

TRADE AND TRANSPORT INTEGRATION (TTI) PROJECT – CROATIA

**OVERALL ENVIRONMENTAL ASSESSMENT
OVERARCHING EXECUTIVE SUMMARY
(FINAL)**



EKONERG, 2006.

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Introduction

The TTI Project is a regional initiative designed to develop an important international corridor for several countries within the region, bringing in the same time benefits to Croatia. The starting/ending point, i.e. the gateway of the corridor is Croatian port of Ploče.

Development and growth program of the Port of Ploče (within TTI Project) consists of several components, of which new Multipurpose Container Terminal (CT) and Bulk Cargo Terminal (BCT) are the major components. Both these components have been classified as category A activities in accordance with WB OP 4.01, for which separate EAs and EMPs have been prepared. This *Overarching Executive Summary (OES)* addresses and summarizes environmental issues originating from the cumulative investments of the World Bank and associated investments of others that are crucial to the successful implementation of the TTI Project, i.e. mainly its Port Development component.

The OES includes and puts particular emphasis on:

- (i) A summary of the planned development and expansion program of the Port of Ploče and related infrastructure (roads, rails, water, power supply, etc.), including associated and supporting projects not lying within the TTI, with particular attention to the socioeconomic and biophysical environment, including issues such as project alternatives, changing traffic volumes and patterns, provision of raw materials, etc.;
- (ii) An assessment of the potential cumulative impacts on the environment of the aggregated activities comprising the development and expansion program, together with recommended mitigating measures;
- (iii) Any additional assessment of environmental issues both short and long-term, relating to the *Neretva River Valley* (Delta in particular) a RAMSAR Site, together with recommended mitigating measures.

1. Baseline

1.1 Brief summary of basic data on the geography and economy of Croatia and countries for which the Port of Ploče is an actual and potential gravity area.

The Republic of Croatia, as a SE European country, has the longest coastline on the east side of the Adriatic Sea among all coastal countries of the “West-Balkans” region (Slovenia, Croatia, Bosnia and Herzegovina, Serbia and Monte Negro).

The countries gravitating to the Adriatic ports, in particular to the Port of Ploče, are BiH and Serbia and Monte Negro (due to the structure of their heavy industries, and lack of appropriate export/import maritime infrastructure facilities), and to a lesser degree the EU new member states – Hungary and Slovakia.

Connection to Pan-European Vc Corridor (Budapest-Osijek-Sarajevo-Mostar-**Ploče**) which also connects East and South regions of Croatia (i.e., Osijek, Ploče) with this WB project will bring additional benefits. The railway is to be improved (important for bulk cargo traffic from/to Port of Ploče) and soon also a motorway connection with additional benefit for container and general cargo transportation not only to BiH, but also within Croatia.

1.2 Brief summary of Croatian and Regional economic policy.

Croatian economic and general policy has been driven by its objective to join the EU. Ongoing EU accession process results, among other issues, in restructuring and conversion of economy (with increasing rate and level of privatization in majority of economic sectors), emphasis within the so-called Adriatic Orientation on tourism and traffic (accelerated construction of motorways as socially and economically integrative elements of development, reconstruction of international ports along with ferry ports, restructuring of shipbuilding), revival of agricultural resources for the purpose of tourism. All these development issues require particular emphasis on environmental protection and sustainable use of natural resources.

The objective of Croatia is to become a leading country in the Region in terms of sustainable economic development (taking in particular into account natural resources and protection of environment), regional social and economic cooperation, and ethnic reconciliation. Particular importance is given to the neighboring Bosnia and Herzegovina, with significant number of inhabitants of Croatian nationality living mainly in south regions of BiH, and, in particular, along the south section of the Vc Corridor.

1.3 Brief overview and assessment of Croatian trade and transportation sectors.

Due to its geographic and geopolitical position Croatia can draw benefits from its mutually interrelated trade and transportation sectors, especially when neighboring countries are concerned. This has been one of the starting points and positions of Croatian Strategy of Traffic Development (1999), which is being largely implemented in the years of this decade (increased rate of motorways construction, ongoing restructuring of railways, ports modernization – Rijeka Gateway Project, pending TTI Project, improved cross-border transport, and trading mechanisms, etc.)

1.4 Maps showing configuration of existing road and rail infrastructure, and data on capacity and present usage.

Road and rail infrastructure are basic elements and precondition of increased trade and transportation. Geo-traffic location of the Port of Ploče and existing and planned road and railway network in the wider Ploče area are shown in the maps – Figures 1-1 and 1-2.

Figure 1-1: Geo-traffic location of the Port of Ploče



Figure 1-1: GEO - TRAFFIC LOCATION OF THE PORT OF PLOČE

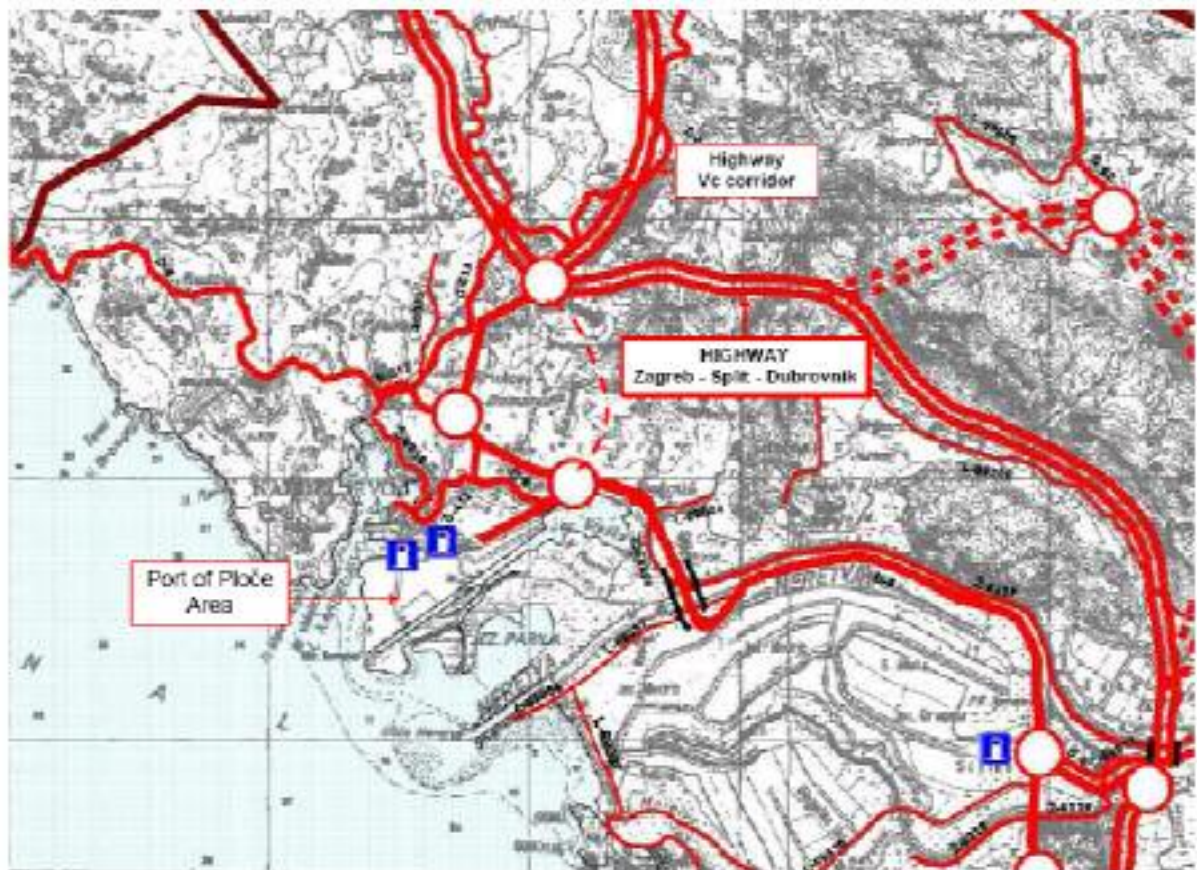


Figure 1-2: Road network in the wider Ploče area

1.5 Summary of the environmental baseline

The Delta of the Neretva River is a specific area (rough dimensions: base 13 km at the coastline, inland penetration of 18 km, i.e, some 12,000 hectares) on the Adriatic coast characterized by floodplain, formed by sediment deposition and intersected with numerous side branches, lakes and channels, coastal area, and karst hills on the north side. Sediment deposition brought by the Neretva River is present also in the marine/seabed section of the Port of Ploče Area – the area delineated by the man-made Vlačka Channel at the north-west border of the Delta, as well as in the wider marine area surrounding the Port and the Delta.

