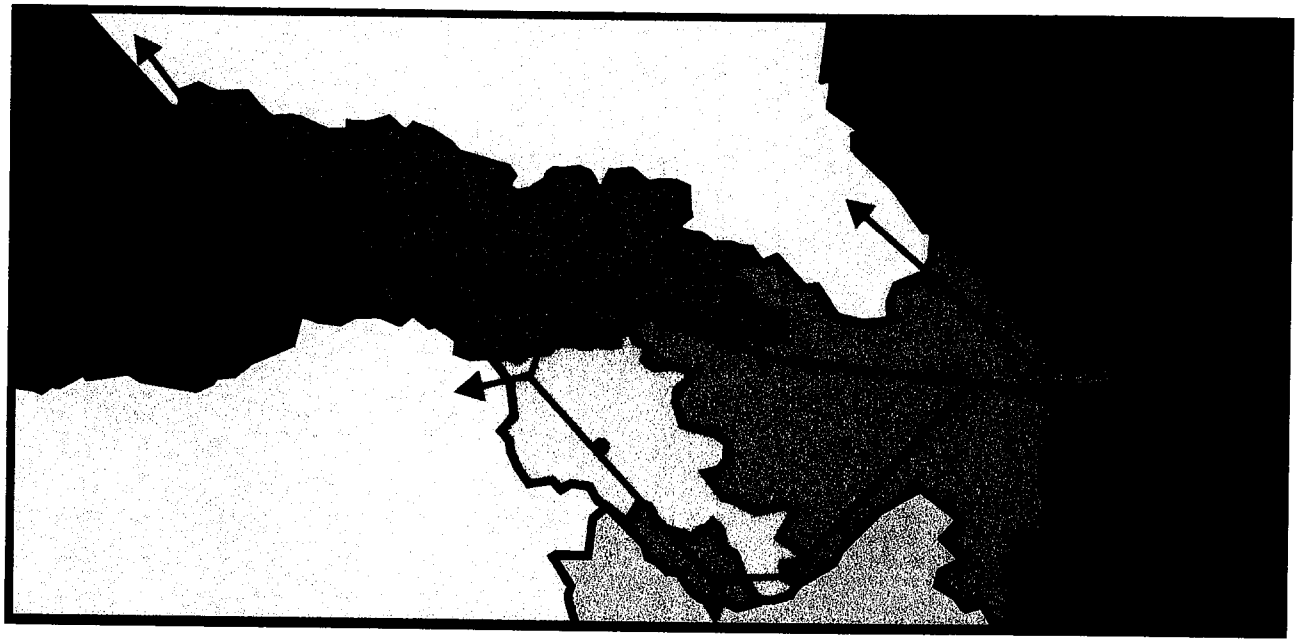
COMMISSION OF THE EUROPEAN UNION

Directorate General IA External Relations
DG IA/E/6 Tacis

Technical Assistance to the New Independent States and Mongolia
TRACECA
TNREG 939401

Joint Venture(s) for the Caucasian Railways



FINAL REPORT

Volume V

March 1998

TEWET
TRANSPORT EAST WEST EXPERT TEAM GMBH

in association with

DE-Consult

gtz

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Abbreviation list:

AC	Alternating Current of electrical power
AGC	European Agreement on Main International Railway Lines
AGTC	European Agreement on Important International Combined Transport Lines and Related Installations
AGZD	Azerbaijan State Railways
AICCF	International Railway Congress Association
AIM	Agreements for the International Carriage of Goods
AIOC	Azerbaijan International Operating Company (Oil production)
AIV	Agreements for the International Carriage of Passengers and Luggage
ARM	Agreement for the Communication of Traffic Restrictions for the International Carriage of Goods by Rail
ARM	Armenian Railway
ATP	Agreement on the international carriage of perishable foodstuffs and on the special equipment to be used for such carriage
BIS	Baku International Seaport
BOLT	Build - Operate - Lease - Transfer
BOT	Build - Operate - Transfer
BUS	Transformer station of railway power supply
BWRS	Baku Wagon Repair Plant
CECA	European Community for coal and steel
CEH	European Timetable Conference for Passenger Trains
CEM	European Timetable Conference for Goods Trains
CEV	European Passenger Tariffs Conference
CFS	Container Freight Station
CIM	Contracts for International Carriage of Goods by Rail
CIS	Commonwealth of Independent States
CIT	International Rail Transport Committee
CIV	Contracts for International Carriage of Passengers by Rail
COTIF	Convention for the International Carriage by Rail
CSC	Caspian Shipping Company
DB AG	Deutsche Bahn AG (German Railways)
DC	Direct current of electrical power
DCU	Uniform Regulations for Rail Transport
DEG	Deutsche Investitions- und Entwicklungsgesellschaft mbH (German Society for Investment and Development Ltd.), Cologne, Germany
DEM	Deutsche Mark (= German currency)
DIN	German Regulations of Standardisation in the Industry
DM	Deutsche Mark (= German currency)
DMU	Diesel Motor Unit
Dpt.	Department
DR	type of inspections of locomotives, wagons, coaches and EMU/DMU
DSA	European Prestressed Concrete Sleepers (type of sleepers)
DSS	Decision Support System
EBRD	European Bank for Reconstruction and Development, London, UK

EC	European Community
ECE	Economic Commission of the UN for Europe
EDI	Electronic Data Interchange
EDIFACT	Electronic Data Interchange for Administration Commerce and Transport
EDP	Electronic Data Processing
EEC	European Economic Community
EMU	Electric Multiple Unit
ESCAP	Economic and Social Commission for Asia and the Pacific
EUROP	Agreement for the Common use of Wagons
FADA	Traffic controller installations
FESA	Permanent line-side radio installations
FSU	Former Soviet Union
FTOS	Freight Transport Operation System
FZ	Financial co-operation programme (in Germany)
GDP	Gross Domestic Product
GDR	former German Democratic Republic
GOST	State Organisation of Standardisation of the former Soviet Union
GRID®	American management training system
GRZD	Georgian Railways
HERMES	German State Guarantees for Suppliers
HQ	Headquarters
HV	High Voltage
ICC	Information and Computer Centre
ICE	Inter-City-Express(-Train)
IMF	International Monetary Found
IRR	Internal Rates of Return (of investments)
ISO	International Organisation of Standardisation
JV	Joint Venture
KfW	Kreditanstalt für Wiederaufbau (= German Bank for Reconstruction), Frankfurt/Main, Germany
KR	type of repairs of locomotives, wagons, coaches and EMU/DMU
LIF	General List of Frontier Points for Rail Transport
LOI	Letter of Interest
LOU	Letter of Understanding
LV	Low Voltage
MBC	Motorised coaches
MESA	Mobile railway radio installations
MIS	Management Information System
MPS	Ministry of Railway Transport of the former Soviet Union
MTT	Uniform Transit Tariff of the OSShD
MV	Medium Voltage
nm	nautical miles
OCC	Operations Control Centre (of the railways)
OCS	Overheadline catenary system of power supply
OCTI	Central Office for International Carriage by Rail (in Bern, Switzerland)
OR	type of overhauls of wagons, coaches and EMU
OSShD	Organisation for the Co-operation of Railways
PC	Personal Computer

PCM	Personal Computer assisted Management
PFCCS	Processing and Freight Cost Calculation System
PIEx	Common Regulations for the International Carriage of Express Parcels
PIM	Common Regulations for the International Carriage of Goods
PIV	Common Regulations for the International Carriage of Passengers and Luggage
Pkm	Passenger-kilometre
POD	Port of Discharge
POL	Port of Loading
PPW	Regulation for the Use of Wagons in International Rail Transport
resp.	respective
RIC	Regulations for the International Carriage of Containers by Rail
RIC	Regulations for the Reciprocal use of railway carriages and luggage vans for International Transport
RID	Regulations for the International Carriage of Dangerous Goods by Rail
RIEx	Regulations for the International Carriage of Express Parcels by Rail
RIP	Regulations for the International Carriage of Private Wagons by Rail
RIV	Regulations for the Reciprocal use of Wagons for International Transport
RoRo	Roll-on-Roll-off
RSM	General Summary of Special Regulations for the International Goods Traffic
SBB	Swiss Federal Railway
SCADA	Supervisory, Control and Data Acquisition System
SMGS	Conventions to International Railway Transport of Goods
SMPS	Conventions to International Railway Transport of Passengers
SNCB	Belgian Rail
SNCF	French National Railway Society
SZD	former Soviet Railways
TCLE	Trans-Caucasian-Logistic-Express
TECF	Tbilisi Electro-Locomotive Construction Factory
TEU	Twenty feet container Equivalent Unit
TEWRS	Tbilisi Electro-Wagon Repair Plant
TEWS	Tbilisi Electro-Wagon Repair Plant
TIEx	Agreements for the International Carriage of Express Parcels
Tkm	Ton-kilometre
TO	type of overhauls of locomotives, wagons, coaches and EMU/DMU
TQM	Total Quality Management
TR	type of repairs of locomotives, wagons, coaches and EMU/DMU
UIC	International Union of Railways
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UTI	International Transportation Units
VAT	Value Added Tax
ZÜV	System for the supervision of train running

Chapter 7

Port and ferry services

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7 Port and Ferry Services

7.1 Introduction

The TOR request to note and comment upon the capacities of the ports and complementary ferry services in the Caucasus region or ancillary road services that could affect the performance of the railway.

In line with this requirement and in correspondence with the technical proposal the

- port conditions and services,
- technical and operational requirements for ports,
- port development options and strategy and
- technical and operational requirements for the ferry services between Baku and Turkmenbashi.

will be dealt with. Main objective of this part of the study is to find out whether the ports can duly fulfil their transit function, viz. act as reliable link between sea and inland transport, to identify any existing bottlenecks and constraints on the present and future port performance with possible impeding repercussions on the performance of the railway corridor and to outline proposals for future port development so as to safeguard the functioning of the railway corridor and the prompt dispatch of wagons and trains in future.

In order to make maximum use of the time allocated to the a. m. sub-tasks and of the information already available from other studies the critical assessment including physical inspection of facilities is focused on the ports of Baku, Poti and Batumi as most important ports of the railway corridor.

During the study it became obvious that - apart from technical and operational requirements - organisational issues had to be considered as well as they could be even more important for the establishment and successful operation of a joint venture for the rail corridor than pure physical, i. e. technical and operational requirements. Also it was found useful although somewhat difficult **to distinguish** between **the relevance** of particular port problems and constraints identified in the Interim Report and related development objectives **to the rail corridor** and **their relevance to the** proposed **joint venture** for operating of the rail corridor.

Future berth requirements etc. in the ports are probably **not** of direct relevance to the rail corridor joint venture, as necessary investments in these areas would be under the control of the ports and not the railway operator/s. Nevertheless, from the joint venture point of view it is good to know whether there are any bottlenecks in the ports with an impeding impact on the future performance of the rail corridor.

It appears that - apart from an obvious back-log in re-investments and overhaul of facilities - existing port infrastructure and superstructure do not represent any significant bottleneck against the revitalisation and commercialisation of railway transport through the envisaged establishment of the joint venture. However, the port services offered will be studied not only in quantitative terms, i. e. whether the physical port capacity is sufficient to cope with future transport demand, but also qualitatively, that means whether the ports can offer an adequate level of services to secure existing railway traffic and attract additional cargo.

As the joint venture for the Caucasian railways is in focus of the study, road transport related questions will be considered only with regard to possible repercussions from a possible modal shift on the dispatch of railway wagons within the ports.

The title of this study and the TOR imply already that most of the governing problems are not technical or operational problems, but managerial ones.

In view of the fact that substantial portions of potential corridor traffic are generated at the ports the identification of existing problems and constraints should not be limited to the dispatch of train-ferries, container and RoRo vessels but also to the discharging and loading of conventional dry bulk, liquid bulk and general cargo, so as to come up to a comprehensive basis for the proposal of development objectives and the identification of future port related requirements relevant to the railway corridor.

However, during the further progress it revealed that the a. m. objective may be only considered a development objective for the ports and shipping part as part of the corridor itself, whereas the immediate objective or purpose of the study should be to find out existing problems and recommended improvements relevant to the establishment of the joint venture for the rail corridor. In this context the following information is to be understood as plausibility check of existing studies focused on missing interfaces and lack of compatibility with the rail corridor joint venture, rather than an audit of these studies or the result of any basic research.

In spite of all efforts very limited information could be obtained on the ports of Aktau and Trabzon. Therefore, only an outline can be given on the existing situation and a preliminary assessment on the future development.

As said before, many of the problems and objectives are well known already to the various clients in charge from earlier even more detailed studies or parallel ongoing studies. It appears therefore sufficient to focus on the most important ones to enable a concise overview.

7.2 Present conditions in the Baku Sea Port

7.2.1 Location and nautical conditions

The Baku Sea Port is situated at the SW part of the Caspian Sea on the coast of Baku bay. The position of the commercial harbour is Lat. 40° 22' N and Long. 49° 53' E.

The Apsheron Oil Terminal (4th Harbour District) is situated some 40 km ENE from the city on the Apsheron Peninsula. E of the commercial harbour there is a number of private berths for oil products and dry bulk cargoes (e. g. for the cement industry). A large privately operated off-shore supply base mainly used for the oil industry is located at Karadak some 60 km SSW from the city.

There is an easy access to the commercial harbour from the approach buoy, which is located some 3 nautical miles (nm) SW of Nargin Island. A fairway with traffic separation leads into the Bay of Baku. This outer approach channel has a length of about 6 nm that leads to the inner approach of the various facilities. The inner approach to the dry cargo terminal has a length of about 2.5 nm and a width between 100 and 150 m. The channels are marked by light buoys to ensure day and night navigation.

The channels have to be dredged regularly. Maximum permissible drafts are as follows:

- for dry and general cargo vessels: 4.5 m
- for ferries: 5.6 m
- for tankers: 8.0 m

Vessels trading on the Caspian Sea are restricted to a maximum width of 18 m and - during canal passage - to a maximum draft of 4 m governed by the dimensions of the locks of the Volga-Don-Canal.

There are no adverse weather conditions affecting the operation and thus capacity of the port, although during January and February stronger winds from SW to SE with heavier seas occur that need to be observed during manoeuvring of vessels and staying alongside.

Pilotage is compulsory for foreign vessels only. The use of tugs is in the discretion of the Harbour Master and the pilots.

7.2.2 Port infrastructure, superstructure and equipment

Annex 7.2-1 gives an overview over the location of the individual port facilities, whereas Annex 7.2-2 shows the layout of the dry cargo and the ferry terminal.

In Table 7.2-1 the main important data of the existing berths are listed. The timber terminal (Berths 14 - 16) had to be abandoned in 1995 due to an excessively high water level (rise of about 2 m over the past 20 years), which has also impact on the two shore ramps for dispatch of the railway ferries at berths 12 and 13 as these work in their utmost upper position. Apart from the overflooding of the timber terminal berth No. 14 with a total length of 105 m built in 1960 is completely damaged and thus not operational. In addition to the oil berths at the Apsheron Oil Terminal listed there is one service jetty for marine craft. Two further jetties Nos. 2 and 5 with one berth on either side were demolished recently.

The entrance and exit gate for the dry cargo terminal is located at the end of Prospekt Neftyanik, where all trucks are cleared from customs. Dedicated areas for the checking and waiting of trucks are not available. However, as traffic density is low, the gate is not congested even during usual peak hours in the morning and in the evening.

Tab. 7.2-1: Physical characteristics of the commercial port of Baku

Berth Nos.	1 - 3	4 - 6	7	8 - 10	11	12 + 13	14 - 16	Oil 1A/B & 3A/B
Location	Sea Station	Dry Cargo Terminal	Dry Cargo Terminal	Dry Cargo Terminal	Near Ferry Terminal	Ferry Terminal	Timber Terminal	Oil Terminal
Assigned Cargo in 1990	Passenger vessels	General cargo, containers and dry bulk cargo	Bulk cargo	Break bulk & unitised cargo; RoRo	Water	Railway Ferries	Logs, timber, iron & steel products, bulk cargo	Crude oil and oil products
Assigned Cargo in 1996	Passenger vessels	General cargo, containers and dry bulk cargo	Bulk cargo	Break bulk & unitised cargo; *No. 10 under reconstruction*	Water	Railway and RoRo Ferries	None	Crude oil and oil products
Approx. Design Depth	6.50 m	7.25 m	7.25 m	5.00 m	6.00	6.00 m	6.00 m	9.00
Approx. Quay Length	2 x 130 m = 260 m + 200 m	400.00 m	200.00 m	360.00 m	70.00 m	2 x 150.00 m	350.00 m	4 x 200.00 m
Approx. Quay Width	16.00/45.00 m	20.00 m	15.00 m	15.00 m	walkway only	15.00 m	15.00 m	20.00/40.00 m
Construction Year	1969	1939/1969	1939/1969	1939/1982	1967	1963	1960/71/82	1970
Substructure Construction	Concrete piles	Block wall / sheet piling	Block wall / sheet piling	Block wall / sheet piling	Steel pipe jetty	Steel sheet piling	Sheet piles and concrete piles	Concrete piles
Superstructure Construction	Concrete deck	Concrete deck	Concrete deck	Concrete deck	5 RC blocks	Concrete deck	Topping beams and RC platform	Concrete deck
Cargo Handling Facilities	Passenger terminal	Shore cranes and open storage	Shore cranes and open storage	Shore cranes, transit sheds and open storage	Pipeline and shore tanks	Spec. adjustable shore ramp for railwagons and vehicles at each berth	Shore cranes, transit sheds and open storage	Pipelines and shore tanks (ab. 140,000 t for crude oil and 180,000 t for oil products)
Access	Road	Rail and road	Road	Rail and road	Road	Rail and road	Rail and road	Road

Source: Baku International Seaport
Baku Port Master Plan, Phase I Report 10/96, HPTI
Consultant's Observation

Road access to the ferry terminal is via a 6 m wide and about 550 m long road from the Prospekt Nobelya. Neither the access road nor the ferry terminal was designed for heavy-duty road traffic. Moreover, the terminal was planned for inland transport only, but not for transit/cross border traffic. Consequently this change in modal split and in dispatch procedures has led to a heavy congestion of the whole terminal area.

Both, the dry cargo terminal and the ferry terminal have direct access to the railway station by means of a single line with out-of-level crossings at the main roads. Total rail length on the dry cargo terminal is about 4.5 km and at the ferry terminal some 8.0 km.

The dry cargo terminal occupies in total about 18 hectares. There are 5 sheds are available with a total floor area of about 9,500 m^2 and 4 open storage areas with some 45,000 m^2.

Total area of the ferry terminal is about 8 hectares. Due to the existing built-up of neighbouring areas there is virtually no room for terminal expansion. The adjacent areas are private property (e. g. Caspian Shipping Line and one former concrete factory) and are not used with relevance to the ferry terminal.

In Table 7.2-2 the main characteristics of the existing port equipment are listed. In addition there is a number of floating equipment such as harbour tugs, launches, oil skimmers/waste oil collection boats and other craft available.

According to a report on the inspection of the equipment as part of the Port Master Plan Study, Phase I Report 10/96, prepared by HPTI, about 1/3 of the quay cranes and about 2/3 of the forklift trucks are in such a poor condition or technically obsolete that they are unworthy for repair and should be scrapped. This includes a number of relatively new forklifts that had to be cannibalised due to the lack of spare parts.

In addition to the equipment listed there is a number of grabs and hoppers for bulk handling, lifting appliances for general cargo and spreaders for 20ft containers. There is, however, no dedicated container stacking and unstacking (yard) equipment.

Tab. 7.2-2: Outline of main equipment in the dry cargo port of Baku

Item	Number	Type	Capacity	Make	Year Built
1.1	3	Portal slewing crane	10/15 t	Kirowetz / Abus	1958/1960
1.2	6	Portal slewing crane	6 t	GANZ	1960 - 1986
1.3	4	Portal slewing crane	10/20 t	TAKRAF	1984 - 1990
1.4	4	Portal slewing crane	16/32 t	TAKRAF	1977 - 1987
1.5	1	Portal slewing crane	20/40 t	TAKRAF	1986
2.1	4	Forklift truck	1.5 t	VARNA	1991 - 1993
2.2	13	Forklift truck	1.5 t	TOYOTA	1983 - 1991
2.3	9	Forklift truck	3.0 t	VARNA	1984 - 1994
2.4	1	Forklift truck	4.0 t	STILL	1990
2.5	2	Forklift truck	5.0 t	LVOV	1987
2.6	2	Forklift truck	10.0 t	TOYOTA	1982 - 1985
3.1	4	Terminal tractor	from. 200 HP	SISU	1983/1993
3.2	2	Agricultural tractor	from. 50 HP	Russ./MF	1988/1995
4.1	100	Rolltrailer	25 t	?	1983
	5	Drawbar trailers	10 t	?	1988

Source: Baku International Seaport

7.2.3 Port operations and traffic flow

Table 7.2-3 gives the total cargo handled at the Baku International Seaport in 1995 and 1996. The figures for 1996 are estimates based on the actual figures Jan. - Oct. 1996.

Tab. 7.2-3: Cargo handled at Baku International Seaport

Terminal/Commodity Group	1995 (',000 t)	1996 (',000 t)
Dry Cargo Terminal		
Dry Bulk Cargo	105	100
General Cargo	35	20
Sub-Total	140	120
Ferry Terminal	780	640
Apsheron Oil Terminal		
Liquid Bulk	90	70
Total	**1.010**	**830**

Source: Baku International Seaport and Consultant's Estimate

Main dry bulk cargoes were building materials, salt and grain, typical general cargo consisted of sawn timber, iron and steel, chemicals and containers. In 1995 less than 25 % of the general cargo handled at the dry bulk terminal was containerised.

