shipping to sustain its economy. As Vanuatu has continued to develop economically since independence in 1980, the importation and domestic trans-shipment of goods has continued to increase, and exports have fluctuated. Overall there has been a steady increase in shipping and increasing requirements for adequate port facilities, both in Port Vila and elsewhere in the country, which have not been maintained and developed to meet this demand.

To meet the demand for improved and expanded port facilities, the Main Wharf located to the west of Star Wharf is currently undergoing a major upgrade. Options for improving wharf facilities for domestic shipping, with one option being a new domestic wharf on Paray Bay just to the east of Star Wharf, are also being investigated.

In addition to the Main Wharf and Domestic Wharf initiatives, there is also a requirement to upgrade Star Wharf into an international standard container terminal. Such development of Star Wharf is the subject of this Bankable Feasibility Study (BFS) being undertaken by Soros Associates Australia Pty Ltd (Soros) for the Government of Vanuatu (GoV), with funding from the Australian Agency for International Development (AusAID). The GoV will submit the BFS to donors to seek funding for construction of the development.

2 PROPOSED DEVELOPEMENT

The proposed development includes, inter alia (See Chapter 4 - Engineering Design):

- Demolition and removal of the existing Star Wharf and piles.
- Construction of a new wharf (200m long x 20m wide) and associated works.
- Dredging of a berthing pocket and approaches
- Reclamation of 0.94 Ha of land from the sea along the eastern boundary of the site and improvements and paving to the existing reclaimed area, to increase the area available for container storage and handling.
- Demolition of existing on-shore buildings and development of new container storage and handling facilities, including refrigerated container facility and quarantine wash-down facility, and other new onshore facilities, and associated works.

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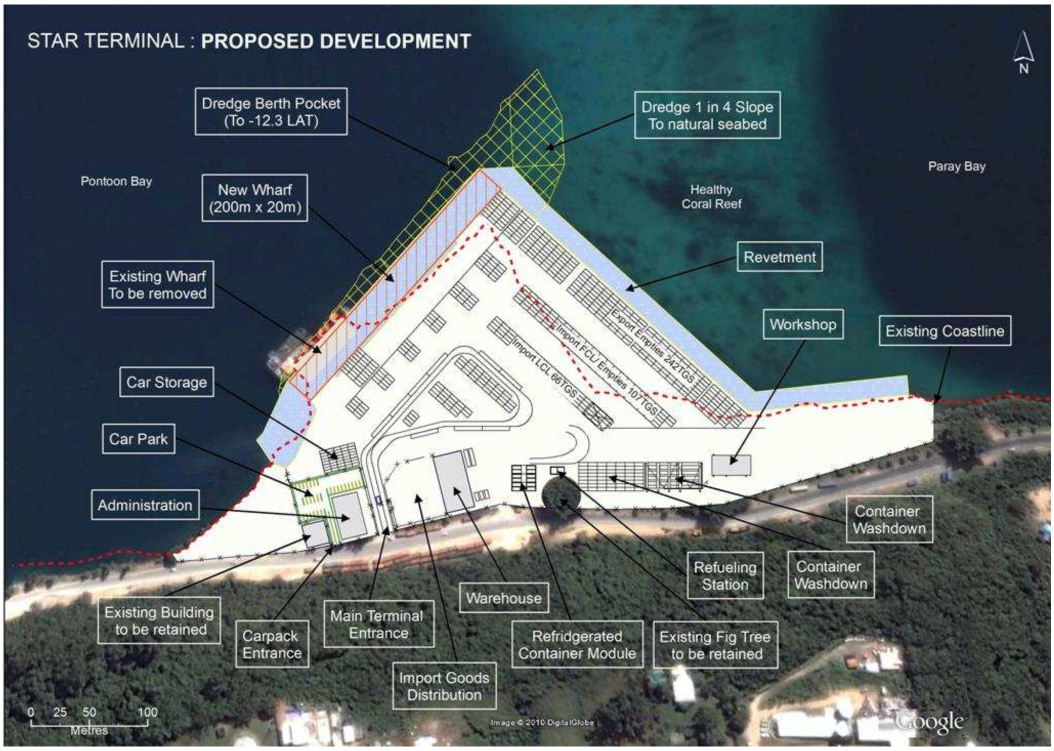
Associated with the development is the restructuring of the Terminal operating company, and provision of new cargo handling plant, including a mobile container crane and forklift trucks. See Chapter 3 - Terminal Operational Philosophy



The construction phase will require a time period of about 30 months. See Chapter 5 - Proposed Project Execution. The wharf facility will have an overall design life of 50 years, and onshore facilities will have a design life of 20 to 25 years.

The terminal will be designed to handle container ships with dimensions of 184.9m Length Overall (LOA), 27.6m beam and 10.6m maximum draft, with capacity for up to 1,257 TEU (Twenty Foot Equivalent Unit) containers.

3 CAPEX

- Required capital expenditure: US$81.2 million.
- Assets acquired:
  - o New multi-purpose container and general cargo ship berth and improved container yard, contiguous with the berth. US$75.8 million (AU$82.5 million). See Chapter 4 - Engineering Design and Chapter 6 - Capital Cost for details.
  - o Facilities for cargo handling and associated activities.
  - o Modern, suitable plant including a mobile container crane and heavy forklift trucks. US$5.4 million. See Chapter 7.2- Plant for details.
- Operated by a restructured, improved terminal and stevedoring operating company, IPDS. See Chapter 3 - Terminal Operational Philosophy for details.

4 APPROVALS

Environmental and planning approval requirements are set out in Chapter 8 - Environmental Impact assessment and Chapter 9 - Regulatory Approvals.

A Supplementary Environmental Impact Assessment has been prepared for the client as part of this BFS.

5 ECONOMIC AND FINANCIAL ANALYSIS

The economic and financial analysis for this project is set out in Chapter 10 - Economic & Financial Analyses. In summary:

Economic benefits:

- Benefits derived from ship and cargo improved efficiency and gains in port productivity will result in lower freight rates, by 10 to 20%, (ie US$250 to US$400 per TEU);
- The proposed mobile harbour crane at the facility would attract a broader range of shipping lines with potential for gearless vessels operated by global carriers offering direct services to and from Asian ports, thus increasing shipping line competitiveness and widening the range of origins/destinations for imports and exports.
- At a 2% discount rate, the net present value to the economy is about US$181 million.
- The economic internal rate of return (EIRR) is 8.2%.

Key financial results:

- The project is cash flow positive in the first year of operation;
- Total cash flow in the first ten years of operation: US$10.4 million;
- Project IRR: 2.4%pa
- NPV at 2%pa: US$9.9 million
- Payback period (ungeared): 31 years.
- Sensitivity testing showed the project is most sensitive to revenue per TEU, followed by volume growth and royalty payments.

The analysis shows that the Star Terminal project is commercially feasible.

6 RECOMMENDED STEPS TO IMPROVE VIABILITY

The financial and economic analysis indicates that the overall project is viable, even although at US$81.2m, the capex is higher than indicated in the scoping study. There are however several ways in which the concept could be improved (see Chapter 12 - Recommendations for Feasibility Enhancement):

- Reduce length of wharf

- Delete Dredging
- Place de-vanning activities off-wharf
- Reduce the Container yard area
- Retain existing Administration buildings, warehouse and workshops.

A quick estimate of the savings that can be achieved, including direct costs and project additionals such as engineering. owners costs, insurances, freight, profit and contingency, is approximately AU$25 million (US$23 million). See Figure 12-1 and Table 9 Potential Areas of Capital Cost saving.

1. INTRODUCTION

1.1 PREAMBLE

Soros Associates Australia Pty Ltd, (Soros), is pleased to present this Bankable Feasibility Study for the development of the proposed Star Container Terminal as per its contract with the Government of Vanuatu supported by the Governance for Growth program of AusAID.

Soros confirms that:

- The Design Criteria have been developed to comply with the requirements of the Government of Vanuatu and AusAID;
- A full market review has been completed to ensure that all future demand for international cargo services have been identified and quantified;
- The Financial Model has been updated to take account of revised costs and revenue projections;
- The program for phasing the development of the works will enable international trade to continue throughout without significant disruption so long as certain works are commenced at an early stage.

1.2 PROJECT BACKGROUND

The demand for this project has arisen from the significant recent growth in demand for the use of the only international deep water berth in the Port of Port Vila, which port services the majority of international trade for the whole of the many islands that comprise Vanuatu. See Figure 1-2.

The growth comprises cruise vessels, which have priority berthing, tankers and container vessels, which are inevitably experiencing berthing delays.

The current upgrade of the existing berth under a Japanese aid program – Main Wharf – will give only temporary relief but will not solve the significant issues which include:

- The limited axle loads permitted on the wharf deck which prevents the use of large forklift trucks, limits the use of mobile harbour cranes and thus the movement of heavy containers;
- The relative shortage of immediately adjacent back-up area for handling and storing containers;
- The distance between Main Wharf and the current back-up area at Star Wharf where containers are currently stored;
- The requirement to use the public open road for container unpacking;
- The competing users of the facility; and
- The lack of ability to achieve an ISPS rating for such operations

Figure 1-1 The existing Main Wharf in the distance and the proposed new Star Terminal site in the foreground.

1.3 PROJECT DESCRIPTION

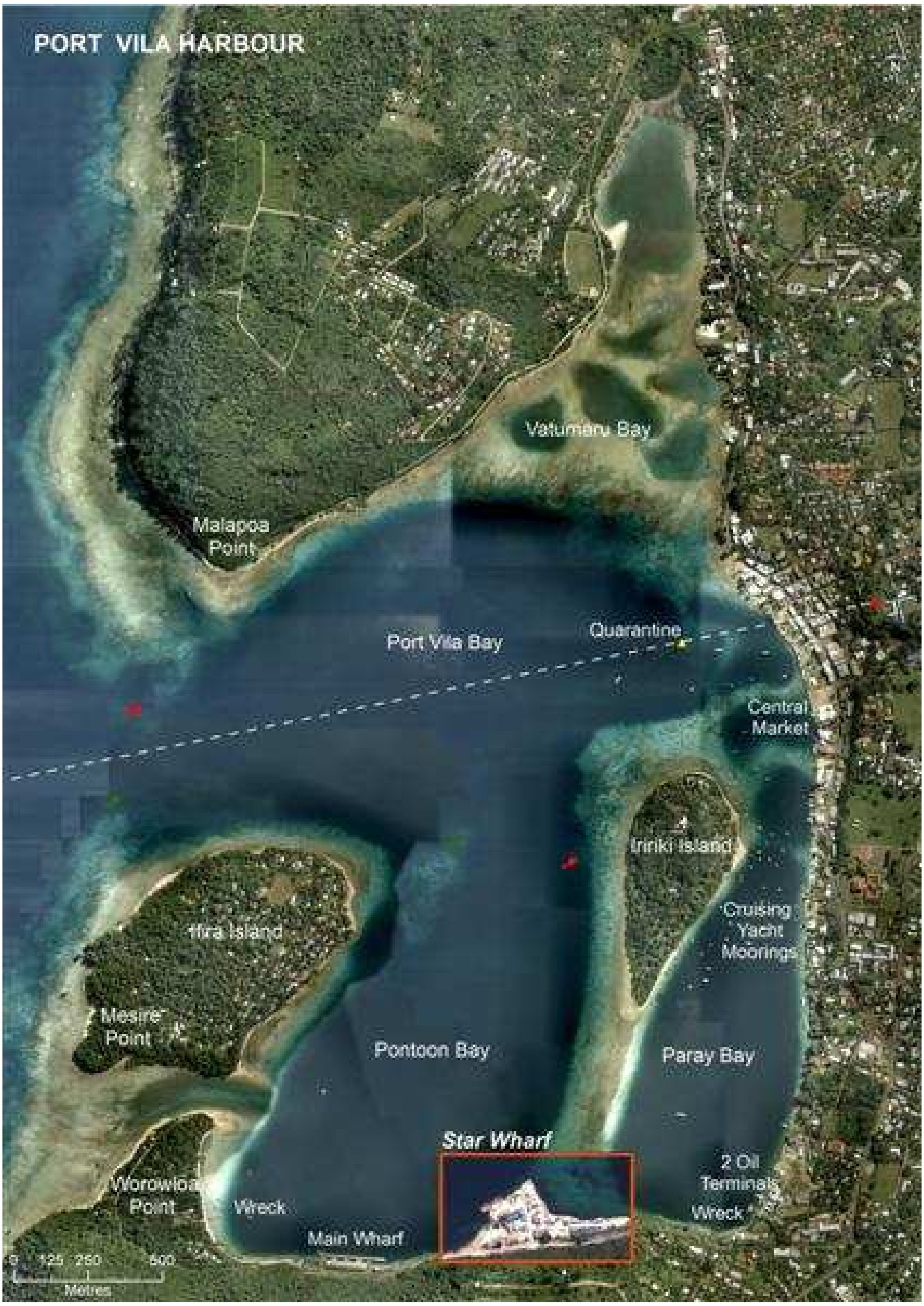
This proposal involves the development of the current Star Wharf precinct into a totally self contained modern container terminal comprising a single berth of 200 metres in length and serviced by a mobile harbour crane. See Figure 1-4.

The existing terminal area presently, (March 2010), provides berthing for about 25% of domestic shipping calls at Port Vila while its primary role is as a harbour side Container Freight Station, (CFS), and Container Yard, (where empty containers are washed and stored prior to being exported out of the country). See Figure 1-1 and Figure 1-3.

The project entails considerable demolition of old or inappropriate structures and the progressive reconstruction of new facilities, while the pavement areas will be built up and contoured to provide appropriate drainage across the whole site.

The majority of the cargo handled is containerised and most other cargo is unitised into small concentrated lifts of such products as pipes, steel and timber and as such are handled in much the same way as containers. Notwithstanding this, the relatively small volumes of containers means that a low key approach must be taken to the handling systems as high cost straddle carriers or rubber tyred gantries would be inappropriate for such volumes and anyway lack the flexibility required for such operations. The terminal handling system has been designed around a forklift operation.

Figure 1-2: Port Vila harbour

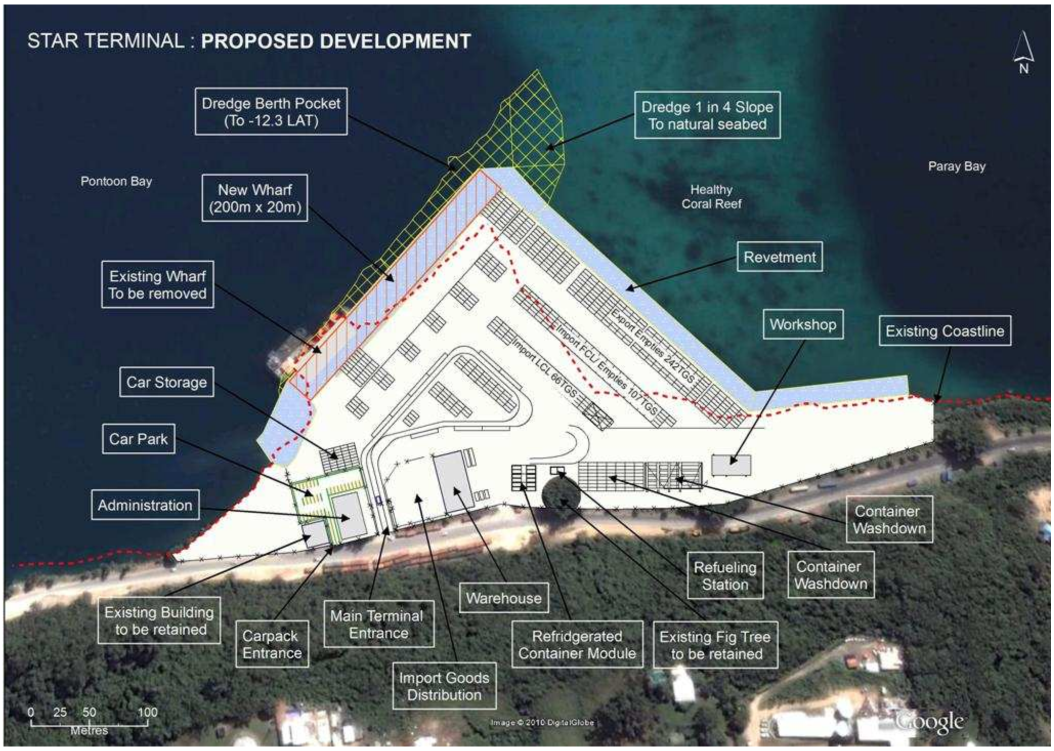


Source: "EcoStrategic Consultants".

Figure 1-3: Star Wharf- Existing facilities

Source: "EcoStrategic Consultants".

Figure 1-4: Star Wharf- Proposed Development



Source: "EcoStrategic Consultants".

2. STAR TERMINAL COMPLEX – THE OBJECTIVE

2.1 TO PROVIDE CAPACITY

The Problem

- High berth occupancy at existing International Wharf, clashing with cruise ships which have priority
- Lack of container storage space
- Lack of LCL unpacking capacity

Objective: Build a new wharf and construct container yard and facilities at the Star Terminal site.

2.2 TO IMPROVE EFFICIENCY

The Problem

- Present very high cost of stevedoring
- Delays and congestion causing poor delivery performance of FCL containers and LCL cargo to consignees

Objective: Introduce management and operational methods, invest in cargo handling plant and develop new relationships with stakeholders that are suitable for the ship and cargo throughputs.

Consultant's Note: the poor efficiency of the existing arrangements is a result of berth congestion (container ships having second priority to cruise ships mostly) and resulting inefficiencies in unloading, and uncontrolled container handling and Yard operations. The inefficiencies are not however directly linked to quay length of the existing International Wharf or the area and size of the existing container yard.

3. TERMINAL OPERATIONAL PHILOSOPHY

3.1 OPERATIONAL PHILOSOPHY AND OBJECTIVES

The IPDS's objective will be to operate the best container terminal in the South West Pacific Region in terms of design, operational efficiency, customer satisfaction and service standards. It is the Government of Vanuatu's desire that within three years from operational commencement of the new facilities the goal will be for the IPDS Terminal to be recognised as a Regional leader in terminal efficiency and performance benchmarks. The IPDS Terminal will be a container terminal that is ultimately seamlessly integrated with other facilities at the Port. It will facilitate efficient transportation of goods throughout the entire supply chain, both upstream and downstream.