The Delta represents the most important Mediterranean wetland in Croatia and is one of a few remaining habitats of this type left in Europe. Due to extensive melioration numerous swamp areas, lakes and lagoons were dried. However, from biodiversity and landscape aspect this is still one of the most valuable areas in Croatia.

Due to geographic location and diverse habitats the Delta is characterized by rich bird fauna. 310 bird species, including 115 which nest here, have been recorded in the literature. Brackish zone near the river mouth is an important wintering site and a resting place during spring and autumn migrations. Moreover, in the delta around 150 fish species, including marine and 35 freshwater species, have been recorded. Prior to drying of lakes and lagoons an area near the river mouth was very important as a fish spawning and fry nursery area. Thus preserved lagoons, such as Parila and Vlačka, represent important areas for fish and crabs which spend rest of their life in fresh waters or in the sea.

The Neretva Delta has been included in the List of Wetlands of International Importance of the Convention on Wetlands of International Importance, especially as Waterfowl Habitat (RAMSAR Convention). It is also included in the program of Important Bird Areas conducted by the BirdLife International. Moreover, it is proposed for protection as a nature park. Currently, three ornithological bird reserves have been declared within the area; Pod Gredom (Vid), Prud (Metković) and Orepak (Kula Norinska) at approximately 12 to 15 km distance from the Port of Ploče Area, and the fish and bird reserve Ušće Neretve on the left side of the river mouth, 2 km from the port. The area Ploče-Lake Parila on the right side of the river mouth (extending close to the port area) and Lake Kutina on the left side (some 20 km) are proposed for the protection as bird reserves. In addition, Modro oko Lake and Lake Desne (some 6 km NE from the port) are protected in the category of significant landscapes. The Bačinska Lakes are situated northward from the Ploče Port. They represent a karst depression with high landscape value. Višnjica Hill with forest vegetation is located opposite to central section of the Port of Ploče in its existing, operational area (at approximately 1.5 km distance). Restrictions on the land use and activities (fishing, hunting, etc.) allowed in the nature protected areas very often cause protests from and conflicts with interested groups of local population.

Wider Neretva Delta is predominantly also very fruitful agricultural area with a large number of mainly local landowners. Dependant on the fresh water flow of the Neretva River, feeding irrigation system for their arable land, local inhabitants are more concerned about the upstream issues/activities that may influence the Neretva flow regime and quality than about those to be performed at the marine rim of the Delta, such as the Port of Ploče development and growth activities. *Agriculture related activities in the Neretva Valley and the Delta itself are considered to be potentially a greater threat to the Delta than planned construction*

activities and current/future operation of the Port. Recently increasing problem of salt intrusion in the delta area is coming as a result of unsupervised agricultural activities.

According to the Register of Cultural Heritage, information obtained from the Ministry of Culture (MoC) - Conservation Department in Dubrovnik and physical plans of the area (County, Municipal) - in the near vicinity of the Ploče Port project location **there are no inland or submarine sites registered as a cultural heritage**. In the Ploče Municipality area there are seven registered cultural heritage sites (only two archaeological sites) in villages Baćine and Staševica, which are distant from and will not be influenced by the Port project.

Maintenance dredging has been already conducted for many years in the project area and no archaeological findings/sites have been found so far. Moreover, during scuba diving surveys performed for the CT EIA and BCT EIA respectively, no artifacts were noticed. According to Cultural Heritage Protection and Conservation Law, in case of detection of archaeological artifacts during dredging or construction of terminals and their infrastructure, works must be stopped and appropriate authority, in this case Conservation Department of MoC in Dubrovnik, must be notified. This measure is included in appropriate EMPs.

There are no coastal tourist resorts or capacities either in the immediate surrounding of the city and port of Ploče, or closer than 10 km. The Delta itself, and its protected or for protection proposed natural phenomena within the proposed borders of the Nature Park “Neretva”, are target destinations of excursion, scientific/research and adventure tourism, currently on predominantly local and national level.

1.6 Summary of the key environmental issues in the Neretva watershed and surrounding areas and in particular, the Delta that relate to the overall Port project.

Key environmental issues related to the development of the Port of Ploče – and its potential impact in the Neretva Delta and in the Port surrounding areas - originate primarily from construction activities both for Port components proposed under the TTI project (terminals and supporting infrastructure), but also (and even more) for future transportation infrastructure already planned (e.g. motorways crossing the Delta, under separate projects).

Port construction activities (none within the Delta) with environmental impacts encompass mainly dredging activities and on-shore disposal of dredged material (limited impact on marine communities, removal of benthos, sediment up-take and increased sedimentation and turbidity in the areas of activities during dredging operations); noise emission may temporarily and reversibly affect birds in neighboring proposed ornithological reserve. Port operation, in particular BCT, incl. its maintenance dredging, will be an intermittent source of noise and light pollution affecting birds; large vessels at berth will reduce the rate of water circulation through the Vlaška Channel (west border of the Delta) with no significant upstream effects on Delta.

2. Strategic Plans

2.1 Summary of the regional/local strategic plans for the Neretva watershed and particularly the Delta

The Neretva Delta, as the most valuable natural resource in the area, is anticipated for protection in the nature park category by Croatian strategic documents (Strategy and Action

Plan for the Protection of Biological and Landscape Diversity, Physical Planning Strategy and Dubrovačko – neretvanska County Physical Plan). The Ploče-Parila area on the right side of the river mouth and Lake Kutina on the left are proposed for the protection as ornithological reserves (County Physical Plan)

Moreover, one of the strategic objectives of the Croatian Physical Planning Strategy (1999) is to protect and improve natural and man-made wetlands, which are the most threatened ecosystems in Croatia. Another strategic objective is conservation of the biological diversity and characteristics of the coast and islands containing an action plan directly concerning the Neretva River: Protection of Marsh Habitats in Neretva Delta.

Most of possible sources of potentially more dangerous impacts on the Neretva Delta and on the catchment area along the Neretva watercourse are located in its upstream area, that is the Neretva Upper Drainage Basin in Bosnia and Herzegovina, covering a number of industrial and hydroelectric power facilities. The plans involved are under discussion and their implementation could affect the Neretva water-flow regime.

As regards the transport corridors through the Neretva Valley and its Delta, a motorway is planned along the Vc corridor (Ploče-Mostar-Sarajevo) and possibly also extension of existing/under construction motorway between Zagreb and Ploče, toward Dubrovnik that would run across the Neretva Delta. By improvement of the road infrastructure, by a Vc corridor in particular, provided issues of environmental impact during construction are solved, the risks to the Neretva River from road, primarily truck traffic and transport of liquid fuels between Ploče and BiH would be significantly reduced.

2.2 Basic data on past, present and projected growth in:

- (i) Port traffic, covering all types of cargo including liquid, bulk and container traffic,
- (ii) Rail and road traffic, and
- (iii) Urbanization and industrial development related to the development and growth plan for Ploče Port.

The Port of Ploče carries out the largest part of its operation by doing business with the partners in Bosnia and Herzegovina, just as it did in the late 1980s. Before the 1991 – 1995 war in the region, total cargo traffic through the Port of Ploče was some 4.6 million tons per year, primarily coal and iron ore (bulk cargo) for the Ironworks in Zenica and for the Coke Plant in Lukavac (B&H). During the War, cargo traffic, bulk cargo in particular, declined considerably but over the last few years, very rapid rise in bulk cargo traffic is evident again. **Table 2.1** reviews cargo traffic through the Port of Ploče in the period 1988 to 2005.

