TURKMEN SEA ADMINISTRATION
TURKMENBASHI, TURKMENISTAN

Renovation of the Ferry Terminal of
Turkmenbashi Port

Prequalification Documents
January 1998

Volume II, Description of Project

LIST OF CONTENTS

1. INTRODUCTION

Turkmenbashi port is the only deep sea port of Turkmenistan and occupies together with Baku Sea port a key strategic position on the transport link across the Caspian Sea which constitutes an important section of the Traceca corridor linking Europe and the Caucasus region with the Central Asian countries.

Constructed in 1960, the ferry terminals in both Baku and Turkmenbashi, serving this sea ferry link, today face various and serious problems that are of major constraint to a proper and smooth use of the terminals. If these problems are not addressed in a proper way in the near future, they may even constitute a threat to the continuation of the ferry service on the sea route linking the two ports.

The main issues of the present concern, when speaking of terminal infrastructure, are related to the following areas:

- poor state of repair of the terminal facilities
- inadequate terminal layout and insufficient facilities
- change of water level of the Caspian Sea

The objective of the present project is to address these problems by renovating the ferry terminal infrastructure at Turkmenbashi port.

The project works are intended financed using local funds and the proceeds of a loan from the European Bank for Reconstruction and Development (EBRD).

Due to the present low level of traffic, the uncertainty in the momentum of the economic growth and traffic increase, the uncertainty in pace of changes in modal split, the present stop in water level increase, and the wish to maximise the financial feasibility it is proposed to implement the Terminal Development Plan in phases according to the pace of growth in terminal activities and possible reactivating of rise in Caspian Sea water level. The present project constitutes the 1st phase of the terminal development.

The information given hereafter is given in good faith but without any responsibility of the Employer. The Bidder shall satisfy himself regarding all conditions that may influence on his bid and no claims from the Contractor due to any error in the site information supplied by the Employer will be accepted.

Due to presently ongoing renovation works in Turkmenbashi port and yet no final agreement on loan arrangements, the works described hereafter may still be subject to changes.

2. DESCRIPTION OF SITE

2.1 Location of Terminal

The sea port of Turkmenbashi is the only major port in Turkmenistan located on the eastern shore of the Caspian Sea at a distance of approximately 550 km from the country's capital Ashgabat. The town has 70,000 inhabitants. The port is linked to the capital by road and railway. From Ashgabat similarly there are road and railway connections to the neighbouring countries of Iran, Uzbekistan and Kazakhstan. On the sea side of Turkmenbashi there are maritime connections to Azerbaijan, Iran and Russia. Through the Volga-Don-system, maritime transport can reach large parts of Western Russia and Eastern Europe.

The port was built as a result of construction of the Central Asian railway at the end of the 19th century. Physically the port is located in a sheltered bay, some 14 nautical miles from the open sea at 40(00' North and 53(01' East. The location of the port can be seen from Dwg. T.01.00.

The waterway entry to the port is through 22 km long dredged channel.

The ferry terminal is located at the eastern end and about 1.5 km from the main port area.

2.2 Natural Conditions

2.2.1 Topography

The ferry terminal is located partly on reclaimed land with a surface level of -25.4 m.

A topographic survey has been carried out as part of the present project.

2.2.2 Bathymetry

As bathymetric surveys are not carried out on a regular basis, there is no exact knowledge about the water depths in channels and at quays. Detailed data are available from 1975, but because of the high degree of siltation in the area, these are not reliable. In 1993 a Ukrainian company carried out some bathymetric surveys in connection with construction of a terminal for agricultural products just east of the ferry terminal. However, these data are not available in the port of Turkmenbashi.

2.2.3 Meteorological Conditions

2.2.3.1 Temperature and Precipitation

The climate of the Turkmenbashi area is characterized by hot, dry and sunny weather in the long summer period and by frost and small quantities of precipitation in the winter period. The region is the most dry in the former Soviet Union with a yearly average precipitation of 116 mm. The average relative humidity is 65%.

The annual air temperature is +15.9°C. The absolute maximum was +44.1°C and the absolute minimum -17.9°C. The average number of frost days is 18 and average number of days with snow is 3.

2.2.3.2 Wind

Wind roses are available, giving probability for wind direction and wind speed interval. The roses show that northerly winds are predominant. Wind rose for Turkmenbashi is attached in Appendix 5. Too strong winds makes navigation at quays and in the channels difficult, and therefore a maximum wind speed of 17 m/s has been set out by the port authority as the limit for navigation. According to the Harbour Master, maritime traffic is interrupted during an average of 5 days per months due to too strong winds.

2.2.3.3 Visibility

Only ten days with fog are observed per year. In addition to this, haze and dusty storms can occur.

2.2.4 Hydraulic Conditions

2.2.4.1 Waves

Due to the sheltered location of the port of Turkmenbashi, wave heights are very limited. The fetch is a few km for northern winds and 20 km for western winds. It is very unusual to observe wave heights of more than 0.5 m in the bay.

2.2.4.2 Currents

Currents in the Bay of Krasnovodsk are characterized by the eastern drift. In general, the direction of the current is equal to the direction of the wind. Maximum speed of current is not more than 0.5 m/s according to natural measurements.

At the entrance to the northern channel in the opening in the Krasnovodsk split, the current can be very strong.

2.2.4.3 Tide

Tides in the Caspian Sea are negligible.

2.2.4.4 Salinity

The average annual salinity in the Caspian Sea is 1.27 %. The maximum salinity is 1.45 % and the minimum is 1.11 %.

2.2.4.5 Ice

Ice can occur in strong winters. The average duration of ice periods in strong winters is 24 days and the average thickness of the ice is 3-10 cm.

2.2.5 Soil Conditions

The region of Turkmenbashi Ferry Terminal is formed by clastic sediments of sand, big rock fragments, silt and loamy soils underlayered by clay. The area of the Ferry Terminal has been created by reclamation of sand brought in from the Krasnovodsk Spit.

