CENTRAL DEVELOPMENT CORRIDOR (CDC)
REGIONAL SPATIAL DEVELOPMENT INITATIVE PROGRAM (RSDIP)

INTEGRATED TRANSPORT STRATEGY – LAKES TANGANYIKA AND VICTORIA

Volume I
Recommended Transport Strategy

February 2009

PREPARED BY:

Marine Logistics Limited
Part of the Logistics Consulting Group
252 Manara Road, Ada Estate
P.O. Box 77283
DAR ES SALAAM - Tanzania

Client

CDC Project Manager, Banque Rwandaise de Développement (BRD)

On behalf of the Governments of :
THE UNITED REPUBLIC OF TANZANIA; THE REPUBLIC OF RWANDA;
THE REPUBLIC OF BURUNDI; THE DEMOCRATIC REPUBLIC OF THE CONGO

With support from the Government of the REPUBLIC OF SOUTH AFRICA

Abstract

This report is prepared in two volumes in accordance with instructions issued by Mr. SMAK Kaombwe, the Central Development Corridor Project Manager. This volume (Volume I) details the recommended transport strategy for Lakes Tanganyika and Victoria. It should be read in conjunction with Volume II which provides a situation analysis and background information.

Contents Amendment Record

This report has been amended as follows

Report No.	Revision	Description	Date	Prepared	Checked	Approved
3-3-060	0	Initial Draft	12-11-2008	APH	VF	
3-3-060	1	Draft	27-11-2008	APH	VF	
3-3-060	2	Final Draft	2-2-2009	APH	VF	
3-3-060	3	Final	13-2-2009	APH	VF	SK/MK

Distribution Record

This report is addressed and distributed as follows

To	Organisation	Description
The CDC Project Manager	BRD	Original Report
The RSDI Coordinator	DBSA	Copy Report

Disclaimer

TABLE OF CONTENTS

Part A: The Need for a Transport Strategy for Lakes Tanganyika and Victoria

1. Background

1.1 The Role of Lake Transport

Inland water-way shipping on Lakes Tanganyika and Victoria plays a key role in the regional transport network. When integrated with railway services, inland water-way shipping on Lake Tanganyika has the potential to provide the least cost, most efficient and reliable means of moving goods to Burundi, parts of the Eastern DRC and peripheral regions of Tanzania. In terms of international origin and destination trades, these Central Development Corridor routes provide the shortest link - through the gateway port of Dar es Salaam - to the Indian sub-continent, China, the Middle and Far East. Moreover, the advantage of inland water-way transport is that apart from the comparatively small investment required to modernise the existing lake services, it uses a no-cost infrastructure and the extraordinary north-south extension of Lake Tanganyika can provide a marine highway for increased infra-regional trade between southern and eastern Africa.

On Lake Victoria, full integration of inland water-way transport into intermodal door-to-door supply chains can also provided Uganda with more than one access route to and from the sea, while simultaneously providing the potential to opening-up additional east-west routes for Rwanda and Burundi.

1.2 Current Characteristics and Main Challenges

Despite a rising population and demand for access to health, security, employment and trade there has not been a corresponding growth in rail or lake transport or services. Most of the rail and lake infrastructure was constructed in the early to mid 1900s and investment has been insufficient to either maintain the existing system, or add new capacity needed to accommodate economic and demographic growth. This has resulted in a generally dilapidated rail and lake transport network characterised by inefficiency, unreliability, inconvenience and delay. Accordingly, approximately 95% of all transit cargo through the CDC gateway port at Dar es Salaam is currently carried by road, which in terms of tonne-kilometre cost is typically 100% - 150% more expensive than comparative rail/lake systems. This has pushed up freight rates, which cost between 12.6% and 24.1% of import value, compared to approximately 3.1% in the developed economies and a world total of 3.6%. This means that the cost of transport can be over 6 times more expensive when compared to world averages, inflating the price of imports and undermining export competitiveness. These costs are compounded when the effects of congestion and delay are added to the total freight bill, reaching up-to 40-50% of import value in parts of Tanzania, Rwanda, Burundi and the Eastern DRC.

Scarce, poor or inefficient infrastructure also leads to very high inventory cost in the agriculture, mining, manufacturing and processing industries, resulting in missed

opportunity and deterring foreign direct investment. In the eastern DRC – one of the richest mineral resource regions in the world - there is a direct link between limited access to infrastructure and deteriorating security, social and economic conditions.
In order to reverse this situation, inland water-way transport has to overcome certain challenges including those related to:

Trade Growth

Which has increased significantly over the last few years and which is reflected in the volumes of goods flowing through Dar es Salaam, the CDC gateway port. This trend is expected to continue, resulting in a growth of transport demand by over 340% by year 2015 and by over 1000% by year 2032. Growth is also expected to be most pronounced in the container trade, which currently accounts for 75.5% of all transit volumes through the port of Dar es Salaam to Burundi, the DRC, Rwanda and Uganda. By year 2032, container cargo is expected to account for over 82% of all hinterland trade.

Modal Competition

As the rail/lake share of future transport growth cannot be taken for granted due to increasing competitive pressure from road haulage. Indeed and although originally forming the backbone of transport infrastructure, the rail/lake system was constructed prior to the introduction of the containerisation concept in shipping and has still not fully taken advantage of increasing cargo unitisation. Moreover, lake transport distances represent only a small fraction of total origin and destination routes – a reverse of the basic infrastructure framework required for competitive inland water-way shipping. To compete with road haulage, rail/lake systems need therefore to achieve minimal total freight costs on the entire transport chain by improving efficiency and effectiveness.

Shipping Technology

Which changes the nature of port operations. On most inland water-ways worldwide, shipping lines have increasingly sought to reduce costs by rationalising services and using specialised ships to consolidate their trades. This can benefit importers and exporters through efficiencies gained by economies of scale, increased levels of productivity, shorter turn-around times and lower generalised and internal cost. In the combined passenger and parcel trades, new Roll-on Roll-off shipping technology can reduce infrastructure investment required in remote towns and villages on the shores of the respective lakes.

Intermodalism

Especially the worldwide trend to improve the interfaces between transport modes. This has yet to be achieved on the inland water-way transport system on Lakes Tanganyika and Victoria and users cannot presently benefit from opportunities of door-to-door and just-in-time logistics services. While this trend is most advanced in the container sector, excepting Kigoma port on Lake Tanganyika, none of the other lake ports are provided with facilities for efficient container handling at the ship to shore interface, which places stress on infrastructure and transport links.

Environmental Safety and Security Pressures

As currently there are no harmonised standards for shipping and port operations on the respective lakes. The lack of safety standards and poor enforcement has created a very negative impression for inland water-way transport, especially in terms of cost to life, loss and damage to property. As the respective communities place increasing value on safety, security and environmental management, inland water-way services will continue to be subject to increasing regulatory requirements. This should be managed at a system wide (regional) level and each national government should proactively evaluate these risks on an on-going basis in order to identify and mitigate potential loss.

1.3 Key Goals and Objectives

The Central Development Corridor (CDC) Spatial Development Initiative (SDI) programme aims to overcome these trade and transport constraints and unlock the economic potential within its coverage area.

This Lakes Tanganyika and Victoria Transport Strategy is therefore intended to be sufficiently forward looking to anticipate and deal proactively with far-reaching issues. It is designed to guide investment decisions that complement each other and build on the competitive strengths of both rail and lake services to reduce the cost of transport. Specifically it seeks to:

- Ensure that appropriate port infrastructure and technological developments are made to cater for future freight tasks;
- Ensure that laws and regulations, tariff and pricing structures are harmonised;
- Ensure that appropriate organisational and commercial policies are implemented to promote inland water-way trade;
- Better integrate port planning with the development of other transport modes.