Table 2.1: Cargo traffic (in thousand tons) through Port of Ploče from 1988 to 2005

	1988	1991	1994	2000	2002	2003	2004	2005
GENERAL CARGO	881	521	206	266	396	420	346	301
BULK CARGO	3336	1356	39	417	474	675	1518	2211
LIQUID CARGO	360	360	360	360	360	360	167	303
TOTAL	4577	2213	268	804	1063	1284	2031	2815

The port activity is recovering quickly since the end of the war in 1995. The traffic growth has averaged 23 percent per year since 1994 and is peaking up, attaining 58 percent in 2004 and 36 percent in 2005. Cargo traffic reached 2.8 million tons in 2005, 61 percent of its maximal pre-war level. Bulk cargo represented 78 percent of the total traffic in 2005, while

general cargo, currently at the level of 300,000 to 350,000 tons, is composed principally of containerized cargo, timber, metal products from the major BiH clients and food products.

Realistic estimates forecast a significant increase in bulk and general cargo traffic, which is expected to reach 7 million tons as early as in 2010 in the base case scenario¹, and exceed 10 million tons in 2020 and 13 million tons in 2030.

With potential construction of a navigable waterway Bosanski Šamac (at the Sava River) – Vukovar (at the Danube), and the Pan-European road corridor Vc (Budapest – Osijek – Sarajevo – Ploče), the Port of Ploče will become even more important for a combined traffic with all Danube-basin countries. A central Adriatic Sea connection and a natural extension of the Vc corridor will also connect, through the Port of Ploče, the south regions of Italy with the Central and East European countries in a cost-efficient and the most acceptable way. Therefore, a high increase in traffic in the Port of Ploče is expected compared to the current level.

The second engine of growth is containerized traffic, which is increasing significantly and is expected to increase in Ploče. Traffic growth has averaged 75 percent per annum since 1998 and the traffic passed 17,000 TEU in 2005. The world trend of cargo containerization, the current low level of containerized cargo both in Croatia and in BiH, and finally the recovery of the BiH economy are the strong pillars of this growth.

The base case scenario of container traffic forecasts is based on the estimated growth of the BiH and Croatian economies over the period, on their trade forecasts, on an evaluation of the market share of the port of Ploče for this traffic over the period and on the potential increasing containerization of the various products that transit through the Port.

Six container lines already indicated their interest in considering dedicated feeder vessels to Ploče, if proper facilities are in place. Growth in the base case scenario averages 15 percent per annum until the new Ploče CT is operational in 2010 (i.e. reaching 40,000 TEU), 14 percent from 2010 to 2015 (reaching 60,000 TEU), reflecting the opening of the motorway to Split in 2008 and the new capacity of the Port to handle cellular container vessels from 2009, 6 percent up to 2020 and 3 percent afterwards. Additional contributing factor to the expected growth of container traffic is section-wise construction of the Vc Corridor Motorway towards BiH within the timeframe of up to 2020.

As regards the direction of cargo movement, current concept will not change much. In other words, the Port of Ploče will remain mostly a transit port (see **Table 2.2**).

Table 2.2: Cargo traffic (in thousands tons) in Port of Ploče according to movement direction in the period from 1988 to 2005

	1988	1991	1994	2000	2004	2005
IMPORT	2.863	1.244	16	9	181	172
EXPORT	1.086	555	1	2	5	19
TRANSIT	142	158	243	710	1.673	2314
TRANSSHIPMENT	486	256	8	83	172	310
TOTAL	4.577	2.213	268	804	2031	2815

Likewise, the current concept of cargo transport from the Port to final customers is not expected to change much. Most of bulk cargo (almost 100%) will be, as it has been now,

¹ Forecasts have been evaluated in *Consulting Services to Enhance Private Participation in the Development of the Port of Ploče*, a 2006 study conducted by Royal Haskoning and funded by a PPIAF grant.

transported by Ploče-Mostar-Sarajevo railway to final destinations in BiH. General cargo will continue to be transported almost equally by railways and by roads. Liquid cargo will also continue to be transported almost completely by roads. Most of containerized cargo (around 70%) is planned for road transport and its smaller part for transport by railways. It is expected that the increase in traffic in the Port of Ploče will be also followed by reconstruction and improvement of the existing traffic routes – Ploče-Sarajevo railway (present MOU between Croatian and Bosnian Government) and construction of new roads/motorways – Vc Corridor Motorway and Zagreb-Split-(Ploče)-Dubrovnik A1 Motorway, and a road connection of the Port of Ploče to these motorways.

Scenarios of traffic development and growth in the Port of Ploče (and expansion of the Port of Ploče itself) are in line with the physical planning documentation of the local area (Ploče Municipality Plan, County Plan), which recognizes the importance of the Port of Ploče and whose physical and development plans rest on this very important economic segment. Port expansion program will certainly have indirect and induced effects on local and southern Dalmatian region economy. Simultaneously, these plans and stricter implementation of physical planning, environmental protection and construction regulations do - and will even more - take care of protecting the Neretva Delta from induced development of industrial and warehousing/trading activities.

Besides port activities, development of industrial activities is also planned within the existing Port area and a free customs zone has already been formed. The existing Port area offers a substantial land area to develop side activities, and even more new areas will be made available after sufficient settlement of CT and BCT dredged material disposed on-shore within the Port area. Sufficient land within the very Port area to become available for induced development will reduce the demand and pressure on land outside the Port, and in particular in the Delta. Since the vast majority of cargo handled in the Port of Ploče is destined to or coming from B&H, indirect effects are likely to materialize proportionally more in BiH than in port free zone(s).

Development of industrial and other port-related activities within the Port area are to be followed by appropriately planned urbanization in local physical plans.

3. Legal and Regulatory Framework

Croatian legal and regulatory framework related to the Project is mainly already harmonized with EU regulations and its *Environmental Acquis*. Therefore, the implementation of the Project will almost certainly be performed within the EU regulatory framework.

The Croatian regulations require a series of steps before needed location and building permits are issued. Basic documents for obtaining a location permit are the physical plan (showing that the proposed activity is foreseen within the regulations of the master plan), a feasibility study, and an EA report (in accordance with the Croatian environmental law). In order to obtain the final building permit allowing start of construction work, the design documentation must show that all environmental mitigation measures as stipulated in the location permit have been addressed and included.

Annex 1 contains a list of international agreements in the field of environmental protection and nature that relate to the Project. Applicable legislation of the Republic of Croatia addressing the issues of nature protection is reconciled to the international agreements listed

in the Annex 1, and the regulations of MARPOL Convention are included in the Croatian legislative documents and by-laws regulating the equipment used in ports and their operation.

4. TTI Project Description and Rationale

4.1 Summary of the overall project strategy within the context of national, regional and municipality plans.

The main objective of the Bank's assistance to Croatia is to support the Government growth strategy embedded into the European Union (EU) accession process through supporting projects that would generate economic benefit and foster trade and transport in the region.

The Port of Ploče Development Program (within the Trade and Transport Integration Project – TTI Croatia) came as a response to a significant increase in traffic, which, in turn, came as a result of industrial restructuring in Bosnia and Herzegovina. In recent years, traffic increased from 1.1 million tons in 2002 to 2.8 million tons in 2005. The Corridor Vc generates significant, year-round profit for Southern Dalmatia. As the final destination of more than 80% of cargo passing through the Port is outside of Croatia, the Project is of great significance for the Region. The overall development objective is to improve the Corridor Vc capacity, efficiency and quality of services to meet projected traffic demand planned with particular focus on the Port of Ploče and support regional development, all that in environmentally safe and acceptable manner.

The TTI Project and its main components are in line with Physical Planning Strategy and Program of the Republic of Croatia (the highest level planning documents), the documents which emphasize the development of the Port of Ploče as a large international port. The new BCT and CT are consequently also planned in the County Plan, as well as in the Town of Ploče Urban Plan (Port of Ploče as international, but also local port).

TTI Project Components

The WB sponsored project includes three components: (i) Port Infrastructure Development of Ploče; (ii) Trade and Transport Integration; and (iii) Project Implementation. In parallel, but not included under this WB project, Croatian Government will finance upgrades for the Croatian Railways (HZ) in Ploče.

The **Port Infrastructure Development** component includes the following subcomponents:

- (i) construction of a new bulk cargo terminal (BCT) with an initial capacity of 4.6 million tons;
- (ii) construction of a container/multipurpose terminal (CT) with an initial capacity of 66,000 TEU; and
- (iii) construction/rehabilitation of the supporting port infrastructure (road, rail, water, wastewater, and power supply) within the port area including a new entrance facility.