In comparison with the following maximum throughput capacity of the existing facilities as estimated by the port the a. m. utilisation appears rather low:

- Dry Bulk Terminal 1.5 million tpy
- Ferry Terminal 5.5 million tpy
- Apsheron Oil Terminal 25.0 million tpy

The port offers its services 24 hours a day on 365 days a year. Due to the present low level of occupancy cargo handling at the Dry Cargo Terminal is normally done during day-shift between 08.00 h and 20.00 h with 2 meal-breaks of 1 ½ hours in total on ordinary working days from Mondays to Fridays. However, the ferries from Baku to Turkmenbashi (the former Krasnovodsk) are dispatched around the clock.

During various visits to the port between 20.11. and 3.12.1996 at the Dry Cargo Terminal only one vessel was discharged with a cargo of about 3,000 t of salt, whereas at the Ferry Terminal one to two ferries per day were dispatched.

The workforce of the Operations Department included the following staff (rounded figures):

- Dry Bulk Terminal 225
- Ferry Terminal 35
- Apsheron Oil Terminal 35
- Marine Services 165
- Passenger Terminal 25
- Other Sections 15

Pre-planning of operations, allocation of berths, equipment, working gangs and railway wagons is done through the Dispatch Office in co-ordination with the Technological Section on the basis with the practice and standards of the FSU under consideration of local conditions.

During discharge of bulk cargo ex river-sea-vessel with three cranes and working gangs (brigades) in total 22 men are employed equivalent to about 7 men per gang.

Typical output per ship and day based on the "gross normatives" of the Ministry of Ports and USSR Fleet in Moscow for river-sea-vessels under consideration of a "technological map" issued 1982 by the Head of the Technological Section of the Operations Department are:

- Discharging salt	5,500 tons per vessel and day
- Discharging grain in bulk	3,000 t/v/d
- Loading unitised general cargo	1,000 t/v/d
- Discharging sawn timber	1,700 t/v/d
- Loading metal	2,000 t/v/d

Information on a performance review regularly or at random in particular on the slack of the actual output figures against the planned ones were not at hand during the visit. Planned performance figures for the dispatch of ferries and the handling of containers were not available.

Far most of the cargo is handled directly onto/from railway wagon, i. e. that the portion of indirectly loaded and discharged cargo is very low. During visits to the Dry Cargo Terminal only some small consignments of salt, scrap and logs were on stock. The transit sheds were empty.

For the Caucasian railway corridor is the railway ferry line linking the port of Baku with the port of Turkmenbashi (former Krasnovodsk) is of particular importance. For this ferry service, which is operated by the Caspian Shipping Company, Baku, the following vessels were brought into service during 1984 and 1986:

- SOVETSKIJ DAGESTAN
- SOVETSKIJ TADJIKISTAN
- SOVETSKAYA KIRGIZIA
- SOVETSKAYA KALMIKIA
- SOVETSKIJ AZERBAIJAN
- SOVETSKAYA GRUZIA
- SOVETSKAYA BELORUSSIA
- SOVETSKAYA NAKHICHEVAN

These vessels were built at R. O. Brodogradiliste "Uljanik" shipyard in Pula, Yugoslavia, under the class KM * L 3 I A2 (trailer) of the former USSR Register of Shipping, and have the following leading particulars:

Type of ferry:	DAGESTAN
Operator:	Caspian Shipping Co. (CSC)
GRT:	11,200
DWT:	3,950
Full displacement:	8,800
Length over all:	154,47 m
Width:	18,30 m
Maximum draft:	4,50 m
Capacity:	about 420/510 lane meters or 28 rail wagons/34 trucks + 70 cars
No. of decks	2 (lower deck for cars only)
Service speed:	about 17 kn.

At present 5 of these vessels are allocated to the service between Azerbaijan and Turkmenistan. 2 are chartered out and 1 is under repair.

The sailing distance between Baku and Turkmenbashi is 167 nautical miles. Under consideration of slow steaming on outer and inner approach voyage time is about 14 hours.

The ferries are dispatched at berths Nos. 12 and 13. The sequence of discharging operations is as follows:

1. Berthing, mooring of the vessels, lowering and hydraulic adjustment of the (3-fold) shore ramp
2. Disembarking of passengers
3. Unloading of trucks and unlashing of rail wagons
4. Unloading of rail wagons
5. Unloading of private cars from lower hold

Loading operations are organised in reverse order.

As there is no terminal building for passengers they are transferred by bus to/from the nearby Sea Station (Passenger Terminal). Shunting of rail wagons is done simultaneously with two locomotives to avoid excessive eccentric loads on the ship-to-shore interface during loading and unloading. Therefore, rail wagons are transported in equal lots of minimum 10 to 28 wagons per trip.

Discharging and loading operations are considerably slowed down through clearance of passengers through immigration and customs and of vehicles directly at the ramp, leading to a queue of waiting passengers and vehicles, as the terminal was designed for inland dispatch of rail wagons only and there is no capacity ashore for checking and holding of vehicles, that would allow for the usual separation between cross-border control and loading/unloading operations.

The situation has become worse by the fact that a fixed sailing schedule for the ferries is not practised, through which the booking system and the pre-stowage of trucks could be facilitated and truck waiting times could be minimised.

The total time needed for the dispatch of one ferry with a combined full load incoming and outgoing is at present 6 to 8 hours. This compares with a peak performance ever achieved in the past of 3 hours (rail wagons and passengers only without cross-border control) and about 2 hours that would be needed for similar size and type of ferry for other European short-sea services on the Baltic, North or Mediterranean Sea.

According to CSC at present there is a demand for the shipment of 5 to 30 rail wagons per day. (To compare: The design capacity of the Ferry Service is said to be about 100 rail wagons each incoming and outgoing = in total 200 per day. This

would imply 2 x 25 rail wagons in and out during 4 trips per day). Based on the CSC statistics for the first 10 months the following traffic can be expected for 1996 (units):

- Rail wagons 5,800
- Trucks 5,200
- Private cars 3,600
- Passengers 16,800

7.2.4 Port organisation

The International Seaport of Baku (ISB) was established on 28.11.1994 with Charter No. 407. It is an autonomous port authority and operating company that replaces the former department of CSC. The administration was put directly under Government's jurisdiction and reports at present to the Ministry of Economics (and probably in future to a newly established Ministry of Transport now in discussion).

The Port Authority is a legal body with own seals and accounts. The statute regulates in particular:

- Objectives and functions,
- Rights and obligations,
- Property of the port,
- Port management,
- Basics on calculation of tariffs, accounts and control,
- Reorganisation and liquidation.

A corporate plan or business plan for the application and full implementation does not exist.

ISB is still working in line with the formerly established organisational structure comprising 10 different departments including the operations, personnel, engineering and harbour master as more important ones although this structure appears outdated. A new objectives and commercially oriented structure is in discussion with the support of HPTI but had not yet been approved and implemented at the time of the visits to ISB due to the obvious difficulty, complexity, sensitivity and time demand related to the general nature of such fundamental changes not only on paper but also and in particular in the minds of all managers and staff in charge.

The new structure, which was still kept confidential during the visit, is expected to be implemented in 1997.

At the time of the field visits ISB employed in total about 800 employees and workers, wherefrom about 500 were assigned to the Operations Department and about 100 to the Technical Department.

Basis for the dispatch of the railway ferries on their route to Turkmenbashi is a special *node-agreement* between the ISB, CSC and the Railway Administration, which

regulates the pre-planning and monitoring of operations, means of documentation and communication as well as settlement and clearing of services rendered etc. Apparently there is a need to update this agreement in line with the changes in modal split, services charges and dues, expected future level of traffic and services etc.

7.2.5 Wagon and truck transfer

7.2.5.1 Fundamentals

In 1996, a Node Agreement was concluded between the railways on the one hand and the port on the other hand, which stipulates the exchange of information and operational regulations for handing over the freight wagons. These stipulations relate both to the medium-term planning as well as the operational handling of the multi-modal traffic between Baku-Tovarnaya Station on the one hand and the port or the ferry port on the other hand, and these stipulations apply to import, export and transit.

A Quadripartite Node Agreement deals with the ferry traffic between Baku and Turkmenbashi and was concluded on 14th April 1995 between the Caspian Shipping Company, the Baku AGZD Office, the Port of Baku and the Customs Administration of the Republic of Azerbaijan. This agreement governs the handing over of the wagons from and to the ferry, the necessary transfer documents and customs clearance, as well as the responsibility for the technical check on the wagons, handing over of the freight documents and the drawing up of protocols on damages.

In principle, Baku-Tovarnaya Station is responsible for servicing the ferry and handing over the wagons at the port. There are a receiving/departure group and a ferry group for servicing the ferry, which are the property of the railways. The track installations at the port are the property of the port, which has its own shunting engines, operating in the store and quayage.

7.2.5.2 Operational procedures of the railways

7.2.5.2.1 Ferry traffic

Baladshary Station is the central shunting yard for Baku. This is were the incoming trains are broken up. All those loaded and empty wagons destined for the ferry are collected for Baku-Tovarnaya Station and handed over in a transfer (1st technical shunting operation).

Upon the trains of the West-East direction entering Baku-Tovarnaya, the transfer train is broken up, and those wagons destined for the ferry are collected on one track. The receiving and departure group consists of 17 tracks, the changing group of 5 tracks (2nd technical shunting operation). The station registers the wagons with the ferry port in advance. Then they are shunted to the receiving group of the railways (Annex 7.2-1).

On the basis of the freight documents, the ferry port sets up a cargo schedule, i.e. it is stipulated which wagon is to be shunted to which track of the ferry. The receiving/departure group consists of eight tracks, including four receiving/departure tracks with a usable length of 352 to 415 metres and four shunting tracks with a usable length of 221 to 304 metres. The composition of the wagon group for the ferry (3rd technical shunting operation) is based on the cargo schedule. Then the wagons are transferred to the ferry group. This group consists of 2 x 4 tracks for the respective ferry terminal, specialised in withdrawing and feeding the wagons from and to the ferry. Customs clearance is also conducted at the ferry group. Those wagons not accepted for customs, commercial or technical reasons have to be taken off (4th technical shunting operation) and remain on the draw-out tracks as difference wagons under railway supervision. Then the ferries are serviced (5th technical shunting operation) by shunting engines of the railways, which use three protective wagons at all times (the engine must not access the ferry ramp due to an excess axle load). The ferry is loaded in the following sequence - cars, wagons, trucks. The established priority of the freight wagon trajecting is not always observed. The reasons for this, from the shipping company's point of view, is that the income is not as high as from trucks. Furthermore, illegal extra fees are charged for trucks.

Altogether one has to say that the current operational technology and commercial handling do not satisfy modern requirements.

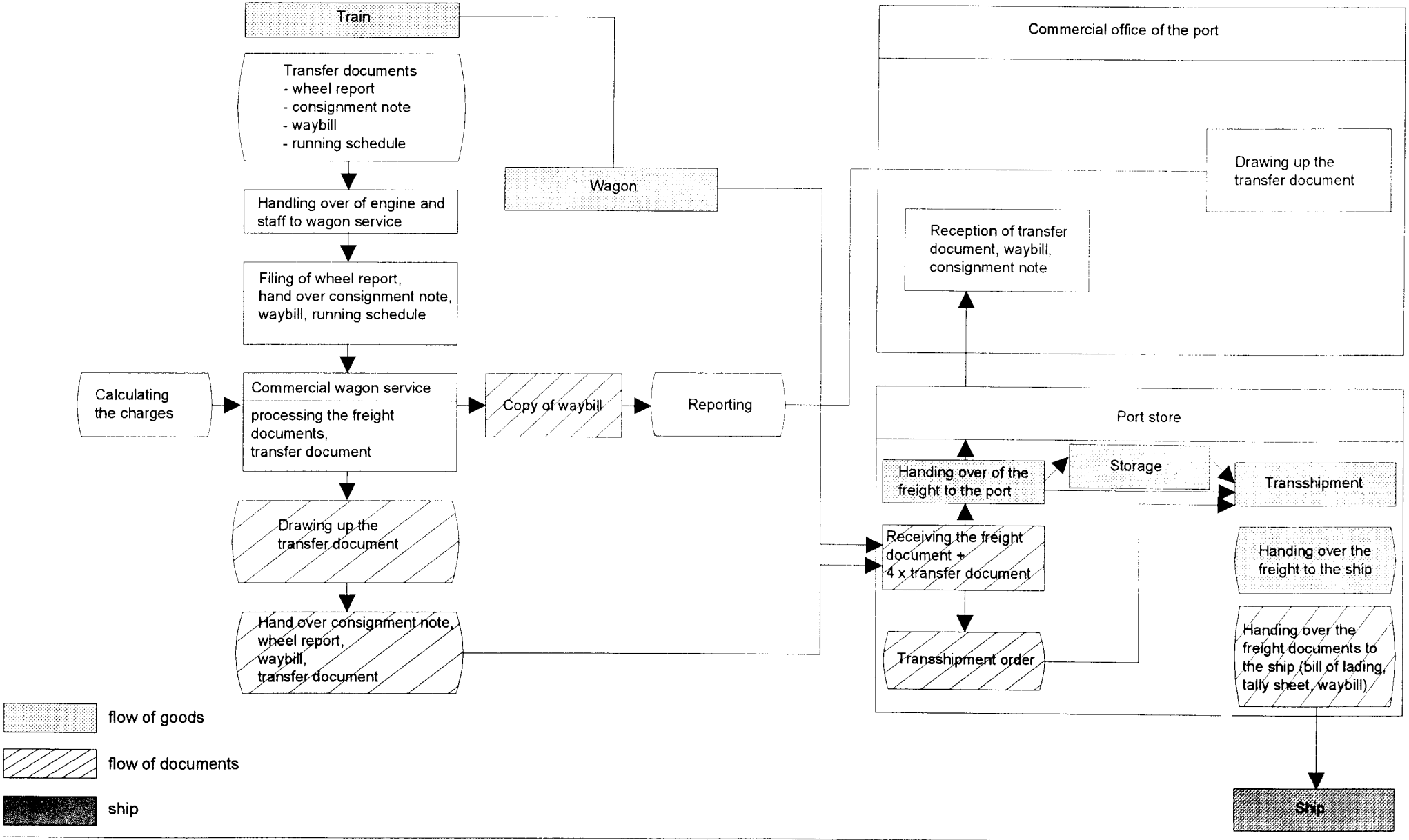
Container traffic

Container wagons arriving at Baku-Kishli with the Logistic Express, are transferred to the ferry under an agreement with the Azerbaijan haulage company. The operational and commercial treatment is conducted as described under Fig. 7.2-1.

In the East-West direction, the captain of the ferry sends a summary advance notification to the ferry port, which in turn informs the railways. Upon the ferry entering the port, and the handing over of the freight documents, the customs clearance is conducted on board. After that, the wagons are drawn off (1st technical shunting operation). The wagons are handed over to the railways in the ferry group, on the basis of an acceptance document. Any damages are registered in writing. Then the wagons are handed over to Baku-Tovarnaya Station with a shunting transfer via the departure group (2nd technical shunting operation). The next shunting step (3rd technical shunting operation) is carried out in dependence on the destination station and the wagons are then passed on to Baladshary Shunting Station with transfer trains, where they are allocated to the respective trains on the basis of the train formation schedule.

As freight traffic is based on request lines, additional waiting time develops due to the collection of wagons at the shunting station until the determined capacity is reached. Container wagons for the Trans-Caucasian-Logistic-Express are added in Kishli and the train always runs on Mondays.

Fig. 7.2 - 1: **Handling flow chart rail/port Baku**



7.2.5.2.2 Port

The port is serviced from Baku-Tovarnaya station, just as the ferry port. Due to the territorial location, quays 4 to 10 are linked through the Pristan 28 connection and quays 14 to 16 (wood port) through the Post 18 connection. The shunting transfers to the harbour are not secured (manual switches), whereby the engine is situated at the end of the wagon train due to insufficiently developed tracks. It becomes evident from the track chart (Annex 7.2-1) that only this technology is available at the current stage of track development (Annex 7.2-2).

Thus no train can actually enter the port. The railways feed empty wagons (according to the requirements) and take over loaded wagons after completed loading operations. The procedure is described in figure 7.2-1.

7.2.6 Ongoing activities on Baku port development

The port received a technical assistance programme through Tacis implemented by the Consortium HPTI - UNICONSULT - RECON during January to December 1996. This package covered about 36 man-months external expertise in total and was focused on the following output and main activities:

- Output:
  Support the Management of the Baku port in the transition to the market economy, by strengthening the management and introducing new policies and working methods to cope with the new challenges from the new market oriented environment.

- Main activities:
  1. Establish private activities/investments in the port of Baku
  2. Elaborate and implement port infrastructure investment plan
  3. Conduct management training and develop a training scheme
  4. Establish a Free port in Baku
  5. Introduce an appropriate Management Information System
  6. Adjust manpower and equipment to workload

For further details please refer to Technical Assistance for the Development of the Port of Baku, Project Progress Report, 15.08.1996, HPTI.

In addition to this technical assistance a Port Masterplan is being prepared by the same team. Furthermore, the Consortium Ramboll - Booz Allen & Hamilton - Probel is in process of preparing the feasibility study, planning and final design documents for the renovation of the Ferry Terminals in Baku and Turkmenbashi.

7.2.7 Existing port problems

As the ports are important nodes of the international transport chains, problems related to ports are also directly or indirectly relevant to the railway corridor.

With reference to the introductory remarks as per section 7.1 the following problems of the port of Baku - many of them interrelated issues - are pertinent to note:

I. Legal and institutional problems:

a) National ports policy including institutional framework and delimitation of powers and responsibilities not clearly defined;

b) Role, options and consequences of private sector participation including allocation of main existing and proposed future port sector functions not clear;

c) Outdated port and transport legislation, incomplete/inadequate transport administration (e.g. Ministry or fully fledged transport department);

II. Management, organisational and structural problems:

a) Lack of port pricing policy and cost oriented port tariffs;

b) Lack of a corporate strategy and plan or business plan e.g. including marketing strategy, investment plan, manpower plan, operations and productivity improvement plan and financial projection;

c) Lack of internal communication in spite of new MIS proposed and lack of virtual dialogue between parties involved (externally);

d) Lack of market and service orientation and cost consciousness among managers and staff;

e) Outdated node agreement on dispatch of ferries/shipment of rail wagons between CSC, ISB and the railway administration;

f) Traditional working practices and performance standards; low productivity in comparison with Western standards;

g) Level of salaries and wages too low to attract high calibre managers and staff;

h) Low utilisation of existing resources (quays, areas, equipment and personnel);

III. Operational and technical problems:

a) Lack of adequate ferry terminal (poor access and regress, lack of checking and holding areas for trucks and passengers causing interference between discharging and loading operations and gate traffic);

b) Lack of adequate facilities for container handling and storage (container yard, dedicated equipment for stacking and unstacking, possibly also container freight station etc.);

c) Poor technical condition of existing infrastructure, superstructure and equipment; low equipment availability, high down times;

d) Limited capacity of road access to Dry Cargo Terminal;

e) Insufficient capacity of existing ferries and terminal for the transhipment of full trains (of 57 rail wagons);

f) Lack of areas for future expansion of Dry Cargo Terminal and Ferry Terminal.

7.3 Requirements for the Baku Sea Port

7.3.1 General

It is obvious that the rehabilitation and extension of the existing ferry terminals in Baku and Turkmenbashi, for which final design documents are in preparation and appropriate funds have been earmarked already through EBRD, has got highest priority for the development of port. Through this renovation and the restructuring of the existing dry cargo terminal towards container handling and RoRo cargo as proposed in the Port Masterplan already under way the most urgent demand for the port in the near to medium future will be met.

The reorganisation of the port administration and commercialisation of cargo handling operations as suggested by HPTI in the framework of their technical assistance can be considered as an important contribution to make these investments financially and economically viable and as a precondition for development of the port of Baku as Gateway between East and West.

It is important that the railway corridor is operated from port to port and not from railway station to railway station or inland terminal to inland terminal, so as to

- secure train scheduling integrated with ferry scheduling;
- avoid double handling and trucking of transit containers from an inland terminal to the port and vice versa;
- enable the bundling of container traffic with (priority) conventional cargo;
- use the economies of scale in investments/avoid over-investments;
- secure competitive handling rates through high utilisation of resources (yard, equipment and personnel);
- facilitate consignment monitoring and communication.

Therefore, plans for immediate investments in a "dry" intermodal terminal in or near Baku should be reconsidered and all relevant pros and cons of alternative locations should be assessed systematically using appropriate site selection criteria.

Subject, of course, to detailed analysis of the traffic forecast and capacity calculations still to follow it appears that the envisaged container terminal in the port would have sufficient spare capacity to handle also local containers and unit loads on the short to medium term, so that probably the construction of a dedicated/larger scale local terminal would be justified only on the longer run.

It can also be expected that the problems listed will be solved in the not too distant future so that they should not be considered as significant constraints against the further development of the railway corridor. This applies not only to the port of Baku, but also to the Georgian ports.

7.3.2 Berth requirements

The key question is whether the existing berthing facilities under consideration of the rehabilitation and modernisation programme suggested in the Port Masterplan prepared by HPTI have sufficient capacity to handle the expected traffic. The berth forecast as per Table 7.3-1 gives a positive response to this question as the forecast traffic in 2015 is not expected to exceed the potential berth throughput capacity per year.