Operational efficiency is expected to be achieved by the following:

- Development, in collaboration with Government of Vanuatu, of an efficient container terminal layout that represents best practice and maximises operational efficiency and utilisation with an initial throughput capacity of 20,000 TEUs per annum and a potential design capacity of up to 50,000 TEUs per annum as vessel call frequency and container turn times improve;
- Adoption of a virtually paperless system supported by web-based cargo tracking functionality with continual access for all stakeholders including customers, PHD, Customs and Quarantine;
- Investment in handling equipment costing over Vatu 700 million, including purchase of a mobile harbour crane, two heavy top-lift forklifts and two empty container stackers and other smaller handling equipment and systems;
- Performance standards that meet or exceed the targets set by the Government of Vanuatu in the Concession Agreement;
- Adoption of truck and vehicle management plans that promote efficient cargo delivery and turnaround times (including paperless automated entry and exit systems governing driver, truck and container recognition and related gate controls);
- Flexible labour working arrangements that are responsive to customers and efficiency requirements and which incorporate an acceptable approach to overtime and manning;
- Minimising occupational health, safety and environmental issues, (especially the risk to visitors and personnel employed in the Terminal); and
- Utilisation of well established computer technology and operating and management information systems and real time web-based functionality.

IPDS's plan by necessity also covers the transitional operations during the construction period during which functions will gradually be moved from Main Wharf to Star Terminal.

3.2 TERMINAL DESIGN, OPERATIONAL STRATEGY AND CAPITAL COMMITMENTS

The Container Terminal has been designed and layout has been developed to match the Technical Specifications provided by the specialist maritime engineers, Brisbane-based Soros Associates Australia Pty Ltd (Soros).

The Terminal operator will need to work with the Government of Vanuatu to ensure a seamless integration with the Port's other operations and customers; this includes detailed wharf and terminal design, pre-commissioning and commissioning matters and operational compatibility with any adjacent operations at Main Wharf after the transfer of the container business to Star Wharf and any Domestic port facilities should these be developed to the east on Paray Bay.

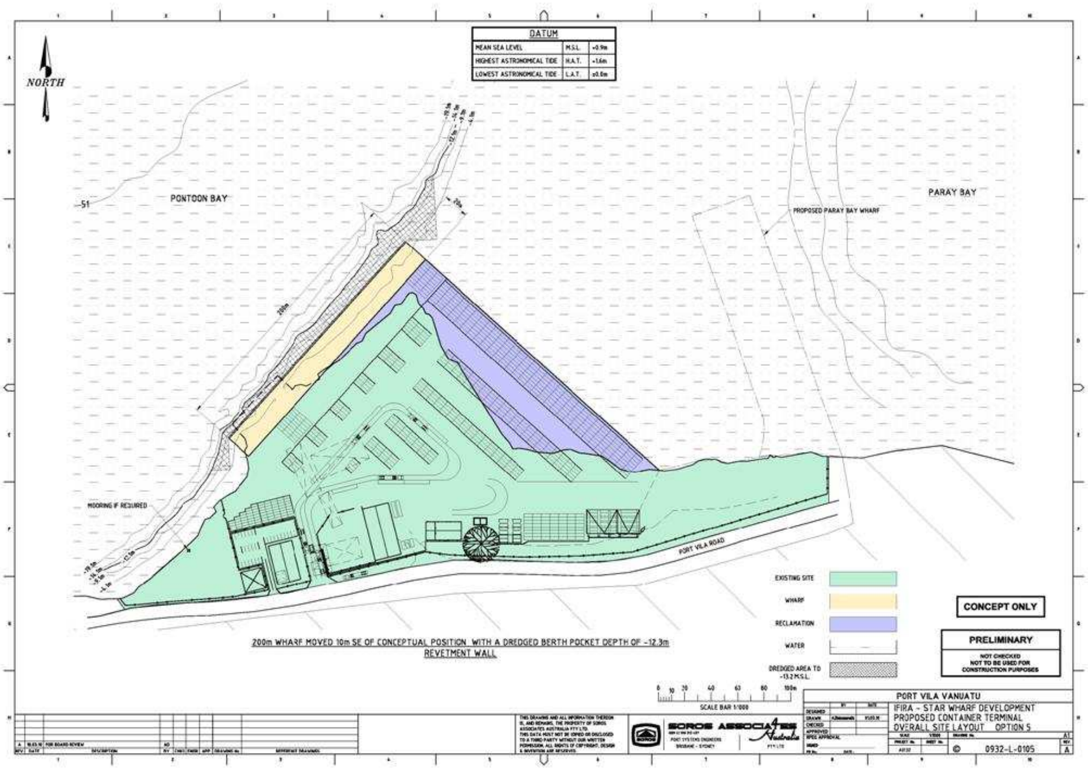
The introduction of the physical plant and equipment will be phased in consistent with the transition, so where it can be shown that such equipment can improve the interim operations, an earlier purchase will be pursued. Tried and tested mechanical equipment models that have the most accessible back-up service potential given geographic exposure will be selected. Systems packages will be acquired that can be remotely serviced as it is recognised that there is a lack of such sophisticated and specialised technology support in Port Vila.

3.2.1 Terminal Design and Layout

A practical design has been developed for the Terminal so that it is possible to best utilize the restricted space and at the same time maximise operational efficiency and capacity within the available footprint.

Figure 3-1 shows the fully developed terminal.

Figure 3-1 – Layout of Star Terminal



The design and layout of the terminal is considerably influenced by the high number of empty containers that are necessarily stored on the wharf as a result of long container dwell times arising from the service intervals of the shipping lines calling at Port Vila.

The container yard operation has been designed for a heavy forklift/empty container handler, (ECH), operation because these machines:

- Can perform all tasks within the terminal;
- Can achieve high stacking and thus be more efficient for the use of limited ground space;
- Are most efficient where the average carry distances between the quayside and the stack is less than about 150 metres; and
- Can operate safely as it is only planned to use one mobile harbour crane going and thus no more than one fork lift will generally be working in the area so lower visibility is less of an issue.

The proposal to use Heavy Forklifts as opposed to Reach Stackers has been made for the following reasons:

- Reach Stackers are usually used where there is a significant demand for reaching over one rail line to access another and, of course, there is no such requirement in Port Vila;
- Reach Stackers are also recommended as a means to reduce double handling when picking imports from a forklift stack but in Port Vila demand is much lower and the stack can be laid out to reduce double handling for the delivery of imports.

3.2.2 Terminal Capacity

The design capacity of the terminal is estimated at 20,000 TEUs per annum using 621 total ground slots, which will include 12 reefer ground slots.

Further reclamation to the east could perhaps double this capacity whereas full utilisation of the existing reclamation to the west, if this is not required for other activities such as the stern and bow ramp ro-ro vessels that currently use Star Wharf, would give the minor benefit of 70 additional ground slots.

3.2.3 Terminal Equipment

To provide capacity to service of gearless ships it is intended to install and operate a terminal operating system utilising a Mobile Harbour Crane (MHC), or ship's gear as required. A simple Terminal Operating System will also be installed to ensure that the operation is better and more efficiently managed.

A summary of major equipment, shown against estimated throughput, is provided in the following table.

Mobile Harbour Cranes	1
Heavy FLT	2
ECH	2
Terminal Throughput ('000TEUs)	12,000

The total capital investment for container yard equipment to achieve the Terminal capacity is in current day values estimated at US$5.4 million.

Mobile Harbour Crane, (MHC)

The MHC to be acquired will have a Panamax outreach of approximately 36 metres and an absolute outreach of 51 metres for handling empties.

A further MHC is budgeted for in Year 10 but as with other equipment this will be acquired as throughput increases, as shown in the above table.

Forklift Trucks and ECH are expected to give a minimum of 50,000 hours of service and thus given low but peaking utilization one can expect that little replacement program will be needed unless growth is very much accelerated.

The MHC will have an under hook capacity of up to about 50 tonnes depending on the outreach requirement and container spreaders that are electrically operated. Each MHC is estimated to cost approximately €2.4 million. (about A$3.5 million)

Yard Equipment

The IPDS Terminal will be primarily based on a forklift operation although it will also deploy empty container handlers. The reasons for this choice are set out below.

Additional Terminal Facilities and Services

Star Terminal development includes new Administration and Maintenance Buildings, the removal of the existing Bond Store and the building of another similar cyclone proof structure, reefer storage, a fully equipped washing facility and an electrical sub-station

The Administration and Amenities Building is proposed to be three stories with amenities, lockers, showers and toilets on the ground floor, staff and client offices, including Operations, Finance and Customs on the first floor, and Board and Management on the top floor. IPDS will not require a control tower, though the operations area will have glass facing the terminal areas for visual oversight to supplement closed circuit television systems. The total area is expected to be approximately 1620 sq metres.

The workshop will be of clear span design with approximate dimensions of 14 metres clear and an estimated 27 metres long. A mobile fueling truck from the fuel company will refuel the MHC but the other mobile plant and trucks will fill from a refueling tank set in a bunded area to the rear, (South), of the terminal.

IPDS will take its power at high transmission voltage and the electrical supply will be transformed through high voltage switch gear and transformers located in a small modern designed sub-station with service ducts, circuit protection etc.

3.3 PROPOSED TERMINAL CAPITAL COMMITMENTS

It is expected that just over US$80 million will be invested in the Terminal. This includes over US$5 million on state of the art container terminal plant and equipment and computer systems. The Terminal will provide extensive staff training and best practice manning arrangements. See Chapter 6 for details.

The capital requirements are expected to be 100% funded through loans arranged by the Government of Vanuatu which will be on-lent on the same favourable terms as acquired by Government. The loans will be guaranteed by the Government of Vanuatu and but secured against the terminal assets.

The total capital investment proposed by IPDS over the initial term of the Concession is US$81.2 million at 2010 values, including replacement and upgrades of plant and equipment.

A financial model and funding plan have been developed that includes all the capital requirements for Star Terminal.

4. ENGINEERING DESIGN

See Appendix II - Engineering design Report *for full report.*

4.1 DESIGN CRITERIA

4.1.1 Ship Traffic and Design Ship

While large ships such as the container vessel "Trans Fiuja" at 192.9m LOA" have been reported to use Port Vila over recent years and previous studies by others have made the assumption that the design container vessel of 1,500 TEU capacity with dimensions 220m LOA x 32m beam x 11.5m maximum draft should be used for further planning and design, Soros is of the view that a smaller design ship should be used.

Information gathered recently has revealed the following vessels are currently scheduled to call at Vila:

Table 1 Characteristics of Ships Calling at Port Vila

Characteristics of Ships currently scheduled to call at Port Vila							
Vessel Name	Coral Islander	Pacific Horizon	Pacific Pathfinder	Southern Trader	Sofrana Surville	Scarlett Lucy	Total Calls
Line	Bali Hai	Swire	Swire	PDL/Reef	Sofrana	Neptune	
GRT	17,111	10,352	18,468	6,245	9,935	3,972	
DWT	17,500	13,387	25468	8,164	12,343	4,100	
LOA m	160.73	158.1	184.9	114.43	140.66	97.8	
BM m	25	22	27.6	20.8	23.2	17.3	
Props	1	1	1	1	1	1	
Speed kts	18	15	18.5	14	15	11.5	
Bow Thruster	Bow			Bow	Bow/Stern	Bow	
Pitch	CPP			Fixed	CPP	CPP	
Call Freq days	35	21	0	18	35	30	
Calls pa	10.4	17.3	0	20.2	10.4	12	
Calls pm	0.9	1.4	0.0	1.7	0.9	1.0	5.9

Swires Shipping advised in recent consultations that other vessels are scheduled to call at Vanuatu that are heavier – e.g. Challenger class vessels.

Hence, the wharf has be designed to accommodate the following range of vessel sizes:

- A fully laden container carrier of 25,561 DWT, 184.9 m LOA 27.6 m beam 10.6 m loaded draft (MV Tasman Mariner)
- RoRo carrier of 17,800 DWT, 160.73 m LOA operated by Greater Bali Hai

Larger ships may berth, however controlled conditions such as use of a tug and minimal use of the ships propellers will have to be employed.

4.1.2 Standards

In the absence of specific Vanuatu codes, Australian standards and codes have been adopted for the detailed wharf and container yard design. It is proposed also to extend the list to comprehend the guidance provided by the World Association for Waterborne Transport Infrastructures - PIANC[1].

4.1.3 Wave & Climate Criteria

Soros has undertaken a wave analysis for climactic conditions at the proposed site of the Star Terminal in Port Vila, Vanuatu, during a 50 year storm condition. It has confirmed previous studies which indicated that significant wave heights of 0.9 metres can be expected at the site with the design period of 50 years.

Table 2 Significant wave heights summary

Scenario	Description	Significant wave height, H_S	Significant period T_S
1	Storm driven sea state Westerly Direction	0.92 metre	4.0 seconds
2	Fetch limited sea state Mele Bay	0.40 metre	3.8 seconds
3	Fetch limited sea state Pontoon Harbour	0.70 metre	2.5 seconds

A full report of wind and wave conditions is provided in Attachment C in the Engineering Report in Appendix II.

4.2 ASSUMPTIONS

Assumptions are set out in the Engineering Report in Appendix II.

4.3 WHARF DESIGN

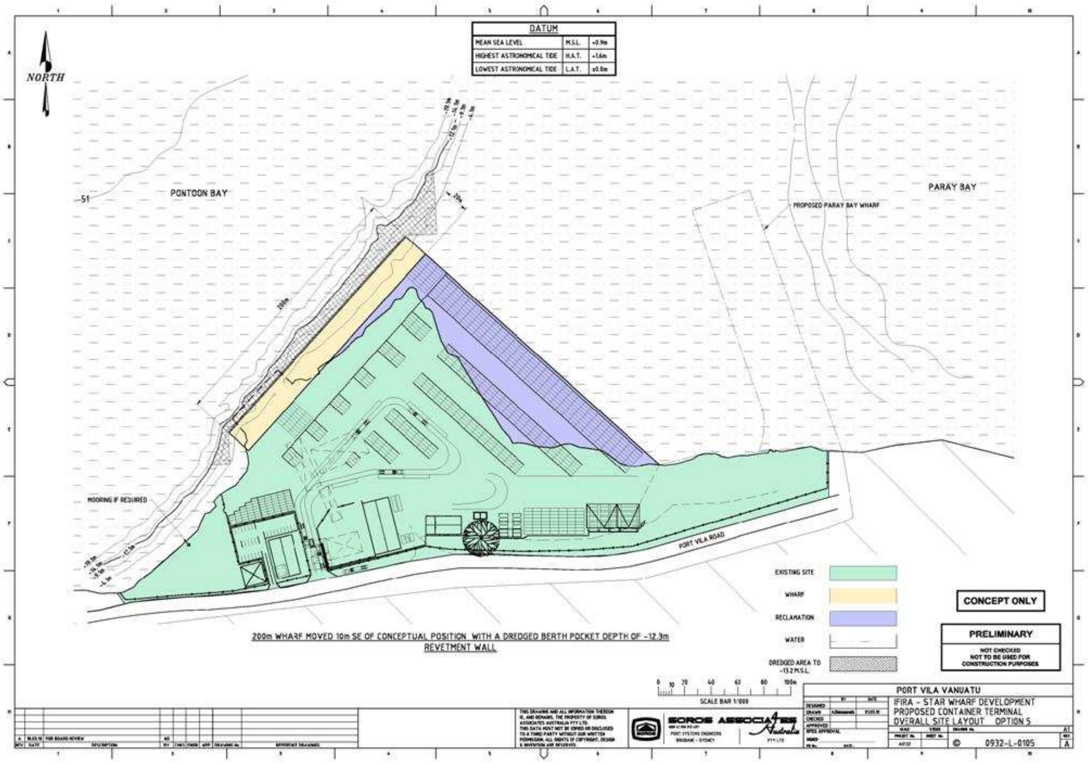
4.3.1 LOCATION

While the wharf is still proposed to be located adjacent to the Star Wharf complex, it has been necessary to review the conceptual design location. An amended configuration and alignment is now proposed as a result of new geotechnical and hydrographical information obtained during this study.

[1] PIANC is the global organisation providing guidance for sustainable waterborne transport infrastructure for ports and waterways. It brings together the best international expects on technical, economic and environmental issues pertaining to waterborne transport infrastructure. PIANC provides guidance to public and private partners through high quality technical reports.

As shown in Figure 4-1 – Optimal Location & Layout of Wharf and Yard, Soros considers that the optimal location and design for the wharf is adjacent to and extending eastwards from Star Wharf. A dredged berth and approaches at RL – 12.3 metres below Lowest Astronomical Tide (Chart Datum) will be required.

Figure 4-1 – Optimal Location & Layout of Wharf and Yard



A full option analysis is provided in the Engineering Design Report in Appendix II

The design layout showing the proposed wharf position, the proposed dredged basin and approach and the proposed reclamation and yard design is as shown below:

Design details are shown in drawings in Appendix III - Tender Documents: Attachment D - Tender Drawings.

4.3.2 GEOTECHNICAL AND SEISMIC INVESTIGATION

A preliminary geotechnical investigation of the Wharf site has provided sufficient subsoil information to make assumptions for the design of the steel piles and the container yard and building foundations.

The preliminary report indicated that based on borehole drilling over water, the site is likely to be amenable to the proposed wharf construction with reasonably competent limestone providing the pile founding stratum.

A summary of the preliminary report is attached in Attachment F - Geotechnic Investigation Report to Appendix II and the final report together with a seismic assessment will be provided as a supplementary to this report.

4.3.3 HYDROGRAPHIC and TOPOGRAPHICAL SURVEYS

A key finding from the hydrographic survey commissioned during this study was the presence of lateral ridges on the eastern end of the proposed wharf site and a ridge running parallel with the wharf on the western end.

As described above, this required the conceptual wharf design to be changed by providing a dredged berth basin and approach and a revised alignment in order for the reclamation behind the wharf to be constructed in reasonably shallow water (4 metres below LAT)

The Hydrographic Survey report is attached as Attachment D to Appendix II.

4.3.4 STRUCTURAL DESIGN

The main area of the wharf is 20m wide x 200m long. Driven piles are spaced on a grid 6.25m by 6.25m. Steel box girder headstocks are supported on the piles at 6.25m centres.

A row of raking piles at the rear and 3 sets of raking piles longitudinally spaced along the centre give stability to the wharf. For the determination of losses due to corrosion of steel piles it is recommended that an annual corrosion rate of 0.15mm / year on each exposed face be adopted. This has been built into the design of piles and the thickness has been increased accordingly.

A number of assumptions have been made for allowable bearing pressure and skin friction for the design of the piles due to the preliminary information received for the geotechnical investigation, this would apply to the seismic loadings as well.