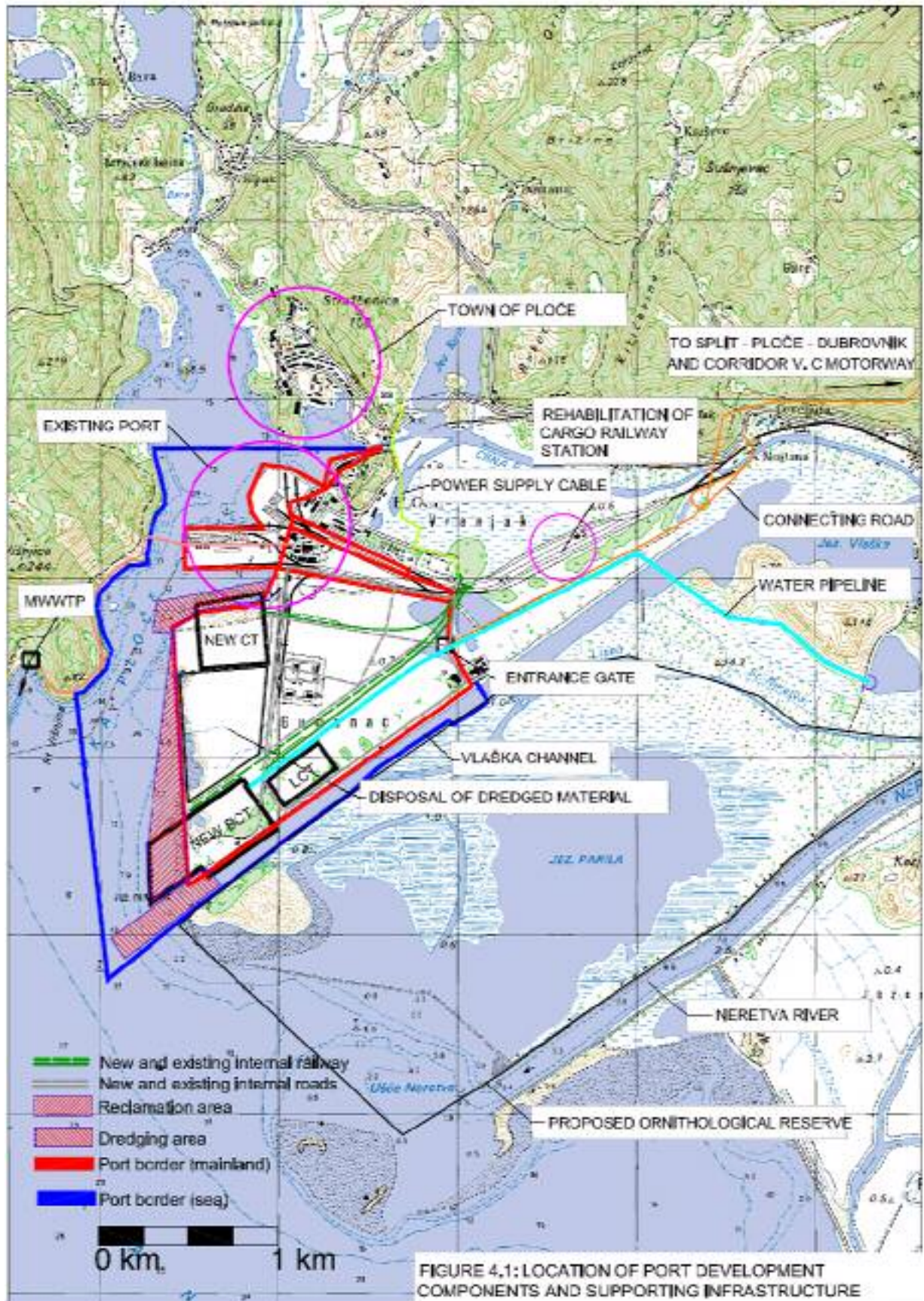
The third sub-component connects the new terminals with the existing utility infrastructure inside and outside the port. **(Figure 4.1)**

The new terminals will be located in an undeveloped and unused area of the port, with meager vegetation growing on material previously dredged from the sea. In terms of

environmental protection, this part of the port area does not have either local or regional importance.

Object	Investor	Source of funds
Bulk Cargo Terminal Infrastructure	PPA	50% local, 50% foreign
Container/Multipurpose Terminal Infrastructure	PPA	50% local, 50% foreign
Construction of Port Entrance Facility	PPA	50% local, 50% foreign
Rehabilitation of railway infrastructure outside port area	Croatian Railways	50% local, 50% foreign
Equipment/ Superstructure	LP/Concessionaire	
Projects related to the TTI project but not within it		
Construction of connecting road between entrance facility to Port area and the motorway	Croatian Highways Comp.	100% domestic
Construction of Ploče Municipal Waste Water Treatment Plant (*)	Town of Ploče and Croatian Waters Company	60% Town of Ploče 40% Croatian Waters Company
Reconstruction of municipal waste landfill	Town of Ploče and Croatian Environmental Protection and Energy Efficiency Fund (EPEEF)	65% Town of Ploče 35% EPEEF

(*) Submarine discharge point to be relocated from the existing point within the Port area to a position about 2 km outside the harbor.



5. Project Alternatives

Due to its unique geographical location in terms of maritime and land transportation routes and means, as a gateway of the Vc Corridor (specially important for BiH economy and industries), and historically proven and operational facility/route, the Port of Ploče component of the TTI Project had almost no real alternative, neither significant nor comparable. When the whole TTI Project rationale is concerned, the analysis shows that without the project (i.e. ‘no action scenario’), it is likely that the corridor will rapidly reach its present capacity. Clients of the corridor would reroute their traffic to more expensive alternative corridors, reducing not only the competitiveness of BiH industries, but also potential for economic development both in Southern Dalmatia (and Ploče area), and in Bosnia and Herzegovina.

Alternatives were therefore considered and largely analyzed at the level of the Port of Ploče components, i.e. their location within the port area and their design/layout, in particular of the BCT. The main objective of analyses of alternatives was reduction of environmental impacts of dredging and terminal safety and operation, especially with regard to adjacent section of the proposed Nature Park Neretva (i.e., east bank of the Vlačka Channel and Lake Parila proposed ornithological reserve), where the liquid cargo terminal had already been operational. Positioning of the BCT berth in the final design in the Vlačka Channel furthest towards the sea (with partial reclamation of land from the sea, using excess stone material from the motorway to Ploče construction), as well as bulk cargo stockyard piles parallel to the Channel, resulted in reduced masses of dredged material (with no construction impacts on the east, protected Channel bank). This layout offered in the same time void area between the CT and BCT sufficient for on-shore disposal (and not off-shore, sea dumping) of cumulative dredged material from dredging activities for both terminals. Additional environmental benefit of this solution is relocation of majority of currently performed bulk cargo handling operations further from the town of Ploče (as shown in Chp.6).

6. Summary of Overall Port Development Environmental Impact

6.1 Potential cumulative environmental impacts on the Neretva Valley/Delta, the traffic corridor and any other potentially affected areas, of the development and expansion program of the Port, using as a reference, issues mentioned in World Bank safeguard policy OP 4.01, Environmental Assessment.

In accordance with the World Bank’s safeguard policies and procedures, including OP/BP/GP 4.01 Environmental Assessment, this Port Expansion and Development Project (i.e. its main components – new CT and BCT) has been classified as a Category A Project for environmental assessment purposes. All the issues of the mentioned WB procedure, i.e., environmental screening, EAs and EMPs, assessment of EA-related institutional capacity of the borrower (in this case PPA), public consultations and disclosure of Project’s objectives, description and potential environmental impacts, have been fully followed.

Since main new Port components (CT and BCT) have very few common operational similarities (and thus impacts of the same type), except for to a certain extent similar location within the unused land Port area (Fig. 4.1), cumulative environmental impacts are in majority cases only those of each new terminal. Therefore various construction impacts (of dredging and dredged material disposal, reclamation and soil improvement, supply of construction raw materials) in the wide construction zone of similar characteristics are assessed to have largest potential for cumulative environmental impacts, although not necessarily performed in the same period of time.

From operational point of view, only noise emission and to a certain extent increased railway traffic (complete bulk cargo, portion of containerized cargo), lead to increased cumulative environmental impacts. Similar type of port activities (cargo handling and storing) will be performed on the new BCT and existing bulk cargo quay (of reduced capacity), so their cumulative impact on air quality was assessed.