In 1961 a geological/geotechnical study was performed to investigate the bearing capacity of the sand and silt within the reclaimed territory.

According to grading, the reclamation sand is fine. Investigation of recovered samples of the sand showed that its mean porosity coefficient is 0,63 in average. In correspondence with СНиП II-15-74 (СНиП 2.02.01-83) the reclaimed sand is of mean density.

Reclaimed sand from the Krasnovodsk Spit is expected to cover the Terminal area in a thickness of 0 - 12 m. The upper boundary of the lower clay layer is generally expected at level -30 to -40.

The old geological/geotechnical survey insufficiently characterise the foundation conditions for each building and structure. Therefor, a new survey covering each building and structure shall be carried out by the Contractor.

2.2.6 Seismic Conditions

Turkmenbashi is situated in a seismically active area. According to the Soviet Standards, the seismic force in Turkmenbashi is 9 (correspondingly to the Modified Mercalli Scale).

2.3 Navigational Aspects/Approach to Turkmenbashi

2.3.1 General

There are two access routes from the open sea to the port of Turkmenbashi. A northern route (length 22 km) going through the opening in the Cheliken peninsula and a southern route (length 35 km) going south of the peninsula. The northern route is normally used by vessels heading for or arriving from Baku or Russia, while traffic to and from Iran uses the southern route. For the ferry link to Baku, the northern route is 24 nautical miles shorter than the southern route.

In the beginning of the 1970's the northern route was dredged to 7 meters water depth. The width of the channel is 140 m.

Naval charts from 1979 and 1980 are available, showing the navigational approach to Turkmenbashi.

Use of pilot is compulsory in the port and access channels of Turkmenbashi. However, the ferries servicing the Baku-Turkmenbashi line are often exempted from the use of pilot.

2.3.2 Sedimentation and Dredging

According to records of the Caspmorput, who has been carrying out the dredging works in Turkmenbashi, important siltation that takes place in the approaches to Turkmenbashi port.

The dredging records also confirm that dredging works carried out in the approaches to Turkmenbashi port since the break-up of the Soviet Union have been "urgency" measures at a level much lower than what should be done in order to maintain the depths of the approaches properly. The result is that today the water depth is much smaller than 7 m.

A particular problem has been mentioned concerning the northern ferry berth which should be suffering from inflow of sediments and materials from the reclamation just north of the terminal.

2.4 Railway Facilities and Access

The railway terminal is situated not far from the railway yard of Turkmenbashi main station. The terminal itself consists of a shunting yard, access tracks and ferry connection tracks, and it is connected to the railway system via two connection tracks as shown on the Turkmenbashi Terminal layout dwg. T.01.00.

Removal of the main goods station of Turkmenbashi to the present site of the ferry terminal in planned and works have started but remain non completed for some years.

The terminal is connected via one track to the track area of the port and via another track to the station yard.

Presently the shunting yard consists of 6 parallel tracks with a switch area in each end. The connection to the ferry access tracks is established from one of the parallel tracks (track 5). Track 1 to 4 have the length of about 500 m. Track 6 of 215 m has a blind end. The lay out of the yard is not very well suited for the sorting of wagons for the ferry as it gives several crossing shunting movements and has a considerably reduced capacity. The already constructed part of the removed shunting yard is also used as a supplement of the ferry terminal yard.

The access tracks are used for parking of wagons waiting for shunting on board the ferry and for temporary parking of wagons from the ferry.

The access tracks are grouped with 4 tracks for each of the two ferry berths. Two of these four tracks are used for wagons to the ferry and the other two for wagons from the ferry. The length of the tracks is about 225 m to 228 m giving a capacity of 15 - 18 wagons corresponding to the capacity of 2 ferry tracks.

Light signals are installed for control of train movements to and from the access tracks. All switches are manually operated and train movements are controlled by radio equipment.

2.5 Road Access

A 2-3 km long asphalt road leads to the ferry terminal from east from the main road between Ashgabat and Turkmenbashi. The access road is generally in a good condition, except for some holes that need repair close to the ferry terminal. The access road is crossing both the port railway and the main railway line. The width of the road is 6 to 8 meters. In connection with the railway crossings, there are sharp bends. Most of the access road is located in level - 25 m, which means only about 2 metres above the current sea level.

2.6 Auxiliary Facilities and Utilities

2.6.1 Heating Supply, Heating and Ventilation

The existing source for heating for the ferry terminal is the local boiler house located at the territory of the ferry terminal. The boiler house is presently being moved to another location next to the sea station. Future capacity will be sufficient for the consumers located inside the ferry terminal area.

Heating systems and ventilation in the existing passenger building/sea station and customs building are in working condition. All heating is by means of hot water radiators. Heating pipelines are temporarily located overground between the boiler house and the passenger and customs buildings.

2.6.2 Electrical Installations

The main source of power supply in the ferry terminal is the 35/6/0.4 kV substation named "Paromnaya". The high voltage side of the substation is supplied from the city network which passes at a distance of 150 m from the substation.

The consumer supply side is 380/220 V and the frequency is 50 Hz.

The condition of the substation is bad and a new substation is under construction next to the sea station.

The outside lighting in the ferry terminal is in a poor condition. The internal telephone communication between divisions of the ferry terminal is good. The outside telephone lines are in a poor condition and therefore communication inside Turkmenistan and internationally is almost impossible.

2.6.3 Water Supply

In the existing facilities, there is a water supply system of steel water pipelines with diameters of 50 mm and 100 mm. However, the system is not in a working condition and water is currently brought by tank trucks.

The water supply system shall be renewed.

2.6.4 Sewerage

No proper sewerage system is existing in the ferry terminal. The newly repaired passenger and administration building is equipped with sewerage installations connected to a septic tank/or wells.

Sewerage and garbage is removed by trucks.