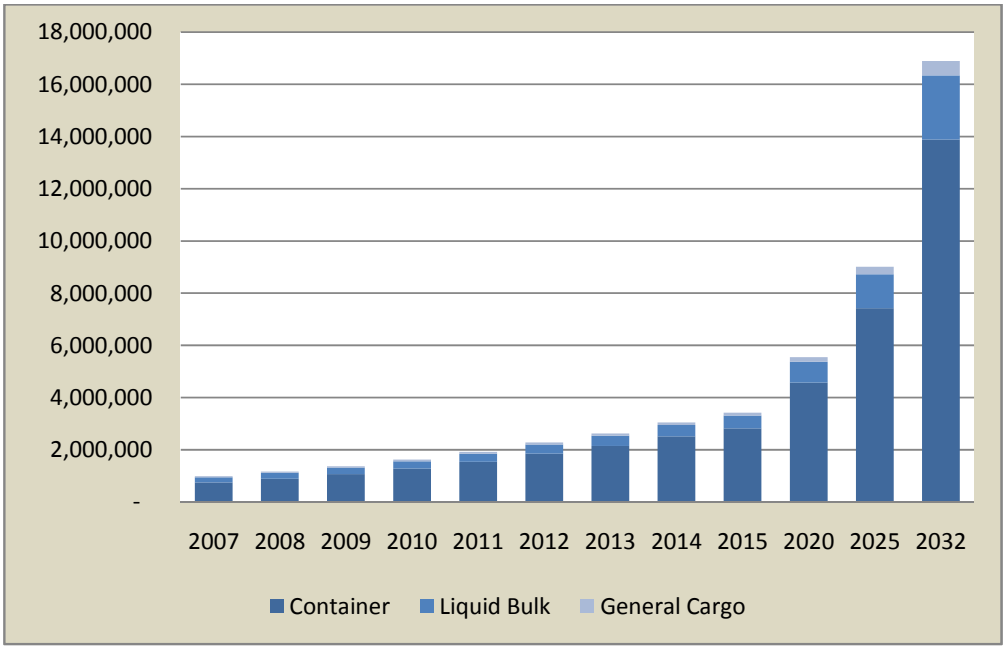
2 Traffic Outlook and Future Freight Tasks

2.1 Forecast Traffic Volumes

Based on the throughput volumes at Dar es Salaam (the CDC gateway port), unhindered transit traffic demand to Burundi, the DRC, Rwanda and Uganda is expected to grow from a level of approximately 990 thousand harbour tonnes (2007) to some 3.4 million tonnes in 2015 and some 16.9 million harbour tonnes in 2032.

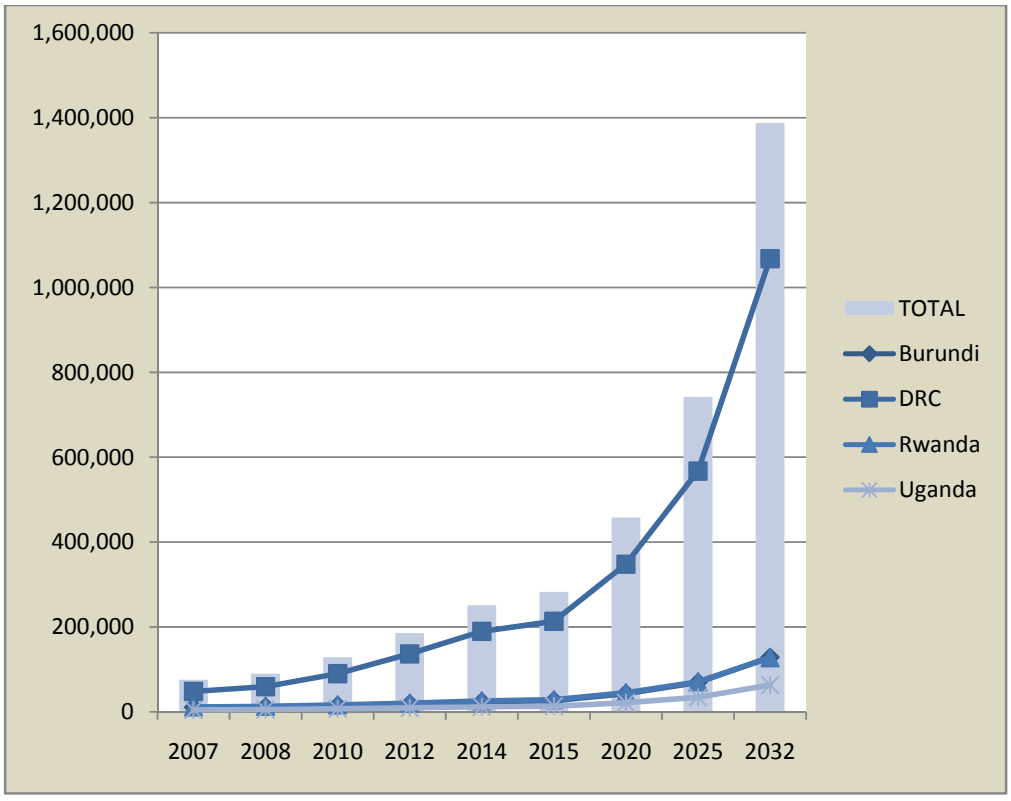
Figure 1 Transit Trade Forecast by Type: Burundi, the DRC, Rwanda & Uganda

Note: Figures in Harbour Tonnes



Containerised cargo is expected to make up the most of these volumes, especially trade to the DRC, potentially the largest and fastest growing transit country user of Dar es Salaam port. When measured in Twenty-foot Equivalent Units (TEU), transit traffic demand (including transport of empty returns) is forecasted to grow from some 75 thousand TEU (2007) to over 282 thousand TEU by 2015 and close to 1.4 million TEU by 2032.

Figure 2 Transit Container Trade Forecast (TEU per annum)



In addition to the above transit trade volumes originating at Dar es Salaam port, inter-regional and domestic trade on Lake Tanganyika is expected to grow from a level of approximately 60 thousand tonnes (2007) to over 130 thousand tonnes in 2015 and close to 700 thousand tonnes by 2032.

Passenger transport on Lake Tanganyika is also expected to grow from a level of approximately 26 thousand people in 2007 to over 86 thousand by 2015 and over 820 thousand by 2032. Over 62% of these passengers are expected to travel between Kigoma and remote Tanzanian villages on the eastern shoreline to Mpulungu in Zambia. By 2015 this trade will account for approximately 50% of all passenger journeys by lake, reducing to between 30-40% by 2032 as trade increases to the DRC.

On the Southern (Tanzanian) portion of Lake Victoria, domestic trade is expected to grow from a level of about 250 thousand tonnes in 2007 to approximately 520 thousand tonnes in 2015 and close to 2 million tonnes by 2032. Similarly, the number of passengers travelling on the lake between the Tanzania ports are expected to grow from about 490 thousand in 2007 to over 1 million by 2015 and over 3.7 million by 2032.

2.2 Potential Freight Tasks – Lake Tanganyika

The main short-medium term (Base Case) strategy for Lake Tanganyika is focused on capture of:

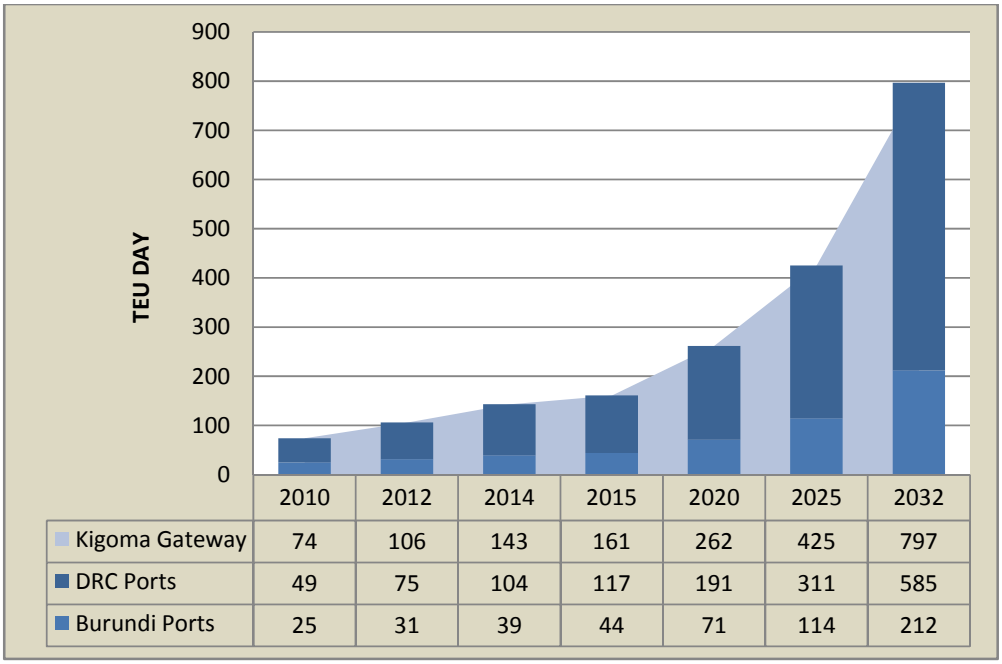
- 60% of the forecasted growth in the transit container trade to Burundi; and
- 20% of the forecasted growth to the DRC

By year 2010, this will equate to a DAILY through-put of approximately 75 TEU at Kigoma (the gateway port); approximately 50 TEU/day at the DRC ports (principally Kalemie); and, 25 TEU/day at Burundi (Bujumbura). By year 2020 daily throughput can be expected to grow to about 260 TEU at Kigoma and approximately 190 and 70 TEU respectively to the DRC and Burundi Ports.