The handling rates and thus the capacities based on the calculations of HPTI appear somewhat on the high side, however, not unrealistic on condition

- of adapting the existing port facilities to accommodate increased container, railway ferry and other RoRo traffic as well as to respond to the modal shift;
- of the implementation of the comprehensive rehabilitation and modernisation programme, so that all **required** port facilities and equipment are permanently kept in a fully operational condition; and
- of the introduction of a modern and fully fledged commercially oriented organisation of the port and of the cargo handling operations

as recommended in the Port Masterplan. The relatively low berth utilisation expected in the short to medium term would give ample spare time to Baku International Seaport (BIS) to modernise, rationalise and optimise its cargo handling operations under consideration of the a. m. programme.

It is pertinent to note that the capacity of the timber terminal has been excluded from the calculation as it is partly overflodded at present and needs substantial rehabilitation work.

In case a - so far - unexpected demand arises for this facility in the medium to long term it is perhaps advisable from the port zoning point of view that all dry bulk commodities are assigned to this terminal so as to get a clear separation between general cargo in general and to enable that the open storage areas behind berths 8 and 9 are dedicated to the RoRo and/or container terminal.

As far as the capacities of the Apsheron Oil Terminal are concerned only Jetty # 1 with berths 1 A and B were operational during the field survey. Major rehabilitation works are needed already in the short term either at Jetty # 3 or 2 to provide two additional berths for the handling of the total crude oil and oil products of about 10 million tons per year.

Within the Port Masterplan no funds for the rehabilitation of the oil terminal were earmarked; it was assumed that these investments - including the ones probably

necessary for the handling of transit oil from Kasakhstan - are done by the oil industry, which owns already the existing tank farms.

It should be noted that berth capacities are dynamic factors that depend on a number of variables and that the values given are fair estimates subject to regular updating and fine-tuning and perhaps detailed EDP modelling under consideration of relevant ship arrival pattern and queuing techniques.

Table 7.3-1: Potential yearly berth throughput capacity of the Baku Sea Port

Berth No.	Main Type of Cargo Assigned to Berth	WWD [a] p. a.	t.p.g-h. (NAP) [b]	Working Hours p/Day [c]	Av. Output per Gang & WWD	Av.No. of Gangs	BOR [d]	Berth Throughput Cap./ mill tpa	Forecast Traffic in 2015 (mill.t)	Expected Utilization in 2015	Observation
						^ shore cranes/equipment					
4 + 6	General C. + Cont.	340	60	20	1,200	2 + 2	0.60	1.0	0.8	80 %	2 berths
5	Containers + G.C.	360	100 [e]	20	2,000	2	0.50	0.6	0.2	33 %	
7	---										Area allocated to container storage
8 + 9	Dry Bulk Cargo	340	90	20	1,800	2 + 2	0.60	1.5	0.7	47 %	
10	---										Area allocated to Ferry/RoRo-Terminal
12+13	Rail Ferries and RoRo-Operations	360	400 [f]	16	6,400	1 + 1	0.95	4.4	2.2	50 %	2 berths
14-16	---										Timber terminal not in operat. condition; spare capacity
Oil: 1A/B 3A/B	Crude oil and oil products	360	600	20	12,000	4 x 1	0.70	12.0	10.0	83 %	4 berths (operational 2 only)
=11	**Total Capacity**							**19.5**	**13.9**	**71 %**	

Key

a) WWD = Weather Working Day

b) t.p.g-h. (NAP) = Estimated output in tons per gang-hour (Net Appliance Hour) under consideration of idle time and non-operational time

c) = Exluding berthing, unberthing and clearing

d) BOR = Max. practicable berth occupancy rates between 0.50 to 0.70 for random and semi-scheduled arrivals and up to 0.95 for scheduled arrivals with reference to various UNCTAD Shipping publications.

e) = Average 10 TEUs per hour à 10 t net load for slewing crane oper.

f) = Existing rail ferries about 1,700 t in about 4 hours including shunting of wagons

Source: Consultant´s Estimate based on Phase I Report Port Masterplan, HPTI, 10/96 and own observation

Tab. 7.3-2 Outline of space demand for Baku dry bulk terminal in 2015

Design parameter	Solid bulk	General cargo		
	Open storage	Containers	Open storage	Transit shed & CFS*
Expected berth throughput 2015**	840,000 t	60,000 TEUs***	450,000 t	150,000 t gen.c.+ 200,000 t cont.= 20,000 TEU (?)
Percentage of indirect operation	50 %	100 %	65 %	100 %
Average storage period/ dwell time	10 days	7 days	10 days	5 days
Annual operating days for receipt and delivery operations	360 days	360 days	360 days	360 days
Average stock	11,700 t	1,200 TEU	8,300 t	4,900 t
Peak Ratio	1.3	1.3	1.3	1.3
Maximum Stock	15,200 t	1,600 TEU	10,800 t	6,400 t
Average utilisation per net area	5 t/m^2	1 : 4°	3.0 t/ m^2	2.0 t/ m^2
Effective use ratio	0.80	0.80	0.65	0.65
Required net area	3,800 m^2	500 TEU°° = 25,000 m^2	5,600 m^2	4,900 m^2
Allowance for operational area	1,200 m^2	5,000 m^2	1,400 m^2	1,100 m^2
Required gross area°°°	**5,000 m^2**	**30,000 m^2**	**7,000 m^2**	**6,000 m^2**

Key
*/ CFS = Container Freight Station
**/ = Based on most likely scenario Phase I Report, Port Master Plan, HPTI, 21. 10. 96
***/ TEU = Twenty Foot Equivalent Unit
°/ One ground slot = average four storage slots with RMG stacking system (rail mounted gantry crane)
°°/ One ground slot needs 50 m^2 stacking space including roads, but excl. quay areas
°°°/ Excluding quays, road and rail access areas

Source: Consultant's estimate

7.3.3 Storage area requirements

Table 7.3-2 gives a rough estimate of the future demand for storage areas in the dry cargo terminal based on the expected traffic in 2015 (preliminary most likely scenario). According to this estimate a demand for covered storage (transit shed for perishable and sensitive conventional general cargo as well as containerised cargo to be stripped and stuffed at the CFS of 6,000 m^2 will be needed compared with about 9,500 m^2 existing sheds. The demand for open storage including containers is estimated to be about 42,000 m^2 (to compare: size of total existing areas about 45,000 m^2). Consequently, the total existing area on the dry cargo terminal is large enough to cope with the estimated increase in traffic at least in the short to medium term, on condition, however, that the existing areas are adapted to the assigned container and RoRo traffic as suggested in the layout of the Port Masterplan for Baku.

The traffic forecast includes the import of about 170,000 t grain per year. In view of this relatively small cargo volume it will not be necessary to construct a dedicated grain silo in the short to medium term. A consequence would be to discharge these consignments directly onto rail as also practised in Poti and Batumi on a larger scale. However, on the longer run, the construction of a silo with specialised discharging equipment could probably become a viable alternative and should be included in future more detailed studies.

Apart from the a. m. area requirements there is a space demand for the ferry terminal of 3.5 ha in the short to medium term and of 6.0 ha in 2015 for the prestowage of trucks, RoRo-trailers and containers in addition to the existing marshalling yard for the dispatch of the rail ferries. (Please refer to separate calculations as per Phase 2 Pre-Design and Feasibility Note, Renovation of the Ferry Terminals Baku and Turkmenbashi, Draft, Ramboll, 11/1996). This area will be provided by reclamation of the waterfront between the Ferry Terminal and berth No. 10 of the dry cargo terminal also as a traffic link connecting both terminals.

Areas adjacent to the timer terminal would not be needed at least in the short to medium term. In view of the scarcity of waterfront storage areas these should not be abandoned but kept as spare area for future development and perhaps reallocation of bulk cargoes from the dry cargo terminal as far as appropriate.

As in the past and also assumed in the port Masterplan, investments in storage tanks for the handling of crude oil and oil products should be under the control of the private sector and not the port administration.

7.3.4 Requirements for receipt/delivery operations

Both studies, the Ramboll report and the HPTI report contain detailed proposals for the improvement of the road access to the dry cargo terminal and to the ferry terminal based on modal split estimations. The reports also recommend to improve the road network on the terminals to secure an unhampered traffic flow. After implemen-

tation of these improvements the most impeding bottleneck against future port and road traffic development (lack of holding and checking areas for trucks) will have been solved.

However, in view of the fact that larger portions of solid bulk and general cargo are expected to be handled directly (as assumed in Table 7.3-2) and of the fact that in spite of the proposed improvements in port infrastructure and facilities the overall port configuration and in particular the access to the rail sidings on the terminal with level crossings remains unchanged, it will be absolutely necessary to carefully pre-plan and closely monitor all ship loading and unloading, quay transfer as well as receipt and delivery operations to minimise traffic interferences in particular between road and rail traffic as well as between ship operation and receipt/delivery operations.

Potential output figures as target performance for receipt and delivery cannot be predetermined and would have to be negotiated between the parties involved as they depend on the type of commodities, mode of handling (direct or indirect) configuration of rail sidings, layout of the port etc. For the dispatch of a block train with say 40 TEU one would probably calculate a net unloading time of two to three hours e. g. with one reach stacker, the same time would be required as a minimum for a full train with say 80 TEU on condition that two machines are allocated to work. The handling rate for RMGs as suggested for the Baku Sea Port the theoretical handling rate would be higher but as only two cranes will be provided for ship operation and for receipt/delivery to wagon and truck some time allowance should be considered for movements other than dispatch of the container train.

For other commodities the handling rates for ship unloading and loading outlined in the Interim Report may serve as a guideline subject to detailed study.

7.3.5 Organisational requirements

The preconditions for a successful establishment and operation of the rail corridor joint venture are probably similar for the development of the ports as sub-sector of the transport chain. Essential requirements related to the Baku International Seaport would include:

a) Updating of node agreement on the dispatch of the rail ferries between Caspian Shipping Company (CSC), BIS and the railway administration and joint venture operator with regard to train and ship scheduling, performance targets, allocation of resources, responsibilities and liabilities, charges, handling charges and other financial issues etc.;

b) Privatisation or commercialisation of port and terminal operations and services based on an integrated corporate plan or business development plan and on a strengthened legal and institutional framework also in furtherance of the existing HPTI proposal; and

c) Unhampered and direct communication as well as flow of information and documentation between the parties.

To enable transport monitoring by the rail corridor joint venture also during the transit time in the ports and on board the ferries a very close communication between all parties involved is essential, which may be achieved through conventional means of communication such as telephone, fax and exchange of documents.

The most advanced system is by means of electronic data interchange (EDI), which is the recommend system as medium to long term solution also focused on the establishment of a *paperless* port.

World-wide there are different systems used in ports for the interchange of data between

- port administrations;
- terminal operators;
- tallying and other cargo control services;
- shipping lines and agents;
- forwarding agents and shippers;
- customs authority and
- railways

such as INTIS in Rotterdam, DAKOSY in Hamburg, COMPASS/LOTSE in Bremen, SHIPNET in Japan, ACES in New York and USA, TRADELINK in Hong Kong and TRADENET/PORTNET in Singapore, from which the latter one is the most widely used one.

The key elements of the EDI system for ports, also known as *port data socket*, are

- hardware (computers);
- telecommunications network;
- communications and translation software.

In order to facilitate the inter-connectivity and communication between the individual networks of the parties involved a common global standard has been developed by ESCAP/UNCTAD (Economic and Social Commission for Asia and the Pacific/United Nations Conference on Trade and Development), which is called EDIFACT, which stands for Electronic Data Interchange for Administration Commerce and Transport. EDIFACT standard messages are based on particular rules which govern the way different types of data segments can be used to construct standard messages. Key components are:

- Data elements;
- Data segments;
- Standard messages;
- Syntax rules.

It is suggested that on the basis of more detailed information in this respect contained in the intermodal system study a communication interface between the rail corridor joint venture operator, CSC and the ports is being developed. A medium term approach is recommended in this respect as a too straight forward policy bears the risk of adding even more problems to the complex, very difficult and time consuming process of restructuring and modernising the ports administration already initiated.

7.4 Present conditions in the Port of Poti

7.4.1 Location and nautical conditions

The Port of Poti is located at Lat. 42° 09' N; Long. 41° 39' E and is situated on the SE shore of the Black Sea about 3.2 km North of the mouth of the River Rioni. The Port offers year-round navigation. Pilotage and towage are compulsory except for small coastal vessels under 500 GRT. Pilots board in the outer roads.

The approach to the port presents no difficulty in clear weather. It is well protected against swell from SW by means of a breakwater. It has direct access from sea via an approach channel of about one km in length, about 70 m in width and a design depth of 12.20 m. Due to siltation and lack of regular maintenance dredging actual water depth was reported to be about 9.00 m only during the visit.

Anchorage can be obtained in the outer roads in two areas at depths from 10 to 30 m about 3 km from shore. In the event of stormy weather, vessels at anchor are recommended to put to sea.

Severe weather conditions from W or NW (known as Tyagun) can make the harbour inaccessible, causing a heavy sea of the head of Zapadnyy Mole.

The largest vessel that was accommodated had about 68,500 dwt and a length of 225 m.

7.4.2 Port infrastructure, superstructure and equipment

The layout of the port of Poti is shown in Annex 7.4-1. The commercial port comprises berths 1 to 12. The harbour basin inside the southern breakwater is used for ship repairs. Alongside berths 13 and 14 old fishing vessels were laid up. The harbour basin North of the commercial port was used as Russian naval base and is planned to be used in future as expansion of the commercial port (Berths 13, 16 to 21 and 24).

Tab. 7.4-1: Physical characteristics of the commercial port in Poti

Berth Nos.	1 + 2	3	4 - 6	7	8 - 11	12
Assigned Cargo in 1990	Iron ore and bauxite	Metal and steel products	Metals and coal	Containers and general cargo	Chemicals, general cargo and grain	Passengers
Assigned Cargo in 1996	Dry and liquid bulk	Dry bulk	Dry bulk	Containers and Roll-on/Roll-off	General cargo and grain	Passengers
Design Depth	12.50 / 8.50 m	8.50 m	8.50 / 9.75 m	9.75 m	8.10 m	8.50 m
Quay Length	460 m	165 m	520 m	170 m	710 m	230 m
Quay Width	20 m	15 m	20 m	25 m	25 m	10 m
Construction Year	> 30 years	> 50 years	> 50 years	> 50 years	> 50 years	> 30 years
Substructure Construction	Blockwall	Blockwall	Blockwall	Blockwall	Blockwall	Blockwall
Superstructure Construction	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete
Cargo Handling Facilities	Quay cranes, open storage area, pipelines	Quay cranes, open storage area	Quay cranes, open storage area	Quay cranes, open storage area	Quay cranes, open storage area, transit sheds	Passenger terminal building
Access	Rail	Rail	Rail	Road & rail	Rail	Road

Source: Poti Port Stock Company

It can be seen from the plan that the port was designed for the loading and unloading of bulk cargoes from/to railway wagons as is the case with most of the ports in the FSU countries. At most berths the railway lines are not flush with the quay apron and there are insufficient holding areas, roads and quay areas to allow for an unhampered operation with rolling transport equipment or road vehicles.

The railway network of the port of about 10 km in length is directly linked with the nearby railway station. The port has direct road access to the Southern part as well as to the Northern port complex. The density of the local traffic is low.

The port offers in total about 22,300 m^2 covered storage and about 58,500 m^2 open storage areas. The open storage area behind berths Nos. 1 and 2 is blocked by 120,000 tons of iron ore pellets since about 5 years.

Table 7.4-1 gives the main characteristics of the existing berths. In general the port facilities are still in operating condition in spite of its age and the fact that there is an obvious backlog demand for maintenance and repair.

In Table 7.4-2 the main characteristics of the port equipment are listed. All equipment is said to be relatively new and in operating condition although one quay crane was obviously out of order during the visit and a number of cranes had a lattice structure which was the common type about 30 and more years ago.

Most of the cranes at berths 7 - 11 were refurbished to secure a prompt discharge of food aid recently. This rehabilitation programme was financed by the WFP.

Tab. 7.4-2: Outline of main equipment in the commercial port in Poti

Item	Berth/s	Number	Type	Capacity	Make
1.1	1 & 2	5	Portal slewing crane	16/32 t	SOKOL
1.2	3	5	Portal slewing crane	16/32 t	SOKOL
1.3	4 - 6	4	Portal slewing crane	16/32 t	SOKOL
1.4	4 - 6	2	Portal slewing crane	10/20 t	TAKRAF
1.5	7	3	Portal slewing crane	20/40 t	TAKRAF
1.6	7	1	Portal slewing crane	20/40 t	GANZ
1.7	8	3	Portal slewing crane	16/32 t	SOKOL
1.8	9	2	Portal slewing crane	5/16 t	GANZ
1.9	10	3	Portal slewing crane	10/20 t	TAKRAF
2.1	-	1	Floating crane	30/70 t	GANZ
2.2	-	1	Floating crane	16/35 t	GANZ
3.1	-	25	Forklift truck	1.5 t	TOYOTA
3.2	-	10	Forklift truck	3.2 t	TOYOTA
3.3	-	8	Forklift truck	5.0 t	TOYOTA
3.4	-	2	Container forklift truck	25.0 t	KALMAR

Source: Poti Port Stock Company

7.4.3 Port operations and traffic flow

At the time of the visit to the port berths 1 - 11 were used for cargo handling. At berth No. 1 petrol was discharged from tanker directly into railway wagons, as there were no storage tanks available for this type of cargo. Two more tankers were waiting for discharge at this berth. At berth 7 a container feeder vessel from Mediterranean Shipping Corporation (MSC) was under discharge and at berth 10 frozen beef was unloaded from a reefer vessel directly onto reefer wagons. Total berth occupancy during the visit was 75 %.

The port handled in 1995 about 1.5 million tons of dry bulk, liquid bulk and general cargo. Total port capacity of the existing facilities is said to be about 7 million tons. Although the larger cargo share consisted of dry bulk cargoes in particular grain there is an upward trend in containerised and RoRo cargoes.

The port is served by two container feeder lines every fortnight: One is operated by Sea-Land from Triest, the other from Piraeus by East Container Services (ECS) in co-operation with MSC. There are also two weekly RoRo-services with Varna/Burgas and Novorossijsk, although there is no dedicated RoRo-berth.

The port offers year round port operations. Loading and discharging operations are performed in two shifts of 12 hours with two mealbreaks of 1.5 hours, resulting in a net allocated working time of 21 hours a day. However, work during night-shift between 20.00 h and 08.00 h and on Sundays and holidays largely depend on workload, conditions of the charter party and instructions of the shippers/receivers.

Pre-planning of cargo handling operations is well organised. There is a daily operations meeting together with the shipping agents during which all resources needed for cargo handling such as berths, equipment, personnel and railway wagons/trucks are allocated to work. This includes a detailed working instruction on cargo handling technology such as use of gear, material for lashing and securing of cargo, dunnage etc. and the expected output per shift and crane. The latter ones are based upon the former working norms of the FSU for the Black Sea ports.

The following target output figures per ship and day would be typical for direct operation from vessel to railway wagon and vice versa based on two cranes per vessel. The maximum figures would be about twice as much.

- grain	5,000 t
- steel	3,000 t
- bagged cargo	1,000 t
- palletised cargo	500 t
- general cargo (break bulk)	300 t

It is reported from port users that ship and gang output is frequently affected by power cuts and equipment breakdowns.

Due to the fact that far most of the cargo is handled directly onto railway wagon, the governing factor for the cargo handling performance is not the type of commodity, consignment size, type of vessel or the capacity of cargo handling equipment - as in other ports - but the number and type of railway wagons, the number of rail tracks available for cargo handling at the berth and the shunting system.

During the field mission the port employed a total staff of about 2,500. The number and functions of personnel allocated to loading and discharging operations mainly depend on the type of cargo and method of handling (e. g. manual or mechanised). The system is similar as explained for the ports of Baku and Batumi.

7.4.4 Port organisation

The following weaknesses of the existing situation on port organisation and administration in Georgia were identified in the Executive Summary Report of the Optimising and Reorganisation Study for the ports of Poti and Batumi, prepared by HPC in 4/1996 on behalf of the German Agency for Technical Co-operation (GTZ):

"Both ports are still fully government-owned. Legally, they are subordinate to the Marine Department, a statal body responsible for all shipping and port-related activities of the country. The Marine Department determines the prices for the port activities and decides on the allocation of ships, at least for those carrying government-owned cargo.

Since the independence from the Soviet Union, very little has changed in port organisation and cargo operations. Despite the sharp decrease in cargo turnover, both port still keep their number of personnel and cargo handling equipment, thus resulting in high overcapacities in both fields.

The ports are not used to operate according to commercial rules and cost-benefit relations, and - under the present organisation - they are not forced to do so. The costs of individual cargo operations are generally unknown; commercial aspects are hardly considered in decision-making processes. Book-keeping and cost-accounting are done according to the rules of a centralised economy. Besides, marketing strategies and respective know-how are almost completely missing.

In both ports, there are many departments, and the tasks and responsibilities of the individual departments and employees are not clearly specified and overlapping. A high percentage of staff capacity is used for planning, checking and supervision purposes. Due to the inflexible organisation and lack of incentives, the motivation of the employees is generally low. In addition, their qualification is not sufficient for the demands of modern market-oriented port business."

In view of situation, the Georgian government wanted to increase the efficiency of the ports by means of decentralisation, commercialisation and future privatisation.

HPC analysed different options for the reorganisation and eventually recommended to allocate the main port sector functions to the following levels:

a) Public Port Authority and Administration;

b) Private Independent Port Operators (responsible for cargo handling operations and facility maintenance etc.);

c) Private Port Service Company

It was also proposed to start with the commercialisation of these activities as a pre-condition and first step prior to tender for privatisation of port operations (function <b>) and services (function<c>).