3. DESCRIPTION OF WORKS

3.1 General

With reference to dwg. no. T.01.03, the works and items subject of the present project are in brief the following:

- Terminal land works, comprising
  - demolition of buildings and structural works
  - filling and levelling of land part of terminal area (44,000 m^3)
  - execution of outside utilities networks for heating, power and water supply, sewerage, drainage, etc.
  - execution of internal roads and parking areas (34,000 m^2) , including fencing and outdoor lighting
  - repair of the connection to the existing access road to Ferry Terminal (4,000 m^2)
- Marine works, comprising
  - dredging for embankment/reclamation area (20,000 m^3)
  - filling and levelling of reclaimed terminal area (72,000 m^3)
  - coastal protection/embankment works (~400 m)
  - partly demolition and reconstruction of the finger pier, central pier and lifting tower foundation (6) of one ferry berth
  - demolition and reconstruction of access bridge to central pier (80 m)
- Ferry ramp works, comprising
  - dismantling of ferry ramp structures (3 link spans of 130 tons each) and lifting towers (6), including counterweights and machinery
  - cleaning, inspection and verification of dismantled structures and machinery
  - repair works on ramp structures with replacement of rails and deck and partly of structural parts due to deterioration
  - renewal of complete surface protection of all steel structures
  - disassembling and testing of ferry ramp structures and lifting towers, including new counterweights and machinery
  - new lifting tower building structures
  - new control system for operation of ramps, including electronic installations.
- Railway works, comprising
  - provision and installation of new P-65 rails on the ferry ramps (350 m)
  - repair of the existing road/rail crossing at the access road and construction of new crossing at container road
  - execution of inspection walkway alongside rail yard track (900 m)
- Land building/structural works comprising
  - New Ticketing Building, including shed (64 m^2 + 270 m^2)
  - New Border Control Building, including sheds (340 m^2 + 2 x 400 m^2)

- New Public Service Building (124 m^2)
- Modification/extension to Sea Station
- New Substation
- New Passenger Bridge/Sky Walk between the Passenger Terminal and the central pier (75 + 100 m)

3.2 Terminal Land Area Arrangement

3.2.1 Layout, Arrangement

The chosen layout of the renovated terminal is shown on Dwg. no. T.01.03. According to this layout the terminal will comprise the following new/renovated areas:

- Arrival and Ticketing area
- Holding area for dangerous cargo
- Border control area (customs, police)
- Marshalling area
- Interface traffic area in front of ferry berths
- Vehicle disembarkation area

All these areas will be paved by asphalt on a gravel bed and supplied with drainage system and flood lighting. Traffic lanes will be separated by painted lines and low movable fences where found necessary. The customs area will be fenced off.

Access by road and rail will be through the existing infrastructure, but the existing internal road between the ferry terminal and the main port shall be upgraded (through separate project) and a dedicated container/administration additional road link will be constructed.

The following new buildings/structures will be present on the terminal area:

- Vehicle Ticketing Building (new)
- Border Control Building (new)
- Public Service Building (new)
- Passenger and Administration Building (existing)
- Passenger Bridge/Sky Walk (new)
- Railway Control Post (existing)

These buildings are further described in the following sections.

3.2.2 Demolition and Filling Works

To accommodate the layout of the renovated Terminal various existing building works and structures not fitting into the new layout shall be demolished and the demolished material shall be removed from the site.

The demolition works will have to be planned in accordance with the construction of the replacement building works and structures foreseen e. g. the substation.

Following the demolition works the level of the area shall partly be raised to levels as shown in dwgs (average approximately -23.5). Fill material for levelling may be taken either from approved quarry (approx. 11 km from Turkmenbashi) or from the sea side.

3.2.3 Road and Parkings

All new traffic areas and roads are proposed to be constructed in the same way consisting of a three layer base (sand, gravel, crushed stone) on top of which a two layer asphalt wearing course is placed. Where new paved areas are constructed in connection with old ones (e. g. access road), a new asphalt wearing course shall be applied to the old road providing a uniform and levelled surface of the completed road.

Roads and parkings shall be provided with kerbstones, sidewalks, drainage, fencing and lighting. Further, traffic lane markings and road signs shall be provided.

3.2.4 Lighting, Power Supply and Electric Installations

Floodlighting masts, 18 m high each, with glow lamps in the floodlights, shall light the terminal area. Lighting of lanes, footpaths shall be arranged by fittings with ДРЛ type mercury vapour lamps, installed with a help of bracket on steel supports. Outside lighting and power supply net of the buildings and structures is executed from cable conduits 0.7 m under ground. Telephone and radio net is also made of cables.

3.2.5 Drainage, Water and Sewerage

There shall be a drainage system to drain rain waters from the terminal area. The system shall be provided with oil separator before the water is let through outlets into the sea.

On the terminal area, water supply pipelines shall be constructed to provide the buildings and the structures with drinking water. There is also a water pipeline, designed for provision with watering of plantation and washing of pavements. The designed water pipeline is to be connected to the existing water supply pipeline in the terminal.

The water supply pipelines shall be made from steel and they shall be laid at a depth of 1.0-1.2 m under ground.

The area will be provided with fire hydrants.

From the planned buildings the sewage flows to the sewage collecting tank through pipes made from asbestos-cement. From the collecting tank the sewage shall be taken by road tanker to the city sewage system.

3.2.6 Heating Installations

The heat source is hot water, coming from the new local boiler house, located next to the sea station.

The heating net is laid from the boiler house under ground. The pipelines are laid in covered RC ducts.

The pipelines shall be welded steel pipes and shall be heat insulated.

3.3 Marine Works

3.3.1 Layout, Arrangement

Project components are summarised as follows:

. Land base for ferry ramps
. Access bridge
. Lifting towers (first row from land side)
. Lifting towers (second row from land side)
. Lifting towers (third row from land side) and stop fenders
. Lifting towers (third row from land side) and base of central pier
. Finger piers
. Central pier
. Head of central pier
. Coastal embankment/land reclamation

3.3.2 Land Base for Ferry Ramps

To serve future needs of ramp motion with water levels varying between level -25 m and level - 30 m, the land base must be raised; but to reduce costs and taking into consideration the present water level it is decided to maintain existing ramp deck level at land base in the first phase. This entails rehabilitation of bearings and buffers. Minor concrete repair works shall also be executed.