The expected total vessel and rail movements that would be generated by this anticipated trade by year 2020 equates to:

- 5 vessels per day each-way on the Kigoma – DRC/Burundi routes (Type 30 TEU vessels)
- 4-5 trains per day each-way between Dar es Salaam – Kigoma (30 TEU per train).

Figure 3
Potential Daily Freight Task Transit Container Traffic (Base Case)



	2010	2012	2014	2015	2020	2025	2032
Kigoma Gateway	74	106	143	161	262	425	797
DRC Ports	49	75	104	117	191	311	585
Burundi Ports	25	31	39	44	71	114	212

Where the rail-network can be substantially upgraded to a standard gauge able to support axel loads of up-to 80 tons at speeds of 100km/hr, the main medium-long term (High Growth) focus should be based on capturing:

- 80% of the forecasted growth of the container trade to Burundi; and
- Achieving a 50% modal split of forecasted traffic demand to the DRC.

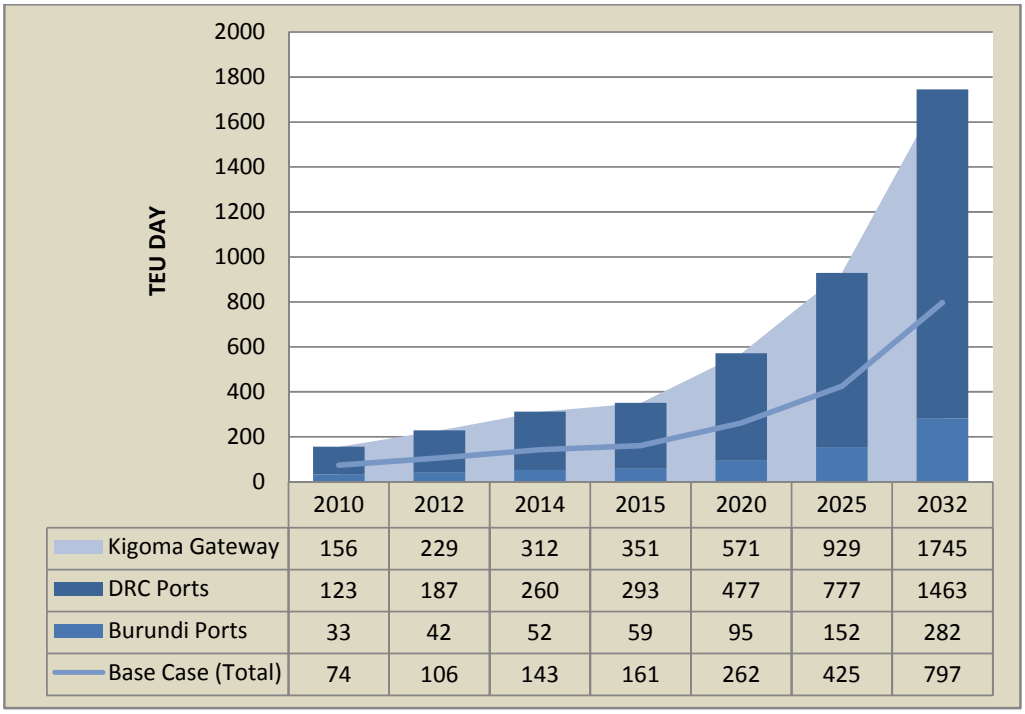
By year 2020, this will equate to a DAILY through-put of approximately 570 TEU at Kigoma (the gateway port) and approximately 470 TEU/day at the DRC ports (principally Kalemie) and 100 TEU/day at Burundi (Bujumbura). By year 2032 daily throughput can

be expected to grow to in excess of 1700 TEU/day at Kigoma and approximately 1400 and 300 TEU/day respectively to the DRC and Burundi Ports.

The expected total vessel and rail movements that would be generated by this anticipated trade in by year 2032 equates to:

- 10 vessels per day each-way on the Kigoma – DRC/Burundi routes (Type 90 TEU vessels)
- 10 trains per day each-way between Dar es Salaam – Kigoma (90 TEU per train).

Figure 4
Potential Daily Freight Task Transit Container Traffic (High Growth)



	2010	2012	2014	2015	2020	2025	2032
Kigoma Gateway	156	229	312	351	571	929	1745
DRC Ports	123	187	260	293	477	777	1463
Burundi Ports	33	42	52	59	95	152	282
Base Case (Total)	74	106	143	161	262	425	797

In addition to the main container transit trade through Dar es Salaam, the Lake Tanganyika ports will also need to handle increased daily demands for general cargo and liquid bulk as follows:

Table 1
Potential Daily Freight Task General Cargo and Liquid Bulk Traffic Lake Tanganyika

Port	2015 (Tonnes per day)		2032 (Tonnes per day)	
	General Cargo	Liquid Bulk	General Cargo	Liquid Bulk
Kigoma	255	1,200	1,375	6,300
Kalemie/Kalundu	230	1,000	1,300	5,700
Bujumbura	210	200	585	600
Mpulungu	120	-	340	-
Kasanga	55	-	155	-

2.3 Potential Freight Tasks – Lake Victoria

On Lake Victoria and based on a growth of CDC traffic originating in Dar es Salaam , the potential daily container freight tasks for the respective lake ports grows to 40 and 175 TEU/day by 2015 and 2032 respectively. General cargo volumes grow to 590 tonnes/day by 2015 and to over 2,000 tonnes/day by 2032 at Mwanza South Port - much more than at Port Bell (at 20 and 55 tonnes/day in 2015 and 2032 respectively). The growth in liquid bulk at both ports is expected to be similar - 150 and 480 tonnes/day by 2015 and 2032 respectively.

Table 2
Potential Daily Freight Task
Main CDC Traffic (Lake Victoria)

Port	2015			2032		
	Containers (TEU)	**General Cargo (Tonnes)**	**Liquid Bulk (Tonnes)**	**Containers (TEU)**	**General Cargo (Tonnes)**	**Liquid Bulk (Tonnes)**
Mwanza South	40	590	150	175	2,090	480
Port Bell	40	20	150	175	55	480

2.4 Potential Passenger Tasks – Lakes Tanganyika & Victoria

Inland water-way transport on both Lakes Tanganyika and Victoria is also critical for the development of the peripheral regions of the respective great lake countries as in the absence of other transport modes, this provides the only link between parts of Tanzania, Burundi, the DRC, Zambia and Uganda.

On Lake Tanganyika, the combined passenger/parcel trades are expected to grow by over 175% by 2015, whilst on Lake Victoria (which already has a higher passenger base), growth is expected to be in the region of 100% by the same year. The accommodation of this growth is of vital importance to the rural economies and forms a key part of the infrastructure development strategy.

Table 3
Potential Annual combined passenger/parcel transport demand – Lakes Tanganyika and Victoria

Trade Route	2015		2032	
	Passengers (number)	Cargo (tonnes)	Passengers (number)	Cargo (tonnes)
Lake Tanganyika				
Kigoma – Small Villages	45,000	18,000	305,000	125,000
Rumonge - Baraka	25,000	26,000	310,000	126,000
DRC – Small Villages	16,000	20,000	205,000	255,000
Lake Victoria				
Mwanza – Bukoba/Kemondo Bay	200,000	145,000	735,000	530,000
Mwanza - Nansio	395,000	20,000	75,000	1,445,000

3.0 Meeting the Challenges

3.1 Strategy Framework

This strategy is organised into a broadly logical sequence of short, medium and long term actions that each respective Government should collectively pursue to ensure port and shipping systems complement each other, build on competitive strengths of rail and lake infrastructure and make the best possible use of investment that has already been made. These actions include:

Infrastructure Development

If there is to be any real change in the quality, cost and time of travel along the Central Development Corridor (CDC) to Burundi, parts of the DRC, Uganda and the peripheral regions of Tanzania, the existing Inland Water-way Ports need to be substantially modernised to meet the potential freight tasks (ahead of demand).

First and foremost, this means investing in backlog maintenance requirements which prevent a port functioning as a place of contact between marine and land space, especially investments which:

- prevent safe access to a port or berth;
- prevent a ship from lying safely afloat when anchored in designated areas or moored alongside a designated berth(s);
- prevent the landing of passengers and goods due to inadequate facilities for trade, including a safe shore, proper wharves, warehouses and other establishments for dealing with the kind of cargo regularly traded on the lake(s).