Based on these proposals a Bill was launched on the future administration, operation, control and development of the ports and on 17. 8. 1996 this Bill passed legislation as Act No. 541.

In furtherance of this Decree, Articles of Association were prepared for the establishment of the Poti Joint Stock Company. Further to the approval by the Office of the President in 1996 this company was expected to become legally in force as of 01.01.1997, notwithstanding the fact that the port administration had been practically working already as a company before that date.

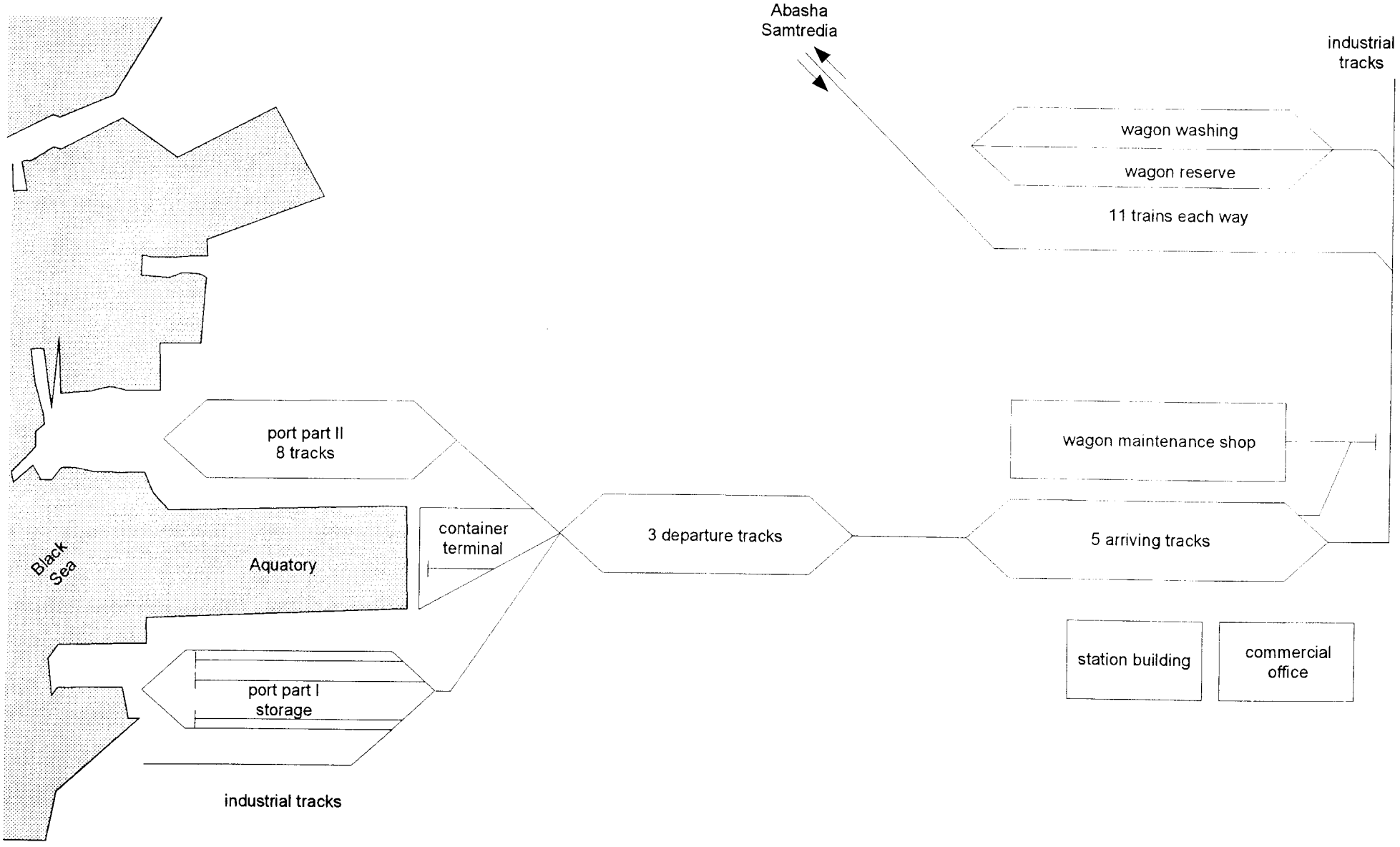
Through this development the course was set to establish a modern port organisation and business fit to cope with the future challenges of the highly competitive transport environment. Bearing in mind that managers and staff of the ports are in focus of the envisaged drastic port sector reform and that attitudes and aptitudes in particular of key personnel have to be changed drastically it appears that further external technical assistance is needed for the successful continuation and completion of reorganisation process initiated.

7.4.5 Wagon and truck transfer

The port is connected by means of the single track, electrified Poti - Abasha line with a theoretical throughput of 22 pairs of trains (11 trains in each direction). At present, 3 pairs of passenger trains and 3 to 4 pairs of freight trains run the line at maximum speeds of 60 km/h and, in places, 40 km/h.

For entry and splitting up of the trains 5 arrival tracks are available. A node agreement regulates the co-ordination between the port and the railway. Following an arrangement between the station inspector and the port dispatcher, the transfer of the wagons is done in the port, Part I, the Container Terminal, and Part II. A Wagon Transfer Log is being kept. For goods imported the port calls for goods wagons, specified as to their types, 24 hrs prior to the arrival of a ship.

Fig. 7.4 - 1: General layout of the railway infrastructure at Poti



Both in the port (Part II) and in the station tracks are available for a wagon reserve (see Fig. 7.4-1).

Subsequent to the docking of the ships, each day at 8.00 hrs a precise request for wagons is made by fax/telephone. Information about containers to be expected is not given until the goods consigned have been cleared by the forwarding agents. If the consignor in the port wants to forward the goods by railway, he hands over the consignment papers in the train dispatching commercial office. In order to get containers available and for their transport it is necessary to make a request to Tbilisi, so as to be assigned wagons and containers, which will only be done upon proof that the freight has been pre-paid; all this resulting in 3 to 4 days time between entry and dispatch.

Transhipment of containers in container traffic is done in the port terminal by 3 cranes, on the area used for intermediate storage of the containers. A direct transhipment ship/rail is not possible.

Owing to the containers being stored twice (at the quay and in the terminal), considerable storage times result for railway transport. Dispatching by truck is done directly from the quay. The transfer time station/ship was indicated to be 5 to 30 hours. The 5 hours refer to special complete trainloads.

In order to improve communication in the port, a computer network is at present being established. As a first step, computer-aided wheel reporting has been realised.

Continuous work in the station is hindered by repeated current blackouts (no PC, fax, or heating), and the competence of the station (cost centre of its own) does not meet the requirements, either.

The access by road from the east is done by a road running parallel to the railway line. This road for its most part is in a deplorable condition, as heavy trucks caused considerable damage.

7.4.6 Ongoing activities on Poti port development

Since 1995 the ports of Poti and Batumi have got technical assistance from HPC on the reorganisation of the port administration as well as on the assessment of future demand for the ports. This package is financed by the GTZ.

In view of the very limited capacity of the existing container stack of about 150 ground slots in relation with the recent growth in container throughput the port is planning for the construction of a new container terminal at berth 12. This plan is based on a feasibility study prepared by Sea-Land in 1996. The terminal will be fully equipped with two container gantry cranes, dedicated yard handling equipment, interchange area and good road and rail access. Total investment cost is said to be about US$ 25 million.

The port expects start of construction in 1997. It is envisaged that the terminal will be operated by a joint venture company with shares from the port, Sea-Land and probably a consortium of local banks. Details will be finalised as soon as the new Poti Port Stock Company has become fully operational.

It is planned furthermore to construct a new bulk terminal for the transhipment of grain at berth 8 mainly consisting of a grain silo of 5,000 t and two continuous ship unloaders.

According to the feasibility study completed by the Consortium Triton/GEM/AAK in May 1995 the total investments are expected to be about US$ 14.35 million. In co-operation with the EBRD an Invitation for Tenders for a Strategic Partner to Up-grade, Operate and Transfer the Poti Grain Terminal has been published as of 01.12.1996.

The port plans furthermore the construction of a railway ferry terminal for a service to Ukraine, Bulgaria and Romania. This is in furtherance of the endorsed project No. 16 at the TRACECA Working Group Conference held in Venice on 27-28 March 1996. A preliminary design for this terminal at berth 20 has been prepared already, although the port expects further initiative on a feasibility study, detailed engineering and securing financing of this project from the side of the Commission.

7.4.7 Existing port problems

Please refer also to the introductory remarks as per section 7.1. The following major problems were identified. Some of them are interrelated issues:

I. Legal and institutional problems:

a) New national ports policy and organisation towards more autonomy to the port authorities, less influence of the Government in day-to-day business and commercialisation/ privatisation of port operations and services not yet applied;

b) National administration within the Ministry of Transport for the control of ports and transport not yet fully established;

c) Future role and functions of the ports and its competitive situation/ market sharing with Batumi not clear;

II. Management, organisational and structural problems:

a) Lack of port pricing policy and cost oriented port tariffs;

b) Lack of corporate strategy and plan or business plan e.g. including marketing strategy, investment plan, manpower plan, operations and productivity improvement plan and financial projection;

c) Lack of internal and external communication;

d) Lack of market and service orientation and cost consciousness among managers and staff;

e) Outdated node/siding agreement between port and railway administration (train scheduling and shunting, transfer points, information, documentation, dispatch and transport times etc.);

f) Traditional working practices and performance standards; low productivity in comparison with Western standards;

g) Level of salaries and wages too low to attract high calibre managers and staff;

h) Low utilisation of existing resources (quays, areas, equipment and personnel);

III. Operational and technical problems:

a) Lack of adequate facilities for the dispatch of RoRo vessels (shore ramp, access and regress, checking and holding areas for trucks and roll-trailers etc.);

b) Lack of adequate facilities for container handling and storage (container yard, dedicated equipment for stacking and unstacking, possibly also container freight station etc.);

c) Poor technical condition of existing infrastructure, superstructure and equipment; low equipment availability, high down times, lack of regular maintenance dredging;

d) Existing port layout for cost effective use of ship's gear, for indirect handling system and for receipt/delivery by truck inadequate; limited capacity of road accesses; plans for port development do not consider modernisation of existing facilities (apart from container and grain terminals);

e) Lack of terminal for the import of oil products (e.g. gasoline).

7.5 Requirements for the Port of Poti

7.5.1 General

Reportedly the port has taken control over the territory of the former Soviet Naval Base, which is a large spare area for future development. Also various projects are under way which will boost the port capacity and substantially improve the port performance. This development potential on one hand and the dynamism already developed can be considered as main strengths of the port of Poti.

It appears, however, that there is still a long way to go until the port is developed to overcome the difficulties and to fully meet future requirements and the initiated process of reorganising the port administration is successfully completed. It is essential for the port and also for the railway corridor that cargo handling operations are cost effective. This objective can only be achieved by drastic and painful measures such as adapting the resources to the actual workload possibly including reductions in manning levels.

Although the ongoing development and the efforts of the port administration can only be much appreciated, the question should be allowed whether berth No. 8 is the ideal location for the erection of the grain terminal and whether berth No. 12 is the most advantageous location for the container terminal, as from the port zoning point of view it is not recommendable to have bulk cargoes and general cargo concentrated at one area. Therefore, an integrated port master plan is suggested under due consideration of investment and operating costs of alternative development options e. g. to concentrate space intensive operations such as container and RoRo handling at the new port and leave bulk cargoes and conventional cargo at the existing facilities.

Apart from these difficulties and the fine tuning still needed between the port and the joint venture for the railway corridor, port related impeding factors on the railway corridor are not expected.

7.5.2 Berth requirements

A calculation of the future potential berth throughput capacities for Poti and for Batumi is not possible, as the role of the ports has not yet been defined and the total cargo potential as assessed by HPC in 1996 has not yet been split into individual forecasts for both ports. Moreover, port master plans or development plans do not exist, from which commodity groups could be allocated to individual port zones and berths.

From the discussions held with representatives of both ports there is a direct competition for the following projects:

- container terminal;
- grain terminal and
- rail ferry terminal.

In view of the scarcity of funds is essential to avoid overinvestments and secure a high utilisation of new investments. Therefore, it is high time to develop a policy and development plans for both ports under due consideration of its strengths and weaknesses also as adequate transparent platform for larger scale private sector involvement in this sector.

Notwithstanding the before mentioned, a rule-of-thumb estimate is necessary so as to identify any major imbalance between the potential transport volume of the rail corridor and the throughput capacity of the port. In the following Table 7.5-1 the future potential berth throughput capacity is outlined and compared with the forecast for the **rail corridor** in 2015, i. e. the potential cargo received and delivered by road is not included.

The result is that the existing capacities are sufficient to cope with the **future rail traffic** (optimistic scenario) and it appears that there is also ample spare capacity for the dispatch of the cargo delivered to/received from truck. It has to be pointed out, however, that a dedicated berth and tank farm for the imports and exports of oil products do not yet exist. For the simultaneous handling of different commodities as benzene, gasoline or kerosene possibly more than one berth would be required.

Tab. 7.5 - 1: Outline of berth throughput capacity for the Port of Poti

Item	Parameter	Liquid Bulk	Dry Bulk	General C.
1.	No. of weather working days	355	340	320
2.	No. of net appliance hours per day	20	20	20
3.	Average output per ship-hour	500 t	120 t	80 t
4.	Berth occupancy factor	50 %	65 %	60 %
5.	Throughput capacity per berth & year	2,200,000 t	530,000 t	310,000 t
6.	Number of berths required	1	5	5
7.	**Future potential total throughput capacity per year**	**2,200,000 t**	**2,650,000 t**	**1,550,000 t**
8.	Expected throughput in 2015 (to/ex rail)	2,100,000 t	1,100,000 t	1,000,000 t
9.	Expected utilisation (rail cargo only)	95 %	41 %	65 %

Observations:

1. 365 calendar days less 10/25/45 days allowance for periods of heavy swell, rain, maintenance and repair;
2. 23 gross allocated hours less 3 x 0.5 h = 1.5 h for change of shift = 21.5 h less about 1.5 h non-productive time such as berthing and unberthing, opening hatches, changing gear etc;
4. See UNCTAD berth throughput; as a consequence of higher specialisation berth allocation will be less flexible in future to avoid traffic interference and long transport distances; with these factors average waiting time will be less than 20 % of service time, which is deemed to be acceptable for random arrivals;
7. Precondition is that all four jetties (out of 6 existing including the mooring buoy system) are kept in operational condition and berth No. 5 which was idle during the field missions is dedicated to dry cargo handling;
8. Please refer to Table 3.1.5-7 in conjunction with Tables 3.1.6-7 and 3.1.6-8. (To compare: In 1985 in total about 5 million tons mainly dry bulk cargo were handled).

Although the a. m. exercise indicates that there is no demand in quantitative terms, there is a demand in qualitative terms, as e. g. the present performance and conditions during container handling are absolutely inadequate (relatively low performance mainly due to lack of space and relatively long transit times), so that there is a very urgent demand for the construction of a container terminal. This terminal will have to be designed in line with future medium to long term demand based on a detailed container forecast and modal split analysis. During the second mission in February 1997 there were no further news on the status of the negotiations with Sea-Land or any other private company on the implementation of the project.

Contrary to the expectation of technical director of the Poti Joint Stock Company during the first mission the tender for a strategic partner for the grain terminal had not been published until February 1997.

Although the introduction of a rail ferry service between the Ukraine and Georgia was part of a recent agenda for bilateral talks, this project is considered a medium to long term perspective. It would require large scale investments at an area outside the territory of the existing port which is still occupied by a naval base.

7.5.3 Requirements for storage and receipt/delivery operations

For the a. m. reasons it is not possible to calculate the future storage area demand. In general terms it can be assumed that the existing covered areas of about 2 ha and open areas of about 6 ha are not any limiting factors on the service of the rail corridor joint venture. More specifically however, it should be observed that

a) The existing container yard of about 160 m x 60 m = about 1 ha adjacent to berth 7 is heavily congested. This problem will be solved soon after the implementation of the new container terminal project near berth 12.

b) There is no dedicated RoRo terminal at present. RoRo vessels are dispatched at berth 6 with their stern ramp athwartships at berth 7. Trailers are parked at the Northern end of the container yard. After relocation of the container terminal from berth 7 to 12 the vacant area and perhaps also parts of area 6 could be used for the holding of RoRo trucks and parking of roll-trailers.

c) The storage capacity for the shipment of cotton and other moisture sensitive cargoes are mainly trucked from private warehouses 5 km outside the port enclosure to the quay (as practised in other ports). Maximum storage capacity in the port is about 7,000 t, outside the port about 20,000 t. A new shed for 10,000 t perishable cargo is under construction, there is a project for the construction of a further shed for 17,000 t cotton. In case of an unexpected further substantial increase in the transit shipment of cotton by conventional means (not containerised) the transit shed capacity has probably to be further increased.

d) There is no temperature controlled store. A possible demand e. g. for the import of bananas or the export of fruits would have to be studied as part of the port development or master plan study.

e) Although about 750,000 t oil products were handled in 1996 there is no tank farm for these commodities. A new tank farm with a capacity of about 22,000 t is under construction. In case of further increase of oil products the tank storage capacity would have to be increased substantially. It is expected that these investments are financed by the private sector.

f) The import of pipes for the oil industry is increasing considerably. In order to enable a prompt dispatch of the vessels the cargo is handled semi-directly, i. e. larger portions are unloaded directly onto rail, smaller ones are stored intermediately on the open storage areas. In case of massive imports a shortage of storage areas may occur. It is therefore very important, that the 150,000 t iron ore pellets which are blocking open storage areas 1 and 2 since more than 5 years are removed.

The present rail access to the container terminal consists of a dead end with a slot capacity of three wagons only and is therefore completely inadequate, as it requires a lot of shunting which interferes with the yard and receipt/delivery operation. This problem will be solved after reallocation of the containers to the new yard at berth, that will be designed to load/discharge a full container block train (to be split into two parts).

As the port was designed as railway port the present road access and network in the port is not adequate. At present all trucks to the container and general cargo berths 7 - 11 have to pass a gate behind berth 11. After the relocation of the container terminal the situation will improve, however, the relocation of the gate, provision of a second gate and also proper access to the bulk berths 1 - 6 are recommended and subject to detailed study.

7.5.4 Organisational requirements

For the establishment of a successful relationship and co-operation between the rail corridor joint venture and the ports of Poti and Batumi it is essential that process of reorganising, optimising the structure and organisation of the ports including application of commercial principles and a possibly gradual privatisation is continued and completed (based upon the detailed proposal studied by HPC in 1996 with the financial assistance through GTZ).

To implement these incisive changes successfully a strong support by the government is important. As said before a strong legal and institutional environment and a transparent port policy and organisation are preconditions to attract larger scale private sector participation. It appears also that further external assistance is needed to coach this development.

More specifically, it will be necessary to update the existing node agreement between the ports and the rail corridor joint venture on the dispatch of wagons and trains as already explained in Section 7.3.5. The success enforcement of this agreement will largely depend on an unhampered and direct flow of agreed information between the two parties either conventionally or per EDI and their understanding and commitment to serve the industry.

Although this node agreement is nothing new to the parties with their long term relations it appeared during the field missions that many professionals contacted were somewhat reluctant or simply not interested to provide prompt and correct information which was readily available with the usual reference to the - said to be - confidential character of such information. So what really matters in this respect is to establish a virtual dialogue not only between the port and the rail corridor joint venture but also between the port and the main customers such as shipping and forwarding agents and probably main shippers and receivers also to be understood as a means to permanently of improve port performance and productivity.

The most important organisational problem that needs to be addressed is the slow and cumbersome process of cargo clearance which is dealt with in more detail in the intermodal transport study parallel to this Study. During the visits to the port the clearance of incoming trucks from Bulgaria and Romania also in transit to Azerbaijan and Armenia needed min. 24 hours after discharge for being cleared through customs. For larger scale reliable transport corridors the clearance should not be a matter of a day but of a few hours - on condition, of course, that all documents required were duly and completely presented. The situation on the clearance of import containers was much more serious. In spite of the prevailing difficulties at the terminal the discharge of containers was effected quite promptly as the berth was vacant in most cases when a vessel came in, so that the container was landed in one or maximum two days after arrival of the vessel .The minimum time needed for the clearance of the container was three to four days for SeaLand containers which have their own bonded depot in Poti and some seven days for other containers. It is essential that this interrelated legal, institutional and organisational problem is solved through a multilateral container transport facilitation programme through which - among others - it has to be guaranteed that transit containers are either checked not all or inspected only on a random basis, but not on a regular or scheduled basis.

7.6 Present conditions in the Port of Batumi

7.6.1 Location and nautical conditions

The commercial port of Batumi is situated at the head of the Batumi Bay, on the South part of the Caucasian coast. The position is:

Lat. 41° 39' N Long. 41° 39' E

The port has direct access to the sea with water depth between 10.50 and 13.00 m. Approach channel and harbour basin are subject to moderate siltation and have to be dredged in regular intervals. The recommended outer anchorage area is located NNE of the East side of Burun-Tabiya Point in depths ranging from 15 to 20 m. Anchorage in the inner roads can be obtained with prior permission of the Harbour Master.

Pilotage and towage are compulsory.

The port offers year-round navigation. However, between October and May strong winds from the SW, W and NW can occur, causing a strong variable current with surge in the port. At the time of this Tyagun condition, vessels are recommended to cease loading/discharging operations, vacate the berth and anchor off, or secure to mooring buoys or put to sea.

The largest vessel that called at the port had about 70,000 dwt and a length over all of some 240 m.