3.3.3 Access Bridge

Existing substructure consist of reinforced concrete piles 350 x 350 mm in lengths of 12 - 14 m. Existing superstructure is a reinforced concrete slab, 6300 mm wide.

Existing access bridge shall be completely demolished.

A new steel access bridge shall be constructed. The bridge consists of 3 equal spans of 26 m U-shaped sections. Bridge supports are established as follows:

- Land base with steel sheet piles, concrete piles and a reinforced concrete superstructure
- 2 support reinforced concrete beams between bases of lifting towers
- Demolishing and concreting for a support in the rear side of pier base

Deck level varies from pier level in - 23.07 m to the existing level in -25.39 m. The result will be an inclination in the first span of about 0.082, which is considered acceptable.

Free height will be limited to 3.5 m by the existing control building on pier base exactly as it is limited today.

The passenger access bridge/sky walk is envisaged executed as a steel bridge at a higher level above access bridge using the same supports and with the same free spans. When crossing existing control building at the pier base it is planned to demolish parts of the top of this building to let the passenger bridge pass. For this purpose no installations should be placed in the mid section of existing control building.

3.3.4 Lifting Towers

A rectangular box (10.6 m x 5.6 m) of steel sheet piles forms the substructure in the first and second row. The concrete front towards ramp side is drawn back from steel pile front, and steel piles are cut at low level to allow ramp movements.

An irregular but almost rectangular box (14.5 m x 11.85 - 15.50 m) of steel sheet piles forms the substructure at the base of finger piers. At the same time the structure forms the first part of the finger pier.

An irregular box (15.4 m x 13.0 - 18.0 m) of steel sheet piles forms the substructure at the base of the central pier. At the same time the structure forms the first part of the central pier. Besides the building for the electrical system and control system is situated on the structure.

The inside of tower foundations are filled up with mass concrete, which is formed to create support for the steel structures, stop fenders, guiding fenders and pits for counterweights. The steel superstructures are towers for carrying the lifting mechanism and the counterweights.

To serve future needs of ramp motion with water levels varying between level -25 m and level - 30 m, lifting towers must be raised.

Steel structures in existing towers shall be rehabilitated and reused. Tower foundations are raised by concreting.

Pits are designed to give the necessary space for motion of counterweights. The pits shall be rehabilitated and made watertight as follows:

- Existing counterweights are taken up
- Pits are pumped dry, cleaned and sandblasted
- A steel tank lining are installed to secure watertightness
- The volume between existing pit surface and lining are concreted
- Raising of substructures by concreting to level shown i table

New circular counterweights are constructed, eventually reusing some of the heavy steel from existing counterweights. Lay out design of counterweights include a well (manhole) for maintenance access to pits. Existing steel sheet piles are protected by sacrificial anodes.

3.3.5 Finger Piers

Existing substructure consist of reinforced concrete piles 350 x 350 mm with toe levels varying from - 15.0 to - 16.3 m. Existing superstructure is a reinforced concrete slab 6200 mm wide and about 28 m´s in length. A front wall of precast concrete units supports the guiding fenders. On top of the slab sand is filled in to top level of the pier. The finger pier is equipped with wooden guiding fenders supported by driven wooden piles. On the pier a lighting tower is placed.

Existing finger piers shall be totally demolished from pier end to base at lifting towers.

New shorter fingerpiers are established consisting of:

- Steel pipe piles foundation protected by sacrificial anodes
- A reinforced concrete superstructure anchored to existing tower support substructure
- Fenders

3.3.6 Central Pier

Existing substructure consist of reinforced concrete piles 400 x 400 mm with toe levels varying from - 16.5 to - 17.5 m. Existing superstructure is a reinforced concrete slab 12 m wide and 139.1 m´s in length including pier head. A front wall of precast concrete units supports the guiding fenders. On top of the slab sand is filled in to top level of the pier. The pier is equipped with wooden guiding fenders supported by driven wooden piles. On the pier a ligthing tower is placed close to the pier head.

3.3.7 Demolition

Existing structures to be demolished are:

- All existing fenders and pile supports for fenders
- Front walls of precast concrete units
- Pavement
- All structures above concrete slab
- Taking up scrap material, broken piles etc. from the bottom

Existing slab and concrete piles support shall be a part of the rehabilitated structure to serve as relieving platform.

3.3.8 New Structures

The new pier structure is carried out as follows:

- Driving of a new steel sheet pile wall. The wall must be slightly inclined to avoid interference with existing concrete piles.
- Mutual anchoring of the walls on both sides the pier by anchors in every double pile.

- Sand are filled in between the walls up to slab level. It might be necessary to make interim holes in the slab to completely fill up the volume below the slab.
- Concreting of bollards- and fender supports.
- Filling in sand on top of slab.
- Installing of water outlets, water pipes, cables etc.
- Pavement

3.3.9 Quay Equipment

Fenders are designed to cover all levels of fender list belting of the ships ranging from the highest ship deck level at waterlevel - 25 m to lowest ship deck level at waterlevel - 30 m. New fenders are the pivot type to avoid fender panels to tilt into ships hull. Fenders are constructed with a closed box design for the panel minimizing the exposed surface area to be protected from corrosion. Corrosion protection will be a combination of painted surface and sacrificial anodes. Steel panel facing is designed to be a 60 mm UHMWPE (ultrahigh molecular weight polyethylene) plate covering the total front from level -20.00 m to -27.50 m.

Pivot support is a driven steel pipe pile and top fastening and energy absorption is created by two rubber fender elements of types as "Trellex MV". Rubber fender elements can be installed in three different positions depending of actual waterlevel.

Additional equipment to be installed are:

- Bollards per 30 m
- Sacrificial anodes on sheet piles
- Safety ladders
- Light
- Water supply
- Water outlets

3.3.10 Head of Central Pier, Dolphin

A rectangular box (7 x 12 m) of steel sheet piles filled with sand forms the existing substructure. A reinforced concrete quay wall is constructed on top of the sheet piles.