The superstructure for the wharf design comprises of steel box girder headstocks welded to the circular steel piles. Pre cast concrete deck elements are supported on the Headstocks, a cast in situ concrete topping completes the deck. All wharf concrete has a characteristic compressive strength (f'c) of 50 MPa.

Berthing loads applied by ships to the wharf and seismic loadings cause uplift forces on the piles, to eliminate this as much as possible an anchor slab at the rear of the wharf is constructed to help transfer horizontal forces to the land.

The wharf deck is designed to take the design loads applied by the mobile harbour crane, fork lifts, empty container handlers, stacked full / empty containers and A160 Traffic Loads. It is a recommendation to have dedicated areas marked on deck for placing of crane pads when operating.

The anchor / settlement slab at rear of the wharf is designed to accommodate forces imposed by pavers, overburden, sub base, traffic loads, and a 50KPa live load for the stacking of containers. The mobile harbour crane is excluded from using this area but 2 dedicated areas have been assigned and the settlement slabs have been strengthened to suit.

The existing wharf structure is to be demolished and removed so as to facilitate the Star Terminal construction, a staged construction of the wharf will be necessary so as not to impact on the overall operations.

The design of wharf structure is to relevant Australian Codes of Practice as documented in the Engineering Design Report.

For the protection of steel piles it is recommended that a cathodic protection is considered as this is the most suitable in delaying the onset of corrosion in a cost effective way.

4.3.5 FENDERING

A Cone Fender (manufactured by Trelleborg, Bridgestone, or similar) is fitted to the front face of the Wharf, a Fender Panel is attached to the front face of the Cone. The Cone Fender is to be mounted on the centre line of a pile grid and Headstock and spaced 12.5m centres to allow for use by the large range of container ship sizes expected to use the wharf.

4.3.6 MOORING

80 tonne capacity mooring bollards are proposed along the wharf length at 12.5 metres to allow for mooring of different size ships.

A further 80 tonne bollard is proposed on land west of the wharf to facilitate stern line mooring of the design vessel (184.9 m LOA)

These moorings will not be adequate as cyclone moorings in which case ships will have to be put to sea.

4.3.7 DREDGING AND RECLAMATION

The presence of lateral ridges and uneven sea bed at the wharf site has necessitated a dredged berth and approach area to RL -12.3 m (LAT).

The preliminary geotechnical report has indicated that beach deposits are present in a layer 8 -12 metres thick which forms the proposed dredging zone. While this material is assessed as dredgable by a cutter suction dredger or an excavator dredger, the presence of limestone deposits and a capacity limited reclamation would mitigate against the use of cutter suction techniques.

The amount of dredged material will be in excess of capacity in the reclamation area and the surplus spoil will have to be managed by:

- Using material as fill in the domestic shipping wharf development proposed for Paray Bay.
- Making material available for sale for building fill.
- Subject to an EIA the material could be disposed of off shore at a suitable location.

4.3.8 REVETMENTS

It is proposed to protect the existing and new fill in the yard by a revetment (seawall) consisting of an armour layer of limestone boulders, a filter layer of crushed coral and a filter layer of geotextile fabric.

The revetment has been designed to withstand wave action, ship propeller wash and wash from ship's bow thrusters in accordance with Australian and international codes.

4.4 YARD DESIGN

4.4.1 GEOTECHNICAL INVESTIGATION

A preliminary geotechnical investigation of the container yard has provided sufficient subsoil information to make assumptions for the design of Footings, Bored Piles, Slabs and Paving Sub Base. See Attachment F - Geotechnic Investigation Report to Appendix II.

4.4.2 PAVEMENT LOADS AND DESIGN

For the Pavement to be a success compaction and grading of the sub grade as well as drainage is a key element to ensure a long service life - Refer to Container Yard Paving Details on Drawing 0932-S-0011.

Concrete Block Pavements have been used for heavy duty pavements in Container Terminals for over 25 years based on their abilities to withstand severe dynamic and static loadings, resistance to fuel and hydraulic oil damage, settlement as well and in many instances being more economical than asphalt or rigid concrete pavements.

For these reasons pavers were chosen as the preferred method of construction at the Star Terminal Container Yard.

As Vanuatu is subject to Earthquakes, pavers also have the advantage of local repair without the need for specialist equipment and they can tolerate higher levels of seismic activity allowing movement without destruction.

The Pavers are designed for the following loads:

- Container Stacking as per AS 4997 (Guidelines for the Design of Maritime Structures) - This covers Full / Empty Containers
- Container Transport as per AS 4997 – This covers Fork Lift / Empty Container Handlers.
- Mobile Harbour Crane in Travelling Mode.
- A160 Traffic Loads as per AS5100 (Bridge Design).

For the Pavement to be a success compaction and grading of the sub grade as well as drainage is a key element to ensure a long service life - Refer to Container Yard Paving Details on Drawing 0932-S-0011.

4.4.3 BUILDING DESIGN

The following facilities Buildings are included in the Structural Design:

- Warehouse Building.
- Workshop Building.
- Administration Building.
- Refrigerated Container Power Tower.
- Container Wash Bay.

- Refuelling Station.
- Leakage Containment Tank.

A detailed description of each facility and design loads according to the relevant Australian Codes is contained in the Engineering Design Report.

The selection of materials; Structural Steel, Concrete, Aggregates and Reinforcing Bar is dependent on availability and lead times for delivery.

The design of Pad Footings, Bored Piles and Ground Slabs has been designed to the relevant Australian Codes of Practice with a characteristic compressive strength (f'c) of 40 MPa. A preliminary Geotechnical field summary of findings was used to make assumptions for the allowable bearing pressures and skin frictions. Once the final geotechnical report is finalised these pressures / skin frictions can be confirmed.

4.5 MAINTENANCE

Information on maintenance expectations are set out in the Engineering Report in Appendix II.

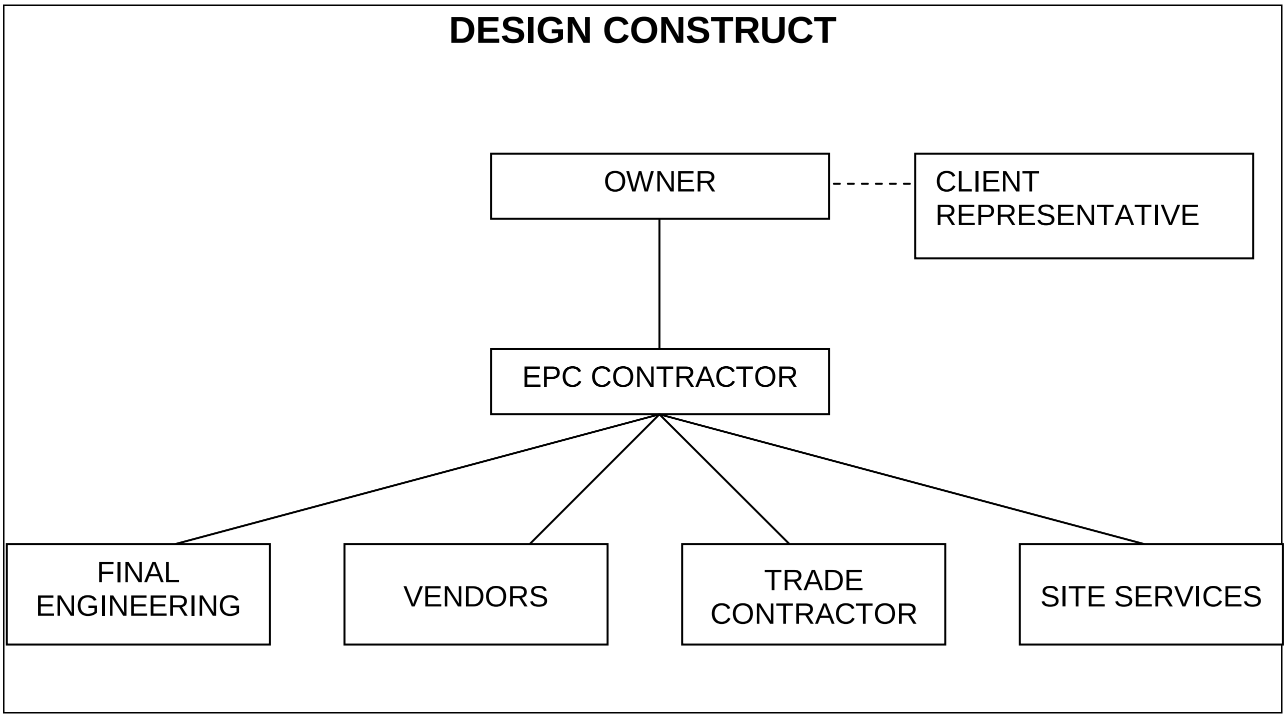
5. PROPOSED PROJECT EXECUTION

5.1 PROCUREMENT PLAN

5.1.1 Tender & Construction Contract

EPC Contract

For many years the most common way for an Owner to procure a major construction project was by using a fixed price, lump sum turnkey method. This is called an Engineering, Procurement and Construction contract (EPC). An EPC contract is a design and construction contract where a single contractor takes responsibility for all elements of design (engineering), procurement and construction. By this method Banks and Owners expect to get the degree of certainty as to time and costs that they require. This method has been so popular that the International Federation of Consulting Engineers (FIDIC) has produced standard contract forms that closely reflect these market conditions, whereas FIDIC have yet to develop a standard form of contract for Engineering, Procurement and Construction management (EPCM). There are also subcontractors and major vendors engaged by the EPC contractor for their specialty parts of the project. Banks provide the financing for the project. The figure below shows the typical organizational structure for a Design Construct model. Noting that the Government of Vanuatu does not have extensive resources to manage and administer an EPC Contract, Soros highly recommends that there be a Client Representative selected to be an interface between the Government of Vanuatu and the construction contractor, to ensure that the EPC Contract is thoroughly and diligently delivered upon. It is important to note that this is not an unusual practice.



For major projects it is not unusual to split the project delivery into two phases. In the first phase engineers set the design parameters which define the work scope and break the work into work packages for budgeting and planning purposes. This work needs to be done in enough detail to allow the Owner to go out to the market to tender the work. This is basic or conceptual engineering. This usually includes project schedules and cost estimates. This basic engineering is then used to obtain competitive bids for a construction contractor on a lump sum basis.

One of the key benefits to an EPC delivery method contract is that an EPC Contract can be used to overcome what is arguably the flaw in EPCM delivery. When EPCM Contracts have gone wrong it has usually emanated from a lack of competitive bids and transparency in the tender process for selecting suppliers and contractors. EPC contractors, on the other hand, have a vested interest in getting the best result in all sub-contracts in order to win the work in the first instance.

Perhaps the key consideration for an EPC delivery is that the contractor must pick up the design work from where consultancy contracts have left off. The critical issue is to avoid any later disputes over liability of design versus construction risk. It is Soros' view that this issue is best mitigated by way of:

- Not taking design to a construction-ready level during study design phases; and
- Taking forth the consultant used during study work to support the client/project owner during the delivery/execution phase of the project.

Appointment of Client Representative

Soros highly recommends that there be a Client Representative selected to be an interface between the Government of Vanuatu and the construction contractor, to ensure that the EPC Contract is thoroughly and diligently delivered upon. This is covered in the capex estimates as a line item amounting to AU$ 818,040, although the cost of a Client Representative can vary significantly. The GoV can determine what level of costs depending on what assistance they request from a Client Representative.

As a guide, the following costs are based on a Client Representative assisting the GoV for 12 weeks full time preceding the award of a construction contract. The costs then assume a 30 month construction schedule with one full time week at the Star Terminal jobsite and one full time week in the representative's home office each month. Eight weeks of full time assistance after construction to finalize costs and accounting with the contractor are also included. Should the GoV desire any more or less assistance than this they can negotiate whatever amount of assistance they desire. These Client Representation costs should probably be negotiated as a time and material costs and not as lump sum, fixed fee costs. The following costs serve only as an example and are the basis of the costs in the Capex estimate.

Table 3 Estimated Client Representative Costs

Salary for 12 weeks before contract award			
wks	$/hr	hr/wk	
12	170	40	= $81,600.00
Salary for 1 week per month in home office			
wks	$/hr	hr/wk	
30	170	40	= $204,000.00

Salary on jobsite one week per month with overtime				
wks	$/hr	hr/wk		
30	170	60	=	$306,000.00
Average airplane costs to and from Port Vila				
trips	$/trip			
30	850	1	=	$25,500.00
Misc travel costs to get to and from Port Vila				
wks	$/wks			
30	100	1	=	$3,000.00
Lodging costs at Port Vila				
wks	days/wks	$/day		
30	7	176	=	$36,960.00
Living expense costs in Port Vila				
wks	days/wks	$/day		
30	7	110	=	$23,100.00
Communication costs in Port Vila				
wks	$/wks			
30	50	1	=	$1,500.00
Taxis, buses etc. while in Port Vila				
wks	$/wks			
30	66	1	=	$1,980.00
Salary for 8 weeks after job completion				
		hr/wk		
	=	40		$54,400.00
Miscellaneous extras = 10% +/-			=	$80,000.00
Total of all estimated Client Representative costs			**=**	**AU$ 818,040.00**

Type of procurement

Soros were advised to assume that financing of this project would be through tied funding. In such as case, the type of procurement of EPC contractor will be dictated by the funding agency. In the event, however, of non-tied funding, Soros recommends that procurement of the EPC contractor be through closed tender with the Client's Representative working closely with the Client to close out those parties that are on the tender invitee list. Soros considers that all those mentioned in Section 5.3.2 - Availability of Contractors below are suitable and could be included on that list.

Other Procurement Items

A capital cost estimate and a draft construction schedule along with a model Project Execution Plan ("PEP") have been produced. A supplement to the Environmental Impact Study has been written. An economic report and analysis has also been written. Land, bathymetric and topographical surveys have been completed. Geotechnical drilling has been done and reports are being written. The Government of Vanuatu can now proceed to obtain funding and then a construction contractor for the Star Terminal project.

5.1.2 Tender Documents

A FIDIC example contract has been written and are attached as Appendix III - Tender Documents. Technical specifications and design criteria have been produced. Detailed engineering drawings have been created.

Specifications

Model specifications are attached as Tender Documents, Attachment B - Specifications, covering:

- **Structural**

Structural Earthworks Specification	A0932-TS-CS-0001
Bored Cast – In Place Piles Specification	A0932-TS-CS-0002
Concrete Works Specification	A0932-TS-CS-0003
Steel Fabrication Specification	A0932-TS-CS-0004
Protective Coating Specification	A0932-TS-CS-0005
Cladding Specification	A0932-TS-CS-0006
Brick & Concrete Masonry Specification	A0932-TS-CS-0007
Administration Building Functional Requirements Specification	A0932-TS-CS-0008

- **Electrical**

Electrical Specification	A0932-TS-EL-0001

- **Fire & Water**

Water Pumps Specification	A0932-TS-M-0001
Fire and Water Services Specification	A0932-TS-M-0002

- **Special Construction**

Dredging Specification	A0932-TS-SC-0001
Wharf Furniture Specification	A0932-TS-SC-0002
Revetment Specification	A0932-TS-SC-0003
Pile Driving Specification	A0932-TS-SC-0004

- **Miscellaneous**

Scope of Works & General Technical Specification	A0932-TS-0001
Design Specification	A0932-TS-CS-009

Drawings

Drawings are also attached as Appendix III, Attachment D - Tender Drawings. The drawing schedule is:

DRAWING NO	TITLE	REVISION
0932-L-0000	Drawing Register	A
0932-L-0001	Overall Site Plan	E
0932-L-0002	Overall Site Plan (Option 2)	B
0932-L-0003	Wharf Layout Sheet 1 of 2	A
0932-L-0004	Wharf Layout Sheet 2 of 2	A
0932-L-0005	Wharf Section	A
0932-L-0006	Shipping Approach Diagram	A
0932-L-0007	Container Yard Movement Diagram	A
0932-L-0008	Water & Fire Water Pipe layout	A
0932-L-0009	Ship Berth Arrangement	A
0932-L-0010	Reclaim & Overall Site Areas	A
0932-L-0101	Overall Site Layout Option 1	A
0932-L-0102	Overall Site Layout Option 2	A
0932-L-0103	Overall Site Layout Option 3	A
0932-L-0104	Overall Site Layout Option 4	A
0932-L-0105	Overall Site Layout Option 5	A
0932-L-0106	Overall Site Layout Option 6	A
0932-L-0107	Overall Site Layout Option 7	A
0932-L-0201	Construction Phase 1	A
0932-L-0202	Construction Phase 2	A
0932-L-0203	Construction Phase 3	A
0932-L-0204	Construction Phase 4	A
0932-L-0205	Construction Phase 5	A
0932-C-0001	Finish Grading & Drainage Plan	A
0932-C-0002	Subgrade Grading Plan	A
0932-C-0003	Finish Grading & Drainage Sections Sheet 1 of 2	A
0932-C-0004	Finish Grading & Drainage Sections Sheet 2 of 2	A
0932-S-0001	Wharf Pile Layout Sheet 1 of 2	A
0932-S-0002	Wharf Pile Layout Sheet 2 of 2	A
0932-S-0003	Wharf Pile Detail & Notes	A
0932-S-0004	Wharf Steel Headstock	A
0932-S-0005	Fender Details	A
0932-S-0006	Wharf - Deck & Element Details	A
0932-S-0007	Pile/Headstock Connection Details	A
0932-S-0008	Wharf - Anchor Slab Sections	A
0932-S-0009	Anchor Slab Details Sheet 1 of 2	A
0932-S-0010	Anchor Slab Details Sheet 2 of 2	A
0932-S-0011	Container Yard Paving Details	A

DRAWING NO	TITLE	REVISION
0932-S-0012	Light Pole Footing Details	A
0932-S-0013	Wharf Dredging & Revetment Plan	A
0932-S-0014	Wharf Sections	A
0932-S-0015	Wharf Revetment Detail Sheet 1 of 2	A
0932-S-0016	Revetment Details Sheet 2 of 2	A
0932-S-0100	Container Washbay Layout	A
0932-S-0101	Container Washbay Concrete Details	A
0932-S-0200	Administration Building Layout	A
0932-S-0201	Administration Building Ground Floor plan	A
0932-S-0202	Administration Building First Floor plan	A
0932-S-0203	Administration Building Second Floor plan	A
0932-S-0204	Administration Building Slab/Footing Details	A
0932-S-0300	Workshop Layout	A
0932-S-0301	Workshop Slab & Pile Layout	A
0932-S-0302	Workshop, Warehouse, Washbay -Slab Details	A
0932-S-0303	Workshop, Warehouse, Washbay -Single Pile Details	A
0932-S-0304	Workshop - Double Pile Detail	A
0932-S-0305	Workshop - Pad Footing Detail	A
0932-S-0400	Warehouse Layout	A
0932-S-0401	Warehouse Slab & Pile Layout	A
0932-S-0500	Refrigeration Tower Layout	A
0932-S-0501	Refrigeration Tower Footing Detail	A
0932-S-0600	Refueling Station Bund & Footing	A
0932-STD-0001	General Notes Sheet 1 of 2	A
0932-STD-0002	General Notes Sheet 2 of 2	A
0932-STD-0003	Slab on Ground, Plinth & Wall Details	A
0932-STD-0004	Pedestal Details	A
0932-E-0100	Electrical Power Flow Diagram	A
0932-E-0101	Single Line Diagram for SUB PDB-1	A
0932-E-0102	Single Line Diagram for SUB PDB-2	A
0932-E-0103	Single Line Diagram for SUB PDB-3	A
0932-E-0104	Single Line Diagram for SUB PDB-4	A
0932-E-0105-SH1	Single Line Diagram for SUB PDB-5 Sheet 1	A
0932-E-0105-SH2	Single Line Diagram for SUB PDB-5 Sheet 2	A
0932-E-0106-SH1	Single Line Diagram for SUB PDB-6-Sheet 1	A
0932-E-0106-SH2	Single Line Diagram for SUB PDB-6-Sheet 2	A
0932-E-0107	Single Line Diagram for SUB PDB-7	B
0932-E-0108	Single Line Diagram for MAIN PDB	A
0932-E-0109	Electrical Legend Sheet	A
0932-E-0110	Electrical Warehouse Solar System	A
0932-E-0111	Electrical Workshop Solar System	A

DRAWING NO	TITLE	REVISION
0932-E-0200	Electrical Workshop arrangement	A
0932-E-0201	Electrical Warehouse arrangement	A
0932-E-0202	External area & navigation aid lighting layout	B
0932-E-0203	Wharf, Yard & Reefer Tower Power Outlet	B
0932-E-0302	External Area Cable Route Layout	B
0932-E-0400	Electrical Cathodic Protection System Drawing	A

5.2 CONSTRUCTABILITY

See Appendix IV - Constructability Report for a report on the constructability, prepared for Soros by Waterway Constructions Pty Ltd.