7.6.2 Port infrastructure, superstructure and equipment

The port has one harbour basin with 9 berths. West of the harbour basin further two berths for passenger vessels are available (berth No. 10 and 11). These are open to the sea, can be used however most of the time during the year as prevailing winds come from SSW and SW directions. North of the breakwater a MBM system (multi-buoy-mooring) is installed for loading of tankers.

The Northern part of the port was designed for the handling of crude oil and oil products, whereas the Southern section was planned for the loading and discharging of bulk cargoes and general cargo primarily directly onto rail. The Southern part has good rail access directly linked with the marshalling yard of the local railway station. Road access is provided via two gates that lead directly to one of the main roads of the city, one of which was not in use for traffic during the visit. Moderate traffic was observed in the City.

The port has about 4,000 m^2 transit sheds and some 15,000 m^2 open storage areas. The utilisation of storage space was very low due to the fact that most of the cargo was handled directly to/from railway wagons. A container yard was not available as there were no regular container shipments to/from the port.

The main characteristics of the existing berths are listed in Table 7.6-1 and the main data on port equipment are given in Table 7.6-2. Berth No. 12 is an off-shore berth outside the Neftyanoy Mole (Northern breakwater) consisting of a multi-buoy mooring system (MBM). Loading of crude oil is done by means of an underwater pipeline and a floating hose which is connected to the manifold of the tankers with a maximum size of about 60,000 dwt.

Tab. 7.6-1: Physical characteristics of the commercial port in Batumi

Berth Nos.	1 + 2	3	4 + 5	6 - 9	10 + 11	12
Assigned Cargo in 1990	Crude oil and oil products	Crude oil and oil products	Crude oil and oil products	Dry bulk and general cargo	Passenger and fresh fruit	Crude oil
Assigned Cargo in 1996	Crude oil and oil products	Crude oil and oil products	Not in use	Dry bulk and general cargo	Passenger and fresh fruit	Crude oil
Design Depth	10.50 m	10.00 m	10.00 m	7.50 - 11.60 m	5.00 - 7.50 m	13.00 m
Quay Length	350.00 m	180.00 m	340.00 m	660.00 m	380.00 m	*n. a. (MBM-system)*
Quay Width	10.00 m	10.00 m	15.00 m	45.00 - 25.00 m	10.00 - 20.00 m	
Construction Year	1905	1905	1878	> 30 years	> 20 years	> 10 years
Substructure Construction	Blockwall	Blockwall	Blockwall	Concrete piles	Concrete piles	n. a.
Superstructure Construction	Concrete	Concrete	Concrete	Concrete	Concrete	n. a.
Cargo Handling Facilities	Pipelines	Pipelines	Pipelines	Quay cranes, transit sheds, open storage	Passenger terminal	Pipeline and floating hose
Access	Road	Road	Road and rail	Road and rail	Road	

Source: Commercial Sea Port of Batumi

Tab. 7.6-2: Outline of main equipment in the commercial port of Batumi

Item	Berth/s	Number	Type	Capacity	Make
1.1	5 & 6	5	Portal slewing crane	10/20 t	TAKRAF
1.2	7	5	Portal slewing crane	5/15 t	GANZ
1.3	8 & 9	5	Portal slewing crane	10/20 t	TAKRAF
2.1	8	2	Suction type elevators for alumina and grain	150 t/h	HARTMANN
3.1	-	10	Forklift truck	1.5 t	TOYOTA
3.2	-	3	Forklift truck	4.0 t	TOYOTA
3.3	-	2	Forklift truck	10.0 t	TOYOTA
4.1	-	3	Wheel loader	3.0 cbm	Komatsu
5.1	-	1	Floating crane	40/100 t	GANZ
5.2	-	1	Floating crane	16/35 t	GANZ

Source: Commercial Sea Port of Batumi

Two oil berths were under repair during the visit. As in most other ports of the FSU also in Batumi there is a general demand for overhauling existing installations, facilities and equipment.

7.6.3 Port operations and traffic flow

In 1995 the port had the following traffic:

-	406	bulk carriers and general cargo vessels with a total cargo volume of	742,000 t
-	66	tankers with crude oil and oil products	642,000 t
	472	vessels in total with	1.384,000 t

Dry cargo mainly consisted of grain discharged in bulk. Total present port capacity is reported to be 8 million tons for liquid bulk cargo and about 2.2 million tons for dry bulk and general cargo.

The port offers year round port operations. Loading and discharging operations are performed in two shifts of 12 hours with two meal breaks of 1.5 hours, resulting in a net allocated working time of 21 hours a day. However, work during night-shift between 20.00 h and 08.00 h and on Sundays and holidays depend on workload and payment of overtime.

Cargo handling operations are well pre-planned and organised similar to the details given for the port of Poti.

The following target output figures per ship and day would be typical for direct operation from vessel to railway wagon and vice versa based on two cranes per vessel. The maximum figures would be about twice as much.

- grain	3,700 t
- ore	2,000 t
- bagged cargo	1,000 t
- iron and steel	1,000 t
- palletised cargo	700 t
- general cargo (break bulk)	500 t
- sawn timber	500 t

During discharge of bulk grain (food aid for the WFP) the maximum unloading rate was 10,000 t per day by means of 4 shore cranes of 15 t and the use of grabs and hoppers for loading of the wagons.

During the visit to the port a total workforce of about 1,200 was permanently employed, wherefrom about 25 % was operations personnel and some 15 % was technical personnel.

The number and required qualification of personnel allocated to work mainly depends on the type of commodity, capacity and type of handling equipment and method of handling. Typical gang structure e. g. during discharge of palletised cargo would be as follows:

- 1	foreman
- 4	men on board
- 1	signalman on board
- 1	shore crane driver
- 4	men in wagon/on platform
- 1	signalman ashore
- 1	forklift driver ashore
12	men in total

During handling of bagged cargo more men are allocated, during discharge of bulk cargoes by means of grab less men would be employed depending, however, on the amount of trimming work required on board. Thus, a relatively flexible gang allocation system is practised. Performance targets as well as gang composition is renegotiated with the trade union on a yearly basis under consideration of advancements in transport technology.

Due to the fact that far most of the cargo is handled directly onto railway wagon, the governing factor for the cargo handling performance is not the type of vessel or the capacity of cargo handling equipment - as in other ports - but the number and type of railway wagons, the number of rail tracks available for cargo handling at the berth and the shunting system. Experience has shown that the maximum capacity of the Southern dry and general cargo part of the port is about 100 loaded railway wagons

per shift = some 200 wagons per day. Taking an average net load per wagon of 40 t the present total dry cargo capacity for the port would be in the order of 8,000 tons per day.

7.6.4 Port organisation

The information given under section 7.4.4 for the port of Poti is principally also applicable to the port of Batumi.

7.6.5 Wagon and truck transfer

The port of Batumi is served by the Batumi Tovarnaya freight station / shunting station. Since it is situated in the city centre, its track capacity is limited. Via a single track line Batumi is connected with Supsa station, whence a double track line leads to Samtredia . At present, 8 to 9 trains are running each way, one of which is a passenger train (Tbilisi - Baku).

The automatic electric block system is out of order, resulting in a line capacity of 20 trains each way.

The node agreement of 10-02-1997 regulates the co-ordination between railway and port in the fields: planning of shifts / of routine of the day; supply with and withdrawal of wagons; downtimes of wagons and billing of wagon rents and, finally, effective concerted action.

As can be taken from the general layout of the infrastructure, the supply of wagons to the port is complicated. It is neither possible to shunt the wagons to the loading berths, nor to the stores. Only one track is provided for the port. Every 4 hours the wagons are withdrawn from this track and, by way of a turnout track, are led to the port, their run not being protected by signals. The track system belonging to the port is served by the port's own shunting locomotives. A maximum of 15 wagons can enter any of the quayside transfer tracks.

Since the north end of the station also serves for train runs and supply runs to the depot, and since all of the points have to be switched manually (key dependency), this station is a bottleneck already. Its envisaged expansion by a railway ferry terminal, and the construction of a container terminal would aggravate the situation even more. As can be seen from the figures 7.6-1 and 7.6-2, entry to the ferry / container terminal would require 4 shunting runs. Direct serving of the container terminal is not possible either, since container trains are not allowed to enter directly. The expansion of the track system as planned from the point of view of the port is not acceptable in terms of operation, since it would severely obstruct port, terminal, and transport operations.

Operating and commercial procedures are subject to a node agreement. 24 hours prior to planning the shifts, the port informs about wagons needed for transfer pur-

poses. In addition, surveys of ships expected, of ships lying in the roads, and of stocks and works in progress.

The delivery control of goods entering/leaving the port is done in the station (customs frontier). Station dispatcher and port dispatcher concert the tasks related to railway operation. There is no fixed timetable for servicing.

The delivery of goods is done on the basis of the consignment papers and receipts. This manual technology leads to further delays.

Road access to the port is only possibly via the city centre. Overflow areas in the municipal area are scarce. The planning for the terminal does not give any indication as to whether customs clearance has been taken into account. An alternative solution might be something like the "stacking principle" (developed by KRUPP), with integrated dispatching. The access road from the north runs across two passes full of curves.

Fig. 7.6 - 1: **Fundamental layoutplan of the railway infrastructure in Batumi**

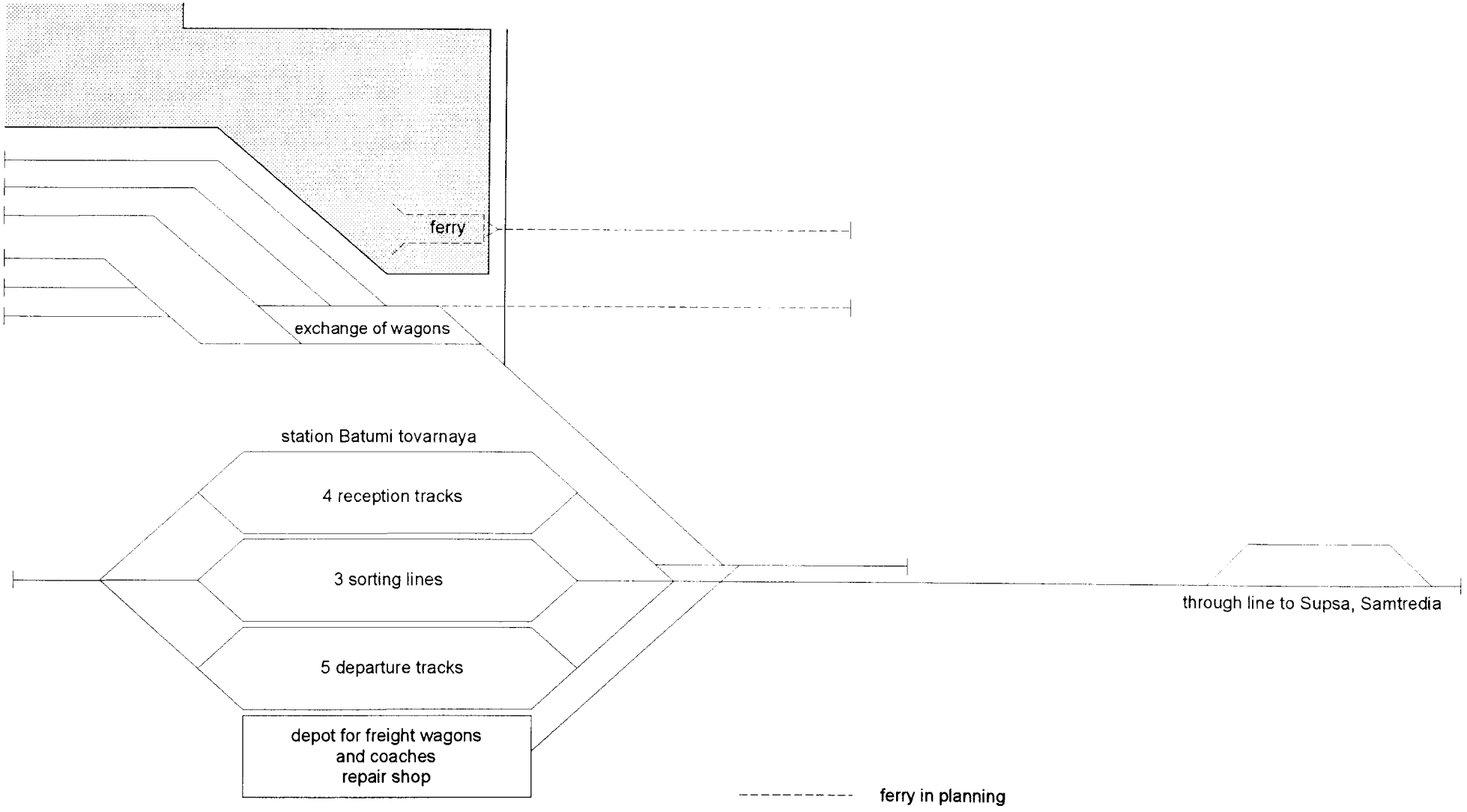
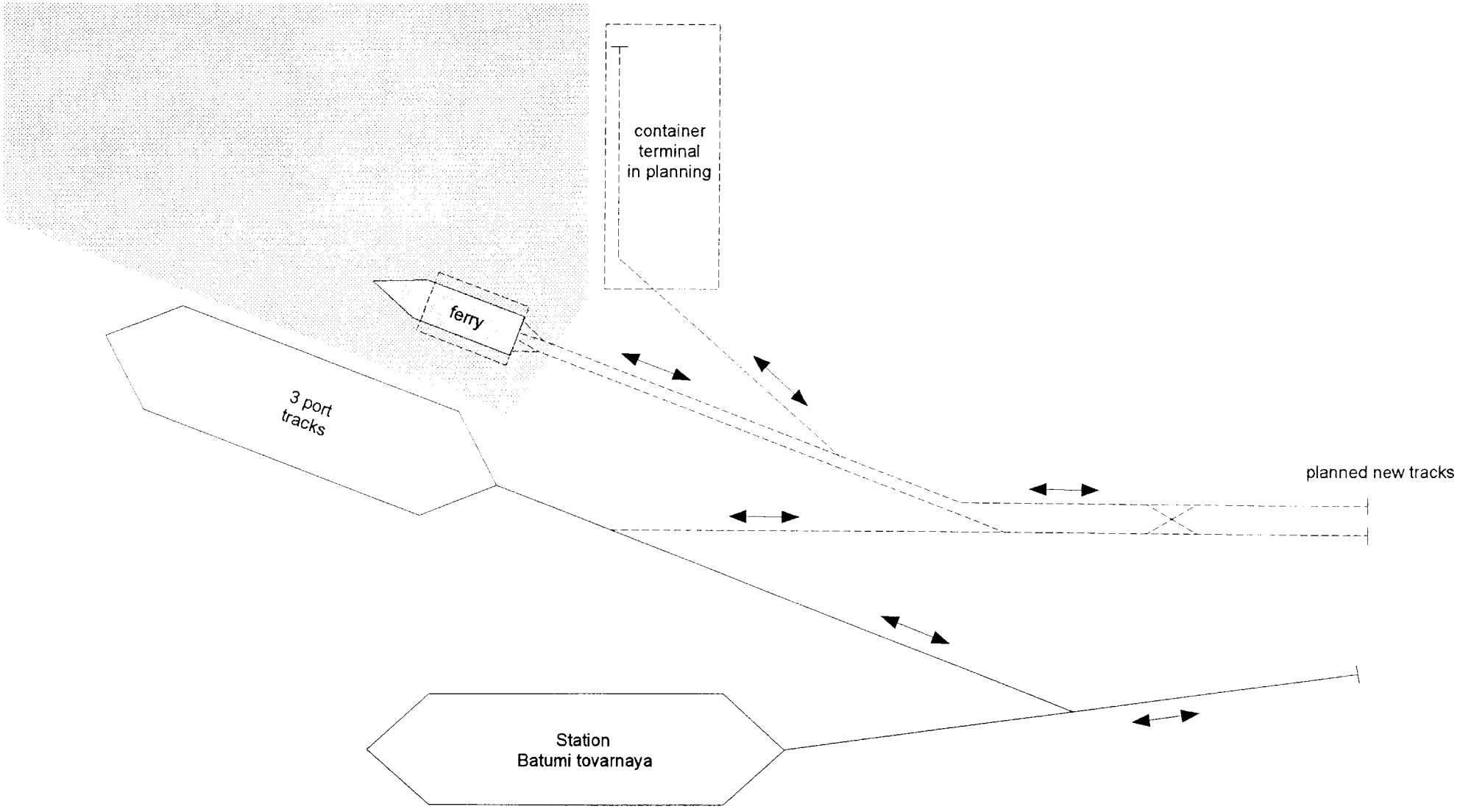


Fig. 7.6. - 2: Planned track development in the port Batumi



7.6.6 Ongoing activities on Batumi port development

The port plans for the implementation of the following projects:

a) Conversion of berth No. 6 for the accommodation of railway ferries;

b) Construction of a grain silo of 20,000 t at berth No. 8;

c) Construction of a container terminal at the Eastern end of the harbour basin (berths 4 and 5);

d) Construction of a new oil terminal North of the existing harbour basin.

Detailed engineering for the first project was completed in 1996. Site preparation mainly by demolishing existing structures for the provision of railway lines has been started already. The material for the modification and extension of the railway lines has been ordered.

The construction works for the conversion of the berths (primarily consisting of 5 new mooring dolphins and the provision and installation of the access bridge) has been tendered through CENTRACO in Moscow. Total investments are estimated to be about US$ 15 million. Expected time of construction is said to be about 1 ½ years. The terminal will be operated by the joint venture company Batum Mostrans.

It is planned that the terminal will serve a new railway ferry service from Batumi to Ilyichyovsk/Ukraine and Varna/Bulgaria. For the traffic to/from Bulgaria system interchange (change of bogies or rehandling of cargo between standard and wide gauge wagons will be in Varna).

Design vessel is the railway ferry type now in service between Ukraine and Bulgaria with the following leading particulars:

Name of ferry:	Geroi Shipki
Operator:	Black Sea Shipping Co. (BLASCO)
GRT:	10,096
DWT:	12,889
Length over all:	182,21 m
Width:	26,78 m
Maximum draft:	7,40 m
Capacity:	1,650 lane meters or 108 wagons
No. of decks	3
Service speed:	about 20 kn.

Target time for unloading and loading 108 wagons each including time for operating the lift which links the lower deck and upper deck with the main deck is reported to

be 16 hours. Traffic potential in particular for transit traffic to Armenia is said to be about 1.5 million tons net.

On 16.11.1996 the port has placed an order for the final design of the projects b) - d) with Sojusmorniiproekt in Moscow. The envisaged throughput capacities are as follows:

Container	1,5 million tpy
Grain	2,1 million tpy
Oil and oil products	25,0 million tpy

7.6.7 Existing port problems

With reference to the introductory remarks as per Section 7.1 the following problems of the port of Batumi - many of them interrelated issues - are to be noted:

I. Legal and institutional problems:

a) New national ports policy and organisation towards more autonomy to the port authorities, less influence of the Government in day-to-day business and commercialisation/privatization of port operations and services not yet applied;

b) National administration within the Ministry of Transport for the control of ports and transport not yet fully established;

c) Future role and functions of the ports and its competitive situation/market sharing with Poti not clear;

II. Management, organisational and structural problems:

a) Lack of port pricing policy and cost oriented port tariffs;

b) Lack of corporate strategy and plan or business plan e. g. including marketing strategy, investment plan, manpower plan, operations and productivity improvement plan and financial projection;

c) Lack of internal and external communication;

d) Lack of market and service orientation and cost consciousness among managers and staff;

e) Outdated node/siding agreement between port and railway administration (train scheduling and shunting, transfer points, information, documentation, dispatch and transport times etc.);

f) Traditional working practices and performance standards; low productivity in comparison with Western standards;

g) Level of salaries and wages too low to attract high calibre managers and staff;

h) Low utilisation of existing resources (quays, areas, equipment and personnel);

III. Operational and technical problems:

a) Lack of adequate facilities for the dispatch of RoRo vessels (shore ramp, access and regress, checking and holding areas for trucks and roll-trailers etc.) although berth for railway ferry under construction;

b) Lack of adequate facilities for container handling and storage (container yard, dedicated equipment for stacking and unstacking, possibly also container freight station etc.);

c) Poor technical condition of existing infrastructure, superstructure and equipment; low equipment availability;

d) Existing port layout for cost effective use of ship's gear, for indirect handling system and for receipt/delivery by truck inadequate; limited capacity of road accesses;

e) Lack of integrated port development plan;

f) Congestion expected on access sidings for future grain and container terminal;

g) Very limited area for future port expansion (except for the oil terminal).

7.7 Requirements for the Port of Batumi

7.7.1 General

The Port of Batumi has a long tradition in the transhipment of crude oil and oil products as well as in the export of fruits and has successfully tried to diversify and attracted also dry cargo. Due to its location in the City of Batumi, the topography and the road and rail access from the North very close to the shore line the development potential other than for liquid bulk appears rather limited.

Nevertheless, the port will continue to play an important role as transhipment centre. Investments in a container terminal would probably make sense only on condition that it is a one berth minimum investment which can be used also for heavy lifts, neo-bulk cargoes, project cargo and perhaps RoRo cargo. But, a larger scale investment would directly compete with the terminal in Poti and it appears somewhat difficult that the port of Batumi can attract regular callers with container feeder vessels within the coming years. Therefore, the role of both ports should be clarified, to avoid duplication of public spending and/or low utilisation of private and public resources.