This existing pierhead shall be totally demolished. The new dolphin forming the pierhead is positioned about 20 m far out than the original to create better berthing and mooring conditions for the ferries which are longer than existing pier.

A TT-shaped prestressed reinforced concrete beam makes the acces to the dolphin.

The dolphin consists of:

- A circular substructure of driven straight-web steel sheet piles filled up by sand
- A reinforced concrete superstructure as a sand filled box
- Fender supports
- Bollards
- Fenders

3.3.11 Coastal Embankment/Land Reclamation

To create additional land areas for the renovated ferry terminal the sea area west to the existing ferry terminal shall be reclaimed to reach an upper surface level of approximately -23,70 m.

The works shall comprise

- Removal of existing coastal protection and debris in the area
- Dredging of layer of soft soil deposits, if actual
- Filling, levelling and compaction of fill

The horizontal dimension of the reclaimed area will be approx. 0,6 ha.

The reclamation shall be done using proper sand fill (possibly from sea), properly compacted to allow direct foundation of buildings works and roads.

The reclaimed area shall be protected from the sea side by a properly designed and constructed coastal protection. The crest level of the embankment shall be -23.00 in BSL and it shall be extended also to cover the existing embankment protecting the existing reclamation. The embankment shall be made from core of gravel with cover layers of armour stones.

3.4 Ramp Structures

It is the objective of the project to reuse as much as possible of the original structure of the access ramps and the operating machinery, which for many years of service have proven records of reliable operation. Changes may be necessitated by deterioration, damages and accommodation to the future requirements for the operation of the terminals. Therefore the works start with the dismantling of the whole ramp structure incl. lifting tower for a detailed inspection on land, which may reveal weak points in the structures.

3.4.1 Elevating of Ferry Access Ramps

The existing ferry access ramps shall be relocated to adjust to the future water level variations.

The machinery shall be modified so as to allow for all three spans of the ramp to be positioned with a slope of maximum 4.6 % in upward as well as downward direction.

In the foreseeable future a maximum slope of 3.8% in both directions should be sufficient for the ferry terminal operation rendering a maximum allowable difference in ships position of 6.6 meters.

3.4.2 Structures of Ferry Access Ramps

The Wooden deck of the ramp spans shall be replaced with a deck of Ekki or Azobé timber.

The strength of the Azobe wood is such that the span between the supports of the timber may be maintained as it is on the existing structures, and yet the deck will be able to resist the design load from vehicles.

The steel structures of the ramp spans shall not be changed unless proven unable to resist the design loads agreed upon or unless they have been damaged or deteriorated decision shall be taken in agreement with Employer following the detailed inspection, testing and verification by the Contractor.

Since the rail switches on the seaward span of the ramps are not used (as the ferries have only two connecting rail tracks) the switches shall be omitted and only two straight tracks be provided. The existing rail, type P43, shall be replaced by rail type P65.

3.4.3 Machinery for the Ferry Access Ramps

3.4.3.1 Existing Machinery

In principle the existing machinery may be used with the following modifications:

- The lifting towers are raised to an elevation corresponding to the new elevation of the ferry ramps.
- The spindles and the counterweight wires for machinery in rows 1 and 2 are replaced with longer ones allowing for the increased slope of the spans.
- Wires for the lifting machinery and counterweights at row 3 are replaced with longer ones for the added travel length of the span.
- Counterweight mass shall be increased in accordance with the increased mass of the wooden decks.

Other modifications are not foreseen unless the towers or machinery are proven unable to resist the design loads as agreed upon or unless they have been damaged or deteriorated.

3.4.3.2 Alternative: Hydraulic Machinery

It is possible to remove the lifting towers at rows 1 and 2 and replace the towers with steel columns for suspension of oil hydraulic cylinders for operation of the ramp spans no. 1 and 2.

Using hydraulic cylinders for the operation will make the use of counterweights unnecessary, and the counterweight pits may be filled with concrete.

In order to carry the live load, the spans shall be equipped with hydraulically operated sliding bolts or similar locking devices.

The machinery at row 3, however, can not in a simple way be operated by hydraulic machinery as the counterweights are necessary to reduce the weight of the third span at the ferry support and as the stroke length of the cylinders would be too long.

3.4.4 Electrical Installations

3.4.4.1 General

The electrical installations on the ferry ramps and piers are of old construction and worn-out.

Generally, all the electrical installations (cable trays, cables, limit switches, motors, switchboards, control boards, lighting fixtures, etc.) shall be changed. The following chapters describe in outline the work to be done in the different areas.

It shall be emphasised that during the whole construction period shall the Contractor organise the electrical work in a way making it possible to operate the left ramp system when right ramp system is renovated and vice versa.

3.4.4.2 Power Supply to the Ramp System

For the time being, the whole ramp system is supplied from 3 (3x150 + 1x70 Cu cables. These cables shall be used in the future for supply of the new installations.

3.4.4.3 The Ramp Control Building

From this building the ferry ramps are controlled.

All the electrical installations in this building shall be changed. The Contractor shall organise the work in the building in a way making it possible to operate one ramp side during the renovation.

After renovation, electrical heating in the managing centre shall be delivered and installed.

3.4.4.4 Lifting Tower Buildings

All the existing electrical installations in these 6 buildings shall be totally replaced. After the building and the machinery has been repaired and renovated, the new electrical equipment can be installed.

3.4.4.5 Outdoor Lighting Installation

The outdoor installations on the piers and the buildings shall be total new installations.

New masts (2 nos.) shall be furnished, each 21 m high.

3.4.5 Ramp Control System

The existing way to move the ramps with electrical motors, gears and counterweights shall be retained but the total electrical installations and materials (motors, limit switches, control boards, cables, breaks, etc.) shall be changed to new materials and new technology. Further, the motor control shall be changed from slip ring AC motors to frequency controlled AC motors.