Short review of environmental impacts is divided in two groups, depending on location of the source of impact: **(a) in the Port area**, and **(b) outside the Port area**.

a) **The Port Area**: The main possible environmental impacts caused by construction of some parts of the Port area and by regular operation of the Port of Ploče are summarized in **Table 6.1** and a cumulative review of these impacts has been addressed in Chapter 6.2.

Table 6.1: *Review of main environmental impacts of sources within the Port area*

IMPACT ON	CONSTRUCTION	USE (REGULAR OPERATION)
SEA AND SEA ORGANISMS	+	-
	CAUSE 1: DREDGING AND DREDGING MASS DISPOSAL (ABOUT 1.1 MILLION M3 IN TOTAL) LEADING TO: → Sea turbidity → Destruction of immobile sea organisms in dredged area CAUSE 2: DEVELOPMENT OF NEW AREAS FOR THE PORT DEVELOPMENT → Sea turbidity → Destruction of immobile sea organisms in new area → Higher noise level in the sea	NOTE: Minimal impact under assumption environmental protection measures are implemented with a special emphasis to: <ul style="list-style-type: none"> • Construction of wastewater drainage and treatment systems/facilities, • Realization of conditions for collection of all types and quantities of waste, and • Procurement of adequate equipment for possible emergency situations/accidents
AIR QUALITY	-	+
	NOTE: Fugitive emission during construction of the terminal due to movement of construction machinery	CAUSE 1: Cargo handling activities at BCT and remaining activities at existing BC quay Erosion of bulk cargoes caused by wind
NOISE	+	+
	CAUSE 1: DEVELOPMENT OF NEW AREAS AND CONSTRUCTION WORKS → Higher noise level – indirect impact on sea organisms and ornithofauna (this refers to BCT)	CAUSE 1: REGULAR OPERATION → Higher noise level
BIOLOGICAL CHARACTERISTICS OF SURROUNDING AREA	+	+
	CAUSE: Dredging	CAUSE: Ornithofauna: noise and light pollution caused primarily by BCT operation

+ Impacts of acceptable level exist, even with mitigation measures implemented

- Minor impacts exist, provided mitigation measures are implemented

Other possible environmental impacts in the Port area cover wastewaters, waste, and possible emergency situations/accidents in the Port area.

Wastewaters: Each terminal is provided with special systems for collection and treatment of wastewaters generated in the terminal area and wastewater discharge into the sea (with a possibility of connection to a common sewerage system of the Port area once it is built). In respect of wastewater drainage and treatment systems/plants planned, no considerable impact to the sea quality is expected but improvement of the current situation. Internal roads to be

built in the Port area will also be provided with adequate drainage and treatment systems for storm water before its discharge into the sea.

Waste: Today, the Port of Ploče has limited facilities to accommodate the international requirements of handling waste, wastewater and bilge water from arriving vessels. Pursuant to the Croatian regulations, the conditions should be provided for acceptance of all types of waste from vessels, and an adequate place for collection of all types of waste. The Port will start solving this problem along with further development of the Port.

Emergency situations/accidents: The probability of emergency situations/accidents in the Port area is assessed low. Still, to assure the quickest possible and efficient response in the event of possible emergency situations/accidents, more equipment is needed as compared to current situation, which will be solved gradually with the Port development.

Impacts of supporting infrastructure components

New Railway Tracks. New railway tracks to the new terminals will be required **within the port area**, and the construction will generate moderate noise levels, with no impact for the surroundings or inhabitants in Ploče. Some of existing tracks will be removed requiring disposal of old creosote treated sleepers. In accordance with Croatian regulations, these outdated sleepers must be handled by a licensed company, and be exported to a certified company in Germany for appropriate destruction.

Power Supply. A new 10 kV underground power line to the terminals will be established. The power will be provided from an existing sub-station in Ploče outside the Port area. No specific impact is expected.

Roads. New asphalt roads will be established within the Port area to facilitate transport from the new terminals. No specific impact is expected.

b) **Outside the Port area:** Two important components of the Port expansion program are located outside the Port area (and outside the TTI Project), aiming primarily at achieving more efficient road and rail transport of cargo from the Port towards its final destinations:

- Construction of a new connecting road from the town of Ploče and Port of Ploče area (Port Entrance facility) to the Zagreb-Split-Dubrovnik A1 Motorway (i.e., to the common junction with the Vc Corridor Motorway);
- Rehabilitation of the Ploče railway junction and cargo station;

In addition a planned facility, not directly related to the port expansion, is expected to have environmental significance for sea water quality in the town of Ploče and in the Port of Ploče marine area. This facility will be largely located outside the Port area, but has some of its components (pipeline and pumping station) within or passing through the existing Port area:

- Municipal waste-water treatment plant (MWWTP) for the Town of Ploče and adjacent settlements, along with its sanitary/faecal waters sewerage system;

Connecting road

Improvement of the Port of Ploče connection to the existing road network is one of collateral benefits of the broader Motorway Construction Program of Croatian Government – the

program of ensuring efficient, economically feasible and socially integrative North-South Connection of Croatian Regions by construction of the Zagreb-Split-Dubrovnik A1 Motorway. Since the motorway route passes almost entirely through the hinterland to preserve the attractive Adriatic coastal area, the municipality/town of Ploče needs to have a public connection/access road to the nearest motorway junction, as other coastal cities (like Zadar, Šibenik, Split) already have. The Port of Ploče is also a gateway port for the BIH and its economy, and therefore it is the terminal point of the already mentioned Vc Corridor (Sarajevo-Mostar-Ploče) Motorway.

Development of design documentation and EIA Study for the new common connecting road (both for the Port of Ploče and Town of Ploče) to the future motorway(s) is in progress (“Express Road Ploče 2 Junction – Ploče” Project), coordinated by Croatian Highways HAC. According to existing project documentation, the whole connecting road will be 8.5 km long, and will have as a joint purpose the link to the town of Ploče and the Port of Ploče area.

The EIA Study identifies possible impacts and adequate environmental protection measures with a special emphasis on the road route passing through karst, forest and agricultural areas. The Port connecting section of the road and its junction “Ploče-Istok” with Town of Ploče access road (incl. railway two-level/fly-over crossing and the Crna Rijeka bridge) are located in the 200-300 m wide strip area between the Ploče railway cargo station and the Vlačka Channel. This area is currently used for small scale agricultural production, so major impacts would be the loss of agricultural land for a 30-m road corridor and for new access roads to privately owned lots of land, along with change of existing cultures (mainly to pastures and meadows). In fragmentation zones of agricultural land green horticultural/vegetation belts as protective mitigation measure are recommended, as they are even more for landscaping purposes in the area to be changed by new road infrastructure. Technical measures in road design and construction will minimize changes in local surface water patterns, and enable drainage of polluted rainwater to avoid pollution of local water bodies, incl. the cases of road accidents (potentially involving road transport of liquid cargo from the Port of Ploče).

Railway rehabilitation

With development of the new BCT and an increase in bulk cargo traffic, the traffic at the current terminal of Ploče-Metković-Sarajevo railway will increase. Ploče railway infrastructure outside the Port area, being of crucial importance for cargo movement efficiency, will require necessary rehabilitation and railway investments. Among the priorities identified by Croatian Railways (HZ) are reconstruction/rehabilitation of (i) tracks at the Ploče cargo station and its marshalling yard, incl. electrification of two additional tracks, (ii) the 1st Switching Group, (iii) the servicing area and the Freight depot building, as well as (iv) installation of stable hydraulic plants for a full brake control, (v) modernization of switcher locomotives and (vi) IT system. None of these railway components is expected to have major environmental impacts. Only temporary and moderate noise generation during construction and later during increased railway operations, with - due to location of the cargo station and electrified tracks – only light increase of noise impact in the immediate surroundings and none to Ploče inhabitants. Replacement/removal and disposal/handling of old rotten sleepers (as already mentioned) will be performed in line with Croatian regulations for hazardous waste. Similar impacts will occur at certain rehabilitation points/sections (yet to be defined, where appropriate) of the Ploče-Metković-Sarajevo railway section in Croatia (although not planned at this moment)

Solving of these issues is within the scope of implementation of Croatian Railways HZ (to be financed from the HZ regular budget) in agreement between the Croatian Government and the World Bank (and other IFIs).