Also, both ports, Poti and Batumi, want to invest in a new grain terminal mainly for transit grain in bulk. Of course there is a general saying that competition leads to an increased level of service, which the ports are obviously fully aware of. However, in the interest of savings in investment and operating cost and probably also in utilising the economies of scale in bulk shipping it is highly recommendable that the investment policy is reconsidered in this respect as well.

The reconstruction of Berth No. 4 to accommodate a wide-gauge railway ferry is of utmost importance for the railway corridor. The envisaged solution has two operational disadvantages:

a) The two rail tracks for unloading and loading the rail wagons behind the shore ramp have a dead end so that additional shunting is required to the holding area in the vicinity of the berth, from where the rail wagons are transferred to the railway station.

b) The quay construction at berth No. 4 has no protection against propeller erosion. Although a new dolphin and fender line will be provided the use of bow thrusters and propellers most probably will have to be restricted during berthing and unberthing. This will result in certain delays.

In spite of this drawback, the project seems to be highly viable in view of the very low investment cost and short implementation time in comparison with the construction of a complete new railferry terminal.

7.7.2 Berth Requirements

As explained in Section 7.5.2 a detailed calculation is not possible. Nevertheless, a rule-of-thumb estimate is necessary so as to identify any major imbalance between the potential transport volume of the rail corridor and the throughput capacity of the port. In the following Table 7.7-1 the future potential berth throughput capacity for liquid bulk (oil products) and for dry cargo (bulk and general cargo) is outlined and compared with the forecast for the **rail corridor** in 2015, i. e. the potential cargo received and delivered by road is not included.

The result is that the existing capacities are sufficient to cope with the **future rail traffic** (optimistic scenario) and on the assumption of a modal split rail / road for dry cargo of 2/3 to 1/3 also with the cargo delivered to/received from truck.

Tab. 7.7-1: Outline of berth throughput capacity for the port of Batumi

Item	Parameter	Liquid Bulk	Dry Cargo
1.	No. of weather working days	345	330
2.	No. of net appliance hours per day	20	20
3.	Average output per ship-hour	500 t	120 t
4.	Berth occupancy factor	65 %	70 %
5.	Throughput capacity per berth & year	2,200,000 t	550,000 t
6.	Number of berth	4	5
7.	**Future potential total throughput capacity per year**	**8,800,000 t**	**2,750,000 t**
8.	Expected throughput in 2015 (to/ex rail)	7,700,000 t	1,500,000 t
9.	Expected utilisation (rail cargo only)	88 %	55 %

Source: The Consultants

Observations:

1. 365 calendar days less 20/35 days allowance for periods of heavy swell, rain and maintenance and repair;
2. 23 gross allocated hours less 3 x 0.5 h = 1.5 h for change of shift = 21.5 h less about 1.5 h non-productive time such as berthing and unberthing, opening hatches, changing gear etc;
4. See UNCTAD berth throughput; as a consequence of higher specialisation berth allocation will be less flexible in future to avoid traffic interference and long transport distances; with these factors average waiting time will be less than 20 % of service time, which is deemed to be acceptable for random arrivals;
7. Precondition is that all four jetties (out of 6 existing including the mooring buoy system) are kept in operational condition and berth No. 5 which was idle during the field missions is dedicated to dry cargo handling;
8. Please refer to Table 3.1.5-7 in conjunction with Tables 3.1.6-7 and 3.1.6-8. (To compare: Between 1986 and 1988 about 5 million tons of crude oil and oil products were handled and about 1.6 million dry bulk cargo).

As already mentioned in the Interim Report the port plans for the following projects:

a) Conversion of berth No. 6 for the accommodation of railway ferries;
b) Construction of a grain silo of 20,000 t at berth No. 8;
c) Construction of a container terminal at the Eastern end of the harbour basin (berths 4 and 5);
d) Construction of a new oil terminal North of the existing harbour basin.

Contrary to the earlier expectations these projects appear less advanced than explained during the first field mission. In order to avoid isolated solutions not consis-

tent with the national ports policy and to avoid interferences between the traffic of these commodities a detailed port development plan is recommended under due consideration of the existing landside constraints.

7.7.3 Requirements for storage and receipt/delivery operations

The port has only 4,000 m^2 transit shed capacity and about 15,000 m^2 open storage capacity. The spare area for providing additional space is limited to about 10,000 m^2 due to the fact that the port enclosure is surrounded by the city which makes an extension virtually impracticable.

In view of the fact that in the medium to long term in general less raw material in bulk but more manufactured goods as general cargo are expected to be handled, the demand for intermediate storage to enable an indirect handling of goods will increase. In this respect some repercussions on the dispatch of wagons from limitations in storage areas may occur. These would have to be analysed within a port development study.

At present there are no holding areas for trucks, so that the modernisation programme of the port would have to include a substantial upgrade of the two gates and of the road network within the port territory.

7.7.4 Organisational requirements

Please refer to section 7.5.4 above.

7.8 Complementary information on other ports

7.8.1 Information on the Port of Turkmenbashi

The Port Turkmenbashi (the former Kransnovodsk) is situated on the east coast of the Caspian Sea at lat. 40° 01' N and 53° 00' E. There are the following port facilities for the accommodation of vessels (from west to east):

a) General cargo terminal;
b) Dry bulk terminal;
c) Ferry terminal;
d) Oil well drilling and support facility (about 3.6 km to the east);
e) Oil terminal (about 1 km SE of the base for the oil industry)

The general cargo terminal comprises three berth Nos. 12 - 14 with a total length of 410 m and a water depth of about 5 m. It has a 9 m wide concrete deck supported by concrete piles constructed between 1940 and the late 1960's. There is a number of quay cranes with a capacity between 5 and 30 t. The berths and the open storage areas adjacent to the quay have road and rail access.

The dry bulk terminal consists of two berths (Nos. 15 and 16) with a total length of about 290 m and a water depth of about 5 m. There are quay cranes available, but there is no rail access.

There are three transit sheds available with a total capacity of about 6,000 m^2 and some 6 ha open storage areas. General and dry cargo used to handle about 2 million tons. In 1995 the total throughput was about 126,000 t mainly gravel, scrap and some smaller consignments of cotton. The number of containers handled was insignificant.

The ferry terminal is practically a mirror image of the terminal in Baku.

The oil terminal has two jetties with 2 berth at either side for the import of crude oil from wells in the Caspian Sea and for the loading of oil products.

As in most ports of the FSU there is obviously a backlog in maintenance and repair of the facilities and equipment. For the general cargo and dry bulk terminals in 1996 a feasibility study was prepared by Louis Berger International, Inc. on behalf of the Turkmen Sea Administration. This study includes a traffic forecast with 10 different scenarios. The forecast for 2010 varies between 260,000 t and 910,000 t with a mean value of about 600,000 t. It is anticipated that the existing berths will be capable to handle the forecast cargo, however, on condition of some rehabilitation and modernisation works in particular to enable the handling of containers.

For the renovation of the ferry terminal a network plan and improvement programme is under separate study by Ramboll parallel to their work for the terminal in Baku.

According to the Phase 2, Pre-Design and Feasibility Note - Turkmenbashi December 1996 the following development has been proposed:

a) Minimum investment plan for immediate implementation
(cost estimate about US$ 17.6 million excl. equipment):
- Renovation of marine works;
- Raise of level of first half of rail yard;
- Establishment of first phase of truck/car facilities;
- Modifications to passenger terminal;
- Provision of border crossing facilities;
- Use of adjacent container handling facilities;
- Procurement of container handling equipment.

b) Additional (long term) investment plan (US$ 6.5 million):
- Raise of level of administration area;
- New passenger terminal and administration building;
- New ticketing area for vehicles;
- Further expansion of truck holding area;
- Provision of new container and trailer yard;
- Raise of level of coastal protection;
- Raise of level of second half of rail yard;
- Procurement of additional container handling equipment.

Although both ferry terminals were not severely congested during the field missions, it is of outstanding importance for the rail corridor and of interest also for the joint venture that the project of rehabilitating both terminals is implemented as soon as possible to overcome the existing difficulties in the dispatch of cargo, to shortcut transit time and thus to make the system more attractive.

Of course, also the general cargo and dry bulk terminals should be modernised in line with future traffic requirements.

7.8.2 Information on the Port of Aktau

The Port of Aktau as the leading port in the Republic of Kazakhstan is situated at the NE coast of the Caspian Sea.

There are three dry cargo berths and two for oil tankers. The ferry berth which served the former rail ferry link to Baku is no longer in operational condition due to the raise in sea level.
There are warehouses and open storage areas and the port is equipped with four rail mounted quay cranes and a number of rolling transport and lifting equipment.

In 1996 the following cargo was handled at the port:

Commodity Group	'000 t	%
Liquid bulk	101	27
Dry bulk	39	10
General cargo	236	63
Total	**376**	**100**

Source: Kazgiprojeldortrans, Almaty

According to the official traffic forecast of the Ministry of Transport and Communications (MOTC) the potential for the port in 2005 is as follows:

Liquid bulk quantities include 4.5 million tons of crude oil and 1.7 mill. t of refined products, dry bulk exports include 1.3 mill. t of grain in bulk.

Tab. 7.8-1: Traffic forecast for the Port of Aktau

Commodity Group	Incoming (mill. tons)	Outgoing (mill. tons)	Total Traffic (mill. tons)
Liquid bulk	-	6.6	6.6
Dry bulk	0.5	1.6	2.1
General cargo	0.3	0.7	1.0
Total	**0.8**	**8.9**	**9.7**
Containers (10,000 boxes)	*10.3*	*13.5*	*23.8*

Source: MOTC

The MOTC has launched a large scale reconstruction and expansion programme for the port to cope with the future traffic demand. For this project which is managed by Posford-Duvivier Haskoning Consulting Engineers and which was under tender during the last field mission in February 1997 financing of the foreign component has been secured by the EBRD. Total investment cost for the first (most urgent) phase for implementation during 1997 to 2001 is said to be US$ 54 million.

The project comprises the raise of the whole port area by 2 m and the expansion of the back-up area by 400 m. New quay walls will be built, the entire area resurfaced and new rail lines laid. Most of the existing buildings will be demolished and new ones erected. Also a range of modern port equipment will be procured including:

- two level luffing quay cranes;
- two harbour mobile cranes;
- bulk handling equipment including wheel loaders and belt conveyors;
- four terminal tractors and 12 semi-trailers for container transport;
- a fleet of forklift trucks from 1.6 to 30 t capacity;
- a set of ancillary lifting equipment.

For Phase II of the project it is envisaged to construct a new grain silo.

The reconstruction of the ferry terminal e. g. to enable the re-introduction of a rail ferry service between Aktau and Baku is **not** part of the project.

7.8.3 Information on the Port of Trabzon

The Port of Trabzon is situated at the Turkish Black Sea Coast at Lat. 41° 00' N and 39° 45' E.

The main harbour which is protected by two breakwaters, one 1,100 m in length and the other 500 m comprises the following quays with a total length of about 1.3 km:

Description	Length	Water Depth
- General cargo quay	410 m	10 m
- New cargo quay	300 m	12 m
- Container quay	300 m	10 m
- RoRo quay	20 m	10 m
- Multipurpose quay	290 m	12 m

Port equipment includes seven shore cranes between 3.5 and 25 t capacity, 12 mobile cranes and one shi-to-shore container gantry crane with a capacity of 35 t, a larger fleet of container handling rolling transport equipment.

There are about 1 ha covered and about 20 ha open storage areas as well as a grain silo with a capacity of about 10,000 t available.

In 1996 about 750 vessels were dispatched with a about 1 million tons of cargo. Daily output figures vary between 500 t for break bulk general cargo, 1,200 t for bagged cargo and 2,000 to 3,000 t for dry bulk cargo.

From the ports and shipping point of view any positive or negative impact related to the port of Trabzon on the throughput of the ports of Poti and Batumi and hence the rail corridor cannot be seen in the short to medium. This is mainly because of the relatively short distance between Trabzon and these ports of about 200 km which means that any short sea RoRo service would not be compatible with road transport in term of freight rate (including port dues and handling cost) and transit time.

7.9. Port Development strategy and complementary recommendations

7.9.1 General

It appears from the discussions with representatives of various companies and institutions contacted during the field missions that up to now there is a tremendous lack of services minded, commercially oriented managers and staff interested in and committed to a free flow of information in general and to an improved port and cargo handling performance and productivity in particular and strong doubts must be allowed whether it is possible to change the way of thinking and aptitudes of persons in charge <in spite of training and possibly incentives for performing better> in the short term. Of course, one cannot wait with improvements until a new generation can much easier and quicker adapt new technologies and to replace traditional procedures to more modern methods and practices more or less dictated by the market economy, but it is felt that, apart from the obviously urgent rehabilitation and expansion measures a medium term approach is recommended for any advancements in respect of

- reorganisation, commercialisation or privatisation of port administrations and cargo handling services;
- implementation of straight forward sales and marketing policies, plans system and methods;
- introduction of modern management principles including MIS and EDI systems as well as transparency in costing and tariffication; and
- achievement of productivity levels similar to western ports

so as to avoid too high expectations.

Of course, in a state of emergency, e. g. where the port cannot pay their employees any more and permanently fails to operate and maintain facilities and equipment, a crash programme would be needed to overcome immediate difficulties probably with the assistance of a management team from abroad. This situation has not yet evolved, but may become the case in the near future without appropriate counter measures.

Prerequisite for any larger scale private investment in the ports sector would be a transparent legal and institutional environment, investment and privatisation policy and procedures as well as port organisation. The governments are fully aware of this situation and have therefore started to clear the path. It is hoped that this process is successfully completed soon, in particular to avoid that individual investors may take advantage from rather still vage conditions by profeetering at public expense.

One may conclude also from the following Tables 7.9-1 and 7.9-2 that in addition to the obviously needed operational and technical improvements at the front (bottom-up approach) a top-down-approach from government via ministerial level to the port

administration is needed to strengthen the institutional, legal and organisational environment of the sector in both countries.

It is deemed necessary to identify some general principles for the development of port facilities and terminals already at this stage also to facilitate an assessment of the suitability of existing facilities. Such general requirements would probably include:

a) Sufficient throughput and storage capacities to cope with expected traffic potential, future container forecast and modal split estimations as well as changes in modes of transport or shipping pattern;

b) Separation between ship loading and unloading operation (stevedoring and quay transfer operation) and receipt/delivery operation so as to avoid traffic interference;

c) Comfortably dimensioned traffic and storage areas directly at the berth to secure high and cost effective cargo handling performance as expected by the customers of the terminal;

d) Design of quays, traffic and storage areas for the use of heavy duty rolling transport and handling equipment as well as mobile cranes;

e) Sufficient rail and shunting capacities possibly also for the dispatch/trajecting of full trains;

f) Separate holding (pre-stowage) areas for incoming and outgoing RoRo traffic for house-to-house traffic (accompanied traffic) as well as pier-to-pier traffic (un-accompanied traffic);

g) Flexibility of the terminal to handle a variety of different cargoes (e. g. containers, heavy lifts and hazardous cargoes), to accept receipt/delivery by rail and road, and to dispatch combined rail-/RoRo-ferries (multi-purpose character of the terminal);

h) Excellent seaside, road and rail access;

i) Minimising safety hazards/Optimising occupational and traffic safety;

j) Sufficient, anti-glare type illumination to secure night work;

k) Application of high security standards (e. g. securing of terminal area in line with customs and police requirements; adequate fencing, gatehouses and probably video monitoring;

l) Room for expansion;

m) Work around the year, around the clock;

n) Guaranteed high port performance in particular to maintain agreed ship and train schedules;

o) Modern, high capacity terminal equipment with high grades of reliability and availability;

p) Highly qualified, motivated and productive terminal management and personnel;

q) Integration of all terminal activities within one organisation;

r) Lean and sufficiently autonomous terminal organisation within a transparent legal and institutional environment;

s) Competitive cost oriented port hand cargo handling tariffs, transparent and reliable tariffication system;

t) Integrated documentation and information system including monitoring of the status/location of individual consignments in close co-operation and co-ordination with railway administration or operator/s, customs and shipping lines.

Of course, as already mentioned under Section 7.1 most of the issues listed are already known to the ports as well as to the governments, but it is important that strategic elements are listed in a concise way so that on this basis Action Plans with time and resources requirements can be developed.

7.9.2 Development strategy for the Baku Sea Port

The Masterplan for the development of the port, prepared by HPTI (see section 7.3, Table 7.3-2), as a medium-term measure provides the establishment of a container terminal on the premises of the General Cargo Terminal. Following co-ordination between the Azerbaijan Tacis Co-ordinating Unit, the port administration, AGZD and the Deputy Prime Minister the container terminal as 'Co-operated Entity Import, Transit and Export' is to handle containers. With reference to the TRACECA corridor this will call for a modification of the operating technology described in section 7.2.5, a modification of the routing of the Logistic Express Poti - Baku, and modifications of the junction agreement. Since the first phase is to be implemented as early as 1997/98, a proposal regarding the modification of the operating technology must be prepared, containing the following essentials:

The terminal point for the Logistic Express is the ferry group of the ferry terminal, i.e. the train's journey does not end in the Kishly station. Splitting up of trains is done in the ferry group, and shunting has to be done according to the following routing indications.

- Baku Seaport Container Terminal
- Ferry Terminal
- Kishly (for container wagons which are transported by rail to stations of AGZD or to Dagestan/Russia).

The container terminal will be served by means of shunting movements. Because of the limited track length in the port terminal, however, the wagons must enter and/or leave it in groups. Within the framework of a shunting technology to be elaborated by AGZD, this formation of shunting groups must be further detailed. Because of this

technology, traffic volumes on the level crossing will increase. Therefore, investments will have to provide an automatic level-crossing protection system.

The logistic information system (server in the ICC of AGZD) will have to be linked to the information system of the container terminal (Electronic Data Interchange). It is also recommended to equip the customs authorities with a PC in order to transmit advance messages to the customs in line with EDIFACT.

For the electronic data interchange the following EDIFACT messages are recommended:

- Provisional Booking Message
- Firm Booking Message
- Booking Confirmations Message
- Instruction Message
- Instruction Contract Status Message
- Arrival Notice Message
- International Forewarning and Consolidation Summary Message
- Intermodal Transport of Containers
- Call INFO Message
- Container Pre-arrival Message
- Container Arrival Message
- Container Pre-departure with Guidelines Message
- Container Pre-departure with Guidelines
- Container Departure Message
- Vessel Departure
- Total Number Message (Cargplan)
- Freight Costs and other Charges

When using the messages, the Russian recommendations on "Electronic Consignment Note" have to be observed.

Within the framework of the project "Information Systems for TRACECA Ports (Batumi, Poti, Baku, Turkmenbashi, Aktau)", planned by the EU, more detailed investigations of this topic should be made.

To overcome the port problems identified in the Interim Report a development strategy for the Baku Sea Port is recommended as outlined in Table 7.9-1. The suggested priority for implementation is to be understood from the viewpoint of the rail corridor joint venture which is probably not in full correspondence with the policy of the BIS.

7.9.3 Development strategy for the ports of Poti and Batumi

From the Consultant's point of view a specialisation of the ports is to be aimed at because of the effective use of investments, the flows of goods to be expected on the TRACECA corridor, the possibility to reach competitive transhipment charges and storage, and because of the railway infrastructure available in Batumi.

In accordance with the available investigation results and taking into account the results from the Multimodal Transport (BCEOM) project, it is recommended to extend the container terminal in Poti and to relinquish the construction of a new terminal at Batumi. A concentration at Poti, accompanied by a radical change in the clearance of ships and a cutback of lay days are, would increase the number of shipowners calling at Poti, which would mean an increased number of arrivals and departures of ships. This would also lead to a favourable market position for the TRACECA corridor: higher frequency of weekly departures of the Logistic-Express, and for the operating company a high efficiency and thus favourable conditions for multimodal transport in line with market conditions. An extension of the railway infrastructure would not be necessary. The rehabilitation measures suggested in section 4 for tracks and bridges and for signalling, telecommunication, and data processing will provide favourable conditions for modern logistics meeting the requirements of customers.

At the same time in Batumi one could do without the expansion of Batumi station, to be required for the development of the terminal, and without storage capacities and construction of new fly-overs.

On the other hand it seems appropriate to push on with the construction of a railway ferry landing place (for broad-gauge cars) at Batumi, in order to conduct full-load traffic from and to South/East and South/West Europe via Odessa (Illitchevsk) and Varna. It is not recommended to construct an additional railway ferry landing place at Poti, since the potentials shown for railway ferry traffic would not justify an efficient exploitation of two ferry connections.

Table 7.9-2 gives the port development strategy proposed for the ports of Poti and Batumi. As the governing problems identified in the Interim Report are similar in both ports, one strategy is expected to suffice to avoid duplication of information.