The existing control system is based on relay systems. The new control system shall be based on a PLC system and relay system.

The control system shall not be based on a 2 wire loop system but hard wired from the lifting towers to the PLC placed in the main switchboard.

The emergency operation system (electrically) in each lifting tower shall be designed independently of the PLC system. These systems shall be hard wired and it shall be possible to run the systems locally with the PLC out of order, but in a safe way.

In each lifting tower and in each of the control panels emergency stop systems shall be installed.

3.5 Railway Works

No major railway works are to be carried out in the first phase of the project. Inside the railway yard itself, only a walkway alongside the inspection track shall be constructed. The inspection walkway, 1.0 m wide, shall be paved with asphalt as a footpath. Otherwise, only minor changes in connection with replacement of rails on ferry ramps and repair of road/rail crossing at the access road and installation of new crossing at the container road shall be executed.

3.6 Building Works

3.6.1 Architectural Layout.

Border Control Building is one-storey building which should be shared by the custom-house, water police and frontier-guards. The building dimensions are 12,4m x 27,4, the height is 3 m from the floor level up to the ceiling.

External doors are plastic coated aluminium. There are veneered wood doors in the office rooms.

The floor of the office rooms is parquet. The floor of toilets is covered with ceramic tiles. The floors in halls, corridors, rooms for customs examination are covered with marble plates.

The ceilings are suspended.

The walls in the office rooms are oil painted, walls of sanitary rooms are faced with tiles.

The facades are plastered with high-quality decorative plaster and painted.

Public Service Building is one-storey building, with dimensions 10x12.4 m and with a height of 3.0 m. The building is located at the marshalling area for vehicles. The structure is divided in two parts:

- kiosks, telephones, buffet
- toilets for men and ladies

The buffet floors are of marble, in the toilets they are made from ceramic tiles.

Walls in the buffet shall be painted with oil paint, in the toilets walls are to be covered with ceramic tiles.

The inside walls are wooden, covered with veneer.

Outside facades of the building are plastered with high-quality decorative plaster and painted.

Ticketing Building is one-storey with rooms for work, rest, kitchen and toilet. The rooms have a height of 2.70 m.

Floors in the rooms and in the corridors are parquet. In the toilets they are covered with ceramic tiles and with linoleum in the kitchen.

Ceilings are painted with water-emulsion paint.

Outside windows and doors are of PIMAPEN type, the inside doors are wooden and veneered.

Walls shall be painted with oil paint. In the toilets walls are to be covered with ceramic tiles.

Facades are plastered with high-quality decorative plaster and painted.

3.6.2 Structural Design

In general applies:

The walls are made of blocks with the thickness of 40cm.The walls are plastered and painted from inside. The overhead covers are pre-fabricated RC hollow panels with the length of 5,86 m, supported by the longitudinal walls 1, 2, 3. The roof water insulation is 3 layer fibreglass felt for heat insulation, blinding, etc.

Direct foundation is utilised constructed as strip monolithic beams of RC on strip slabs. Moisture preventive actions are prescribed. The floors of the ducts are pre-fabricated RC plates.

The sheds covering the traffic lanes have dimensions 22.3x18 m, height 5.5 m.

Direct foundation with strip monolithic beams of RC on strip slabs.

The bearing steel columns are stel pipes.

The roof structure is a pre-fabricated steel structure, covered with galvanised steel plates.

3.6.3 Electric Installation

In general applies:

Lighting of the building consists of fluorescent lamps, built-in the suspended ceiling.

Telephone and radio network and fire alarm system are installed in all rooms.

Fluorescent lamps, telephone and radio network is installed in the cabins in the sheds areas.

If installed, traffic lane barriers shall be electrically operated from cabins.

At the underside of the shed covers high durable fluorescent lighting fixtures are mounted.

The islands between the traffic lanes under sheds shall have identification lights to provide safe driving for vehicles.

3.6.4 Water, Sewerage

In general applies:

Water-supply network is made of galvanised steel pipes.

Sewage network is made of cast iron pipes.

Sewage network is placed under the floor in ducts. Pipe works above floors are visible.

3.6.5 Heating and Ventilation

In general applies:

There shall be a two pipe water heating system with lower separation. The pipelines shall be laid in the floor ducts canal.

Ventilation is mechanical. Air conditioning is installed. "ROOFTOP Heat Pump" type conditioner is to be installed on the roof.

3.7 Modification to Sea Station

3.7.1 Architectural Layout

The following description refers to dwg. T.05.01. The existing Sea Station Building in Turkmenbashi has recently undergone total repair. However, to arrange the necessary facilities for customs and police check of passengers after the new passenger bridge has been introduced, a modification and extension of the building is proposed.

The existing yard is proposed to be covered with glass elements. On the ground floor of the covered yard, the following additional facilities will be constructed:

- ticketing office
- customs and police check area
- hall for arriving passengers
- offices for police and customs

On the first floor there will be connection to the new passenger bridge.

For a convenient operation of the existing Sea Station, staircases and balconies, connected with a passenger bridge, shall be added.

Window frames and doors of aluminium. Floors in halls and checking area will be of marble. In the offices, the floor will be parquet. Inside walls and columns in the halls will be covered by fire-proof materials and in the offices, walls will be covered by paint and wallpaper.

3.7.2 Structural Design

Staircase elements are pre-fabricated RC steps and steel substructure.

The balconies are made of U-profile steel beams and a light floor.

3.8 Passenger Bridges

3.8.1 Structural Design

The basic carrying structures are steel space frames and RC columns.

Roof of the bridge is galvanised steel plates.

Floor of the bridge is steel plates covered with asphalt.

Direct foundations on in situ cast slabs is utilized.

Sides of the structure are made of steel nets with small mesh.

3.8.2 Lighting, Electric Installations

The lighting is carried out by lighting fittings with glow lamps, installed on the ceiling each 10 m along the whole passenger bridge.