Municipal waste-water treatment plant and sewerage system of the Ploče Town and surroundings

The Ploče municipal wastewater treatment plant (MWWTP) as the final point of sewerage system (covering the town of Ploče and surrounding settlements), is currently at its initial stage of preparation (preliminary design and planning of the phased system development). It is within the competency of the Town of Ploče and Croatian Waters Comp. and not the part of the TTI Project. Besides the Town of Ploče, the planned sewerage system will cover settlements/ dwellings at the Baćina Lakes and the Rogotin village that are located within the western borders of the proposed nature park “Neretva”. The sewerage system will consist of sewerage pipes sections, one temporary local waste water treatment facility for one municipality outside of Ploče area (due to phased development), and a series of wastewater pumping stations. A total of five pumping stations are preliminary planned to be located within the Port area, out of which the particularly important is the joint pump station, that will pump the total sewerage system flow towards the location of MWWTP Višnjica. The plant is planned to be located on the other side of peninsula (the Višnjica Cove) opposite to the existing Port area from where submarine outfall will help to harmlessly discharge treated wastewater to the open sea. In the phased development of the wastewater system project, mechanical treatment and submarine outfall (discharge pipe) will be built in the first phase, while plant upgrade to biological treatment of the wastewater should follow in the second phase.

As part of the EU accession process, Croatia will have to align its wastewater regulations and requirements with those of EU. This transition phase of alignment will almost certainly be finished till the time Ploče MWWTP project reaches its implementation. Due to its comparably low PE number among Croatian coastal cities and low sensitivity of receiving sea area, this project does not seem to be ranked high priority in soliciting EU structural funds.

This project, when implemented, will be an improvement with regard to the current situation because (i) the wastewater discharge to sea (for the existing sewerage of the Ploče center) will be relocated from the Port area (discharge is currently between the existing BC quay and new CT, with no pre-treatment) to that new location, on the other side of Višnjica peninsula, (ii) it will bring benefits to water quality of the Baćina Lakes and other wastewater recipient water bodies in the area, and (iii) potential for connecting wastewaters of new and existing Port of Ploče components/terminals after their pre-treatment.

PPA (thru its concessionaire) will provide for reception facilities of waste (bilge) water from vessels in line with Croatian regulations and *Port of Ploče Ordinance on Internal Order and Operation*, as well as for separator systems for collection and mechanical pre-treatment of wastewaters from operation of new terminals. The latter will result with (i) treated water of quality that can be discharged into sea or connected to the municipal wastewater treatment and sewerage system, and (ii) oily and particulate (coal/ore) matter sludge to be managed by an authorized company. Sanitary/faecal waters from administration buildings of new terminals (only very limited facilities will exist on BCT), and possibly also from other capacities within the Port area, will be collected in septic tanks in case of CMT and treated in

small WWTP in case of BCT, until the construction of the municipal wastewater treatment system, and its sewerage system section within the Port area.

Consequently, no major environmental impacts are likely to occur related to implementation of this wastewater and sewerage project components, especially when the Port of Ploče expansion project is concerned. Only usual construction impacts and mitigation measures of trench excavations and water crossings for sewerage network, including cultural heritage chance-finds and post-works rehabilitation procedures and activities. Activities within the Port area will require careful co-ordination and supervision by the PPA from the very planning stage.

6.2 Summary of overall findings - key cumulative environmental impacts

Development of each of the Port of Ploče components of the TTI project (both category A terminals, and supporting infrastructure investments) has been assessed from environmental point of view in separate EA reports and respective EMPs. Environmental impacts of overall Port Development are cumulatively assessed based on separate findings of aforementioned reports/plans, taking also into account the future impacts of major existing and rehabilitated port facilities. Major cumulative impacts, i.e. the noise emission and air quality impacts, were additionally modeled and assessed. Others, like cumulative dredging impacts and provision/supply of raw materials for construction/reclamation activities were cumulatively taken into account during conceptual designs of major components. Cumulative impact of Port of Ploče overall traffic growth was also addressed in appropriate planning solutions of transportation infrastructure (partially out of the TTI Project, but complementary to it).

DREDGING: Dredging will include following areas: access channel to the new BCT berth and area beside new CT. The dredging operations beside new CT are not expected to have negative impact on the aquatic life because in this area aquatic life is very limited and nearly non-existing. In the new BCT dredging area, a relatively small number of species has been identified, but it is certain that in the broader area of the Port of Ploče, there is quite a large number of species living in large populations.

The major effect of the dredging is the disposal of the dredging masses and eventual negative effect of discharging the water included with the dredging masses. Volume of dredged material for disposal from all dredging works in the port area is estimated for around: 1.1 million cubic meters. The dredging masses will be disposed of on undeveloped land within the port area (in-between development areas for the new terminals) and on an additional area reclaimed from the sea around which a protection dike will be built to prevent dispersion of disposed material into the sea. The dike will be made of stone and will be covered with geotextile on its inner side, and thereby function as a confined disposal facility.

In order to prevent negative impacts on fish migration and spawning periods, the dredging operations in access channel to BCT berth will be limited to periods without impact on spawning and fish migration seasons (i.e., to summer period).

Obtained information about the content of different contaminants in the dredging masses shows that, even in case of off-shore disposal, there should not be any environmental concerns, as all obtained values are below international restrictions for off-shore disposal.

Regular maintenance dredging performed so far for the existing terminals (e.g. in access channel to the liquid cargo terminal in the Vlačka Channel), did not discover any finds of underwater heritage. However, due to significantly larger dredging operations (in terms of dredged material quantity and aerial scope) chance-finds procedures are drafted in EMPs for Port expansion program and will be implemented.

AIR QUALITY: Currently, potentially the most serious source of air pollution is a bulk cargo storage situated on the operational quay 5 in the Port of Poče. Within the scope of the EIA Study, five monitoring stations of *total deposited matter* (TDM) have been established for the new BCT. One year sampling and measuring program of quantity and composition of TDM, started in October 2005, is being conducted by an authorized Croatian laboratory. However, when comparing the test results with the limit values of quantity and composition of TDM stipulated by the regulations, it is evident that the TDM values and elements contained are below the limit values stipulated.

When the new BCT is commissioned, the storage for bulk cargo on the operational quay 5 will be used as a reserve. That means that the current capacities will be considerably reduced and potentially the largest source of air pollution will be the new BCT situated along the Vlačka Channel. The impact on air quality during regular operation of the new terminal has been evaluated by an air quality dispersion model (ISCT3 - US EPA) subject to a screening technique the result of which are *conservative* results. The inputs for the air quality model are the data on specific emission², meteorological data, and an array of receptors. It is important to say that the model does not take into account the measures of environmental protection foreseen in the BCT design, thus bringing conservative results (see Chapter 7).

Based on the calculation results obtained by application of a dispersion model and climatic/meteorological data, particularly the wind conditions at the Town of Ploče area, it can be concluded that operation of the new BCT will not cause degradation of the first category air quality³ due to the particulate concentration (PM-10) and deposition in the town of Ploče area. Cumulatively, by operation of the new BCT (with dust suppression measures taken) and substantial capacity reduction of the existing bulk cargo operation/storage, the air quality is expected to improve.

NOISE: The assessment of the current noise conditions is covered by the CT EIA study. Noise measurements were conducted within the Port of Ploče area and outside the borders near the closest residential buildings. The measurement results showed that there was not even one case (day or night) that noise exceeded the limits allowed by law. The reference point was a place on the housing settlement border closest to the terminals and on that place daily and night equivalent noise level was measured. Out of port traffic and operational activities taking place in the neighborhood have a primary impact on daily noise level, while the cause of night noise level are the activities taking place at a nearby bus station. The equivalent noise levels measured and stipulated by law are given in Table 6.2.

Cumulative impact of both terminals (CT and BCT) to the total level of noise impact at the reference point on the residential settlement border is calculated according to ISO 9613 standard. The calculation produced an equivalent noise of 47 dB(A) at the reference point under assumption that both terminals operated simultaneously round the clock, so the figures

² Fugitive emission of dust caused by handling bulk cargoes and wind erosion

³ First Category Air Quality - clean or slightly polluted air; the limit values (LV) are not exceeded for any pollutant – LV are prescribed by Regulation on limited and recommended values of air pollution

calculated apply to day and night period. Table 6.2 shows the values measured and calculated for the reference point. It also shows an anticipated noise level when the existing noise levels are added the calculated level caused by the noise generated by both terminals. Based on the table and comparison of the values with maximum legally allowed noise levels, a conclusion can be made that the cumulative noise caused by simultaneous operation of both terminals will not increase the noise emission levels above limits stipulated and allowed by law.