5.3 CONSTRUCTION PHASE

5.3.1 Project Execution Plan

A Project Execution Plan is attached as Appendix III, which contains information on the following:

- Project Description
- Personnel/Staffing Plan
- Design/Engineering Plan
- Project Services (Control) Plan
- Document Numbering
- Procurement Plan
- Contract/Subcontract Management
- Client And Management Reporting Plan
- Project Reports And Meetings
- Construction And Commissioning Plan
- Labour Relations Plan
- Quality Plan
- Occupational Health And Safety Plan
- Environmental Plan
- Project Turnover and Acceptance Plan
- Management Participation Plan
- Completed Project Review & Standardised Cost Data Capture
- Value Engineering / Management
- Estimate Plan

The tender requirements state that tenderers must prepare and the succesful tenderer keep updated a PEP for the tender, and throughout the construction period. The PEP must be at an equivalent or better standard than that attached here, in content and completeness.

5.3.2 Availability of Contractors

Soros contacted 8 construction contractors regarding their interest and qualifications for the Star Terminal Construction project.

The following 5 contractors submitted their interest letter and qualification package:

- Downer EDI Works Vanuatu Limited
- Fletcher Construction
- Leighton Contractors Pty Limited
- McConnell Dowell Constructors Ltd
- Waterway Constructions

Waterway Constructions was only interested in the wharf piling and wharf construction phase of the project. They could be used as a sub-contractor to another main construction contractor.

The following 3 contractors declined to be considered for this project:

- Bechtel of Brisbane, Australia
- BMD of Brisbane, Australia
- Clough of Perth, Australia

This list of construction contractors is not an all inclusive list. Soros is certain there are other qualified contractors available who would also be interested in the construction of this project.

The qualification information these companies submitted is shown alphabetically in Appendix V - Availability of Contractors.

5.3.3 Potential Contractors Capability and Local Materials Supply

Soros does believe the contractors of the Southwest Pacific area do have the necessary plant and capability to successfully construct the new Star Terminal facility. Evidence of this is the soon to be successfully completed Main Wharf modernization and strengthening project. The Main Wharf project was very similar in types of construction and in the required labour skills and materials to what is required for the Star Terminal. The Main Wharf construction activity involved pile driving, placement and tying of rebar and concrete pouring. An Administration building was also constructed. These same labour skills and materials will also be required for the Star Terminal facility.

The availability of major construction equipment at the time required will also be important. Soros has talked with dredging companies, pile driving companies and construction companies, etc. This equipment is available but it could be busy at other construction sites when it is needed at Port Vila. The contractors prefer to keep their construction equipment busy closer to home if they can. If the construction industry is very busy it gets harder and more expensive for the contractors to send their scarce equipment overseas.

The largest quantity of local material required for the Star Terminal facility will be aggregates for concrete, backfill and revetment shore protection. This material is available in the Port Vila area. Perhaps the question is at what rate can the aggregates be produced and delivered? The contractor needs to coordinate and confirm the production rates of this material and probably have more than one source. It was suggested in the last Ifira board meeting that there are some local land owners who would also have sources of fill aggregates. Some of this material is also required in a more unusual form than normal. For instance smaller aggregates can always be produced from natural material handling and crushing. Larger size aggregates, which can sometimes be less plentiful, are required for the shore revetment protection and must be separated and saved for this specific use rather than crushed down to the smaller sizes. There is also some high strength concrete required for the wharf. This will require higher quality aggregates which are not as available as the common limestone aggregates. These so called “blue aggregates” should also be separated and stored for this high strength concrete use and not used where any ordinary aggregates could be used.

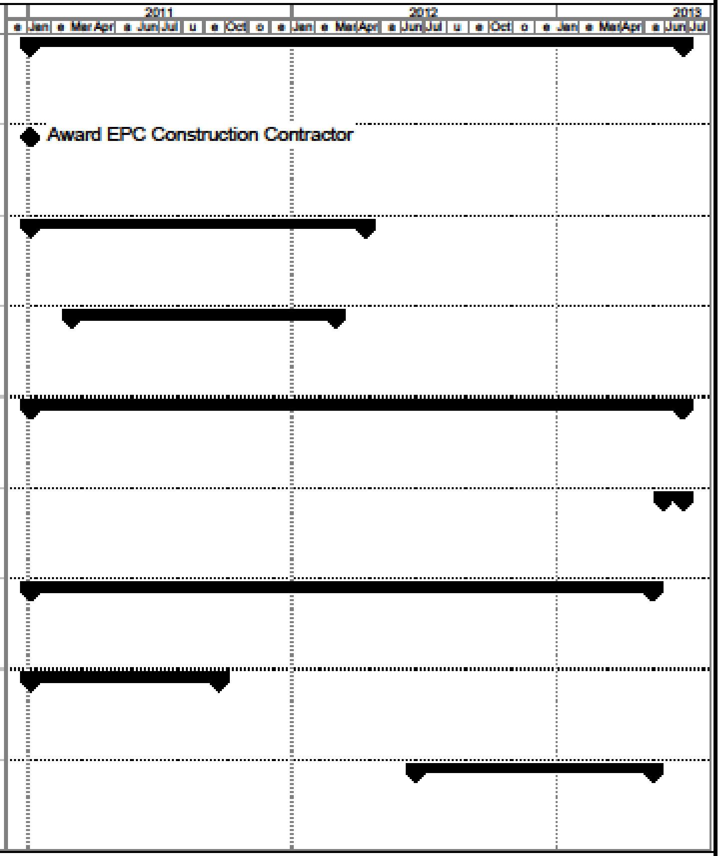
All cement and rebar for the concrete will be imported as is usually done for Vanuatu. The structural steel requirements for the buildings and wharf piles will also be imported. The Grade A concrete pavers for the yard area will be imported.

5.3.4 Staged Development & Construction Programme

The construction of Star Terminal will have an elapsed period of about 30 months. A high-level gantt chart is shown overleaf. A detailed programme is attached in Appendix VI, Attachment B - Construction Schedule

AUS AID VANUATU PROJECT

ID	Task Name	Duration	Total Slack	Start	Finish
1	STAR TERMINAL CONSTRUCTION	611 days?	0 days?	Tue 4/01/11	Wed 26/06/13
2	Award EPC Construction Contractor	1 day?	0 days?	Tue 4/01/11	Tue 4/01/11
3	Finalise Engineering Design	314 days	0 days	Wed 5/01/11	Thu 12/04/12
27	Procurement, Materials and Equipment	247 days	0 days	Thu 3/03/11	Fri 2/03/12
77	Construction	608 days	2 days	Wed 5/01/11	Mon 24/06/13
160	Commissioning	20 days	0 days	Wed 29/05/13	Wed 26/06/13
163	Equipments to be purchased by the Government of Vanuatu (Not a part of the EPC contract)	580 days	30 days	Wed 5/01/11	Tue 14/05/13
164	Container Handling Equipment	180 days	130 days	Wed 5/01/11	Wed 21/09/11
169	Mobile Harbor Crane	220 days	30 days	Thu 21/06/12	Tue 14/05/13



Project: STAR WHARF CONSTRUCT
Date: Mon 29/03/10

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

Page 1 of 1

Construction will have five phases. Some key events in each stage are:

Construction Phase 1

This construction schedule for the Star Terminal is based on an "assumed" main construction contractor award date of 2 January 2011. This date was simply a convenient date to start the schedule on. Once a real construction contractor is selected he can input the real start date and update the schedule as required. Final designs and procurement of materials and equipment can then begin. Selection and sub-contract award of a dredging and wharf pile driving company should be awarded as soon as possible. Ideally, the main construction contractor has already begun discussions with a dredging and wharf pile driving company for this project. The existing Star Wharf piles must be removed before dredging can begin. Because of the dredging the domestic shipping to the old Star Wharf must cease operations a few months earlier than anticipated. The existing Star Wharf is now demolished. Purchase the container yard equipment so the equipment is available to begin high stacking of empties as soon as possible. Begin construction work at the wash station and pre-wash stack areas. This will allow the early introduction of some high stacking areas within the facility to reduce the land area requirements of the empty containers. This will help to free up the jobsite for the increased traffic and congestion the construction will create. Land reclaim will start in the northeast area of the site.

Construction Phase 2

Dredging will be completed for the west side berth pocket. The old gate house and small building between it and the old canteen are demolished. The Administration building construction is begun. Land reclaiming continues at the northeast.

Construction Phase 3

Wharf pile driving begins at the north end of the wharf. Construction of the workshop begins. Land reclamation continues at the north east with revetment construction. Reefer and fuel area is begun. Demolish the old Administration building when the new one is complete. Car parking near the new Administration building is completed.

Construction Phase 4

Wharf pile driving continues moving south west along the wharf. Installation of the headstock and slabs begin at the north end. Wharf piling is completed in the area where the old wharf once was. The new bond store or warehouse construction is begun. Site paving can begin on finished reclaimed land. Land reclamation is completed at the northwest side of the site. Demolish the old workshop once the new workshop is completed.

Construction Phase 5

Wharf construction, anchor slabs and settlement construction is completed. The old ware house is demolished once the new ware house is complete. Site paving is completed. All construction is completed.

Domestic shipping interface

As soon as the existing Star Wharf is demolished, approximately month 8 of construction, the domestic shipping to the old wharf will obviously have to cease. Future alternatives for the domestic shipping in Port Vila are the following:

- Use the existing Dinh and Marine wharfs
- Temporary use of a new bow ramp area to the west of the old Star Wharf

- Temporary use of a barge or pontoon wharf to the west of the old Star Wharf
- Design and construction of a new domestic wharf shipping facility in Port Vila is the only long term solution to this pressing need.

6. CAPITAL COST

6.1 INTRODUCTION

This Chapter generates the capital cost estimate at a Bankable Feasibility Study (BFS) level for all works within the battery limit of the Star Terminal Construction Project BFS.

6.2 BASE DATE OF ESTIMATE

The base date of the estimate is 31 March 2010. The estimate reflects construction wage rates and construction material prices of that date.

No provision has been made within the estimate for escalation after this date.

6.3 ESTIMATE ACCURACY

The goal for this BFS has been to produce an estimate to an accuracy level of +/-10%.

However, the Government of Vanuatu issued a clear statement requiring Soros to not identify the project in any approaches to construction contractors. Soros conveyed that such a requirement is not a normal process in delivery of a capital cost estimate and Soros had intended to be able to utilise direct approaches that identified the project. As a result, these confidentiality provisions of the contract may affect the certainty of the capital cost estimate provided in some areas.

6.4 ASSUMPTIONS

- Engineering facilities at Port Vila limited to small steel rectifications or alterations
- Concrete and fill material can be supplied from the local area
- Pile driving & dredging equipment to be supplied by contractor
- Power, water, communication & waste disposal available at the site boundary
- Local labour is available for assembly & erection of facilities
- All building authorities & permits by the client
- Site security during construction by the client

6.5 CONTINGENCY

- 5% of job costs (Sub-total 1 - see estimate summary).

6.6 CAPITAL COST ESTIMATE SUMMARY

A summary of the capital cost of the project is shown in Table 4 below. Full details are shown in Appendix VII - CAPEX Estimates.

Table 4 Summary of Capital Cost of Works in BFS Scope

Proposal / Project Nº	**A0932**
Client Name	**GOVERNMENT of VANUATU**
Project Title	**STAR WHARF B.F.S.**
Description	**UPGRADE of FACILITIES**

Area	Description	Civil & Concrete	Structural Steel	Totals
1	General Site	3,342,781		3,342,781
2	Building Earthworks	153,794		153,794
3	Building Concrete	1,718,081		1,718,081
4	Marine Earthworks	35,173,193		35,173,193
5	Marine Concrete	9,526,191		9,526,191
6	Warehouse		198,413	198,413
7	Workshop		131,558	131,558
8	Container Wash		183,814	183,814
9	Refrigerated Module		42,454	42,454
10	Container Storage		450,747	450,747
11	Loading Area		0	0
12	Administration		3,456,000	3,456,000
13	Refuelling		10,000	10,000
14	Demolition		1,380,360	1,380,360
15	Wharf		2,715,465	2,715,465
	Labour & Materials Totals	49,914,040	8,568,811	58,482,851
	Engineering			1,000,000
	Client Representation			818,040
	Construction Management		5.0%	2,924,143
	Contractor Mobilization/Demobilization	(Piling & Dredging incl in Marine Earthworks		500,000
	Construction Equipment Rental	(Crane for building assembly)		500,000
	Concrete & Compaction Testing			170,000
	Field Backcharges		2.00%	1,169,657
	Sales & Use Tax			0
	General Liability Insurance		0.72%	421,077
	Freight		Steel	600,329
			Pavers	1,442,448
			Containers	145,548
	Permits		Buildings	30,000
			Environmental	155,000
	Escalation		Excluded	
	Subtotal 1			68,359,093
	Contingency (subtotal 1)		5.00%	3,417,955
	Subtotal 2			71,777,048
	Overhead (subtotal 2)		5.00%	3,588,852
	Profit (subtotal 2)		10.00%	7,177,705
	Grand Total		**AU$**	**82,543,605**
			US$	**75,824,555**

Exchange rate	0.9186
Date	31-Mar-10

6.7 BASIS OF ESTIMATE

6.7.1 Work Scope Inclusions

Costs are estimated on the following basis:

General

Site Survey	Establish construction coordinates & levels
Geotech,	Investigate soil conditions to confirm design assumptions for construction
Hydrographic	Investigate marine conditions to confirm design assumptions for construction
Site Clearing	Most of the trees & shrubs need to be removed
General Cut & Fill	Holes & mounds left after clearing & any top soil will be removed
Road Access	Existing access road needs relocating to suit the construction activity
Perimeter fence	The existing fence is to be relaced with a security fence along the boundary of the site

Building Earthworks

Excavation	Building foundations will be in compacted fill material that is to be placed over the entire site.
Compacted fill	After excavating to the design depth, screened select fill will be compacted to form a bearing surface for the base slab.
Piles	The warehouse, workshop & light poles require bored concrete piles, this to be before final compaction of the fill.

Building Concrete

Concrete.	The majority of the concrete required for this project is high strength (50 MPa)
Formwork	Timber ply use for the building foundations & floor slabs
Steel	Reinforcing bars for inclusion in the building foundations
Bolts	Holding down bolts to be included in the concrete foundations to attach the steel frames of the buildings
Grout	High strength, non-shrink under all building columns

Marine Earthworks

Excavation	No significant excavation will be required
Dredging	Required on the waterside of the wharf to accommodate a 25,561 DWT vessel
Piling	106 tubular marine piles, 1.2m dia x 25mm are required for the wharf driven to refusal into the coral seabed
Compacted fill	The entire container site to be raised approximately one metre above the present level, Done in layers and compacted to form a hard, high bearing base for the paved wear surface. Reclamation of the North East shoreline will also require compaction of fill material
Rock protection	The entire shoreline (approximately 600 metres) requires large, hard rocks for protection against wave and ship action
Hardstand	Between the edge of the container storage area and the boundary of the site, compacted fill will be used to provide an all weather storage
Roads	New entry & exit with lane & directional marking.
Drains	Concrete drains will be required under access roads
Geofabric	The entire site to have a drainage fabric located beneath the pavers
Pavers	Concrete blocks approximately 230mm x 110mm x 80mm thick will form the working surface of the container storage area. These to be laid on a bed of sand 30mm thick.

Marine Concrete

Concrete	The wharf deck is 200m long x 20m wide x 1m thick high strength concrete (50 MPa). A concrete support platform will be precast on shore and placed on the wharf piles to form the base of the deck.
Reinforcing steel	Galvanised (or stainless) deformed bars 20 & 32mm diameter
Steel embedments	The lower edges of the precast deck units will have a steel angle to provide a uniform bearing surface.