Secondly, this means investing in improvements that allow the ports meet their potential freight tasks, including port layout, berth and land transport access, especially investments which:

- can lead to capture of a share of container transport demand with Burundi and the eastern DRC;
- allow an increase of north-south transport demand on Lake Tanganyika; and
- provide an alternative route for access to and from the East African seaboard for Uganda.

Additionally, it means investing in other lake port infrastructure that allows continued infra-regional trade, especially:

- an increase in the demand for passenger transport on Lake Tanganyika;
- an increase in the demand for passenger and general cargo transport in the southern portion of Lake Victoria.

Technological Actions

Analysis of inland water-way transport shows that operationally, lake services have been in general decline with a reputation of being technically not flexible enough and slow. Excepting the delivery of relative new-buildings, lake shipping is characterised by poor safety standards, poor frequency, irregular service and long port stays (generally taking up to 70% of vessel time).

On Lake Tanganyika, of the 68 vessels over fifty gross tonnes, only 25 are currently operational and of the total fleet, 56% is older than 50 years in age and 8% is older than 80 years in age. This includes the Tanzanian flagged passenger ferry Liemba (first launched in 1913) and the Burundian flagged tug Tanganyika (first launched in 1891) – both respectively the oldest commercially operated passenger ferry and towing vessel in the world. Only 21% of the total fleet is less than 20 years in age and 8% less than 10 years in age. There are no fully cellular container vessels, dry bulk or RoRo vessels operating on the lake and trade is currently dominated by privately owned Burundian flagged vessels sailing on north-south routes, including three partial container ships with 14, 24 and 36 TEU capacity respectively. Excepting some trade with Mpulungu in Zambia and aid shipments for the DRC through Kigoma, most of the DRC and all of the Tanzanian flagged vessels operate on cabotage routes (i.e. between ports or landing places in their own territorial waters). While existing capacity is able to meet the current depressed level of lake transport demand, this generally involves considerable delay and long cargo dwell time in the lake ports of origin. The fleet will not however be able to meet future transport demand, especially container transport demand driven by continued GDP growth and, growth realised through increased port efficiency and railway performance.

Although larger, Lake Victoria by contrast has fewer ships over fifty gross tons, most of which are engaged in combined passenger/cargo trades on cabotage routes in the southern and northern portions of the lake respectively. Of the 14 dedicated cargo vessels however, only 10 are currently operational and total cargo deadweight carrying capacity is approximately 3,400 tons. Though previously supplied with five rail-wagon ferries with a combined cargo capacity of approximately 4,400 dwts, one of these, belonging to the Uganda Railways Corporation (URC) was lost in 2005. The two remaining rail-wagon ferries belonging to UCR (both approximately 24 years in age) were withdrawn from service and only those belonging to the railways of Kenya and Tanzania remain in operation (each 44/45 years in age).
The decline of these services has resulted in greatly reduced trade with Uganda through the Central Development Corridor and in late 2008 there were over 170 wagons backed-up waiting shipment at Mwanza and approximately 100 wagons waiting shipment at Port Bell. Although the rail-wagon service was designed to minimise the general cost of modal-change (and provide quick vessel turn-around time) poor availability has resulted in an average wagon turn-around time of up-to 90 days – further compounding capacity constraints on the railway networks.

In this regard, there is a need for major investment by ship-owners on both lakes, which should be based on a radical rethink of the logistics solutions currently used. To achieve this, the strategy takes a targeted approach to promoting the introduction of modern technically advanced vessels able to integrate better into logistics chains on the different lake routes.

Laws and Regulations

While each respective great lake Government has an undeniable right to make rules and regulations governing the registration, licensing, design, construction, maintenance, manning and operation ships flying their respective flags, there are no harmonised standards within the region covering inland water-way vessels. Where specific National regulations do exist, unfortunately they are not applied consistently and each State is hindered to varying degrees in their ability to discharge their duties. This has allowed ship-owners (including State or Parastatal organisations) to operate a wide variety of vessels to different standards or for purposes other than that originally designed. While all are concerned with their financial survival and some hope to trade profitably, at one end of the scale are ship-owners who insist upon the highest standards, while at the other end are those whose sole concern is for an immediate short term returns, irrespective of risk of loss or damage.

To overcome this and in order to promote a safety culture on Lakes Tanganyika and Victoria, a goal of the strategy is to focus attention on relevant government policies regarding the licensing and operations of Inland Water-way vessels.

Similarly, standards of port security, safety and environmental practice are fundamentally important to the long term sustainability of the Inland lakes and it is the respective governments' role to ensure that port regulatory arrangements are well coordinated, regularly assessed and enforced. Such port regulations should aim to meet the practical objectives of good port practice and be modelled in particular on performance based regulation with focus on outcomes which are a key to encouraging innovation and efficiency.

Organisation and Action Policies

Within an intermodal environment, there is always is tremendous scope for improving the organizational aspect of port and shipping environments, particularly where these are characterized by rigid administrative proceedings, non-flexible working conditions and a lack of competition. The scope of these deficiencies ranges from of a lack of suitable interchange facilities, poor information and waiting environments, poor scheduling and uncoordinated service timings (which are of particular inconvenience to passengers), to the lack of intermodal liability regimes and, the lack of facilities for consolidating cargo suitable for carriage using different modes of transport, such as freight stations.

As part of a policy to restore the image of Inland Water-way transport as a modern element in the multimodal logistics chain the strategy focuses on the following organizational actions.

- **Port organisation and the encouragement of interconnectivity:** - especially where ports are not currently organised to operate on a 24 hour basis and vessel's time their arrivals and departures (where possible) to coincide with port working times. On short inland routes this can be problematic and lead to substantial delay over a period of time, especially where there may be commercial pressure to turn-around ships quickly (allowing greater capacity utilisation and greater freight earnings). These problems are also common to the passenger trades where often the most stressful part of the journey is trying to embark onto or disembark from ship. Unreliability and poor punctuality are also major issues and are a key factor in making these services unattractive to users, especially when combined with poorly coordinated service timings, poor waiting and information environments.
  Projected growth in travel will increase pressure on these already unsatisfactory

services unless a program for improvements can be acted upon.

- **Cooperation between different transport suppliers**:- especially problems of through carriage involving a maritime leg with overlapping liability regimes and the additional risk and costs to shippers, consignees and forwarders.

- **Port concentration and achieving economies of scale**:- as one of the particular characteristics of inland water-way shipping is the amount of time a vessel can spend in port due to short voyage distances. Indeed on much of the inland water-way routes, vessels can spend twice as much time in port than en-route, thereby greatly curtailing freight earnings. This situation can be compounded by poor performance at the ship/shore interface and rigid administrative procedures (prohibiting night time sailing etc).
  As economies of scale are important driver for growth (and lowering freight rates), the concentration of inland water-way transport on a limited number of ports is of importance to the sustainability of the industry and the regional economy as a whole.

- **Cargo unitisation**:- in order to allow the benefits of containerisation to be realised on the inland leg of an international transport chain it will be important to develop Inland Container Depots (ICDs - defined generally as facilities located inland or remote from a sea port and which offer services for handling, temporary storage and customs clearance) in the respective great lake countries. Additionally and of equal or not greater importance will be the development of container freight stations (CFS) in the respective ports, particularly the origin and destination ports. A CFS (which can be attached to an ICD) are facilities where shippers can transport their cargoes in break-bulk to a central location which then consolidates and packs the goods into containers. Similarly, receivers of goods can arrange for the containers to be unpacked at the CFS and separated into break-bulk consignments. Accordingly, the establishment of container freight stations forms a cornerstone for the modern development of inland water-way transport.

- **The creation of value added services**:- as strong and efficiently run ports are important assets for economic development and a pole of attraction for a broad range of industries, the attraction of which will strengthen the CDC backbone infrastructure in general and the inland water-way transport in particular.

Pricing Policies

Within competitive port environments, high performance at competitive and predictable port user cost is a key factor to ensuring prosperity and growth.
Currently however, there are no harmonized charges for port services on the respective lakes and Tanzania Ports Authority (TPA) is the only operator with a set of published tariff of rates. Some of the rates are set below full cost recovery, while others exceed related costs, making Tanzania's ports relatively cheap for ships but very expensive for the cargo they carry. Furthermore, the *ad valorem* wharfage charges generally favor low-valued commodities although the same cargo infrastructure is used, which given the high many variables affecting transport cost, is essentially the anti-thesis of both cost and equity-based pricing principals. This situation prejudices carriage of marginal cargoes and does little to encourage fast ship turn-around time or quick cargo off-take from the port.

Commercial Actions

The entire industry is characterized a lack of public information and /or statistics and is generally very difficult to assess. The result is that potential users of Inland Water-way Transport have only vague or a patchy picture and are therefore put-off using its services. The lack of statistical data also makes it difficult for governments to assess the efficiency of their policy implementations and hampers their ability to forecast market trends.