Table 7.9-1: Outline of development strategy for the Baku Sea Port

No.	Major Port Problem	Suggested Development Objective	Proposed Lead Responsibility	Suggested Priority	Observation
1.	**Legal and Institutional Framework**				
1.1	Outdated port and transport legislation; inadequate transport administration	Study, approve and implement new legislation; establish modern transport administration	Council of Ministers	2	Precondition for reorganisation and modernisation of transport sector
1.2	National ports policy & delimitation of powers and responsibilities not clear	Study, approve and implement ports policy and regulatory framework	Department of Transport	2	Precondition for private sector involvement
1.3	Role, options and consequences of private sector participation not clear	Refine privatisation policy & procedure; study & assess options; propose most favourable alternative	Department of Transport	2	as above
2.	**Management and Organisation**				
2.1	Outdated node agreement on dispatch of ferries between CSC, ISB & railway	Study, negotiate and conclude new agreement	Railway Administration	1	Key element for future rail corridor development
2.2	Lack of internal communication & of virtual dialogue between parties involv.	Apply new MIS proposed by HPTI; institutionalise external communication	General Director of the Port	1	in conjunction with 2.1
2.3	Lack of corporate strategy and plan	Study, approve and implement integrat. corporate/business development plan	as above	2	
2.3.1	Lack of port pricing policy and cost oriented port tariffs	Establish policy and implement new tariff based on financial projection	as above	1	based on HPTI proposals
2.3.2	Lack of marketing strategy and plan; lack of market orientation	Study and implement new strategy and plan & continue training	as above	3	
2.3.3	Personnel not geared to market economy (low level of wages, lack of motivation, low productivity etc.)	Study and implement human resources plan incl. assessmt. of skill imbalances, training demand; new payment system	as above	2	incl. securing financing for further assistance
3.	**Operations & Engineering**				
3.1	Low port performance and productivity; lack of performance review	Study and implement performance improvement plan	as above	1	
3.2	Lack of adequate ferry terminal	Approve and implement renovation programme, secure financing	as above	2	based on reports prepared by Ramboll
3.3	Lack of adequate facilities for containers and RoRo cargo	Study, approve and implement port masterplan, secure financing	as above	2	based on HPTI study
3.4	Poor condition of port facilities and equipment, high down times	Study and implement preventive maintenance, increase availability rates	as above	3	incl. allocation of sufficient funds for M & R

Table 7.9-2: Outline of development strategy for the ports of Poti and Batumi

No.	Major Port Problem	Suggested Development Objective	Proposed Lead Responsibility	Suggested Priority	Observation
1.	**Legal and Institutional Framework**				
1.1	Role, options and consequences of private sector participation not clear	Refine privatisation policy & procedure; study & assess options; propose most favourable alternative	Council of Ministers	2	precondition for larger scale privatesector involvement
1.2	National ports policy, role of the ports & delimination of powers & responsibilit. between MOTC and ports not yet clear	Refine, approve and apply new policy; establish modern transport administration	MOTC	2	implement HPC proposal or similar
1.3	Proposed reorganisation of ports incl. commercialisation/privatisation of port operations not yet implemented	Refine orga. for, get approval for and set up separate port authority, cargo handling and services companies	MOTC	2	as above
2.	**Management and Organisation**				
2.1	Outdated node agreement on dispatch of ferries between ports and railway	Study, negotiate and conclude new agreement	Railway Administration	1	key element for future rail corridor development
2.2	Lack of internal communication & of virtual dialogue between parties involv.	Substantially improve internal and external communication	General Director of the Port	1	in conjunction with 2.1
2.3	Lack of corporate strategies and plans	Study, approve and implement integrat. corporate/business development plans	as above	2	incl. securing financing for further assistance
2.3.1	Lack of port pricing policy and cost oriented port tariffs	Establish policy and implement new tariffs based on financial projection	as above	1	based on HPC proposals
2.3.2	Lack of marketing strategy and plans; lack of market orientation	Study and implement new strategy and plan & continue training	as above	3	
2.3.3	Personnel not geared to market economy (low level of wages, lack of motivation, low productivity etc.)	Study and implement human resources plan incl. assessmt. of skill imbalances, training demand; new payment system	as above	2	probably incl. early retirement scheme for redundant personnel
3.	**Operations & Engineering**				
3.1	Low port performance and productivity; lack of performance review	Study and implement performance improvement plan	as above	1	
3.2	Lack of dedicated container terminal in Poti	Approve and implement renovation programme, secure financing	as above	2	based on reports prepared by Ramboll
3.3	Lack of integrated port development plans for both ports & possibly Supsha	Study, approve and implement port masterplan	as above	2	incl. securing financing in coord. with private sector
3.4	Poor condition of port facilities and equipment, high down times	Study and implement preventive maintenance, increase availability rates	as above	3	incl. allocation of sufficient funds for M & R

7.10 Technical and operational requirements for ferry services between Baku and Turkmenbashi

7.10.1 General Requirements

A rail ferry service ideally complies with a number of basic requirements including:

a) Short transit time between Port of Loading (POL) and Port of Discharge (POD) probably including guaranteed transit times for consignments booked in advance;
b) Maximum technically and operationally feasible number of round trips per year;
c) Fixed and reliable sailing schedule under consideration of sufficient spare time to compensate for usual delays (in particular standard deviation due to bad weather or late arrival of a priority train);
d) High utilisation of transport capacities through a fairly balanced traffic (of east- and westbound cargo as well as of full and empty wagons and trucks) and through combined transport of wagons and trucks;
e) Transparent cost oriented and competitive tariff;
f) Simple documentation and customs procedures (random inspections);
g) Easy communication incl. consignment/transport monitoring.

During the field surveys it appeared that these general requirements were hardly met and that there was ample room for improvement in this respect. Moreover, there was only a low level of understanding and awareness for a real need to fulfil these market oriented basic conditions among representatives from Caspian Shipping Company (CSC), Baku International Seaport (BIS) and the Railway Administration.

Therefore, it will have to be one of the prime objectives for SCS to establish a customer and commercially oriented integrated ferry transport policy and system in close co-ordination and co-operation with the a. m. partners involved not only with clearly defined performance targets and means of verification but also with built-in incentives for all persons involved to achieve these performance targets.

It appears that in order to secure the implementation of these substantial improvements the following strategy is necessary:

- a medium term approach to enable a real change in attitudes and aptitudes of professionals involved;
- the establishment, implementation and monitoring of an adequate and comprehensive business plan and probably;
- the selection of a strategic or joint venture partner of CSC.

7.10.2 Existing and future recommended schedule of ferries

During the field missions departures of the ferries were only at random, but SCS confirmed their interest in a fixed sailing schedule to meet future transport demand and to respond to customer requirements.

In the following Table 7.10-1 two options are given for the allocation of a round voyage time. The first more realistic alternative suggests a round trip in 36 hours = 1.5 days for Phase I. This time appears to be achievable in the short term, whereas in the medium term to long term a reduction to 30 hours is expected to be possible (Phase II). The time of 26 hours as suggested by Ramboll (please refer to Phase 2, Pre-Design and Feasibility Note, Renovation of the Ferry Terminals of Baku and Turkmenbashi, Draft 11 1996, Page 5) appears somewhat on the high side, but is considered as long term perspective as a maximum feasible response to a very high transport demand on condition of a high performing, fully fledged and service oriented management.

For comparison also the round voyage time for a regular service with a small container vessel is indicated.

Tab. 7.10-1: Calculation of round voyage Baku - Turkmenbashi - Baku

	Time allocated for / section	**Rail-Ferry (15.5 kn) Phase I**	**Rail-Ferry (15.5 kn) Phase II**	**Container Vessel (10 kn)**
a)	Unberthing and departure Baku	1.0 h	1.0 h	1.5 h
b)	Sea voyage Baku - Turkmenbashi about 160 nm	10.5 h	10.5 h	16.0 h
c)	Approach and berthing Turkmenbashi	1.0 h	1.0 h	1.5 h
d)	Dispatch at Turkmenbashi	4.0 h	2.0 h	14.0 h
e)	Unberthing and departure Turkmenbashi	1.0 h	1.0 h	1.5 h
f)	Sea voyage Turkmenbashi - Baku	10.5 h	10.5 h	16.0 h
g)	Approach and berthing Baku	1.0 h	1.0 h	1.5 h
h)	Dispatch at Baku	4.0 h	2.0 h	14.0 h
	Sub-Total a) - h)	**33.0 h**	**29.0 h**	**66.0 h**
i)	Spare time for slow steaming (e. g. due to bad weather or traffic hold-up)	3.0 h	1.0 h	6.0 h
j)	**Total round voyage time**	**36.0 h = 1.5 d**	**30.0 h = 1.25 d**	**72. 0 h = 3.0 d**
k)	*Equivalent single voyage time (50 %)*	*18.0 h*	*15.0 h*	*36.0 h*
l)	Allocated operating days per year	330 d	330 d	345 d
m)	Potential number of round voyages p. a.	220	264	115

Observation to I):
In Western Europe ferry operators calculate with 350 operating days per year. As CSC depends on the service of the existing shipyards with much less productivity and consequently longer maintenance and repair periods in this case 35 non-operational days were used. This implies that the present average down times (including scheduled classification works) of about 60 to 70 days per year is reduced by about 50 % through application of modern management principles.

Based on a round trip time of 36 hours = 220 round voyages per year (for the I. Phase) in the following figures future sailing schedules are proposed, which are to be understood as examples rather than one and only solutions, but would mean significant shipper or customer friendly improvement:

- Figure 7.10-1 - A 2 ferries 1 - 2 sailing's per day
- Figure 7.10-1 - B 3 ferries 2 sailing's per day
- Figure 7.10-1 - C 4 ferries 3 sailing's per day

As this study is focused on the short to medium term development possible schedules for the long term perspective (Phase II) are not included. The sailing schedule for 30 hours per round voyage and 264 voyages in total per year would require an organisation of the schedule on a rolling basis, which implies that the sailing's are predetermined in advance with varying departure time so as to maximise the utilisation of the ferries.

Fig. 7.10-1-A: Proposed schedule for rail - ferry service Baku - Turkmenbashi
Example for 2 ferries: 1 - 2 sailing's per day east- & westbound

Baku			At Sea			Turkmenbashi	
Monday (Day 1)	12-18.00	1	o	o	2	12-18.00	
Tuesday (Day 2)	06-12.00	2	o	o	1	06-12.00	
Wednesday (Day 3)	00-06.00	1	o	o	2	00-06.00	
	18-24.00	2	o	o	1	18-24.00	
Thursday (Day 1)	12-18.00	1	o	o	2	12-18.00	
Friday & ff. (as above)	06-12.00	2	o	o	1	06-12.00	

Observation
a) Daily fixed departures;
b) Time in port includes berthing, unberthing, manoeuvring and slow steaming during approach;
c) Spare time of about 3 h per round trip was allocated to time at sea.

Fig. 7.10-1 - B: Proposed schedule for rail-ferry service Baku - Turkmenbashi
Example for 3 ferries: 2 sailing's per day east- and westbound

Baku				At Sea			Turkmenbashi
Monday (Day 1)	00-06.00	1	o				
					o	2	06-12.00
	12-18.00	3	o				
					o	1	18-24.00
Tuesday (Day 2)	00-06.00	2	o				
					o	3	06-12.00
	12-18.00	1	o				
					o	2	18-24.00
Wednesday (Day 3)	00-06.00	3	o				
					o	1	06-12.00
	12-18.00	2	o				
					o	3	18-24.00
Thursday (Day 1)	00-06.00	1	o				
					o	2	06-12.00
	12-18.00	3	o				
					o	1	18-24.00
Friday & ff. (as above)	00-06.00	2	o				
					o	3	06-12.00
	12-18.00	1	o				
					o	2	18-24.00

Fig. 7.10-1 - C: Proposed schedule for rail-ferry service Baku - Turkmenbashi
Example for 4 ferries: 3 sailing's per day east- & westbound

Baku				At Sea			Turkmenbashi
Monday (Day 1)	00-06.00	4	o		o	3	00-06.00
	06-12.00	1	o		o	2	06-12.00
	18-24.00	3	o		o	4	18-24.00
Tuesday (Day 2)	00-06.00	2	o		o	1	00-06.00
	12-18.00	4	o		o	3	12-18.00
	18-24.00	1	o		o	2	18-24.00
Wednesday (Day 3)							
	06-12.00	3	o		o	4	06-12.00
	12-18.00	2	o		o	1	12-18.00
Thursday (Day 1)	00-06.00	4	o		o	3	00-06.00
	06-12.00	1	o		o	2	06-12.00
	18-24.00	3	o		o	4	18-24.00
Friday & ff. (as above)	00-06.00	2	o		o	1	00-06.00
	12-18.00	4	o		o	3	12-18.00
	18-24.00	1			o	2	18-24.00

Observation

a) Daily fixed departures;
b) Time in port includes berthing, unberthing, manoeuvring and slow steaming during approach;
c) Spare time of 3 h per round trip was allocated to time at sea.

7.10.3 Transport capacity of existing fleet and expected future fleet utilisation

In the following Table 7.10-2 the transport capacity of the existing fleet is estimated in lane meters, units and net cargo tons. As explained above it is distinguished between a first phase with 220 round trips per year and a second one with 264 round voyages per year.
On the basis of capacity of the existing fleet of four ferries assigned to the service during the field missions of about 305,000 net tons each = about 1,220,000 t and the actual transport performance of about 617,000 t in 1996 the fleet utilisation was about 51 %. The calculation shows that the transport capacity for all 6 ferries of about 2.16 million tons will be sufficient even in 2015 for the forecast volume of about 1.9 million tons resulting in an approximate utilisation factor of 86 %.

Tab. 7.10-2: Estimation of transport capacity for combined rail-/roro-ferry of DAGESTAN type

	Design Parameter	Lane meters	Units	Net tons
1.	**Stowage capacity**			
1.1	Railway transport	416	28	840
1.2	Road transport (trucks)	592	32	640
1.3	Road transport (semi-trailers and roll-trailers)	592	41	820
2.	**Transport capacity per vessel**			
2.1	Combined transport capacity based on future modal split - single voyage	about 590	10 wag.+ 28 trucks 38 units	860
2.2	Combined transport capacity based on future modal split - round voyage	about 1,180	20 wag.+ 56 trucks 76 units	1.720
2.3	Average number of round trips per year based on 330 operational days		220 (I. phase)	
2.4	Transport capacity per vessel & year (100 % utilisation; I. phase)	260,000	16,700	380,000
2.5	Transport capacity per vessel & year (80 % utilisation; I. phase)	210,000	13,400	305,000
2.6	Average number of round trips per year based on 330 operational days		264 (II. phase)	
2.7	Transport capacity per vessel & year (100 % utilisation; II. phase)	310,000	20,000	450,000
2.8	Transport capacity per vessel & year (80 % utilisation; II. phase)	250,000	16,000	360,000
3.	**Transport capacity of existing fleet (6 vessels with 80 % utilisation)**	**1,500,000**	**96,000**	**2,160,000**
3.1	Expected traffic potential in 2015 (preliminary likely scenario)			1,857,000
3.2	Expected fleet utilisation in 2015			86 %

Observation:
Mean length per vehicle 15.5 m;
Average net load per wagon 30 t
Average net load per truck 20 t
Average net load per lane meter 1.46 t/m.

As parameters for the calculation the relevant details of the analysis of the traffic 1996 were used. As transport capacities are dynamic values depending on a number of variable inputs such as modal split, average unit load including and excluding empties and the traffic balance (relation between incoming and outgoing cargo), the calculation should be updated from time to time.

Compared with other RoRo services in Europe the average load factor of 80 % as well as the average truck and trailer load of 20 t appear somewhat on the high side, however, these inputs are well substantiated through the traffic projection studied by Ramboll (see above). This forecast is based upon full ship loads eastbound and a 60 % load factor westbound resulting in an average of 80 %.

7.10.4 Planned terminal rehabilitation programme

The feasibility and design study for the rehabilitation of the ferry terminal prepared by Ramboll (s. a.) proposes a phased development. Phase I shall comprise the short term minimum investments costing in the tune of US$ 17.6 million, whereas Phase II will cover the medium demand until 2010, for which investment cost in the order of 6.5 US$ million are expected.

The necessary renovation works will mainly include:

Phase I:
a) Complete renovation of marine structures;
b) Raise of level of first half of rail yard;
c) Construction of complete truck and car holding areas and dispatch facilities;
d) Construction of a preliminary facility for the dispatch of disembarking and embarking passengers

The adjacent area allocated for containers at the dry cargo terminal will be used also for the dispatch of port-to-port cargo, i. e. containers and roll-trailers.

Phase II:
a) Raise of level of administration building;
b) Construction of new ferry terminal building (for passengers and administration);
c) Construction of new container yard and trailer yard;
d) Raise of level of coastal protection;
e) Raise of level of second half of rail yard;
f) Provision of container handling equipment

It can be expected that with the implementation of this investment programme the existing bottlenecks within the terminal will be eliminated and the terminal will be capable to handle the expected increase in transport volume of the railway corridor.

7.10.5 Recommendations for short term improvements

It is obvious, that for the fulfilment of the requirements outlined in Section 7.10.1 a joint and well co-ordinated integrated effort and approach is needed. This implies, that the establishment of modern management systems should not be limited to the rail corridor joint venture and to the ports of Baku and Turkmenbashi but should include also the organisation of CSC.

Without limiting the outstanding long term experience, reputation and merits of the CSC it appears that in order to meet the challenges of future modern transport and shipping industry a corporate plan or business development plan is needed as already outlined under Section 7.9 for the ports. Subject to a detailed problem and objectives analysis such plan would probably include:

a) Marketing strategy and plan;
b) Performance and productivity improvement plan;
c) Engineering management and maintenance plan;
d) Human resources plan;
e) Management information system (MIS);
f) External communication including EDI (electronic data interchange) and documentation
g) Freight tariff and financial development plan.

Observations to:

a) At present CSC enjoys a fairly comfortable monopoly on the sea link between Baku and Turkmenbashi, however this must not be necessarily so also in the future, as the shipping industry is a highly competitive business environment.

b) It is deemed necessary that utilisation of resources and productivity is increased substantially so as to improve the competitiveness of the fleet.

c) This plan would probably focus on the reduction of down times, thus the increase in operational days per year in co-ordination with the ship repair industry.

d) The HR plan would have to completely review the existing wage tariffs and employment conditions in particular to reduce the dependence of the shippers on the - said to be - payment of „speed money" to the ships command.

f) The requirements on communication and documentation would probably focus on the revised node agreement on the dispatch of the ferries with the rail corridor joint venture and BIS and would have to consider the results of ongoing parallel studies on legal and institutional development and international freight legislation as well as on intermodal transport.

7.10.6 Sea link options

There are basically two options in relation to the rail ferry service between Baku and Turkmenbashi noteworthy within the context of this study; these are related to:

I) the container transport options;
II) the size and type of vessels.

I) Container Transport Options:

In the following Table 7.10-3 an attempt is made to compare and to assess the following systems for the transport of containers from Baku to Turkmenbashi and vice versa:

Option A - Container on wagon on board rail-/roro-ferry;
Option B - Container on roll-trailer on board rail-/roro-ferry;
Option C - Container on roll-trailer on board (pure) roro-vessel;
Option D - Container on board container vessel.

Table 7.10-3: Container transport system comparison Baku - Turkmenbashi

Item	Criteria	Option A	Option B	Option B	Option C
1.	**Systems Outline**				
1.1	Type of Vessel	Rail-/RoRo-Ferry	Rail-/RoRo-Ferry	RoRo-Ferry	Container Vessel
1.2	Handling System	Cont. on wagon	RoRo (rolltrailer)	RoRo (rolltrailer)	LoLo
1.3	Min. number of moves each port	1 - 2	2 - 3	2 - 3	3 - 4
1.4	Type of lifting equipment	none	e. g. reachstacker or forklift truck	e. g. reachstacker or forklift truck	mobile yard equipment and shore crane
2.	**Transit Time (for full shipload as per Item 4.)**				
2.1	Time for splitting-up of train / approach of single wagons	*included in rail transit time*	<	<	<
2.2	Time for train unloading	-	2	2	2
2.3	Average waiting time between unloading of train and loading of vessel (mean value between sailings)	4 (o.5 shift)	8 (1 shift)	8 (1.5 shifts)	36 (4.5 shifts)
2.4	Time for ship loading incl. lashing & securing	2	2	2	6
2.5	Average voyage time (single voyage for 167 nm including manoeuvring & slow steaming)	13	13	13	19
2.6	Time for ship unloading incl. unlashing	2	2	2	6
2.7	Average waiting time in Turkmenbashi (without documentary delays)	4	8	12	12
2.8	Time for train loading	-	2	2	2
2.9	Time for collection of single wagons / train formation	*included in onward rail transit time*	<	<	<
2.10	**Total transit time**	**25**	**37**	**45**	**77**
3.	**Additional Investments Required**				
3.1	Vessels	no	no	yes	yes
3.2	Port infrastructure	no	yes	yes	yes
3.3	Wagons	possibly yes	no	no	no
3.4	Handling Equipment	no	yes	yes	yes
3.5	Rolltrailers	no	yes	yes	no
3.6	Rail Infrastructure				