Structural Steelwork

Steel frames fabricated in Australia to be assembled at site:

Wharf	Welded plate box beams to be welded to the top of the piles. 1000mm deep x 750mm wide x 20m long to support the concrete

	deck
Warehouse	Approximate dimensions 40m x 20m
Admin Building	Approximate dimensions 30m x 18m
Workshop	Approximate dimensions 27m x 14m
Container Wash	Approximate dimensions 39m x 17m
Refrigerated Module	Approximate dimensions 6m x 3.5m
Gatehouse	Approximate dimensions 3m x 2m

Demolition

The existing buildings are unsuitable for future use and need to be removed progressively as the new facilities are completed

Refuelling Station	Approximate dimensions 10m x 6m
Building 1 – Office	Approximate dimensions 8m x 8m
Building 2 - Admin annex	Approximate dimensions 15m x 10m
Building 3 - Admin annex	Approximate dimensions 15m x 15m
Building 4 - Administration	Approximate dimensions 25m x 15m
Building 5 - Workshop	Approximate dimensions 25m x 8m
Building 6 - Store	Approximate dimensions 40m x 12m
Building 7 - Warehouse	Approximate dimensions 40m x 20m
Wharf	Approximate dimensions 50m x 15m

Landscaping & Security

A chain wire security fence to be erected on the boundary of the container facility to replace the existing

Stormwater drains:	Trees, shrubs to be planted where appropriate

6.7.2 Exclusions

Estimate excludes the following:

- Vanuatu Import Duties and Taxes
- Cost of yard equipment. A Mobile Harbour Crane, two fork lift trucks and two empty handlers are part of the overall concept and this equipment is estimated at a cost of US$5,382,996 and is considered in the financial model and the economic feasibility analysis.
- Removal of demolished structures beyond the site boundary
- Supply of fuel
- Management of harbour & road diversions
- Foreign exchange variations
- Vanuatu labour rate variations

6.7.3 Currency

The capital cost estimate is prepared in Australian Dollars and is converted to US Dollars on the last summary sheet. The exchange rate used from Australian Dollars to US Dollars is AU$1.0000 : US$0.9186. The Reserve Bank of Australia projects the long term exchange rate to be approximately 1.00 : 0.88.

No provision has been made in the estimate for expenses arising from changes to the listed exchange rate.

7. OPERATING COSTS

7.1 OPERATIONAL STRATEGY

7.1.1 Container yard layout & facilities

The proposed container yard has a layout that is an enhancement of the existing container yard, and with a contiguous berth. It will have facilities for cargo handling and associated activities. Suitable plant compatible with modern operations, including a mobile container crane and heavy forklift trucks are to be acquired.

Figure 7-1 shows the layout and flow in the container yard.

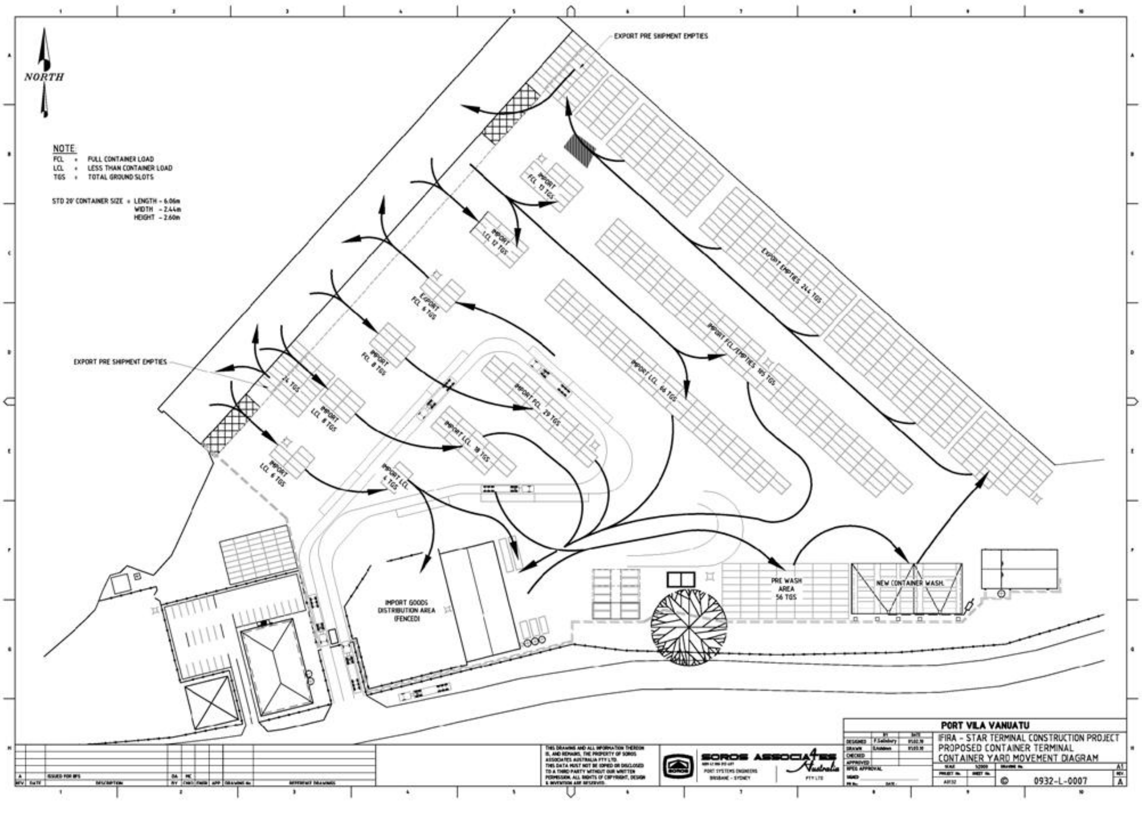


Figure 7-1 Container Yard Layout and Flow

7.1.2 Imports

Import container stacks are designed with rows of containers that are just 4 or 5 deep such that under normal circumstances and the use of preplanning through a good terminal operating system, it should be possible, to minimise unproductive moves when delivering cargo.

Customs require a substantial portion of all import containers to be inspected before they are released for delivery to consignees, (40% compared to Sydney 3%), and additionally there is a substantial proportion of groupage containers where there are multiple bills of lading involved and these might all require de-vanning and temporary storage in the Bond Store.

The current Bond Store will have to be demolished or removed for a number of reasons including:

- It is poorly positioned and compromises the rest of the terminal layout;
- It is not built to cyclone standard;
- It lacks a number of structural members;
- Is not secured appropriately to the foundations; and
- Its floor level is below the planned working heights and would thus be susceptible to flooding.

Import LCL, (Less than Container Load), cargo will be de-vanned in the bond store area either into store or directly to consignee transport.

Import FCL, (Full Container Load), will be loaded out in the transport exchange area in two ways:

- By pre-placing containers on the ground in pre set positions for swing lift trucks to pick them up with their on-board lifting gear; or
- By placing the containers directly onto the truck deck.

7.1.3 Exports

The relatively small numbers of *full export containers* will be delivered to the terminal on trucks which will be driven into the transport exchange area at which point they will be removed by heavy forklift and taken directly to the washing area and thence after external washing, to the export stack.

Empty containers will come from two sources; containers unpacked within the Terminal's CFS or containers returned as empties from consignees. In both cases the containers will normally be moved directly to a pre-wash area from where they will then be picked to go to the Wash Area for cleaning, washing and spraying for insect control. After washing export containers will be separately block stacked and given that they are relatively light and that little selectivity is required will potentially be stacked up to five high.

Special containers are also expected to be block stacked together in shipping service blocks regardless of container type as all such containers generally need to be returned on the first available vessel. All other empties will be stacked to shipping line or slot charterer blocks so that their individual inventories can be picked to order for back-loading.

7.1.4 Ship Handling

Discharge will generally be mostly completed before back-loading commences.

Depending on the vessel and proposed container export load-outs, it is expected that all planned export empties will be pre-positioned to a block stack within the working scope of the mobile harbour crane.

The advantage of this system is as follows:

- The transfer of containers to quay face can be actioned at leisure in advance at a working rate that has no other dependence on other equipment work times;
- The mobile harbour crane can then pick these containers directly from the stack and onto the ship without having to wait for containers to be positioned to the spreader.

Operating savings are then achieved:

- Less forklift and driver time and cost to marshall containers to the spreader;
- Less Mobile Harbour Crane and loading gang time and cost to load containers; and
- Quicker loading times and thus less ship time and cost in port.

Export containers per vessel generally do not exceed a maximum of ten and depending on stowage requirements will possibly be mainly back-loaded during the discharge period.

7.2 PLANT

7.2.1 Equipment Design Specifications and Configuration

The following diagrams illustrate the proposed equipment to be deployed. The exact manufacture and specifications will b determined at the time of procurement but the equipment illustrated serves the purpose of providing an accurate perception on what is proposed.

Mobile Harbour Crane

It is proposed to handle the majority of containers using a mobile harbour crane which will enable faster load and discharge rates to be achieved and reduce wharf handling costs.

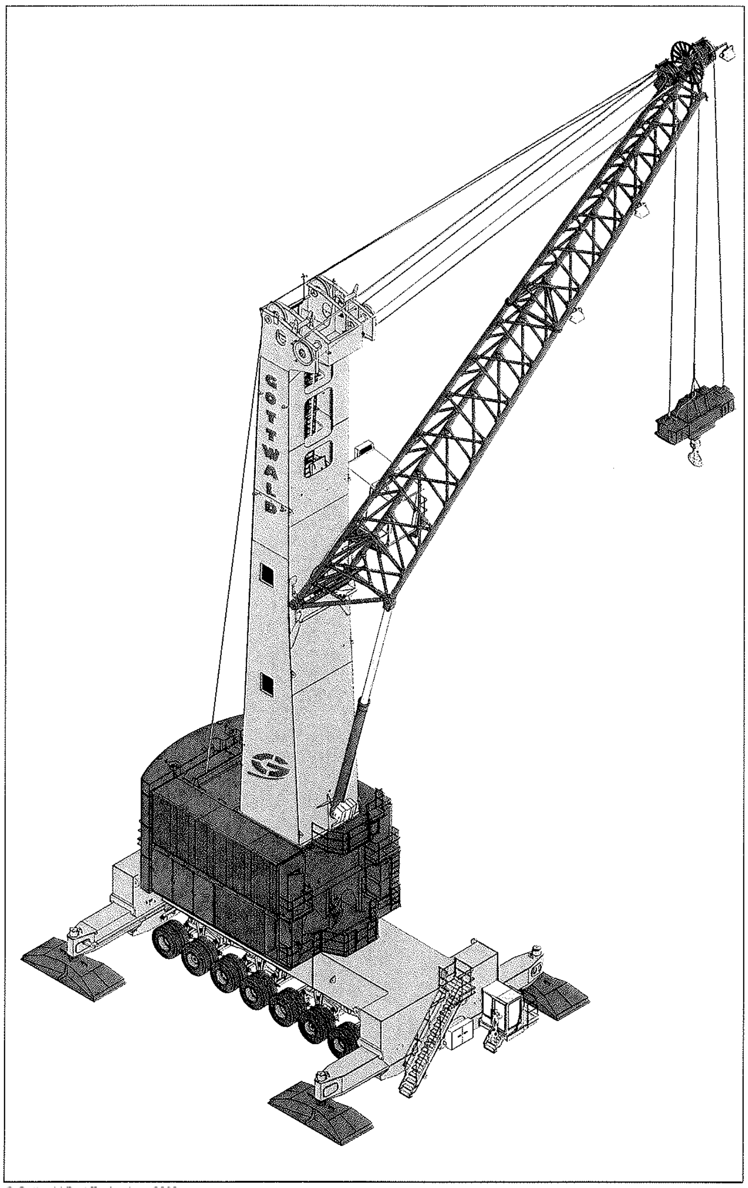


Figure 7-2 Gottwald G HMK 6407 Mobile Harbour Crane Data

Table 5 **Gottwald G HMK 6407 Mobile Harbour Crane Data**

G HMK 6407 Mobile Harbour Crane			
Main Characteristics			
Chassis length		approx	16.6 m
Chassis width with retracted stabiliser pads			8.5 m
Propping Base		12.5 m *	14.0 m
Stabiliser pad size		2.0 m *	4.5 m
Super structure over-rear radius			7.5 m
Boom pivot point height		approx	23.0 m
Tower cab operator viewing height		approx	26.0 m
Fuel Tank			
Main tank capacity		approx	7,000 l
Intermediate tank		approx	1,000 l
Working Range			
Maximum radius			51.0 m
Minimum radius			11.0 m
Hoist Height			
Hoisting height above ground by radius 11 - 45 m			47.0 m
Hoisting height above ground by radius 51 m			29.0 m
Hoisting height below ground load operation			12.0 m
Weights			
Total weight of crane in operational state		approx	423 t
Fixed counterweight		approx	94.0 t
Wind Loadings		Wind	Wind
	Beaufort	Pressure	Speed
Crane in travel condition	9	33.0 kg/m2	20.8-24.0 m/s
Crane propped in operation	9	33.0 kg/m2	20.8-24.0 m/s
Crane propped out off operation	14	120.0 kg/m2	41.5-46.1 m/s
Tip Load Factor			
Normal Load			66.60%
Special Load			75.00%
Grab Operation			50.00%

The selected crane will be able to lift full containers into row 13 on the deck of a Panamax designed vessel.

Heavy Forklifts

The terminal has been planned round the use of heavy top lifting forklifts capable of stacking up to four high. This plan is based on the following hypothesis:

- The lack of space means that empties will eventually need to be stacked high but in the meantime Empty Container Handlers will stack empties 4 high in the export stack and a four high stacking forklift can then provide capacity to support this function if there is an equipment shortage;
- There are no rail load outs required hence no special need for the ability to lift from a second row
- There are several long runs of containers with imports of such commodities as rice and cement etc and these can be block stacked in rows that are mostly only two deep thus the containers can be delivered first in last out thus reducing unproductive moves;
- Heavy forklifts are generally cheaper than reach-stackers and also cheaper to maintain; and
- Heavy forklifts impose lower axle loads on the terminal pavement and hence will reduce the rate of degradation of the surface.

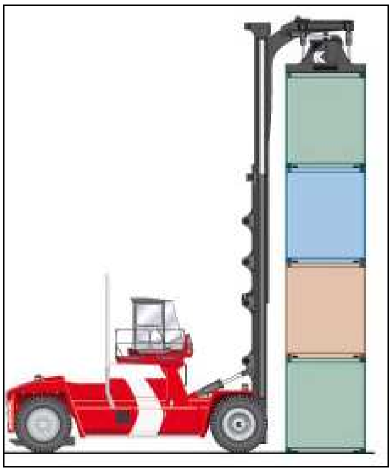


Figure 7-3 Profile of 4 high top lift Forklift

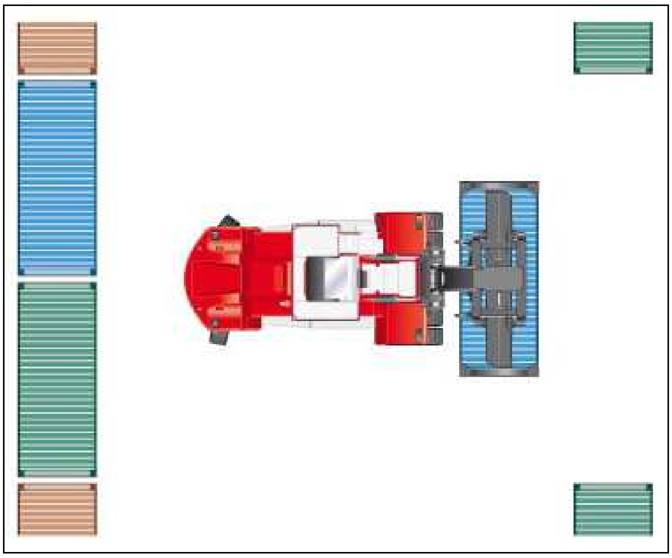


Figure 7-4 Schematic showing forklift manoeuvring in stack

Table 6 Kalmar DCF410CSG Forklift Data

Dimensions of Kalmar DCF410CSG		
Truck		
Truck length with attachment	mm	10970
Truck width	mm	4450
Truck height	mm	4720
Distance between front axle centre	mm	3630
and front side of mast	mm	900
Wheelbase	mm	6000
Track front - rear	mm	3020-2820
Turning radius - outer	mm	8660
- inner	mm	1090
Ground clearance min under truck	mm	280
Min track width for 90□ stacking with 40ft cont.	mm	11990
Min track width for 90□ stacking with 20ft cont.	mm	14680
Standard Duplex Mast		
Height under twist-locks 4 high - 5 high mast	mm	15160
Height under twist-locks min	mm	2160
Mast height - min	mm	9190
Mast height - max	mm	17170
Mast tilting forwards - backwards	□	5>10
Attachment		
Width min - max	mm	12170-6070
Hydraulic slewing	□	±3
Side-shift ± either side centre	mm	400
Levelling	□	±5

Empty Container Handlers

The container terminal at Port Vila suffers from an extremely large number of empty containers because:

- The frequency of ship calls is low with the most frequent service only calling every 18 days and thus there tends to be a build up of empty containers at Port Vila;
- The trade is also marked by significant imbalance with full import containers exceeding full exports by a ratio of about 30:1; and
- A high proportion of containers never leave the precinct of the terminal because many consignees are not in a position to receive full containers hence box numbers accumulate quickly.

The space available for storing containers within the terminal is also restricted and therefore there is significant need to stack empty containers as high as possible.

High stacking is also relatively easily accommodated for most shipping lines will load back out all special containers as first priority thus reducing the absolute number of stacks required compared to facilities that like all individual special container types stacked with separate access.

Figure 7-5: Kalmar Empty Container Handler – E5

Table 7 : **Kalmar Empty Container Handler Data**

Kalmar Empty Container Handler - E5		
Lift Capacity		
Rated	kg	7000
Load Centre	mm	1220
Number of Containers - 8'6"		5
Number of Containers - 8'6"		5
Truck Dimensions	mm	
Length of truck	mm	6355
Width	mm	3500
Height, base machine	mm	3840
Seat height	mm	2700
Distance between centre of front axle	mm	1275
and front face of attachment		
Wheelbase	mm	4000
Track front to rear	mm	2800-1960
Turning radius, outer	mm	5400
Turning radius, inner	mm	285
Ground clearance	mm	250
Max height when tilting cab	mm	
Max width when tilting cab	mm	
Minimum aisle width for 90□ stacking		
with attachment - 20' container	mm	9500
with attachment - 40' container	mm	13950
Standard Duplex Mast Dimensions		
Lifting height	mm	15180
Mast height minimum	mm	8540
Mast height maximum	mm	15040
Mast tilting forward - backwards	□	3 to 5
Attachment		
Width	mm	
Height under twist lock	mm	2180
Side shift	mm	600
Weight		
Service weight	kg	30900
Axle load front - no load	kg	2100
Axle load front - at rated load	kg	32500
Axle load back - no load	kg	9800
Axle load back - at rated load	kg	5400

Other Equipment:

Existing Plant

Much of the current IWS operation's handling equipment is very old and run down and will be phased out when the new terminal equipment arrives on site but some units are still likely to be available to back-up capacity including:

- 1 * Kalmar 36T Forklift (soon to be delivered);
- 1 * Caterpillar 36T Forklift
- 3 * Terminal Tractor Units (Sisu * 2 and Kalmar * 1)
- 2 * Container Mover Units (Sisu)

LCL Handling Plant

Handling of palletised goods also requires a variety of smaller forklifts and a carry-over of a number of other pieces of existing equipment which will have some on-going value including:

- 1 * 5T forklift;
- 1 * Clark 5T forklift;
- 1 * Daewoo 2.5T forklift;
- 1 * Daewoo 2.5T forklift; and
- 1 * Doosan 2.0T forklift.