Table 6.2: Noise levels

$L_{A,eq}$ [dB(A)]	Existing condition	Noise caused by operation of both terminals	Anticipated total noise	Max. noise level allowed by law
Day	58	47	58,3	65
Night	39	47	47,6	50

Because of identical noise level per a square meter of the area of both terminals and the noise level per a square meter of the building area, the same calculation is valid for the terminal construction phase and for their operation phase. Preparatory construction works in both terminal areas will not increase the total level of noise emission in the residential area above the noise level allowed by law.

BIOLOGICAL CHARACTERISTICS OF THE AREA SURROUNDING PORT OF PLOČE :

SEA ORGANISMS: Cumulative environmental impacts of the CT and BCT on the marine flora and fauna will not be significant because. However, according to the CT EIS the construction of this terminal will increase quantities of suspended material, but they will not deteriorate the existing conditions because the sea bottom in the area is already degraded. Moreover, the deepening of the aquatorium during the construction phase will increase water flow and the water exchange of the basin between Quay 5 (existing bulk cargo terminal) and Quay 7 and surrounding aquatorium and would improve present situation regarding sedimentation of the organic and inorganic material. During the BCT construction larger impacts on marine communities will occur only in the relatively small area near construction works and impacts in the area further than 400 m from the construction works is not expected. Moreover, organisms will re-colonize the areas, except in the localities where depth and the navigation route maintenance will occur.

NERETVA VALEY: The Neretva Valley/Delta is located just about 150 meters from the planned location of the new BCT, and the Project has raised several issues of concern for the NGOs that are interested in the protection of the Neretva Valley, which is declared as a RAMSAR site and is proposed to become a Natural Park, but decision has yet to be declared. The cumulative impact of the Project on the RAMSAR site is expected to be generally very limited and mainly related to the new BCT. However, the proximity to the site and concerns raised by the NGOs during Public Consultations, resulted in a significant change in the design of the Project. The direct effects are that the size of vessels received would be limited to 80,000 dwt instead of originally planned 150,000 dwt, thereby avoiding any physical intrusion into the RAMSAR site and less deepening of the Vlaska Channel. In addition, the BCT berth has been moved towards the sea to the early entrance of the Vlaska Channel, thereby also reducing the need for dredging inside the channel and avoiding impacts on the left channel bank.

Possible negative effects of Project cumulative noise from operation of both terminals will not significantly increase impact on proposed ornithological reserve Ploče-Parila. Eventual impact on Ploče – Parila is caused only by BCT operation. Higher noise level during the BCT operation will last almost the whole day and in border area, nearest to the proposed ornithological reserve, will probably be up to 60 dB. *Such noise levels may have only modest negative impact on birds as the noise levels disturbing birds are similar to the levels set for human beings.* Moreover, light sources from the BCT may also have negative impact on birds which are flying through or are living in the area during certain period of year.

The Neretva Delta is anticipated for protection in the nature park category . Moreover, it is a part of the proposal of the National Ecological Network (CRO-NEN) as a part of the Pan-European Ecological Network - NATURA 2000 Network - which consists of areas important for species and habitats threatened on national and European level. Implementation of this project is one of the obligations Croatia has to meet in the accession process to the EU.

Moreover, BirdLife International as a global Partnership of conservation organizations that strives to conserve birds, their habitats and global biodiversity, has designated the Neretva Delta as an Important Bird Area.

Important Bird Areas have the aim to form a network sites ensuring that migratory species find suitable breeding, stop-over and wintering places along their respective flyways and they present priority sites for conservation of birds.

Also, the Neretva Delta has been included in the List of Wetlands of International Importance of the Convention on Wetlands of International Importance especially as Waterfowl Habitat (RAMSAR Convention)..

The Port area planned for port expansion activities is adjacent, but not within the area designated as RAMSAR site. The area to be developed as a part of the project, within designated Port area, will cover 55 ha. In comparison, the adjacent protected RAMSAR area covers 24585 ha, with four established and two proposed reserves of importance for birds. Moreover, the project has been designed so as to avoid significant impacts on the project area, and in particular on adjacent Neretva Delta..

According to the Convention on Wetlands of International Importance especially as Waterfowl Habitat (The RAMSAR Convention on Wetlands) each Contracting Party shall arrange to be informed at the earliest possible time if the ecological character of any wetland in its territory and included in the List has changed, is changing or is likely to change as the result of technological developments, pollution or other human interference. Information on such changes shall be passed without delay to the organization or government responsible for the continuing bureau duties.

Croatian institutions, including relevant body of Ministry of Culture responsible for nature protection, were informed by the PPA when launching the licensing process for the new terminals, and so were the local, national and international NGOs (within the public consultation and disclosure activities performed in line with WB/IFI procedures). The RAMSAR Secretariat was notified about the Ploče Port Project by the World Bank and directed to the Port of Ploče Authority web site http://www.port-authority-ploce.hr/okolis/index_eng.asp with the English version of EIAs prepared for the project terminals (CT, BCT) for more information.

In addition, the person responsible for RAMSAR Convention in Croatia with Ministry of Culture, Mr. E.Draganovic, is in the same time member of the Government commission that is supervising and approving EIA studies of new Port of Ploče terminals.

7. Environmental Management Plan

7.1 *Mitigating measures to address the short and long-term cumulative environmental impacts*

For key Port Infrastructure Development components, that is for CT and BCT, separate EA studies/reports have been made, together with separate EMPs (an additional EMP is made for the Port supporting infrastructure and entrance facility). These documents identified environmental impacts of each terminal, along with mitigation measures to be taken. The CT already obtained location permit (July 2005) containing mandatory mitigation measures to be fulfilled in the CT final design for the construction permit and later on implemented in construction and operation of the CT. The BCT is currently (May/June 2006) in the same licensing process – Draft EA study/report entered the review process by the Government commission, which also requested cumulative environmental impacts of both new terminals, existing port facilities and supporting infrastructure to be properly assessed and checked against current environmental regulations. Cumulative impacts were therefore identified, assessed and modeled not only for this Overall EA Executive Summary required by the WB procedure, but also for the Croatian licensing commission/body.

To avoid possible negative cumulative impacts, following mitigation measures are proposed (and will be implemented):

DREDGING:

- This phase of the Project construction should be scheduled in the period of the least effect on fishes, e.g. fish migration period should be avoided.
- Dredged material shall be disposed in the area within the area of the Port of Ploče.
 - a) Container Terminal (CT):
 - Dredged material shall be disposed within the Port area, on location of the CT area and on areas for further development of the Port
 - b) Bulk Cargo Terminal (BCT)
 - Dredged material shall be disposed on existing land and land reclaimed from sea within the Port of Ploče area.
 - In case that *hydraulic dredging* is chosen: To prevent dispersion of the disposed material into the sea and to allow leakage of water from the material piled on land, it is necessary to make:
 - peripheral stone fills covered with geotextile and sand;
 - a drainage system consisting of drain pipes protected with geotextile and sandIn case of *mechanical dredging* this mitigation measure (i.e. construction of dikes and drainage system) will be excluded.

- Chance-finds procedures for underwater archaeological sites potentially discovered during dredging activities shall be fully implemented: additional pre-dredging investigations/ screening (if needed by contractors), on-site identification, temporary cessation of works, notification of PPA and appropriate cultural heritage authority, participation in post-find activities, etc.

NOISE MITIGATION MEASURES (NOISE PROTECTION MEASURES):

- During dredging operations, economically justified BATNEEC technologies should be used to mitigate noise emission.
- To maintain current noise emission, regular maintenance of dredgers is required.
- During the construction works, economically justified BATNEEC technologies should be used to reduce noise emission.
- All mechanical and other equipment necessary for construction works must be in good repair.
- When selecting the equipment and devices, special attention should be paid to selection of machinery and equipment featuring good sound and anti-vibration characteristics.