3.2 Strategy Staging

Given the geographical and economical situation in which inland water-way transport exists and mindful that the strategy should be integrated with the development of railway services on the CDC (and the railways within the DRC/Uganda), this strategy is staged into short, medium and long term phases. The timing of the stages depends largely on traffic trends and the need to go through statutory processes to determine and approve their detail, including further economic, social and environmental evaluation.

In the short (immediate) term however, it is critical that investment is made in backlog maintenance that prevent the lake ports functioning as a place of contact between marine and land space. It also important that other policies designed to restore the image of Inland Water-way transport as a modern element in the multimodal logistics chain are commenced. These actions, together with a transparent approach to medium and long term planning (reviewed on a regular basis), can make a significant impact on related public/private sector operations, investment and location decisions.

Part B: The Recommended Transport Strategy for Lakes Tanganyika and Victoria

1 Short Term Strategies

Strategy 1.1 Infrastructure Development

Backlog Maintenance and Safe Ports

Dredging Works – Bujumbura, Kigoma, Kalemie, Mwanza North Port
Dredge the ports of Bujumbura, Kigoma and Kalemie (Lake Tanganyika) and Mwanza North port (Lake Victoria) to restore design depths on the approach to, in the anchorage or alongside designated berths. At Kigoma, this includes the dredging of the approach and berths of the Kibirizi Oil Jetty.

Siltation Protection – Bujumbura, Kigoma, Kalemie, Mwanza North Port
Realign, widen and construct permanent canals, breakwaters or groins at the above ports, designed to alter the pattern of sedimentation and river discharge especially during peak flood periods. This should include watercourse management which minimises soil erosion and sedimentation, especially at Bujumbura.

Hydrography, Charting and Aids to Navigation – All Ports
Undertake and/or complete hydrographic surveys and install lake-wise and port navigation aids, especially leading lights designed guide ships along safe passages when entering and leaving a port and jetty-end lights marking the limits of breakwaters, piers etc.

Vessel Bunkering Facilities – Kigoma and Mwanza South Port
Relocate Vessel Bunkering Facilities at Kigoma adjacent to the passenger terminal to Kibirizi Oil Jetty (Lake Tanganyika) and, relocation of the tank-ship loading facility at Mwanza South Port (Lake Victoria).

Oil Jetty Access - Kigoma
Provide safe access and egress at Kibirizi Oil Jetty – Kigoma (Lake Tanganyika), including realignment of boundary walls, the construction of a linear access-way to the backshore area, provision car-parking, fencing and gates, jetty control and fire-fighting facilities.

Fender Arrangements, Ladders, and Life Saving Equipment – All Major Ports
Provide and install cylindrical ship fender arrangements, access ladders, gangways and life saving equipment at Bujumbura, Kigoma, Kalemie, Kalundu and Mpulungu Ports (Lake Tanganyika) and Mwanza North/South Ports, Port Bell (Lake Victoria).

Container Handling Facilities

Provision for Container Handling Equipment

Provide and install LoLo container handling equipment to the ports of Bujumbura, Kalemie, Mwanza South Port and Port Bell, including:

(i). Mobile harbour cranes (Gottwald HMK 90 E or equivalent), front loaders, reach stackers, and tractor trailer units.

Strategy 1.2 Technological Actions

Introducing New Advanced Ship Design

Commence public/private stakeholder consultations to encourage investment in modern shipping technology through:

(i) Reviewing fiscal and other barriers hindering ship construction and operation;

(ii) Allowing national flag ships of any of the great lake states to operate on cabotage routes of other states, including passenger routes;

(iii) Considering the introduction of arbitrary age limits for different type vessels and introducing a gradual policy of fleet renewal by faster, better designed and more commercial vessels.

Strategy 1.3 Laws and Regulations

Merchant Shipping Legislation and Standards

Commence intergovernmental consultations to:

(i) Adopt harmonised rules and regulations regarding design, safety construction, safety operation, manning and maintenance of ships;

(ii) Adopt recognised classification society rules and regulations regarding the construction of special niche vessels including container carriers, RoRo ships, tankers and high speed craft;

(iii) Consider the need to introduce meteorological, navigational warning and other services for inland water-way shipping and adopt a harmonised implementation policy;

(iv) Consider the need for GMDSS services and the establishment of search and rescue organisations and adopt a harmonised implementation policy.

Port Security, Safety and the Environment

Commence intergovernmental consultations to:

(i). Harmonize port security, safety and environmental compliance strategies;

(ii). Introduce relevant port operational and performance standards with a focus on outcomes;

Strategy 1.4 Organizational & Action Policies

Port Organization, Cooperation, Concentration and Unitization

Commence Inter-Port Consultations to:

(i). Consider the practicality of extending port working hours to match through-put demand;

(ii). Consider allowing vessel traffic to enter and depart the ports at night;

(iii). Review the mechanisms for sharing port information and cooperation;

(iv). Consider opportunities for concentrating cargoes at selected ports and the development of facilities to unitise break bulk and general cargo.

Strategy 1.5 Pricing Policies

Commence port tariff reviews to establish user and other infrastructure related charges with a view to implementing a harmonized transparent structure based on different landlord and operational functions.

Strategy 1.6 Commercial Actions

(i) Compile port information booklets for each lake which provides general information, port layout and operations, cargo and tariff information and, contact details for all service providers.

(ii) Collect statistical information, that:

- can be used in the compilation of port booklets (types of shipping services offered, capacity, routes, cost, frequency, time etc); and
- can be used by governments to assess performance and market demand, especially:
  - Service indicators (vessel waiting time, port turn-around time);
  - Output indicators (berth through-put, loading/discharge rates, dwell time);
  - Utilisation Indicators (berth occupancy etc)
  - Productivity Indicators (cost effectiveness etc)

2 Medium Term Strategies

Strategy 2.1 Infrastructure Development

Port Expansion

Lake Tanganyika

Kigoma Port

Container Facilities

Maximising existing container handling facilities and storage yard space to meet medium term (2015) base case demand scenario needs through:

(i). Rationalisation and realignment of the existing Rail-Mounted Gantry crane (RMG) handling system by increasing the number of ground slot capacity to 144 TGS for full imports/exports only. With a stack height of 1 over 3, this will give the port a holding capacity (HC) of approximately 432 TEU and an annual handling capacity of approximately 30,000 TEU (on a dwell time of 5 days);

(ii). Expansion of the container storage yard in landside areas to provide capacity for empties storage (using reach stackers and/or front loaders) to a height of 1 over 6; and

(iii). Conversion of the back-port sheds into a container freight station.

General Cargo Facilities

The redevelopment of the general cargo berths from a two-tiered structure to a single level, thereby facilitating horizontal transfer operations.

Passenger Facilities

(i). The construction of dedicated landside facilities, including convenient, secure and comfortable check-in and waiting areas that allows segregation of passengers and cargo mindful of the general mix of vessel payloads. Where passengers transit international borders, this should include facilities for customs and immigration;

(ii). Provision for the safe embarkation of passengers at the ship-shore interface, including proper gangways and safety facilities.