Delivery Trucks

The delivery of containers to consignees is performed by a small fleet of swing lift type trucks as follows:

- 2 * Daewoo Prime movers;
- 2 * Hyundai Prime movers;
- 1 * 40'/20' Steelbro Swinglift;
- 2 * 20' Steelbro Swinglift;
- 1 * 20' Hammar Swinglift

7.3 PLANT: R&M, ENERGY

Mobile plant costs have been updated according to the costs provided by the Australian Agents; Fuel consumption has been reassessed as advised by the equipment suppliers and are based on current Pacific Energy diesel invoice, copies of which were provided by IWS CFO

7.4 LABOUR

The casual stevedoring labour has been reassessed based on the assumption that current rates will apply at the Base Year but that the labour will work any hour required less Sundays and certain Public Holidays. The number of hours required has also been assessed and is obviously significantly less so there will be less paid hours but at a somewhat higher rate. Base rate costs have been escalated to 2013 to reflect increased volumes and inflated rates of pay;

The base pay rates used were taken from actual pay sheets in the first quarter of 2009/10 and the mix of hourly rates calculated from the premium paid for each penalty hour including lunch breaks, extended shift rates, night shifts etc. The assumption was then made that the average of all such rates would be the paid rate and that labour would, under a new agreement, be required to work any hour for this higher hourly rate. This system of determining a work on arrival paid rate uses the same basic approach as applies in Australia but paid at the various hourly rates that apply currently in Vanuatu.

It has been assumed that certain senior management positions will be created within the IPDS structure and the pay rates for such managers were based on advice as to prevailing rates for similar positions;

The positions of Dock and Operations Managers were assumed to have a start salary of Vatu 250,000 pa, allowances for other management inputs appear to be of the right order at this stage.

7.5 OTHER OPERATING COSTS

All other costs have been escalated through to 2013 and in the case of some like utilities, they have been inflated according to volume changes, power and water consumption being largely related to throughput volumes. These costs are largely based on costs contained in the current P&L

8. ENVIRONMENTAL IMPACT ASSESSMENT

See Appendix IX - Environmental Impact Assessment for full report.

8.1 LEGISLATIVE REQUIREMENT

Section 11 of the Vanuatu *Environmental Management and Conservation Act* stipulates that:

> *"All projects, proposals or development activities that:*
>
> *(a) impact or are likely to impact on the environment of Vanuatu; and*
>
> *(b) require any license, permit or approval under any law;*
>
> *must comply with the provisions of this Act";*

including by undertaking an Environmental Impact Assessment (EIA) in accordance with Sections 12 to 23 of the Act.

8.2 PREVIOUS ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

The trustees and operators of Star Wharf and its associated facilities, Ifira Trustees Limited (ITL) - first proposed the rehabilitation and further development of Star Terminal in 2005. As such development clearly fits with clauses (a) and (b) above, an EIA was required.

In support of their application for the necessary development permits, ITL engaged environmental consultant the late Mr David Esrom, to undertake an EIA in accordance with Terms of Reference (ToR) issued by the Vanuatu Environment Unit. The EIA was published in August 2006 and resulted in a Foreshore Development Permit being issued to ITL by the Minister for the Interior on 27 September 2006. This permit expired on 27 September 2009 without being used. Applications were not made for the necessary approvals under the *Ports Act*, *Physical Planning Act* and *Water Resources Management Act*.

8.3 REQUIREMENT FOR A SUPPLEMENTARY EIA

Because the current proposal to rehabilitate and develop Star Terminal into a modern container terminal differs in several significant aspects from the earlier proposal, and as a review of the previous EIA found that it did not properly address marine impacts and maritime issues, and generally did not meet the EIA standards of AusAID and other international donors, it was decided to include a Supplementary EIA as part of the BFS, based on the ToR issued for the previous EIA.

The purpose of the Supplementary EIA is to:

- Address the design differences between the earlier and current wharf development proposals.
- Address marine impacts and maritime issues that were not fully covered in the previous EIA.

- Propose an Environmental Management and Monitoring Plan (EMMP) that would help ensure that the proposed development would not have adverse impacts on the environment, both during construction and ongoing operation.
- Produce an EIA that meets the standards of AusAID and other international donors, in order to support applications for funding construction of the project.
- Support the application for the necessary regulatory approvals, including under the *Foreshore Development Act, Ports Act*, *Physical Planning Act* and *Water Resources Management Act*

8.4 CONTENT, RESULTS & CONCLUSIONS OF SUPPLEMENTARY EIA

The Supplementary EIA was undertaken from December 2009 through March 2010, including various field surveys and studies, and the full report is contained in Appendix VIII - Environmental Impact Assessment. The Supplementary EIA follows international EIA standards and assesses the likely impacts of the proposed development according to the following categories:

- Construction phase: Land-based activities
- Construction phase: Marine activities
- Operational phase: Land-based activities
- Operational phase: Marine activities

The Supplementary EIA finds that the environment at and around Star Terminal and in Port Vila generally is important and valuable, including special cultural significance for the Ifira people, significant coral communities immediately adjacent to the site, and important socio-economic values such as subsistence fishing by local communities and marine-based tourism. The Supplementary EIA finds that the proposed project has the potential to significantly impact on these resources and values, and that care needs to be taken in the design, construction and operation of the proposed terminal, so as to avoid/minimize such impacts. To address the potential for such impacts, the Supplementary EIA includes a proposed Environmental Management and Monitoring Plan (EMMP) for both the construction and operational phases.

Overall the Supplementary EIA concludes that so long as the recommended EMMP is properly implemented, the proposed Star Terminal development should not pose an unacceptable risk of causing adverse impacts on the physical, biological, socio-economic and cultural environment, natural resources and values of Port Vila Harbour. The project is also assessed to comply with the AusAID and other donor EIA checklist criteria.

The Supplementary EIA concludes there is no environmental reason that the project should not be approved for construction, on the condition that the recommended EMMP is fully and properly implemented.

9. REGULATORY APPROVALS

9.1 NATIONAL LAWS

All land, including reclaimed land, as well as waters, seabed and subsoil there-under, at and adjacent to Star Terminal are the sovereign territory of the Republic of Vanuatu, and both construction and operation of the proposed development are subject to all relevant national laws of Vanuatu.

The Land Title No. is . No. 11/OA13/001

As part of the Supplementary EIA, a Regulatory Review was undertaken to assess the implications of Vanuatu's environmental, planning, natural resource management and maritime laws for the proposed Star Terminal development, from an EIA perspective, and to identify the regulatory approvals that are required. No less than 29 different laws were identified as being relevant.

The Review did not address other laws that relate to non-EIA aspects of the development, such as customs, immigration, commercial and business, employment, workplace safety, construction and building standards and others. The full Regulatory Review is contained in an Appendix to the Supplementary EIA.

In summary, under National laws the Star Terminal development will require the following EIA-related regulatory approvals:

- a *Foreshore Development Permit* under the *Foreshore Development Act* for all works below the mean high water mark, including on and/or over the seabed,
- a *Licence* under the *Ports Act* for any tidal lands and waters of the port that are to be used or occupied for the erection and use of any landing-place or wharf or for any other purpose relating to the convenience of shipping,
- *Building Permits* under the *Physical Planning Act* for the erection of all buildings and structures,
- *Permission* under the *Water Resources Management Act* for the construction, operation and/or maintenance of any physical works related to the protection, management and use of water, including any stormwater and/or wastewater works; and
- a *Quarry Permit* under the *Mines and Minerals Act* for dredging works.

In addition to these regulatory approvals, as a matter of course the construction and operation of Star Terminal will need to comply with a range of other environmental and natural resource management laws, such as but not limited to:

- the *Control of Nocturnal Noise Act* which prohibits excessive noise in Port Vila between 9pm and 5am.
- the *Wild Bird (Protection) Act* which prohibits the destruction of certain bird species (which may occur through clearing of site vegetation) without a permit; and
- the *Montreal Protocol on Substances that Deplete the Ozone Layer (Ratification) Act* which regulates the use of ozone depleting substances in facilities such as refrigeration and fire-fighting systems.

Details of the implications of these and other relevant Acts are contained in the Regulatory Review of the Supplementary EIA.

Additionally, ships that use the Star Terminal will need to comply with a range of national maritime legislation as outlined in the Regulatory Review.

9.2 LOCAL LAWS

The project site is located within the declared municipal boundaries of the City of Port Vila, and the project is therefore also subject to the by-laws of the Port Vila Municipal Council, including the Municipal Town Plan declared in 1979, which identifies the project site as being within Area D – Industrial. This zoning category allows for *inter alia:*

- warehouses,
- outside storage and handling of merchandise; and
- light and heavy industry.

A new town plan is currently under preparation (March 2010) and the Physical Planner at the Municipal Council advises that the project site will most likely remain zoned as Industrial.

The Municipal Council also administers the *Physical Planning Act* within town limits and the Building Permits referred to under section 9.1 will need to be applied for through the Municipal Council.

9.3 INTERNATIONAL LAWS

Vanuatu is party to a number of international environmental conventions, treaties and laws which have general relevance to the project. Some examples are:

- Convention for the Protection of Natural Resources and Environment of the South Pacific Region (Noumea Convention).
- Convention on Biological Diversity (CBD).
- Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol).
- United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol.

Vanuatu is also a member of the International Maritime Organization (IMO), which administers the international regulatory regime for shipping, and is a party to a number of IMO conventions, including:

- Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREG 72).
- International Convention for the Safety of Life at Sea, 1971 (SOLAS).
- International Convention on Load Lines, 1966 (Load Lines 66).
- International Convention on Civil Liability for Oil Pollution Damage, 1969 (CLC 69).
- International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL 73).
- Convention on Facilitation of International Maritime Traffic, 1965 (FAL 1965).
- International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971 (FUND 71).

Details of the implications of these and other relevant international conventions are contained in the Regulatory Review. Importantly, Vanuatu retains national legislation – the *Maritime (Conventions) Act 1982* – which implements a number of maritime conventions that are no longer in-force internationally, and/or which have been superseded or substantially updated in recent years. This includes those listed above, including CLC 69 and FUND 71 which relate to financial compensation for marine pollution damage from shipping incidents, leaving Vanuatu unprotected in this regard.

There are also a number of new, and extremely important international maritime conventions that have been adopted by IMO in recent years, that Vanuatu has not yet ratified/acceded to, such as the *ISPS Code*, the *International Convention on the Control and Management of Ships' Ballast Water and Sediments* and the international legal instruments relating to limits of liability for maritime claims.

It would therefore be highly beneficial for Vanuatu to review and update its ratification of international maritime conventions and update its national maritime legislation accordingly. This will in turn ensure that international shipping servicing the Star Terminal will be required to comply with IMO standards, which should be the norm for any international container terminal.

10. ECONOMIC & FINANCIAL ANALYSES

See Appendix IX - *Economic & Financial Analysis* for *full report.*

10.1 ECONOMIC ANALYSIS

10.1.1 Economic & Financial Summary

The proposed project is the development of a container terminal at Port Vila. The terminal will handle the majority of Vanuatu's import and export shipping containers. The driver behind the project is the desire to promote trade by sea by improving the efficiency of port handling and increasing the capacity of cargo handling infrastructure.

A full economic report is attached as Appendix IX Economic & Financial Analys. That report is summarised in this chapter.

The key project items are:

- ***Required capital expenditure: US$81.2 million***
- ***Assets acquired:***
  - ***New multi-purpose container and general cargo ship berth***
  - ***Enhanced container yard, contiguous with the berth***
  - ***Facilities for cargo handling and associated activities***
  - ***Suitable plant compatible with modern operations, including a mobile container crane and heavy forklift trucks***
- ***Operated by a restructured, improved terminal and stevedoring operating company, IPDS***

Financial and economic analysis shows that the fundamental outcomes are:

- ***Benefits derived from ship and cargo improved efficiency and gains in port productivity will result in lower freight rates, by 10 to 20%, (ie US$250 to US$400 per TEU);***
- ***The proposed mobile harbour crane at the facility would attract a broader range of shipping lines with potential for gearless vessels operated by global carriers offering direct services to and from Asian ports, thus increasing shipping line competitiveness and widening the range of origins/destinations for imports and exports.***

And key financial results are:

- ***The project is cash flow positive in the first year of operation;***
- ***total cash flow in the first ten years of operation: US$10.4 million;***
- ***Project IRR: 2.4%pa***
- ***NPV at 2%pa: US$9.9 million***
- ***Payback period (ungeared): 31 years.***
- ***Sensitivity testing showed the project is most sensitive to revenue per TEU, followed by volume growth and royalty payments.***

The analysis shows that the Star Terminal project is commercially feasible.

10.1.2 The Economic Environment

The key prevailing economic and market conditions, competitive conditions and resulting demand forecasts for imports and exports by container are:

- GDP
    - GDP Growth has been strong over the 5 years since 2003: +6.6% pa
    - Real GDP growth estimate for 2009: 4.0%
    - Real GDP growth forecast: 4.0% in 2010 and 4.5% in 2011
    - Vanuatu has so far been largely shielded from the impact of the global economic crisis and forecasts indicate continued growth opportunity
- Political Stability
    - Since 2003 there has been a level of political stability and fiscal policy reform focus in Government with evidence of conservative economic management
- Fiscal issues
    - Vanuatu has a relatively low tax revenue / GDP ratio
    - External debt is maintained at a low level as a policy direction
    - FX against the U.S. dollar and the Australian dollar was volatile over the course of 2006 to 2008.
    - Vanuatu has the highest public wage bill compared against other Pacific Island states; 12% of GDP in 2008
- Economic issues:
    - Inflation in 2009: 5.2%
    - Inflation accelerated to 5.8% in 2008 from 4.1% in 2007
    - Population growth is steady at 2.5% - Urban population shift is evident in Port Vila
    - Tourism plays a significant role in Vanuatu's economy making up 17% of GDP in 2008
    - Agriculture is the mainstay of livelihoods for the 80% of the population living in rural areas
    - High cost of business due to poor infrastructure, roads, interisland shipping and congestion at ports
    - Construction growth is driven by land sales, tourism and overseas aid funded infrastructure programs
    - There exists an element of market control associated with the delivery of essential services, utilities and price control of consumer goods through economies of scale and market power through the provision of state granted concessions
    - A new Employment Act (passed by parliament), raises severance pay & may raise labour costs significantly
    - Major infrastructure developments will stimulate employment and further economic growth e.g.: construction of a ring road on Efate and planned airport and Government administration buildings
    - Deregulation policy is allowing competition to enter certain market sectors – telecom and airline access

10.1.3 The Proposal and Capex Required

The proposed project is the development of a general cargo and container terminal at Port Vila. The terminal will handle the majority of Vanuatu's import and export shipping containers and breakbulk cargo. The driver behind the project is the desire to promote trade by sea by improving the efficiency of port handling and increasing the capacity and productivity of cargo handling infrastructure. The Project will deliver an unconstrained cargo terminal substantially improving the congested port operations that currently exist. The key project items are:

- ***Required capital expenditure: US$81.2 million.***
- ***Assets acquired:***
  - ***New multi-purpose container and general cargo ship berth and improved container yard, contiguous with the berth. US$75.8 million (AU$82.5 million). See Chapter 6 - Capital Cost for details***
  - ***Facilities for cargo handling and associated activities***
  - ***Modern, suitable plant including a mobile container crane and heavy forklift trucks. US$5.4 million. See Chapter 7.2- Plant for details.***
- ***Operated by a restructured, improved terminal and stevedoring operating company, IPDS. See Chapter 3 - Terminal Operational Philosophy for details.***

10.1.4 Financial Analysis

The financial model covers a 42 year period with the initial first two years focusing on civil and wharf construction and the ordering of mobile equipment. The major assumptions used to develop the model are as follows:

Outgoings
A total capital expenditure of US$81.2 million consisting of civil works of US$75.8 million and mobile plant & equipment of US$5.4 million is assumed. The major cost component of the civil works are the construction of the wharf structure and container yard (US$53.7m of direct costs). The mobile equipment capex consists of a mobile harbour crane and two forklifts and two container handlers.

Additional mobile equipment in year 11 is assumed to handle additional volume and replacement. The civil works is depreciated over 40 years and the mobile equipment over 10 years.

Major volume and operating assumptions
Volume handled: Forecasted at 11,997 TEU in year 1 (2013) and growth at 3.0% per annum thereafter. The first year volume is based from the average of the TEU handled in 2007 to 2009; escalating by 3% pa to 2013, being the first year of operation. The 3% growth rate is considered conservative, but equitably balanced as the volume growth in 2008 over 2007 before the Global Financial Crisis was 28%. It is also considered conservative based on historical GDP growth and country import and export growth.