PROTECTION OF SEAWATER QUALITY AND INDIRECTLY MARINE COMMUNITIES (BIOCENOSIS)

- It is necessary to build a system for drainage and treatment of rainfall (storm waters) from the terminal areas to achieve the quality of water for discharge into the sea stipulated by the Water License.
- It is necessary to build a system for collection and treatment of sanitary wastewater from the terminal areas
- It is necessary to build a system for drainage and treatment of rainfall (storm waters) from future internal roads inside Port of Ploče.

MITIGATION MEASURES FOR AIR PROTECTION:

- To reduce emission of particulates to air during the Project construction,:
 - It is necessary to limit the vehicle speed at the building site to 25 – 30 km/h.
 - It is necessary to spray water onto the area of construction machinery operation to reduce dust rising from ground.
- To reduce particulate emission to air due to *bulk cargo* handling and dispersion of *bulk cargo*:
 - It is necessary to build a system for spraying/wetting bulk cargo and unloading/reloading places (transfer points);
 - Obligatory usage of a spraying / wetting system.
 - If necessary, polyelectrolytes for spraying of the material stored at the terminal shall be used.
 - It is necessary to design closed unloading/reloading places (transfer points) on the belt conveyor line.
- Maintenance of all internal roads is required.

MITIGATION MEASURES FOR PROTECTION OF ORNITHOFAUNA:
(SPECIFIC TO BCT TERMINAL)

- Working hours of dredging operation should be limited in area alongside Ploče – Parila proposed ornithological reserve.
- In order to protect ornithofauna, further design phases should provide direction of the light opposite the area of Ploče - Parila and lights should be directed on the ground, as much as reasonably possible.
- Application of all measures for noise protection prescribed by EMP for BCT

WASTE:

- It is necessary to make a Plan for reception and handling of all kind of waste and cargo residues from waterborne crafts according to the Addendum 1 to the *By-law on Port Operation (Gazette 110/04)*.
- To provide for proper waste management during the Project operation, before the start of the terminal (CT and CBT) operation adequate waste facility it is necessary to create conditions for reception of all types of waste from ships.
- Different types of waste generated during the terminal usage shall be collected separately.
- Waste generated during the Project usage shall be received / collected only by legal entities satisfying the conditions stipulated by the *Law on Waste (Gazette 178/04)*.
- If at the port location, there is no possibility for final treatment of waste generated during the Project usage, final treatment of each type of waste shall be contracted with legal entities licensed for collection, transport and/or management of each type of waste.

ACCIDENTS:

- It is necessary to provide means and equipment for prevention of sea pollution and remedy of the sea pollution consequences.
- It is necessary to make a maritime study for both CT and CBT according to the contents set out in the Article 5 of the *By-law on Port Operation (Gazette 110/04)*;
- The means and equipment for prevention of sea pollution and remedy of the pollution consequences shall be regularly maintained and completed.

In principal, the Port of Ploče Authority (PPA) is responsible for implementation of all environmental protection and mitigation measures agreed or prescribed by licensing regulations/permits.

When signing the contract for development of design documentation and execution of construction works on the terminals planned and the supporting infrastructure, any measures determined for environmental protection during the construction works shall be included in the contractors' obligations. The PPA will be responsible, together with the contractors, for controlling and supervising the implementation of contractual obligations and environmental protection measures during the Project construction.

When signing a concession agreement for performance of some port activities, all measures determined for environmental protection during the Project operation shall be included in the contractual obligation of the concessionaire. The PPA will be responsible, together with the

concessionaire, for controlling and supervising the implementation of contractual obligations and environmental protection measures during the Project operation.

Prior to issuing the bidding documents for the abovementioned construction activities, as well as for concession agreements, the PPA shall issue a more specific environmental supervision plan for each of major project components (terminals) with special emphasis to natural habitats.

7.2 Specific mitigating measures to be taken in respect of projects, sub-projects and associated investments outside the TTI but supportive to it

As already mentioned, all projects outside the TTI Project, but supportive or complementary to it (see Chp.4), are in initial or preparatory phases performed by various legal entities (e.g. Croatian Highways, Croatian Railways, Town of Ploče, Croatian Waters, etc.) and their contractors. PPA is informed of or consulted always when particular projects are related to either this Port Infrastructure Development Project, or to regular PPA line of business. Licensing process of all of these projects includes environmental issues (preparation of EIAs), so that associated environmental protection/mitigation measures will be in line with Croatian regulations, licensing body requirements and good engineering practice.

The most environmentally demanding projects are: (i) construction of connecting road from the Town of Ploče and the new Port of Ploče entrance facility to the closest motorway junction (some 8.5 km), (ii) upgrading of the Ploče cargo railway station.

Connecting road project is of top importance, because it will serve as a supply route of raw materials (large quantities of excess stone of motorways and access roads construction) required in the Port for reclamation and soil improvement purposes for the new CT and BCT. Quality and size specifications of stone will be agreed upon (PPA and Croatian Highways) in order to avoid almost any stone treatment in the Port Area prior to its use, and thus avoiding related environmental impacts of stone treatment. The connecting road will be routed to achieve minimum construction impacts on neighboring settlements. Preparation of EIA study for connecting road is responsibility of Croatian Motorways and will be done in accordance to existing national environmental protection procedure.

Ploče cargo railway station will be upgraded by Croatian Railways. Since detailed project design and EMP is not available yet, replacement of old sleepers and their temporary disposal and export for final treatment as hazardous waste is expected.

ANNEX 1: A list of international agreements relevant for the field of environmental protection and nature conservation relating to specific characteristics of port activities and a special quality of nature in the area where the Port of Ploče is situated

- Convention on Protection of World Cultural and Natural Heritage (Paris 1972)
Published in Gazette – MU 12/93; the Republic of Croatia is a party to the Convention on the basis of notification of succession dated 8 October 1991; came into operation for the Republic of Croatia on 8 October 1991.
- Convention on marsh-land of international importance particularly as wading birds habitats (Ramsar 1971.)
Published in Gazette – MU 12/93; the Republic of Croatia is a party to the Convention on the basis of notification of succession dated 8 October 1991; came into operation for the Republic of Croatia on 8 October 1991.
- Law on ratification of UN Convention of biological diversity
Published in Gazette – MU 6/96; the Convention came into operation for the Republic of Croatia on 7 October 1996.
- Law on ratification of Protocol of biological Safety (Kartagen Protocol) to the Convention on Biological Diversity, (Montreal 2000)
Published in Gazette - MU 7/02. The Republic of Croatia signed the Protocol in New York in 2000
- Law on ratification of Convention on protection of European wild species and natural habitats (Bern Convention)
Published in Gazette - MU 6/00. the Convention came into operation for the Republic of Croatia on 1 October 2000
- Law on ratification of Convention on protection of migratory species of wild animals (Bonn Convention)
Published in u NN - MU 6/00. The Convention came into operation for the Republic of Croatia on 1 October 2000
- Law on ratification of Agreement of protection African.Euroasian migratory wading birds (AEWA)
Published in Gazette – MU6/00. Came into force for the Republic of Croatia on 1 October 2000
- Convention on prevention of sea pollution from ships, 1973, amended by Protocol from 1978 (MARPOL 73/78). The Convention came into force on 2 October 1983. The Republic of Croatia is party to the Convention on the basis of the notification of succession dated 8 October 1991. The Convention annexes are:
Annex 1: Prevention of oil pollution – came into force on 12 October 1983
Annex 2: Prevention of pollution by hazardous liquid substances transported in bulk condition – came into force on 6 April 1987.
Annex 3: Prevention of pollution by hazardous substances transported by sea in unpacked condition – came into force on 1 July 1992
Annex 4: Prevention of pollution by sewage water from ships – came into force on 27 September 2003
Annex 5: Prevention of pollution by waste dumped from ships – came into force on 31 December 1998
Annex 6: Prevention of pollution of air from ships – came into force on 19 May 2005.
- Convention on protection of the Mediterranean Sea from Pollution (Barcelona 1976).
Based on the notification of succession the Republic of Croatia is a party to the Convention since 8 October 1991 (Gazette MU No. 12/93). Amendment of Barcelona

Convention from 1995 published in Gazette MU No. 17/98 came into force for the Republic of Croatia on 9 July 2004 (this date published in Gazette MU No. 11/04).

- Convention on access to information of participation of the public in decision-making and access to the administration justice involving environmental matters (Aarhus 1998), the Republic of Croatia signed the Convention in 1998.