Potential Layout Kigoma Port

Kalemie Port

Container Facilities

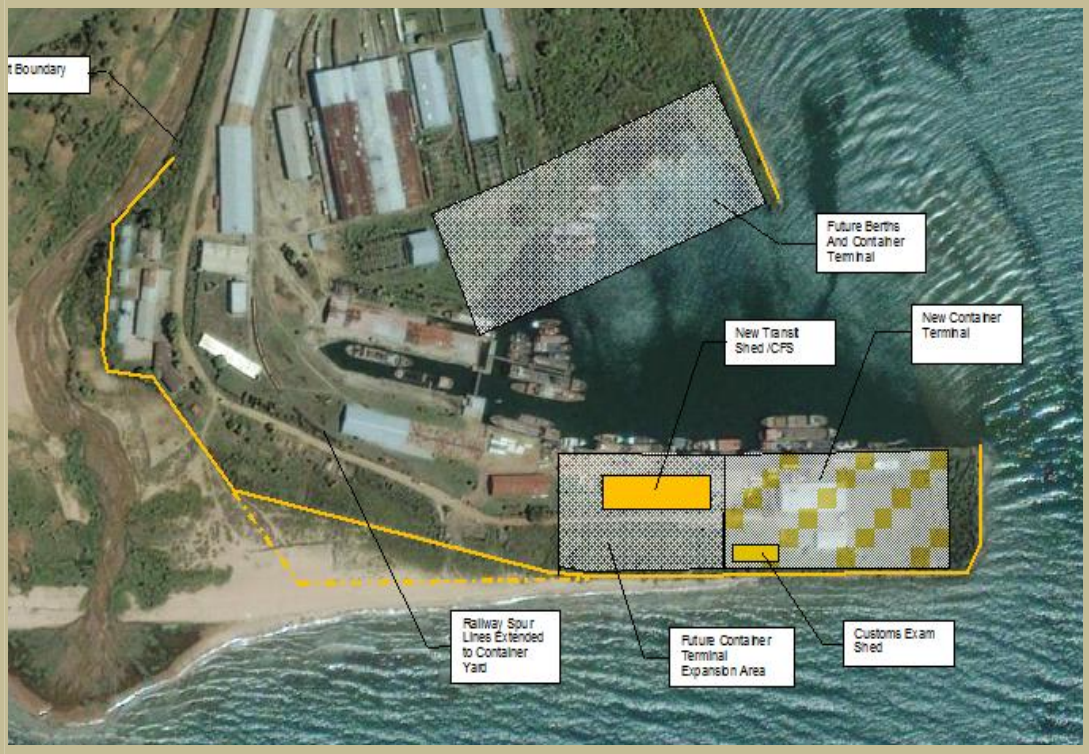
Redevelop part of the eastern breakwater into a dedicated container terminal utilising a Rail Mounted Gantry crane (RMG) of similar specification to that provided at Kigoma to meet medium term (2015) base case demand scenarios. This will initially entail:

(i). Construction of a paved storage yard and container freight station;
(ii). Realignment of rail spur lines and roads;
(iii). The layout of a single block 105m length x 30m width with a cantilevered ends giving a yard capacity of 144 TGS. Based on utilising a stack height of 1 over 3, this will give the port a holding capacity (HC) of approximately 432 TEU.
(iv). The layout of blocks for empty storage (using reach stackers and/or front loaders)
(v). Construction of a container freight station with associated equipment for stuffing/de-stuffing containers.

General Cargo Facilities

Rehabilitation of general cargo quays, aprons, transit sheds and open storage facilities, including provision for new portal cranes.

Potential Layout Kalemie Port



Bujumbura Port

Container Facilities

Redevelopment of part of the main quay into a dedicated container terminal for use with a rubber-tyred gantry crane system (RTG) with tractor-trailer units in order to meet high growth scenarios to 2015. This will initially entail:

(i). Demolition of transit shed no. 1 (close adjacent to the port entrance channel) and the relocation of workshops to back-port areas allowing RTG stacks to be kept parallel/perpendicular to the quay and divided into several blocks each separated by access aisle-ways;

(ii). For the RTG system, the layout of 4 blocks, each 52m length and 23m width allowing operation of a six plus one lane RTG, providing the port with a ground slot capacity of 192 TGS. Where each block is stacked 1 over 3 high, this will give the port a holding capacity of 576 TEU and an annual handling capacity of approximately 19,000 TEU;

(iii). The Supply of additional mobile harbour cranes (Gottwald HMK 90 E or equivalent), tractor trailer units and RTGs.

Potential Layout Bujumbura Port

Kalungu Port

Container Facilities

Redevelopment of part of the main quay into a combined container/dry cargo facility utilising lift truck systems, including:

(i). Demolition of transit sheds and provision of a container yard designed for use with lift truck systems (front loaders/reach stackers);
(ii). The supply of a mobile harbour crane, tractor trailer units and associated equipment.

General Cargo Facilities

Rehabilitation of general cargo quays, aprons, transit sheds and open storage facilities, including provision for new portal cranes.

Potential Layout Kalungu Port

Mpulungu Port

Container and General Cargo Facilities

Extension of the existing pier (which is only 20m length and requires ships to double/tripe bank when moored) and development of yard storage areas into a combined container/dry cargo facility utilising lift truck systems.

Passenger Facilities

(i). The construction of dedicated landside facilities, including convenient, secure and comfortable check-in and waiting areas that allows segregation of passengers and cargo mindful of the general mix of vessel payloads. Where passengers transit international borders, this should include facilities for customs and immigration;

(ii). Provision for the safe embarkation of passengers at the ship-shore interface, including proper gangways and safety facilities.

Potential Layout Mpulungu Port

Rumonge, Kasanga and Other Small Ports

The construction and expansion of piers of ramp facilities for RoRo type vessels allowing loading/unloading directly to shore.

Lake Victoria

Mwanza South Port

Container Facilities

Redevelopment of part of the main quay into a dedicated container terminal for use with a lift truck systems, including:

(i). Demolition of transit sheds and provision of a container yard designed for use with lift truck systems (front loaders/reach stackers);

(ii). The supply of additional mobile harbour cranes (Gottwald HMK 90 E or equivalent), tractor trailer units and associated equipment.

General Cargo Facilities

(iii). The redevelopment of the general cargo berths from a two-tiered structure to a single level, thereby facilitating horizontal transfer operations;

(iv). The development of maintenance quays for dry-docking services.

Potential Layout Mwanza South Port

Mwanza North Port

Passenger Facilities

(i). The construction of dedicated landside facilities, including convenient, secure and comfortable check-in and waiting areas that allows segregation of passengers and cargo mindful of the general mix of vessel payloads;

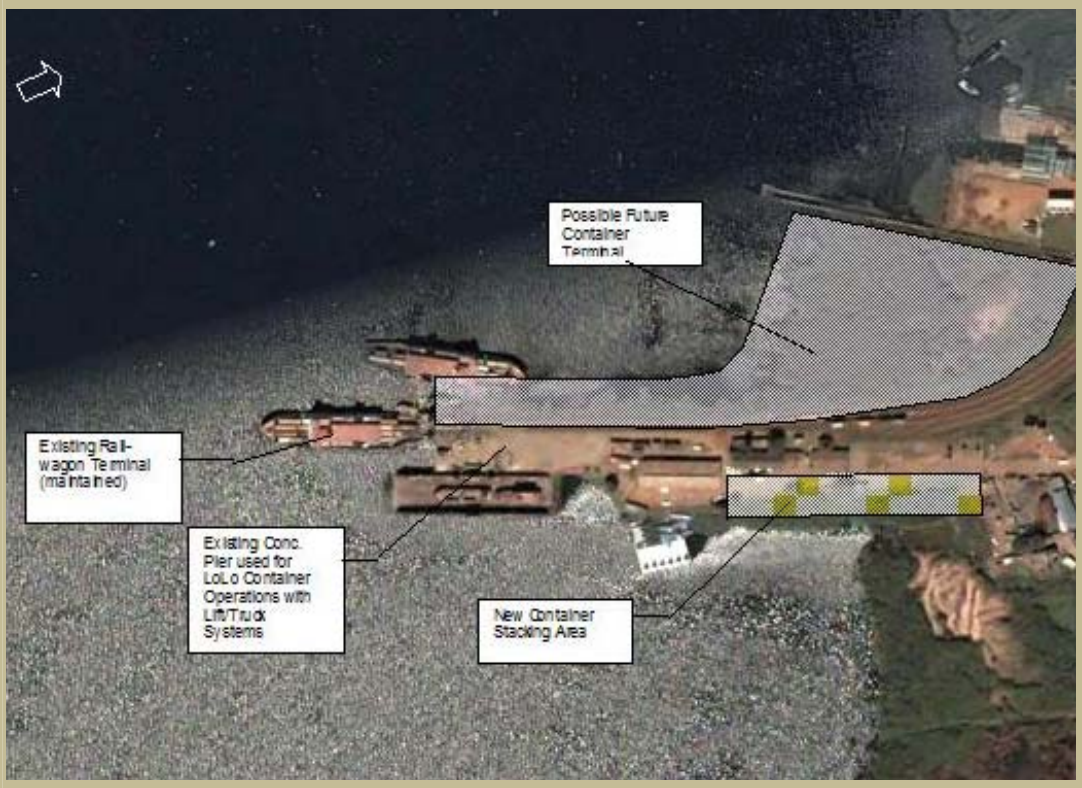
(ii). The construction of RoRo facilities, including truck and car parking and passenger waiting areas.

Potential Layout
Mwanza North Port

Port Bell

Development of back-port areas for the reception of LoLo container traffic, including the supply of a mobile harbour crane, tractor trailer units and associated equipment.

Potential Layout
Port Bell



Strategy 2.2 Technological Actions

Introducing New Advanced Ship Design

Based upon a review/removal of fiscal and other barriers made through public/private consultations in the short term, the respective Governments should provide or encourage private investment of the following types of vessels for the different trades.