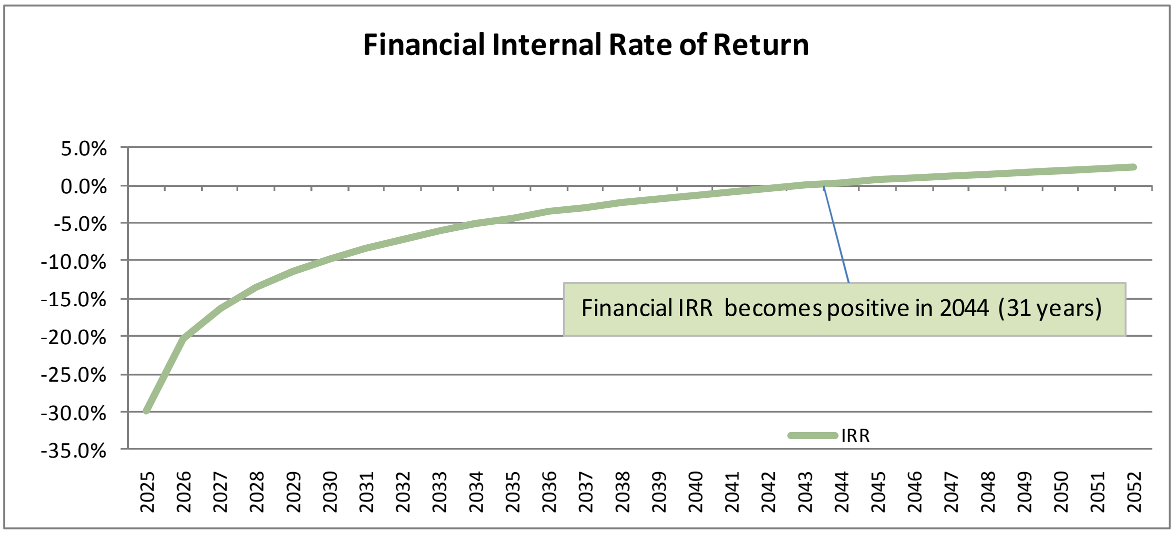
Revenue projections: The average revenue per TEU is based on the current total revenue divided by the total number of TEU handled. The total revenue consists of container and non-container revenue. The average revenue per TEU is assumed to grow by 2.0% pa. The revenue for the projection is calculated by the projected TEU handled multiplied by the average revenue per TEU.
Operating costs: costs are projected to escalate at an inflation rate of 3% pa. Some variable costs will also escalate by the growth in volume handled.
Equipment running costs: based on the number of operating hours multiplied by bench mark costs per hour. Fuel cost is forecast at US$1.40 per litre in the first year.
Management fees: a management fee is provided for.

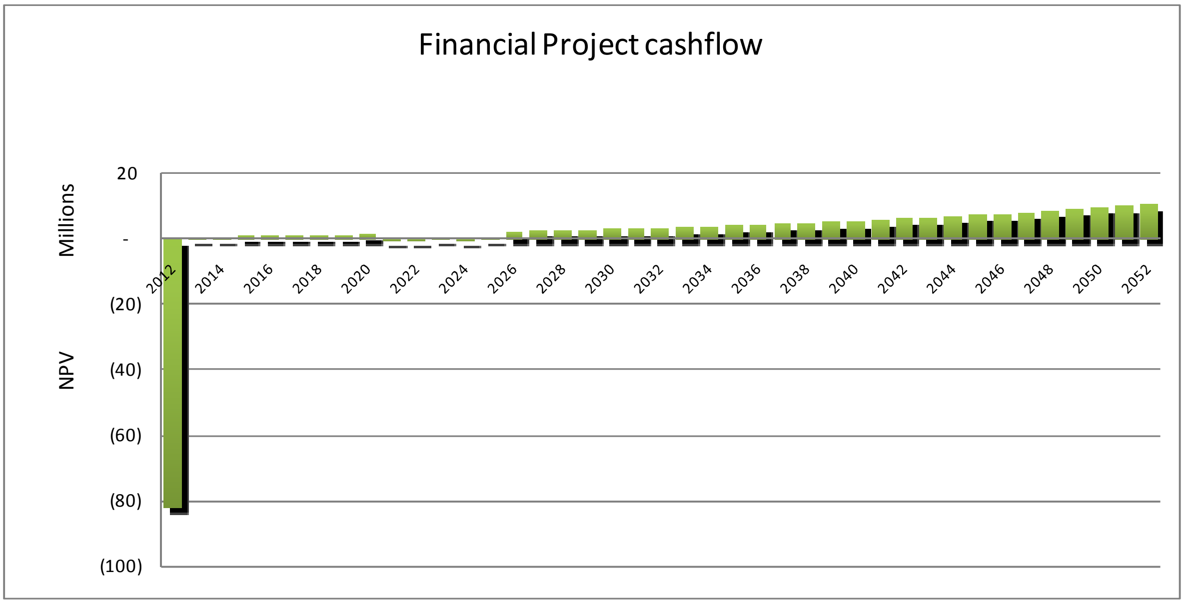
Summary of Financial Results
(Ungeared Basis). See Figure 10-1 Financial Results.

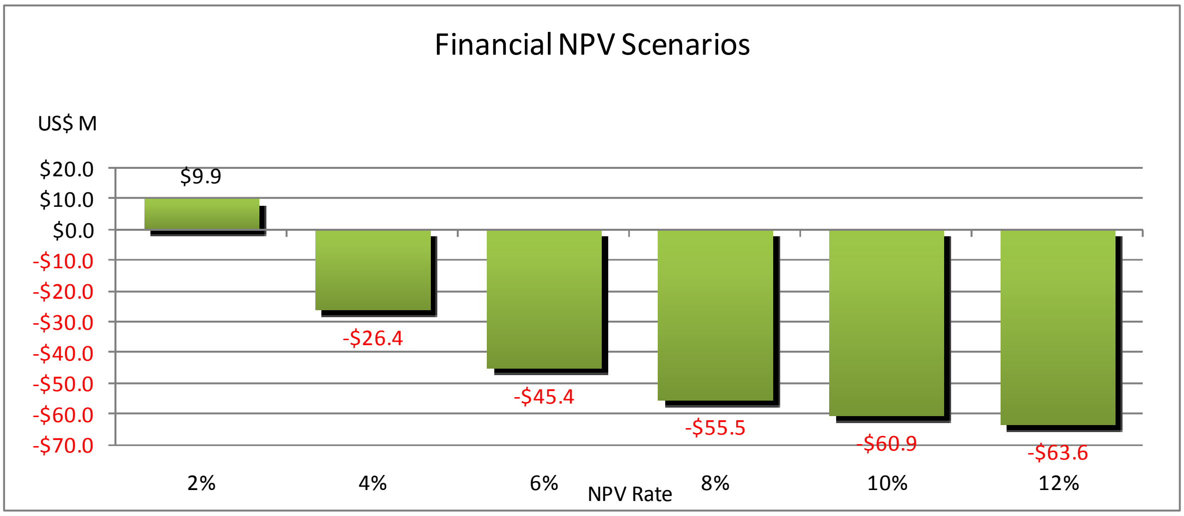
- ***The project is cash flow positive in the first year of operation.***
- ***The total cash flow produced in the first ten years of operation amounts to US$10.4 million.***
- ***The Project IRR is 2.4% pa and***
- ***The NPV at 2% pa[2] is US$9.9 million.***
- ***The payback period is 31 years.***
- ***The project shows incurred losses for the first 16 years (which is not unusual for a project commencing from a base level with such commensurate growth levels).***

[2] The 2% discount rate directly relates to the attributes of the project given the project can borrow at 0.75% per annum and with an added project variable risk of 1.25%, the project return demands at least 2%. Hence NPV is at 2%. For the sake of clarity and comparison other NPV scenarios are described in separate charts for both FIRR and EIRR

Figure 10-1 Financial Results







10.1.5 Economic Analysis

The project is economically viable: (see Figure 10-2 Economic Results).

- ***At a 2% discount rate, the net present value is about US$181 million***
- ***The economic internal rate of return (EIRR) is 8.2%.***

The project will transform Star Wharf precinct, an operationally isolated and constrained facility with little financial and economic value at present, into a dedicated international cargo terminal capable of accommodating the largest class of operating vessels in the pacific islands trades. This will add value to the Vanuatu collective port profile and provide improved capability through the potential to capitalise on the physical facility to deliver efficiency and productivity when handling international cargo vessels and their exchange of imports and exports at Port Vila.

In the process it will generate greater job opportunities for local ni-Vanuatu both skilled and unskilled labour during the implementation and offer a stable source of income post completion for the stevedoring company.

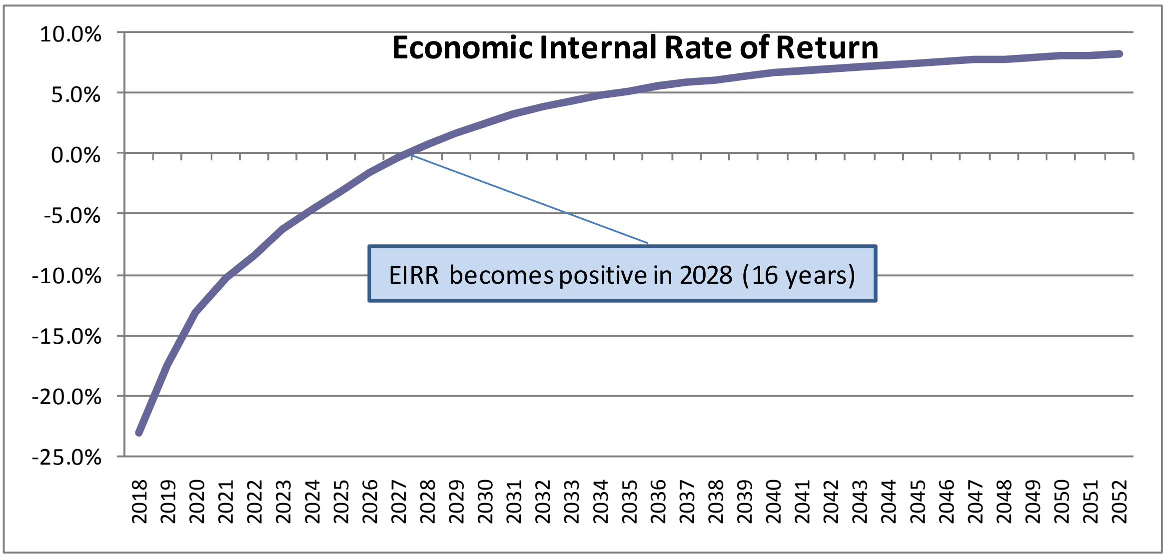
Industrial and commercial development resulting from the project will add hundreds of job opportunities in the main economy of Vanuatu derived through lower landed cost of imported goods which will translate through to creating internal competition and more value added activities than presently the case.

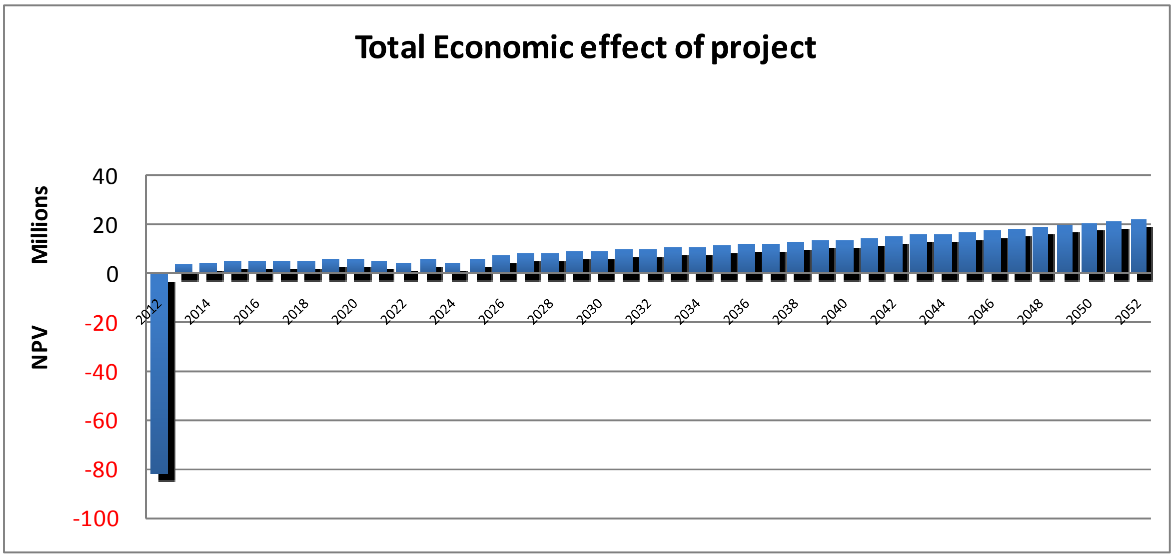
Economic cost benefit analysis
The economic impacts are calculated taking into consideration the direct benefits from the port redevelopment project; a reduction in congestion and delay costs that are currently driving shipping lines to apply a surcharge of between US$100 and US$300 per TEU on top of freight rates that collectively are already higher than other Pacific Island states for similar origin ports and commodities.

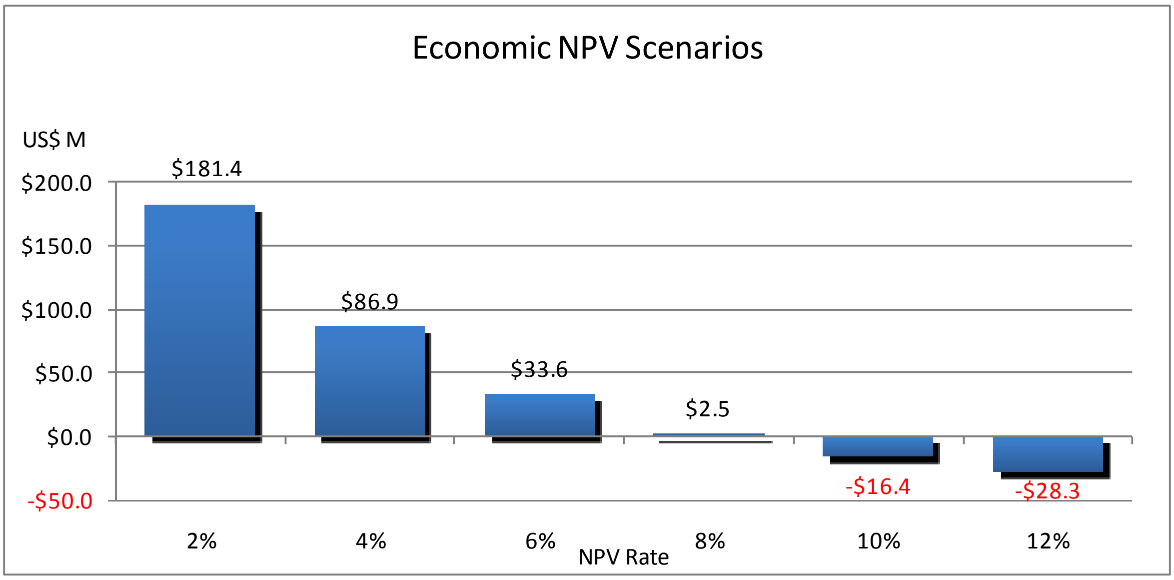
It is considered that the substantial improvement to both vessel and cargo handling will positively affect the operation of container carriers serving the trade to Vanuatu and should influence, over time, adjustments to their commercial application of market freight rates:

- Lower freight rates, by 10 to 20%, (or US$250 to US$400 per TEU), with savings coming from:
    - Less container storage costs payable by carriers due to faster turn times
    - Reduction in carriers container inventory resulting from better managed fleets and ability to evacuate required empty units back into their cycle of usage
    - Operational ship stays in Port Vila being substantially reduced in terms of number of days (anchor or alongside)
    - Stevedoring Charges reduced to reflect real cost (Note: may be difficult due to concession agreement defining rates)
    - Reduction in costs in Australia and NZ to meet the quarantine standards for container cleanliness

Figure 10-2 Economic Results







- Improved vessel schedule keeping which translates into reliability of delivery times giving benefits from:
    - o More efficient planning for handling goods on arrival in store and
    - o Better delivery reliability leading to lower inventories being possible - Less costs for good in transit:
- With fewer days in transit and faster store to store times, the cost of inventory on the water will be reduced
- Better information and automated electronic transmission of Manifests enabling earlier Customs clearances will make the pick-up of cargo more efficient; and
- Ongoing reduction in maintenance costs for equipment operation:
- Lower maintenance costs and higher equipment availability will reduce other on costs
- Encourage better surveillance of unpacking of containers and hence the correct declaration of goods and the proper collection of related excise;
- Safer operations leading to less probability of injuries and their resultant economic costs;

Another consideration of economic impact and benefits derived from the port redevelopment process is the potential for deployment of permanent mobile harbour cranes onto Port Vila wharves. This enhancement would allow Port Vila to be immediately accessible by carriers operating gearless container vessels that would increase port coverage and expose Vanuatu to greater choice of international carrier and introduce greater competition onto the berth. The outcome would be lower freight rates for both imports and exports through Port Vila and its deployment of harbour crane fixtures.

In addition to the immediate operational benefits declared above there are further and far more far reaching economic benefits to the greater internal economy of Vanuatu including;

- Lower freight rates would benefit domestic business activity creating competitive movements in wholesale and retail pricing
- Lower freight rates for export commodities would immediately transfer to the international C&F price creating a more competitively positioned product on world markets. This would allow exporters to increase sales.
- Access to a greater number of global markets would be available once major container shipping lines offer services with gearless vessels into Port Vila facilitated through deployment of a harbour crane
- A combination of lower freight rates and increased competition evolving in the market would expand the number and scope of businesses engaged in international trade and those deriving a livelihood from interaction with traded goods
- Employment would grow upon increased volume throughput for those engaged directly in the handling of freight and businesses needing increased staff numbers to handle increases in transactional activity derived from imports or export activity
- Tourism and construction would immediately benefit through access to greater volumes at lower freight and landed cost of building materials and essential inputs required for the hotel and hospitality industries
- Greater transactional activity in the domestic market would lead to increased VAT and excise duties and produce greater disposable income and shared wealth in the wider community

10.1.6 Sensitivity and Risks

Five key input variables were identified. The base case assumptions were then varied at uniform increments of +/- 10% to a limit of 30% from base case. The results were reviewed for their impact on NPV (at 2% discount rate) as shown below in Figure 10-3 Sensitivity Analysis

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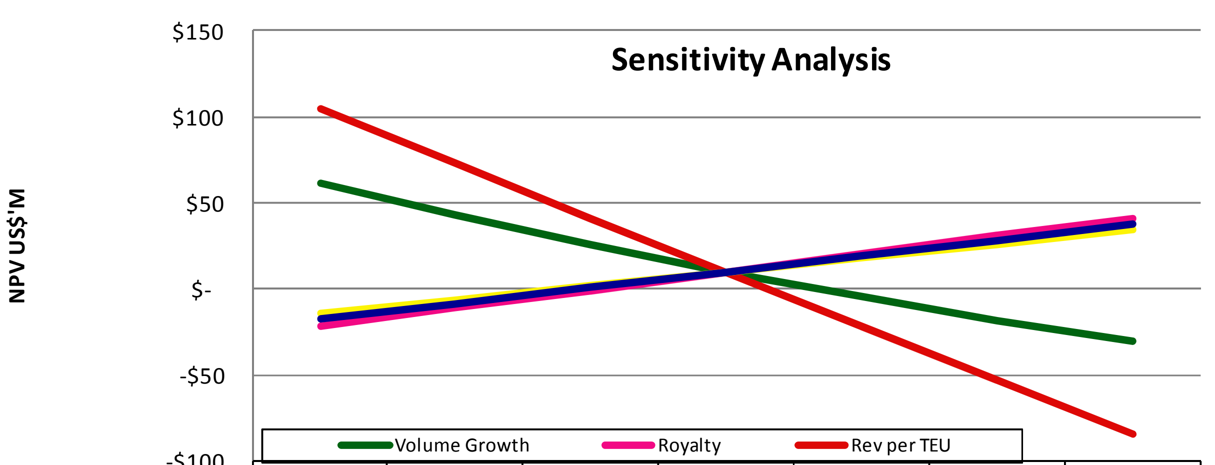
In interpreting the chart, a steeply changing line indicates that the NPV is sensitive to changes in the input assumptions, whereas a relatively flat line indicates the NPV is not sensitive to changes in the assumptions. The direction of the line is irrelevant other than to indicate that Revenue items will run in the opposite direction to cost items.