4. DESIGN STANDARDS AND CODES OF PRACTICE

Constructed during the period of the former Soviet Union, the existing terminal infrastructure in Turkmenbashi port has been designed and built according to Soviet standards and codes of practice

After the break-up of the Soviet Union, the same norms and standards are still used. Despite their wide application these standards and codes are not readily available from ordinary sources in Azerbaijan and Turkmenistan but have to be procured through relevant design institutions and/or from Russia (Moscow). Also they are not available in English translation.

The designs/verifications shall be carried out applying what is considered the most appropriate under the present circumstances. This means that with the exception of the marine works, the designs of other works shall be carried out applying Soviet standards and codes of practice. The marine works may be designed according to relevant international norms, like Eurocodes, etc.

The above described principles have formed the basis for the elaboration of the contract drawings and specifications included in the tender documents. The verification of the project and the preparation of the execution project (calculations, drawings and specifications) which shall be done by the Contractor when he takes over the responsibility of the whole project, shall follow the same principles.

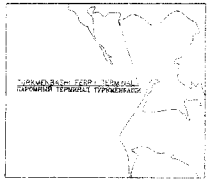
5. PLANNING OF WORKS

It is envisaged that the construction works shall be completed within 20 months from award of contract.

A schematic and general time schedule will be presented in the Tender Documents.

The detailed execution time schedule shall be prepared by the Contractor respecting the completion dates indicated in the General Time Schedule and allow the identification of all major operations of significance for the execution of the works under this contract (execution documents, ordering, provisioning, preparation, execution, testing, approbation, completion, etc.).

In the present project it is of particular importance that the planning takes into account that the ferry terminal shall be kept operational during the whole of the construction period. This shall be obtained by phasing the works, renovating only one berth and ramp at the time. The critical paths of this planning, assumed to be the finishing of substitution works for works to be demolished and the completion of the renovation of the first ramp before the work on the second one can be started, shall be clearly indicated including reasonable margin of security. Also the road and rail traffic through the construction site and border control operations during the period of construction shall be planned in detail and necessary traffic regulation measures be taken by the Contractor before the different phases of the construction works can begin.

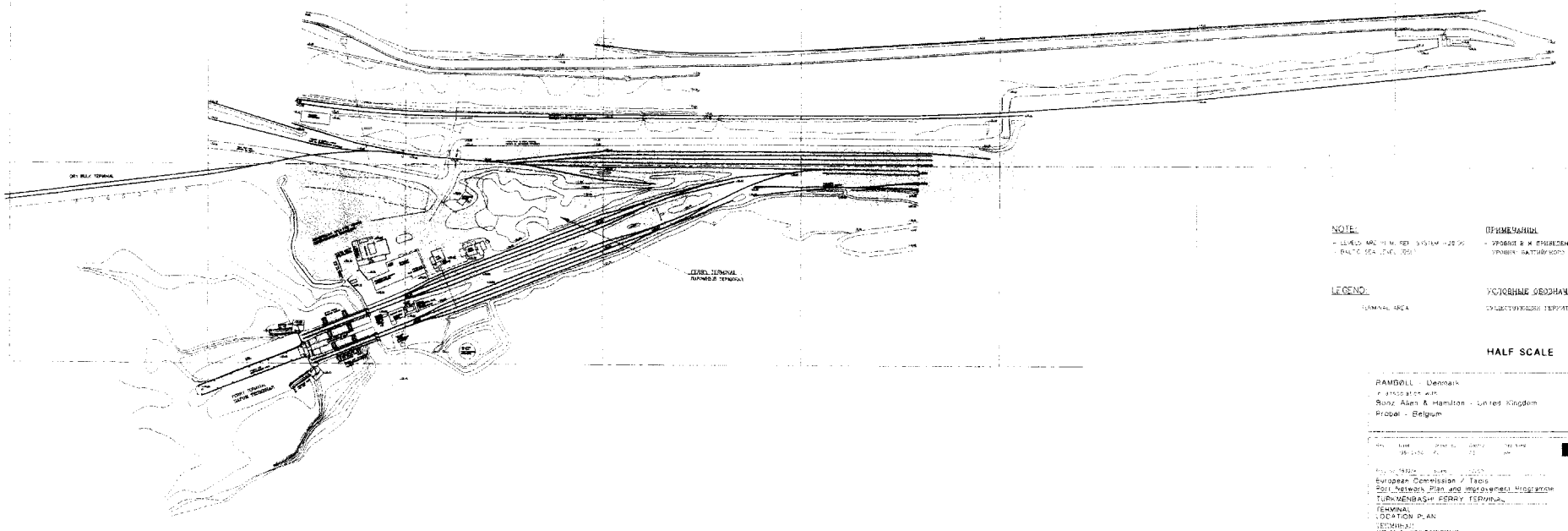


LOCATION MAP 1:500000
ПЛАН РАСПОЛОЖЕНИЯ

N

WEST SIDE
ЗАПАДНАЯ СТОРОНА

EAST SIDE
ВОСТОЧНАЯ СТОРОНА



NOTE:
- LEVELS ARE IN M. REF. SYSTEM +28.0 (BALTIC SEA CHART DATUM)

ПРИМЕЧАНИЯ
- УРОВНИ В М ПРИВЕДЕННЫЕ К УРОВНЮ БАЛТИЙСКОГО МОРЯ +28.0 (УСЛ.)