Lake Tanganyika

The Transit Container Trades

(i). Self propelled small Load-on Load-off (LoLo) container ships (or partial container carriers) of a maximum length of 65m, beams of 15m, depth of 6.5m and a draft of 3.5m with cargo capacities up-to 90 TEU and service speeds up-to 12 knots.

The Bulk Liquid (Petroleum) Trades

(ii) Self propelled double hull tankers up-to 1500 dwts for the carriage of persistent oil in bulk or petroleum products with a flash-point < 60^{o} C;

(iii). The introduction of double hull combination carriers (either self-propelled ships or tug/barge units) up-to 1500 dwts for the carriage of petroleum products with a flash-point > 60^{o}C.

The North-South Infra-regional Trades

(iv) Integrated tug/barge operations on a swap and drop service (one tug/three barges) for the LoLo container/general cargo trades.

The Combined Passenger/Parcel Trades

(v) Medium speed (14 knots) shallow draft Roll-On Roll-Off (RoRo) passenger catamarans with pax complement up-to 600 and cargo capacities of 250 tonnes. The vessels should be equipped with fore and aft loading ramps (reinforced for shore landings) and stream anchors.

Lake Victoria

Rail-wagon Ferry Services

In the absence of alternative shipping capacity and where the efficiency of the rail service can be increased through greater availability of rolling stock, it is recommended that the respective Governments pursue a strategy to convert these vessels into Load-on Load-off container carriers with a view to Increasing revenue deadweight capacity.

This strategy should be phased in a systematic manner to coincide with future port development, initially by:

i) Continuing to maintain the vessels Umoja & Uhuru in their current role; and
ii) Converting the vessels Kaawa & Pamba into container carriers without structural modification of the superstructure by providing cells for 10 TEU on the foredeck and 11 TEU on aft deck. Under the central wheelhouse & accommodation structure, additional containers could be loaded onto purpose

built “Mafi” type trailers running on the existing rail lines on deck, to be loaded first & discharged last. Where the fore and aft deck cargo is stacked two-high, this would, assuming stability remains intact, potentially provide each vessel a capacity of 62 TEU, an increase 63% of revenue deadweight over existing use.

With regard to investment in new advanced ship design for other Lake Victoria trades, it is recommended that the respective governments provide harmonised fiscal and other encouragements to facilitate operation of:

The Bulk Liquid (Petroleum) Trades

(iii) Self propelled double hull tankers up-to 1500 dwts for the carriage of persistent oil in bulk or petroleum products with a flash-point < 60^{o} C;

(iv) The introduction of double hull combination carriers (either self-propelled ships or tug/barge units) up-to 1500 dwts for the carriage of petroleum products with a flash-point > 60^{o}C.

The Combined Passenger/Parcel Trades

(v) Medium speed (18 knots) shallow draft Roll-On Roll-Off (RoRo) passenger catamarans with a maximum deadweight of 400 tonnes (vehicles, passengers and general palletized cargo).

Strategy 2.3 Laws and Regulations

Merchant Shipping Legislation and Standards

(i) Provide meteorological, navigational warning and other services for inland water-way shipping and adopt a harmonised implementation policy;

(ii) Provide GMDSS services and establish search and rescue organisations and adopt a harmonised implementation policy.

Port Security, Safety and the Environment

(iii). Review and update port security, safety and environmental compliance regulations;

(iv). Review and update port operational and performance standards.

Strategy 2.4 Organizational & Action Policies

Port Organization, Cooperation, Concentration and Unitisation

i) Review and amend the organisation of port storage facilities, especially relating to land-use planning and, the requirements for the short and long term storage of different types of cargo and the different loading/offloading requirements between ships, rail and road transport;

ii) Provide convenient service schedules and coordinating them with other transport service timings;

iii) Providing good access to ports for freight and passengers;

iv) Providing good convenient waiting environments, with suitable passenger ticketing, check-in and luggage handling services, sanitation and other facilities;

v) Providing good security and information services.

vi) Consider opportunities for port concentration and moving transit trade cargo (i.e. non domestic passenger and general cargo trades) from Kasanga to Mpulungu Port (and from Kalungu to Bujumbura) allowing higher vessel frequency and economies of scale

vii) Where practical, encourage the development of liner services on Lakes Tanganyika and Victoria – i.e. the operation of ships on a regular schedule between advertised ports whereby space for goods in return for freight is based on a tariff of rates;

viii) Encourage links and cooperate with the major shipping lines, agents and freight forwarders;

ix) Promote the development of facilities to unitize and consolidate quantities of individual items, neo bulk and general cargo into one large shipping unit for ease of handling and shipping on inland water-way transport;

x) Promote the development of value added industries in inland water-way ports, especially services which may add value to the mineral extraction industries in the DRC; and manufacturing and other industries that add value to export competitiveness.

Strategy 2.5 Pricing Policies

Review all port tariff structures and ensure these are related to efficiency, encourage quick vessels turn-around time, enhance competitiveness and improve quality;

Strategy 2.6 Commercial Actions

(i) Create Inland Water-way Transport focal points within the respective government organisations;

(ii) Create industry led Inland Water-way Transport Promotion Centers in all the respective great lake countries that promote its image as a successful transport alternative.

3 Long Term Strategies

Strategy 3.1 Infrastructure Development

Port Expansion

To meet long term freight tasks, the respective governments should establish an Inland Water-way Transport Board to investigate and progress studies which seek to:

(i). Enhance rail and road access to the ports;

(ii). Free up and develop strategic land around the respective ports for freight related activities;

(iii). Increase respective port capacity by expansion of dedicated container and multipurpose terminals and the reorganisation of handling methods utilising wide span gantry cranes (with bridges up 60- 80m width and a capability to cantilever 30-40m each end). These gantries should be used together with mobile harbour cranes and lift truck systems, designed for stack management and the handling containers, swap bodies and semi-trailers;

Strategy 3.2 Technological Actions

Introducing New Advanced Ship Design

Lake Victoria

Rail-wagon Ferry Services

In the long term, it is recommended that the Strategy be to discontinue rail-wagon operations completely and promote the Investment (either through Public-Private Partnerships, JVs or otherwise) of Load-on Load-off (LoLo) container vessel services through use of fully cellular, partial container vessels, or integrated tug/barge units engaged in a swap and drop service.

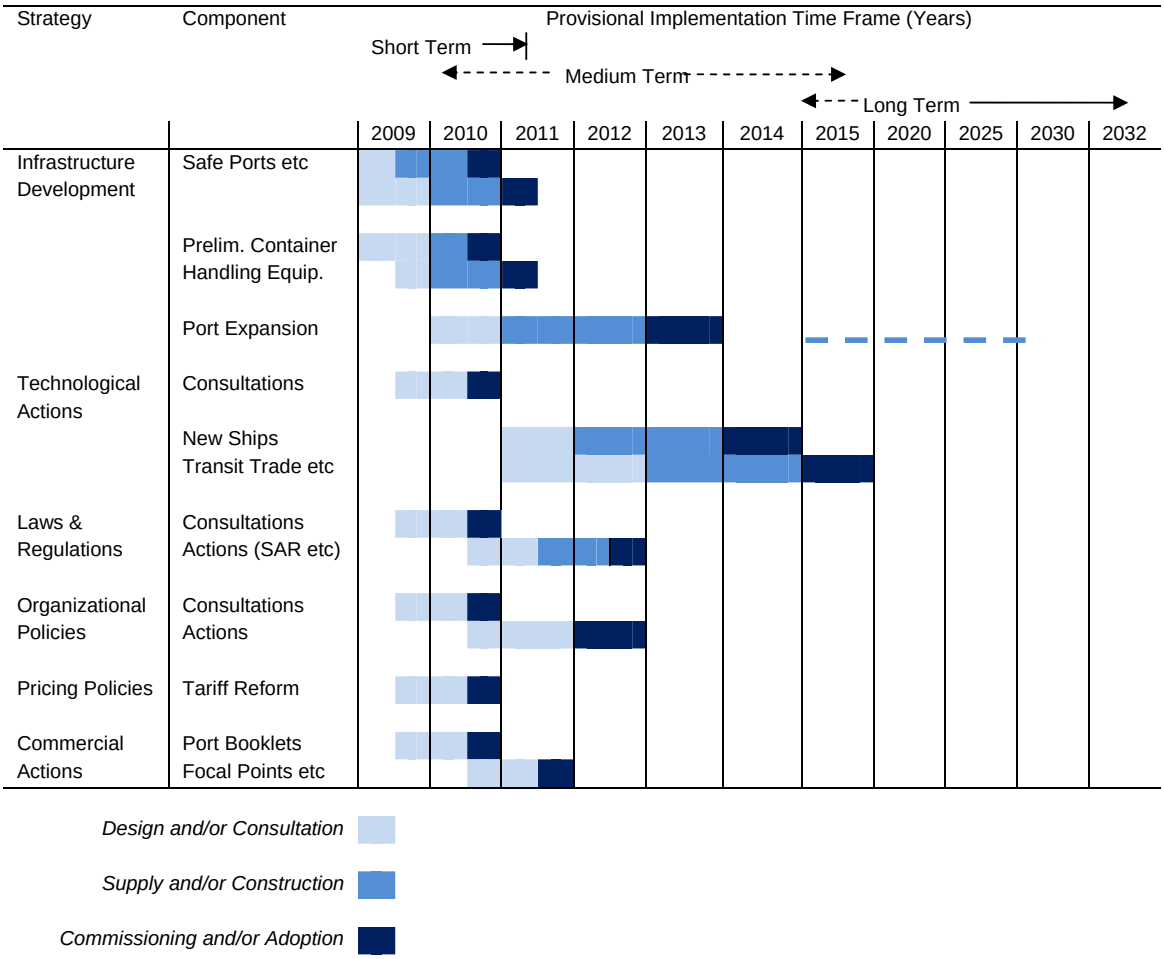
Part C: Strategy Implementation and Cost Estimates