Table 7.10-3: Container transport system comparison Baku - Turkmenbashi

Item	Criteria	Option A (Rail-Ferry; Cont. on Wagon)	Option B (Rail-Ferry; Cont. on Rolltrailer)	Option B (RoRo Vessel; Cont. on Rolltr. or Deck)	Option C (Container Vessel)
4.	**Transport Capacities**				
4.1	Vessel type	DAGESTAN	DAGESTAN	Compositor Kara Karaev	Geroj Mekhti
4.2	Carrying capacity TEU / lane meter	56 TEU / 416 lnm	80 TEU / 592 lnm	130 TEU / 845 lnm	110 TEU / no lnm
4.3	Number of round trips per year during I. Phase (operational days per year)	220 (330)	220 (330)	220 (330)	115 (345)
4.4	Transport capacity per vessel and year with 80 % utilisation factor	9,900 TEU	14,000 TEU	22,900 TEU	10,100 TEU
4.5	Traffic potential 2005 / 2010 / 2015 (incl. M/Ts) (Preliminary)	19,400/26,600/36,400 TEU	<	<	<
4.6	Number of vessels required 2005 / 2010 / 2015	2 / 3 / 4	2 / 2 / 3	1 / 2 / 2	2 / 3 / 4
4.7	Transport capacity 2005 / 2010 / 2015 ('000 TEU)	19.8 / 29.7 / 39.6	28.0 / 28.0 / 42.0	23.0 / 46.0 / 46.0	20.2 / 30.3 / 40.4
4.8	Expected utilisation 2005 / 2010 / 2015	102 / 89 / 109 %	69 / 95 / 87 %	84 / 58 % / 79 %	96 / 88 / 90 %
5.	**Operating Cost**				
5.1	Vessel operating cost per day incl. bunkers excl. port dues per calendar day	$ 12,500	$ 12,500	$ 7,000	$ 3,000
5.2	Average number of single voyages per day	0.83	0.83	0.83	0.63
5.3	Vessel operating cost per single voyage	$ 15,000	$ 15,000	$ 8,400	$ 4,800
5.4	Operating cost per TEU				
5.4.1	Vessel operating cost (excl. port dues)	$ 270.00	$ 190.00	$ 65.00	$ 44.00
5.4.2	Train unloading cost	-	$ 15.00	$ 15.00	$ 15.00
5.4.3	Vessel loading cost including lashing & securing	$ 30.00	$ 30.00	$ 30.00	$ 50.00
5.4.4	Vessel unloading cost	$ 30.00	$ 30.00	$ 30.00	$ 50.00
5.4.5	Wagon loading cost	-	$ 15.00	$ 15.00	$ 15.00
5.4.6	Sub-total 5.4				
5.5	Equipment hire (Rolltrailers)	-	$ 5.00	$ 5.00	-
5.6	Depreciation on investment cost (life time in years)	*still to be defined*	<	<	<
5.7	Other operating cost (e.g. for personnel n.o.s.)	*still to be defined*	<	<	<
5.8	Sub-total 5.4 - 5.8				
5.9	Cost for re-positioning / demurrage of M/T wagons	*still to be defined*	<	<	<
5.10	Cost for re-positioning / dem. of M/T containers	*still to be defined*	<	<	<
5.11	Contingency	$ 15.00	$ 15.00	$ 10.00	$ 11.00
5.12	**Total operating cost per TEU (5.4 - 5.11)**	**$ 345.00**	**$ 300.00**	**$ 170.00**	**$ 185.00**

Table 7.10-3: Container transport system comparison Baku - Turkmenbashi

Item	Criteria	Option A (Rail-Ferry; Cont. on Wagon)	Option B (Rail-Ferry; Cont. on Rolltrailer)	Option B (RoRo Vessel; Cont. on Rolltr. or Deck)	Option C (Container Vessel)
6.	**Other Criteria**				
6.1	Safety of system	extremely high	very high	very high	high
6.2	Security of system	extremely high	very high	very high	high
6.3	Suitability for block trains	limited	good	very good	very good
6.4	Suitability for individual containers	good	very good	very good	very good
6.5	Risk of delays	very low	low	low	low
6.6	Required standards/management skills/quality of logistics/information technology for system	normal	high	high	high
6.7	Possibility of combining the systems with other or adapting the system with other technologies	good	very good	limited	very limited
6.8	Flexibility of combining intermodal / transit transport with conventional inland transport	limited	very good	very good	very limited
6.9	Possibility of a phased development	easy	easy	more difficult	more difficult
6.10	Acceptability of system through transport industry	highly acceptable	acceptable	acceptable	less acceptable
7	**Summary of Comparison**				
7.1	Time required for implementation	very short	short	medium term	medium term
7.2	Transit time	very short	relatively short	very short	relatively long
7.3	Operating cost	high	relatively high	low	relatively low
7.4	Non-quantifiable criteria	acceptable	highly acceptable	acceptable	still acceptable
8	**Preliminary Recommendation** (from the ports and shipping point of view)	**Recommended for groups of wagons**	**Recommended for single wagons**	**Medium to long term alternative**	**Medium to long term complementary system,**

Source: Consultant´s Estimate

The purpose of this exercise is not to get a comprehensive assessment, but to find out, what option would probably have outstanding advantages over others. As one could have expected, there is no one and only answer, but it can be preliminary concluded from the ports and shipping experts point of view, that

a) option A is more expensive than option B mainly due to the low utilisation of stowage space on board the vessel;
b) the time saving of option A against B of about 12 hours appears quite substantial at the first glance, but in relation to the total transport time of say some 20 days it is not significant;
c) options C and D - other than using the existing rail ferries - are highly cost effective and thus competitive mainly because pure RoRo and container vessel require less sophisticated and less expensive vessels than for wagon transport;
d) containers arriving in scheduled block trains will obviously remain on the wagon without double handling at the terminal;
e) individual containers with urgent and high value cargo as well as with dangerous cargo probably also remain on the wagon (perhaps in line with shippers instruction);
f) individual containers without particular advice will be unloaded and stacked at the terminal and then loaded on board at the convenience of the rail operator, the terminal and/or the shipping line (treated as normal cargo);
g) not so urgent shippers own (one way) containers and empty containers will probably be transported by container vessel or barge in the medium to long term.

It is pertinent to note that option A would be the least cost effective system for the transport of empty containers.

A detailed study is recommended on the possibility to double stack containers on roll-trailers or on deck of the ferries (Sto-Ro system), as this possibility would increase the stowage capacity and utilisation of the fleet substantially. In case only 50 % of the total container capacity of 80 TEU could be used for double stacking so that the total capacity would be 120 TEU the total operating cost per TEU could be reduced from $ 300.00 to $ 230.00. The latter amount would mean a considerable advantage over option A for which $ 345.00 are estimated.

Observation:
The present deck height of the ferries is 6.15 m. The height of two standard containers would be 2 x 2.60 m = 5.20. (To compare: a high cube container has a height of 2.90 m). The height of a 40ft roll-trailer with a capacity of 50 t would be 0.75 m, so that a clearance of only 0.20 m would be left for a double stacked containers. In view of the clearance needed for lifting of the trailer during transport (by means of a goose-neck elevated by a 5th weal) and for the gradient of the shore ramp the margin left appears rather limited. Nevertheless the permissible deck load of 8.7 t/m^2 would principally allow higher loads, so perhaps with a purpose designed low profile system or with some minor modifications the possibility of double stacking containers seems to be not unrealistic.

From this exercise it appears that the final choice of the one of the systems described will probably not only be done by means of the determinants given but also under due consideration of other factors such as the balance of trade east- and westbound and the overall freight rates, transport cost and times for the total transport chain.

It is obvious that the choice is heavily influenced by the marketing system of the railway operator/s and the shipping line/s in general and by the question whether the freight rates for rail transport are purely cost based or whether the shipping line is able to grant preferential rates to the railway operator e. g. on a slot charter basis, which could mean that the freight is not paid by unit but by the cargo space allocated for rail transport, whether used or not.

Nevertheless, one should avoid to limit the flexibility in opting for a particular system or to prescribe any particular alternative. During the field missions options C and D did not exist, which means there was only the choice between A and B. In any case the terminals should be designed for the use of either option.

II) Size and Type of Vessels

The rail capacity of the existing ferries is limited to 28 wagons, which means that for the shipment of one block train two ferries are needed. Apart from the waiting time needed for the second half of the train this is not a problem in particular during periods of low road traffic levels in the night. However, it is obvious that medium size ferries with a capacity of say 1,500 lane meters, that can take e. g. one train on the main deck and trucks and trailers on the first deck) can operate much more cost effective than the existing ferries due to the economies of scale through increased vessel size per slot mile or unit.

As explained under Section 7.10.3 the transport capacity of the existing fleet will meet the expected future demand. Nevertheless, is probably worth to study the following options as **medium to long term perspective** in the interest of a further optimised the sea link service, reduced operating cost and increased productivity having in mind also that in particular cost for manning of the vessels are expected to increase substantially over time:

a) Increasing the wagon slot capacity of the ferries by modifying the rail tracks at the stern from two to four lines as structure and stability allows;
b) Double stacking of containers on deck or roll-trailers and related modifications or strengthening;
c) Installation of new main engines to enable a service speed of 20 kn resulting in a reduction of the round voyage time to 24 hours and in an increase of the transport capacity by about 25 %;
d) Employment of larger combined cargo ferries capable for full trains as possible complement to the existing fleet; possible introduction of a service with fast ferries (HSS = high speed sea service);

e) Employment of low cost rail barges and separation between transport of wagons from trucks and trailers; hiring out surplus of existing fleet not used.

Note to d):

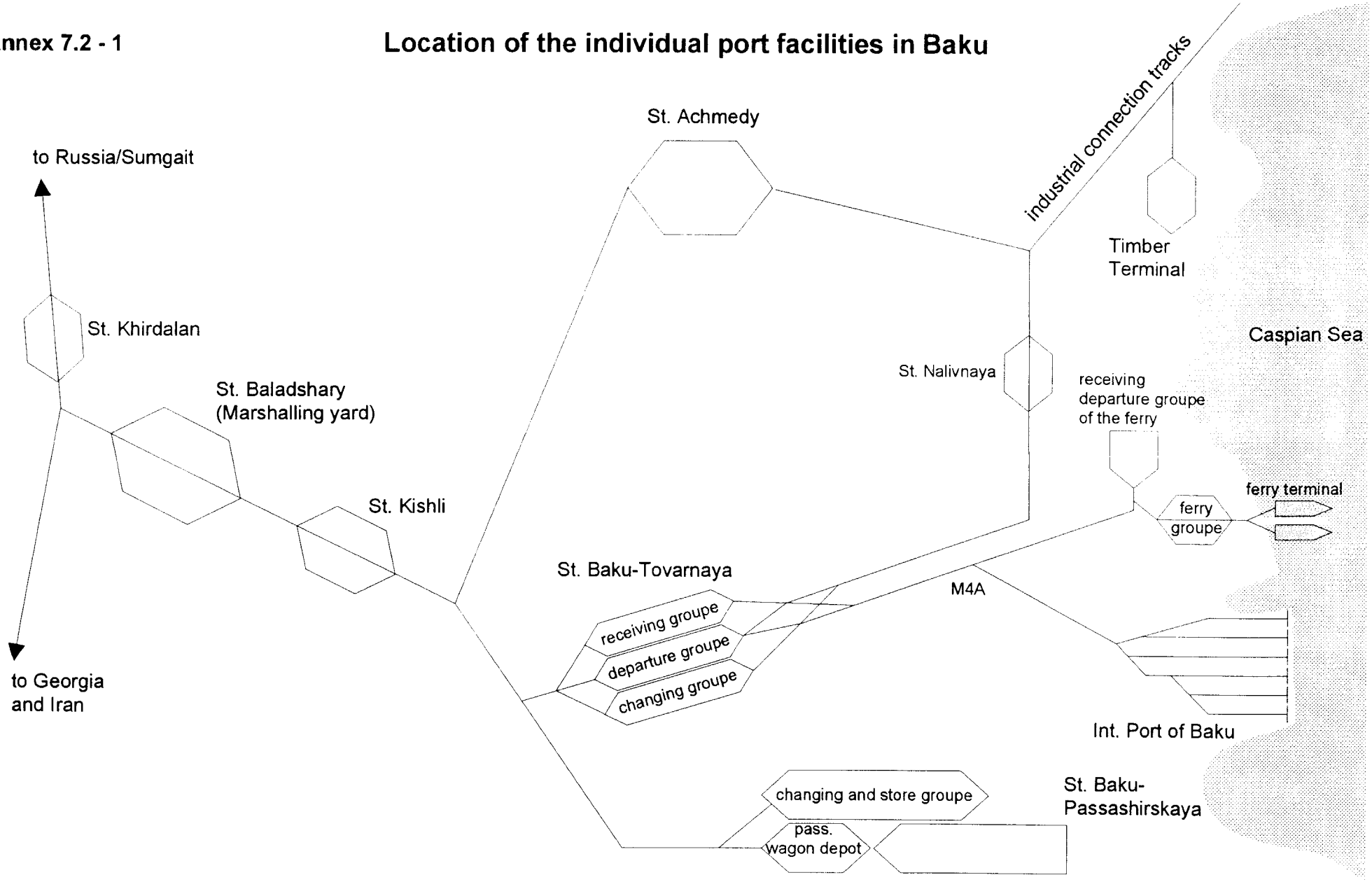
As well known the restrictions with regard to vessel breadth and draft of the Volga-Don Canal impede the employment of vessel larger than the ferries at the Caspian Sea. However, possibly catamaran type ferries could be used or pre-fab new buildings could be constructed and assembled locally - perhaps with the use of the know-how of a foreign shipyard.

Of course, in case of the study of alternatives d) and e) their implications on the terminal configuration would have to be duly considered, although it appears that there are no basic constraints in this respect.

Annexes

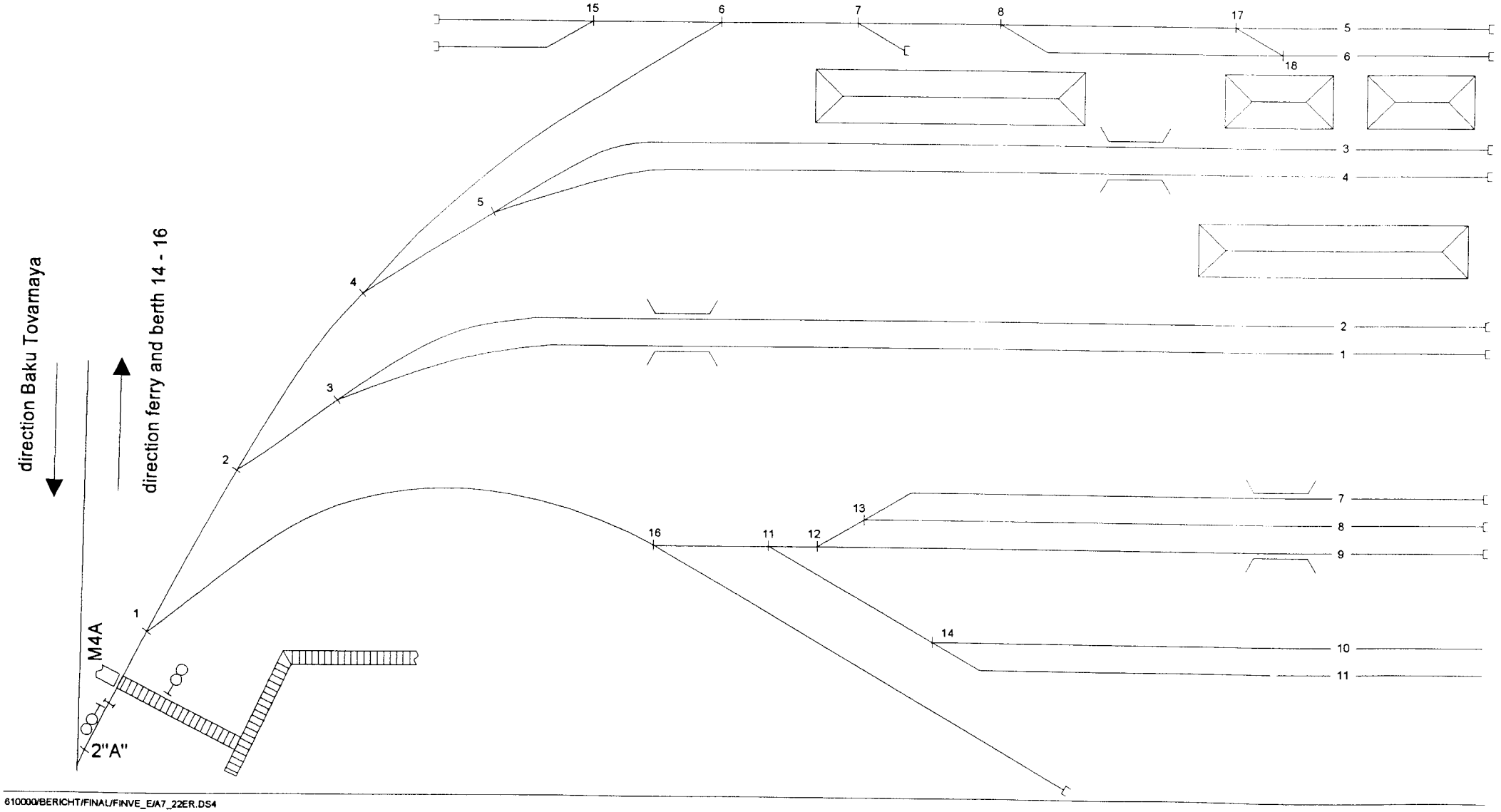
Annex 7.2 - 1

Location of the individual port facilities in Baku



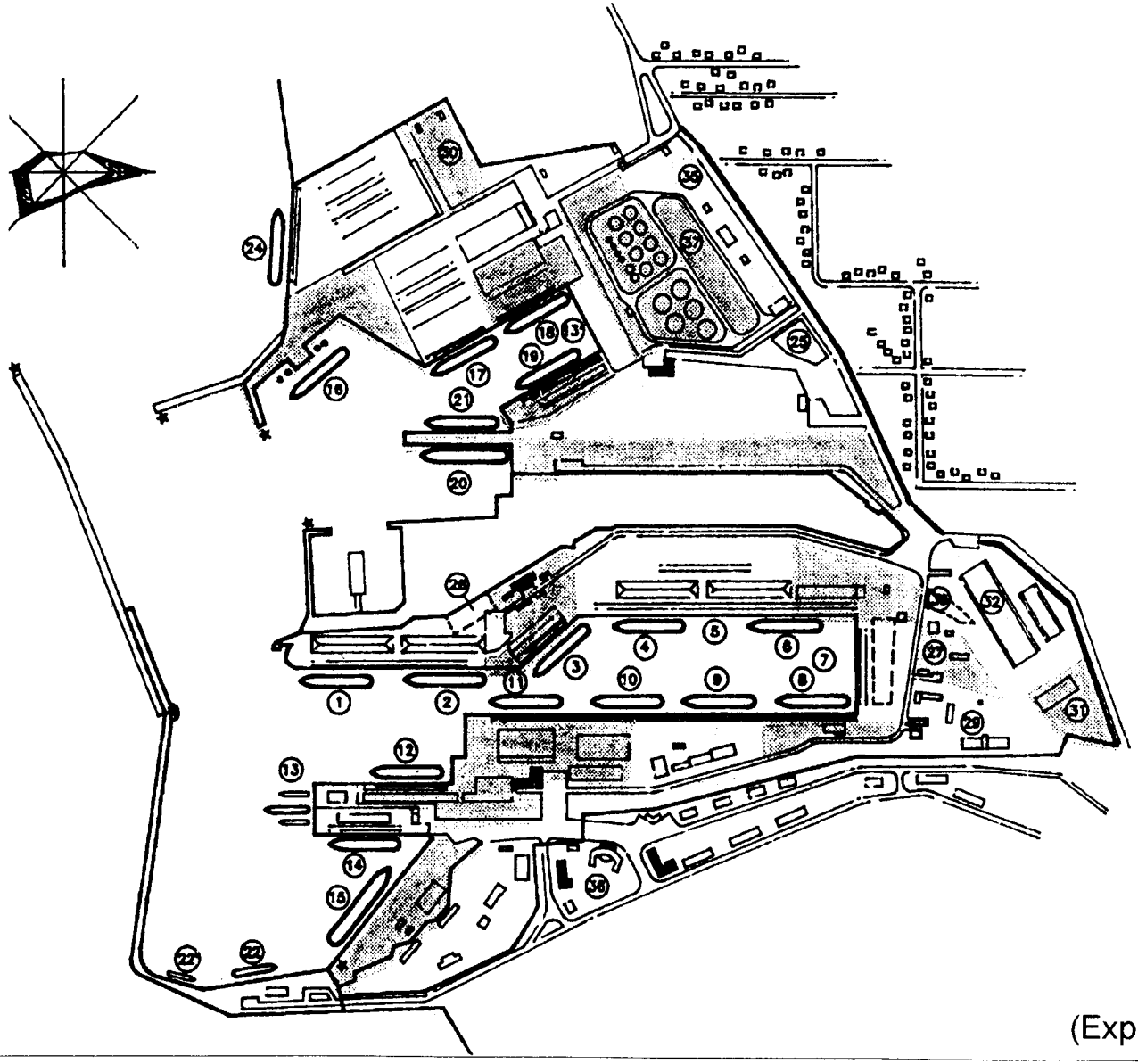
Annex 7.2 - 2

Layoutplan of the tracks in port Baku



Annex 7.4 - 1
page 1

Layout of the Port of Poti



(Explications see next page)

Annex 7.4-1

Explications

1,2	Transshipment complex for ore
3	Transshipment complex for metal and metal wares
4,5	Transshipment complex for coal
6	Transshipment complex for chemical cargo
7	Transshipment complex for drink water and alcohol drinks
8	Transshipment complex for general cargo
9	Transshipment complex for foodstuffs
10,11	Transshipment complex for grain
12	Transshipment complex for containers
13	Port fleet
14	Transshipment complex for perishable goods
15	Transshipment complex for grain
16	Oil-transshipment and bunker complex
17	Transshipment complex for containers
18	Transshipment complex for perishable goods
19	Transshipment complex for cement
20	Railway ferry
21	Motor-car ferry
22	Passenger complex
24	Building base of Administration of objects under construction
25	Facilities (constructions) of inner-port technical water supply
27	Base of small mechanisation
29	Central repair mechanical workshops
30	Purification (cleaning) facilities
31	Warehousing
32	(Consignment) Bonded ware-houses
35	Fire depot
36	Port administration
37	Oil base
39	Substation „Poti-6“

Annex 7.6 - 1

Layout of the Port of Batumi

1 Port Management
2 Passenger Terminal
3 Harbour Master
4 Covered storage areas
5 Store of small equipment
6 Harbour Co-ordinator
7 Open storage areas
8 Workshops
9 Power supply station
10 Harbour administration building
11 Heating station
12 Customs and administration building
13 Cool storage areas
14 Oil handling areas