LEGEND:
TERMINAL AREA

УСЛОВНЫЕ ОБОЗНАЧЕНИЯ
СУЩЕСТВУЮЩАЯ ТЕРРИТОРИЯ ТЕРМИНАЛА

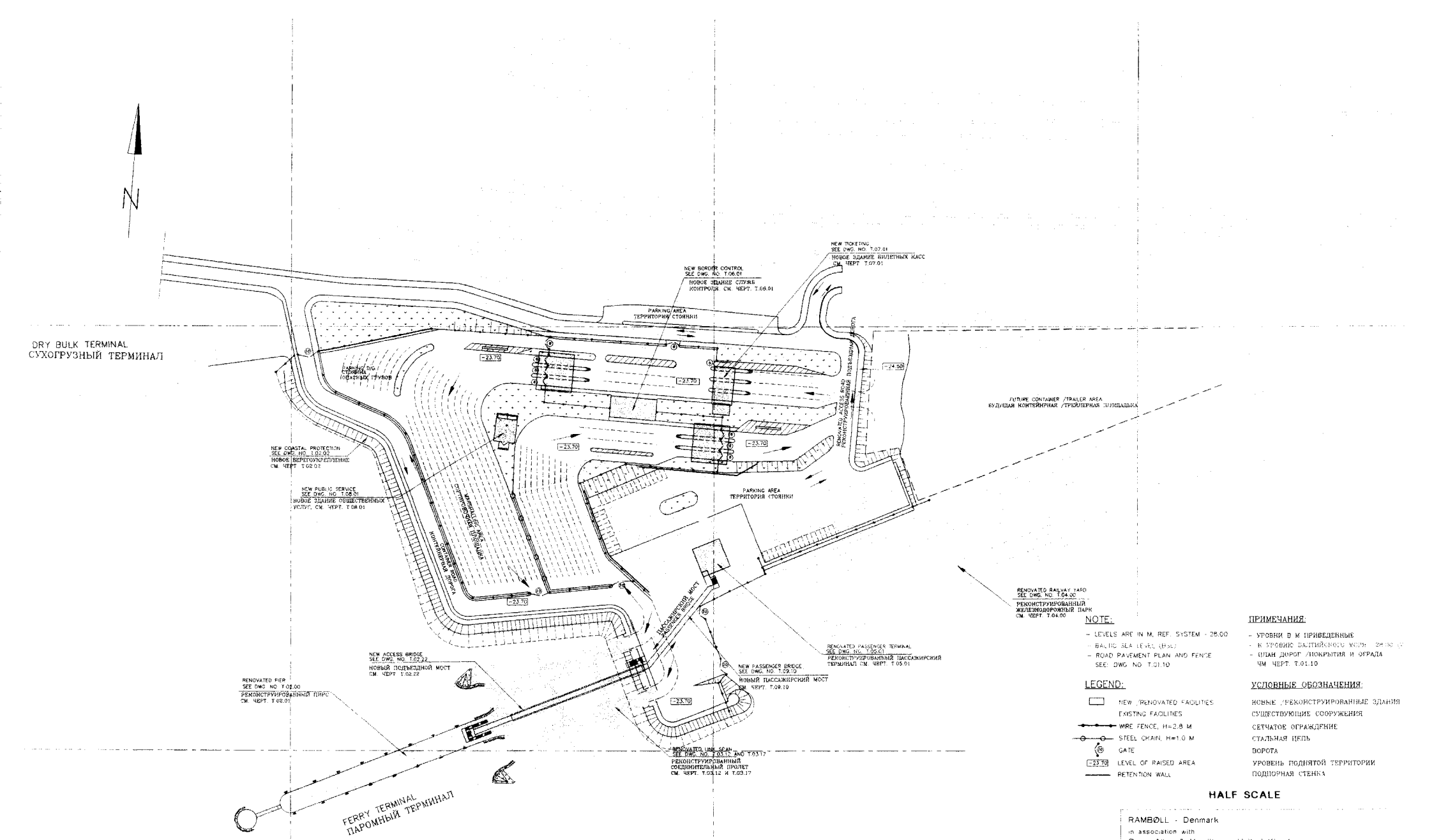
HALF SCALE

RAMBØLL - Denmark
Sonz Aken & Hamilton - United Kingdom
Probel - Belgium

RAMBØLL

European Comission / Tacis
Port Network Plan and Improvement Programme
TURKMENBASHI FERRY TERMINAL
TERMINAL
LOCATION PLAN
ТЕРМИНАЛ
ПЛАН РАСПОЛОЖЕНИЯ

T.01.00



NOTE:

- LEVELS ARE IN M. REF. SYSTEM - 28.00 - BALTIC SEA LEVEL (BSL)
- ROAD PAVEMENT PLAN AND FENCE SEE DWG. NO. T.01.10

ПРИМЕЧАНИЯ:

- УРОВНИ В М ПРИВЕДЕННЫЕ К УРОВНЮ БАЛТИЙСКОГО МОРЯ - 28.00 (БМ)
- ПЛАН ДОРОГ И ОКРЫТИЯ И ОГРАДА ЧМ. ЧЕРТ. T.01.10

LEGEND:

NEW /RENOVATED FACILITIES	НОВЫЕ /РЕКОНСТРУИРОВАННЫЕ ЗДАНИЯ
EXISTING FACILITIES	СУЩЕСТВУЮЩИЕ СООРУЖЕНИЯ
WIRE FENCE, H=2.8 M	СЕТЧАТОЕ ОГРАЖДЕНИЕ
STEEL CHAIN, H=1.0 M	СТАЛЬНАЯ ЦЕПЬ
GATE	ВОРОТА
-23.70 LEVEL OF RAISED AREA	УРОВЕНЬ ПОДНЯТОЙ ТЕРРИТОРИИ
RETENTION WALL	ПОДПОРНАЯ СТЕНКА

HALF SCALE

RAMBØLL - Denmark
in association with
Booz Allen & Hamilton - United Kingdom
Probel - Belgium

Rev.	Date	Drawn By	Control	Approved
	1997.09.01	EP	TG	

Proj. No. 56.0324 Scale 1:1000

European Commission / Tacis
Port Network Plan and Improvement Programme
TURKMENBASHI FERRY TERMINAL
NEW /RENOVATED FACILITIES
SITE AND DEMOLISHING PLAN, WEST
СУЩЕСТВУЮЩИЕ СООРУЖЕНИЯ
ПЛАН УЧАСТКА И СНОСА. ЗАПАД

RAMBØLL
Göt Palmes Allé 22
DK 8230 Åbyhøj
Phone +45 89 44 17 00
Fax +45 89 44 18 18

File T.01.03
Drawing No.

T.01.03