1.0 Strategy Implementation Timeline

1.1 Provisional Schedule

The development of Inland water-way services should be staged to meet the potential freight tasks ahead of demand. Provisional staging for the short and medium term strategies are shown below.

Table 4: Provisional Strategy Implementation Schedule



2.0 Cost Estimates

2.1 Infrastructure Development

The objective of the cost estimate is to provide budgetary capital expenditure costs. The estimate, which excludes any taxes and duties in the respective great lake countries, are given in United Sates Dollars (USD) and have been prepared on undertaking the works as a bundle of contracts on each respective lake- allowing economies of scale and utilizing shared resources (such as dredging equipment). These estimate, up-to year 2015 are summarised in the following tables and broken down into the respective ports on each lake.

Table 5: Cost Estimates for Infrastructure Development

Lake Tanganyika

	Principal Ports				Small Ports				
	Bujumbura	Kalemie	Kalundu	Kigoma	Mpulungu	Kasanga	Rumonge	Others (10)	**Total (US$ Million)**
A. Safe Port and Terminals									
1. Dredging, Survey & Associated Works	1.50	1.00	0.05	1.00	0.10	0.10	0.05	0.50	4.30
2. Sedimentation Protection Works	1.50	0.50	0.00	0.50	0.00	0.00	0.00	0.00	2.50
3. Aids to Navigation	0.15	0.15	0.10	0.15	0.10	0.10	0.05	0.50	1.30
4. Liquid Bulk Terminal Improvements	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.50
5. Fendering etc	0.50	0.50	0.10	0.50	0.10	0.10	0.00	0.00	1.80
6. Preliminary Container Equipment	3.50	3.50	0.00	0.00	0.00	0.00	0.00	0.00	7.0
B. Container Terminal Development									
1. Civil Works	4.00	5.00	2.00	0.50	4.00	0.00	0.00	0.00	15.50
2. Equipment	2.50	2.50	2.00	1.50	2.00	0.00	0.00	0.00	10.50
C. General Cargo & Passenger Terminals									
1. General Cargo Terminals	0.00	2.00	1.50	2.00	0.00	0.00	0.00	0.00	5.50
2. Passenger Terminals	0.00	0.00	0.00	1.50	2.00	0.70	0.70	2.50	7.40
Sub-Total	**13.65**	**15.15**	**5.75**	**8.15**	**8.30**	**1.00**	**0.80**	**3.50**	**56.30**

Lake Victoria

	Mwanza South	Mwanza North	Port Bell	**Total (US$ Million)**
A. Safe Port and Terminals				
1. Dredging Survey & Associated Works	0.10	1.00	0.10	1.20
2. Sedimentation Protection Works	0.00	0.50	0.00	0.50
3. Aids to Navigation	0.15	0.15	0.15	0.45
4. Liquid Bulk Terminal Improvements	1.50	0.00	0.00	1.50
5. Fendering	0.50	0.10	0.15	0.75
6. Preliminary Container Equipment	3.50	0.00	3.50	7.00
B. Container Terminal Development				
1. Civil Works	4.00	0.00	2.50	6.50
2. Equipment	1.50	0.00	1.50	3.00
C. General Cargo & Passenger Terminals				
1. General Cargo Terminals	5.00	0.00	0.00	5.00
2. Passenger Terminals	0.00	2.50	0.00	2.50
Sub-Total	**16.25**	**4.25**	**7.90**	**28.40**

2.1 Shipping Development

The following table show the potential new building requirements and costs for the different freight type and tasks up-to year 2015. This includes the number of ships required to service anticipated base case volumes on the various routes to the same year.

Lake Tanganyika

Route	Freight Type	Freight Task	Vessel Type	Voyage Time (hours) Laden Lake Time 1	Voyage Time (hours) Port Time 2	No of Vessels Required	Cost each vessel	**Total US$ (Million)**
A. Principal Transit Trades								
Kigoma - Kalemie								
Option 1	*Container*	*60 TEU/day (each way)*	*30 TEU partial container ship*	*14*	*20*	*4*	*3.00*	***12.00***
Option 2	*Container*	*60 TEU/day (each way)*	*60 TEU partial container ship*	*14*	*32*	*2*	*5.50*	***11.00***
Option 3	*Container*	*60 TEU/day (each way)*	*90 TEU container ship*	*14*	*44*	*2*	*7.50*	***15.00***
Kigoma - Kalemie/Kalundu	General Cargo	230 Tonnes/day	Integrated tug/barge	18	6	1 tug/3 barges	9.50	**9.50**
Kigoma - Kalemie/Kalundu	Bulk Liquids	1000 Tonnes/day	Tanker	14	20	1	6.50	**6.50**
Kigoma - Bujumbura								
Option 1	*Container*	*20 TEU/day (each way)*	*30 TEU partial container ship*	*18*	*20*	*2**	*3.00*	***6.00***
Option 2	*Container*	*20 TEU/day (each way)*	*60 TEU partial container ship*	*18*	*32*	*1**	*5.50*	***5.50***
Option 3	*Container*	*20 TEU/day (each way)*	*90 TEU container ship*	*18*	*44*	*1**	*7.50*	***7.50***
Kigoma - Bujumbura	General Cargo	210 Tonnes/day	Integrated tug/barge	22	6	1 tug/3 barges*	9.50	**9.50**
Kigoma - Bujumbura	Bulk Liquids	200 Tonnes/day	Tanker	18	11	1	4.00	**4.00**
B. Other Trades								
Mpulungu - Bujumbura 3	Container/GC	175 Tonnes/day	Integrated tug/barge	72	6	1 tug/3 barges	9.50	**9.50**
Baraka - Rumonge	Passenger/GC	500pax & 500t/week	Ro-Pax Ferry	-	-	1	6.50	**6.50**
Tanzania Cabotage	Passenger/GC	900pax & 350t/week	Ro-Pax Ferry	-	-	1	6.50	**6.50**
DRC Cabotage	Passenger/GC	310pax & 400t/week	Ro-Pax Ferry	-	-	1	6.50	**6.50**

Notes: 1: Laden Lake Time is the total voyage sailing time (return trip); 2: Port Time includes time for berthing/un-berthing, loading and discharging (calculated over a return trip – i.e. the vessel free of cargo at the gateway port); 3: the Mpulungu-Bujumbura trade also includes volumes originating at Kasanga (and the Laden Lake Time also includes a return ballast voyage); * indicates capacity already exists

Lake Victoria

Route	Freight Type	Freight Task	Vessel Type	Voyage Time (hours) Laden Lake Time 1	Voyage Time (hours) Port Time 2	No of Vessels	Cost each vessel	**Total US$ (Million)**
A. Principal Transit Trades								
Mwanza - Port Bell 3	Rail-wagon/Container	20 TEU/day (each way)	Rail-wagon Ferry	30	8	-	12.00	**-**
B. Other Trades								
Mwanza - Kemondo Bay/Bukoba	Passenger/GC	3850pax & 2800t/week	Ro-Pax Ferry	-	-	1	8.50	**8.50**
Mwanza - Nansio	Passengers	7500pax & 384t/week	High Speed Ferry	-	-	1	10.00	**10.00**

Notes: 1: Laden Lake Time is the total voyage sailing time (return trip);
2: Port Time includes time for berthing/un-berthing, loading and discharging (calculated over a return trip – i.e. the vessel free of cargo at the load port);
3: The Mwanza – Port Bell trade up-to 2015 is serviced by existing vessels.