Figure 10-3 Sensitivity Analysis



	30	20	10	0	-10	-20	-30
Volume Growth	$62	$43	$26	$10	-$5	-$18	-$30
Royalty	-$22	-$11	-$1	$10	$20	$31	$42
Rev per TEU	$104	$73	$41	$10	-$22	-$53	-$85
Capital $	-$14	-$6	$2	$10	$18	$26	$34
Labour costs	-$18	-$8	$1	$10	$19	$28	$38

% Variation

Observations

Inputs which have the greatest sensitivity and therefore ability to influence the project NPV in order of highest to lowest are as follows:

1) Revenue per TEU
2) Volume Growth
3) Royalty
4) Labour Costs
5) Capital

Revenue Items

1. Revenue per TEU:

Revenue per TEU is the single most significant variable of the 5 inputs modelled. It should be noted that within the 30% min/max boundaries used in this sensitivity analysis that the project is most sensitive to revenue per TEU. NPV starts to become questionable or negative at as little as -10% variation on the base value used in the model.

2. Volume Growth:

The Volume growth assumptions have been modelled on a percentage base, originating from the base +3% value. A variation of +10% on the base results in +3.3% volume growth, variation of +20% results in +3.6% volume growth and so on. The sensitivity analysis indicates NPV is also sensitive to variations in volume growth and variations of more that -10% (i.e. 2.1% volume growth or less) also have the ability to drive the NPV into questionable or negative territory.

Cost Items

3. Royalty Changes:

The model displays a high sensitivity to variations in Royalties and an increase of 10% causes the NPV to become negative.

4. Labour Costs:

The model is somewhat sensitive to labour cost variations; variations of more than +20% cause the NPV to become negative.

5. Capital:

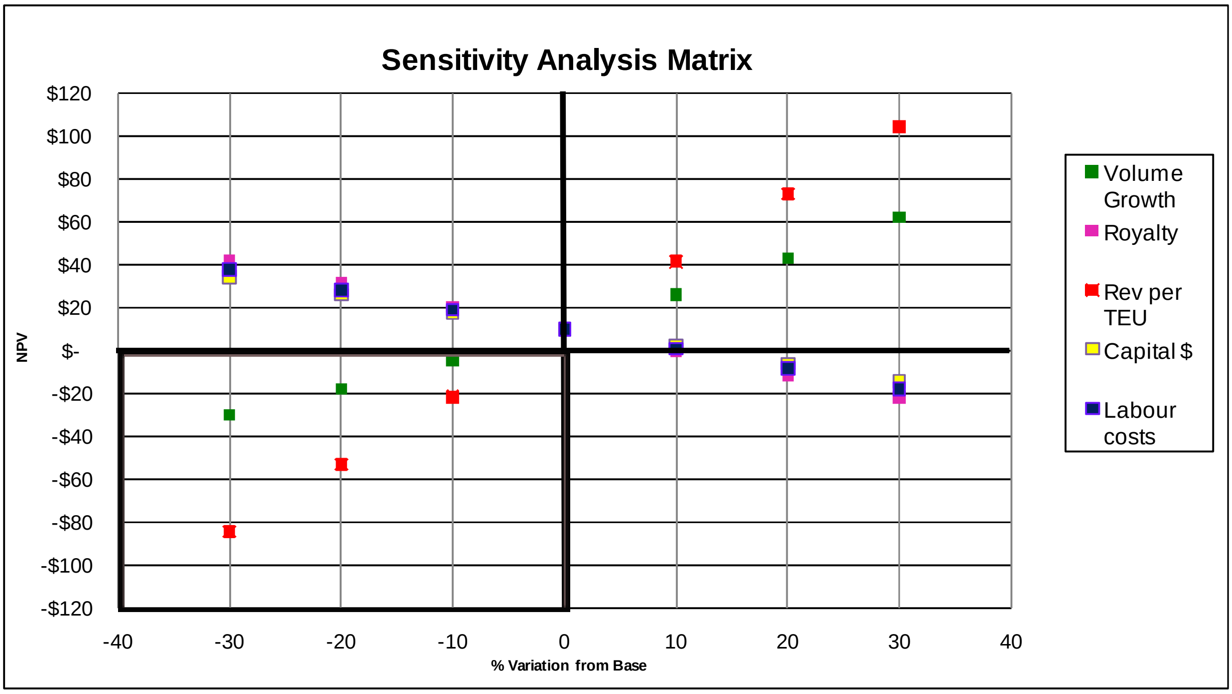
The model displays relatively low sensitivity to variations in Capital. An increase of more than 20% in capex causes the NPV to become negative.

Risk Identification and management

The chart below indicates the combination of variables and % variations that produce questionable or negative NPV. See Figure 10-4: Sensitivity analysis matrix.

Notably any variation on Revenue per TEU of more that -10% from the base produces high risk for the project and additionally a variation of more than -30% on Volume growth is also an item of connected and high concern. The analysis broadens to define that combinations of each variable under sensitivity conditions can cause a high risk to the viability of the project e.g. a combination of royalty and capex in excess of 10% would push the project into a risk category.

Figure 10-4: Sensitivity analysis matrix



Suggested strategies for managing high risk items may include but are not limited to:

- Detailed competitive, mode and market analysis to validate Revenue TEU assumptions
- Detailed operating cost analysis to be undertaken to ensure base data assumptions are true and correct
- Detailed analysis of volume growth by origin and commodity and to include separate items for both break-bulk and containers
- Moving to fixed price annual contracts for major throughput of cargo wherever possible linked to performance regimes
- Investigating TEU subsidy options (for an interim period of the project payback interval)
- Limitations on Government royalty amounts and maybe tiered levels linked to volume throughput and average revenue per unit / TEU / tonne or as appropriate scales.
- Labour agreements based upon productivity and cargo handling rates
- Capital expenditure is a fixed item of project investment

11. RISK ASSESSMENT

11.1 SUMMARY OF RISK REGISTER RESULTS

A Risk Register is attached as Appendix X - Risk Register - Star Terminal, Port Vila. In summary:

11.1.1 Final Detailed Engineering Activity

The highest risks are associated with a lack of understanding by the construction contractor of the site and project requirements, the geotechnical information used in this feasibility study (the design needs to be reviewed against final geotechnical report which was unavailable for the Bankable Feasibility Study), capex changes and delays resulting from design peer review.

The key mitigating actions recommended to be taken to minimize these risks are as follows:

- Appoint a client representative to liaise between client and EPC provider on design matters
- The client representatives role be extended to include, but not limited to, managing interface issues associated with the proposed new domestic wharf at Paray Bay (Port Vila)
- Ensure that this activity remain a priority in order to achieve EPC timeline requirements.

11.1.2 Procurement

The risk of this activity is HIGH for alternative tender evaluation and timing, MEDIUM for price rises but LOW for interference in tender evaluation.

This activity has the potential to delay the commencement of construction and impact the quality of materials and construction.

The action plan should be taken to minimize this risk as follows:

- Appoint a client representative to:
  - liaise between client and EPC provider on procurement matters
  - Assess tenders
  - Monitor both local and foreign material prices.

11.1.3 Construction management

The risk of this activity varies from LOW to HIGH depending on the element.

Although, this activity has an overall LOW/ MEDIUM risk, the risk of inferior quality concrete is assessed as HIGH.

The action plan should be taken to minimize this risk as follows:

- Ensure mobilisation during the non cyclone season.
- Appoint a client representative to liaise between client and EPC provider on quality control and site operational matters.
- Appoint a Contract Superintendent to administer the contract

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12. RECOMMENDATIONS FOR FEASIBILITY ENHANCEMENT

12.1 COMPARISON OF PREVIOUS ESTIMATES WITH BFS ESTIMATE

A comparison of the estimate contained in this BFS report (31 March 2010) to the Feasibility Study on Port Vila Reform (18 Sept. 2009) is shown in Table 8 below.

The Port Vila Reform Study's capital cost estimate was AU$47.2 million dollars with an accuracy of +/-30%. The highest possible capital cost from that estimate would therefore be AU$47.2m x 1.3 = AU$61.4 million. This BFS capital cost estimate is AU$82.5 million for the wharf and terminal complex (ie, excluding the plant). This is AU$21.1 million or 34% greater than the upper limit of the accuracy of the previous report. Some reasons for this increase in capital cost are in the following Table 8:

Table 8 Explanation of Major Cost Differences

	Sept. 2009 Est.	*Mar. 2010 BFS Est.*	*Cost Difference*	*Explanation*
Wharf demolition	$1,000,000	$1,380,360	$380,360	The cost of establishment for the equipment was much more than estimated.
Dredging	nil	$1,937,500	$1,937,500	Dredging was never anticipated until bathymetric mapping was completed and showed underwater high spots.
Wharf Piling & headstocks	$ 19,000,000	$24,817,858	$5,817,858	The cost of establishment for the pile driving equipment was much more than estimated.
Wharf concrete deck	$6,000,000	$9,526,191	$3,526,191	Actual wharf design and heavy equipment loads everywhere on the deck.
Revetments	$1,137,500	$3,799,598	$2,662,098	Revetment size and complexity was never anticipated until Geotechnical reported soft sea bed material capable of being eroded. This soft material & the dredging required a more substantial revetment.
Land reclamation	$ 559,662	$1,498,500	$938,838	Not enough underwater contour information was available in 2009 so this volume was under estimated.

Administration Bldg	$2,000,000	$3,456,000	$1,456,000	Administration Building size and use has increased tremendously. This is now a three level building. It was never anticipated to be this large and accommodate so many different agencies. Potential savings here.
All other buildings	$ 390,000	$556,240	$166,240	A larger and more significant washing station was identified as a required structure.
Electrical	$1,602,000	$3,006,877	$1,404,877	Energy saving equipment was specified that was more expensive such as solar panels on the roofs. This equipment will save energy costs in the long term.
Piping	nil	$442,343	$442,343	This estimate has an extensive fire protection system for the entire site. The fire water requirements could never be met by the existing water system so an expensive salt water pumping system was specified.
Freight	nil	$2,188,325	$2,188,325	High cost of Freight
Field Back charges	nil	$1,169,657	$1,169,657	Add a standard percentage for field back charges
Total	$ 39,496,862	$61,617,232	$22,090,286	

12.2 WAYS TO IMPROVE FEASIBILITY

The financial and economic analysis indicates that the overall project is viable, even although at $81m, the capex is higher than indicated in the scoping study. There are however several ways in which the concept could be improved:

- Increase Revenue
- Increase throughput
- Decrease operating costs
- Decrease capital expenditure

Soros' involvement in this project has mainly involved the potential capital expenditure. Soros has several ideas that could improve the financial and economic returns by reducing the scope of capital works, and thus reducing the capex, without reducing the capability or operability of the proposed complex. Any or all of these would improve the IRR and EIRR markedly. On the basis that revenue, volumes and operating costs remain as per the assumptions in this BFS, the following recommendations are made in order to reduce capital expenditure, without reducing the net revenue or operating costs:

- Reduce length of wharf
  - The design ship requires a wharf of about 150m length; sufficient for the working deck of the ship to lie alongside.
  - This is a 25% reduction in the size of the wharf.
- Delete Dredging
  - This will restrict the maximum draft of vessels that can come alongside, but none of the existing vessels that call would be restricted.
- Place de-vanning activities off-wharf
  - For several decades, it has been unusual for container terminals to be the site of LCL de-vanning activities. The premium availability and value of waterfront land normally dictates that LCL activities are more cost-effectively done off-wharf. There is a good supply of industrial land in Port Vila that could be used for this purpose. Alternatively, third party warehouses could be sub-contracted to devan containers on the terminal Company's behalf.
- Reduce the Container yard area:
  - Area saved by removing LCL activities- container storage spaces and LCL shed
  - Reduce FCL areas to those required by standard practice for forklift truck operations
- Retain existing Administration buildings, warehouse and workshops.

A quick estimate of the savings that can be achieved, including direct costs and project additionals such as engineering. owners costs, insurances, freight, profit and contingency, is about AU$25 million (US$23 million). See Figure 12-1 and Table 9 Potential Areas of Capital Cost saving.

Note that the greatest potential savings are realised by two items; reduction in length of wharf (AU$7.7m) and delay of construction of administration building (AU$3.4m).

Figure 12-1 Potential Areas of Capital Cost Savings by Amount Saved & %age of Total Saving

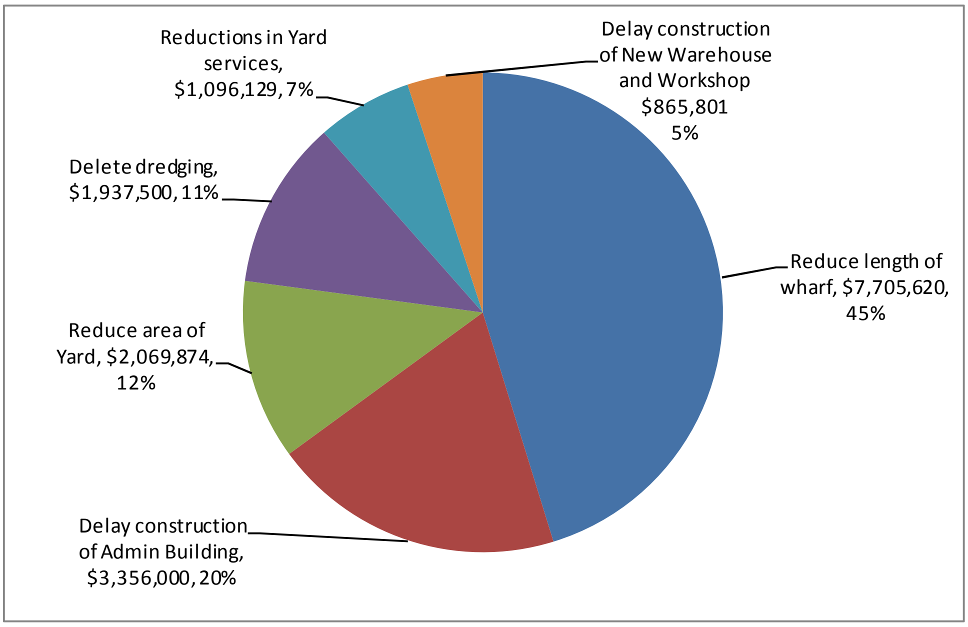

Table 9 Potential Areas of Capital Cost savings by amount & %age reduction in BFS Estimate amount

Type of Reduction in Capex	*Item*	*Savings from BFS Estimate (AUD)*	*Explanation*	*%age saving*
Reduce length of wharf	Wharf Piling	$4,932,530	Build a wharf 150 m long. Remainder of wharf can be built in future	21%
	Wharf headstocks	$391,542		25%
	Wharf conc. deck	$2,381,548		25%
	Total potential saving	**$7,705,620**		22%
Delete dredging	Dredging	$1,937,500	Dredging is not required for the present size of ships. If no requirement is made for the larger ships in the future then dredging is not required. This would limit future ships by their drafts.	100%
	Revetments	TBA	There would also be additional savings from revetment and reclamation.	
	Land reclamation	TBA		
	Total potential saving	**$1,937,500**		100%
Reduce area of Yard	**Paved Hard Stand**	**$2,069,874**	Only pave one half of the container yard during this phase of construction. Pave the other half in the future.	50%
Reductions in Yard services	Electrical	$823,584	Don't install all of the yard lighting for night operations, only the three high poles next to the wharf. GPO's only for reefer and diesel generators.	27%
	Piping	$272,545	Don't install the fire protection system for the yard area.	62%
	Total potential saving	**$1,096,129**		31%
Delay construction of Admin Building	**Admin Building**	**$3,356,000**	Delay the construction of the administration building until later or obtain additional aid in the form of gifts.	97%
Delay construction of New Warehouse and Workshop	Warehouse & Workshop	$372,426	Delay the construction of new warehouse & workshop buildings until later or obtain additional aid in the form of gifts. We do recommend the new wash station and reefer structure be built now.	67%
	Electrical	$476,185	Additional savings if warehouse and workshop are not constructed yet.	16%
	Piping	$17,190	Additional savings if warehouse and workshop are not constructed yet.	4%
	Total potential saving	**$865,801**		22%
Total Direct Cost Savings		**$17,030,924**	**AU$**	**29%**
Total Capital Cost Savings		**$25,398,846**	**AU$**	**31%**

12.3 MANAGEMENT OF THE CONSTRUCTION PROJECT

Soros have recommended that the construction contract be an EPC contract, ie, the contractor takes full responsibility for the outcome of the project. This nevertheless, still needs Owner input to supervision of the works on a day today basis.

APPENDIX I. TERMS OF REFERENCE

APPENDIX II. ENGINEERING DESIGN REPORT

[3] Note: This Hydrographic survey is not suitable for navigation, and should not be used for that purpose, as the accuracy of individual soundings has been assessed by Soros to have a 95% probability of only being within +/- 1.0m of the stated depth. However, the accuracy of the mean depth of a group of say, 25 soundings is +/- 0.2m. For assessment of dredging quantities (the purpose for which this survey was commissioned) this accuracy is sufficient.

APPENDIX III. TENDER DOCUMENTS

APPENDIX IV. CONSTRUCTABILITY REPORT

APPENDIX V. AVAILABILITY OF CONTRACTORS

APPENDIX VI. CONSTRUCTION PROGRAMME

ATTACHMENT A. MODEL PROJECT EXECUTION PLAN

ATTACHMENT B. CONSTRUCTION SCHEDULE

APPENDIX VII. CAPEX ESTIMATES

APPENDIX VIII. ENVIRONMENTAL IMPACT ASSESSMENT

APPENDIX IX. ECONOMIC & FINANCIAL ANALYSIS

APPENDIX X. RISK REGISTER - STAR TERMINAL, PORT VILA