Opi Inter *d.o.o.*

Environmental and maritime engineering

Investor:	*Luka Koper d.d.* Vojkovo Nabrežje 38 6000 Koper, Slovenia
Facility:	Berth 7C quayside with hinterland storage area adjacent Basin I of the Port of Koper Following performance of audit No. 30 26 06 ppm by *E-Net Okolje d.o.o.*
Project Management:	*Opi Inter d.o.o.* Hajdrihova 28c 1000 Ljubljana Slovenia
Person responsible:	Mr Bojan Grum
Project elaboration:	Dr Monika Peterlin
Contractors:	Noise pollution: *Institute of Occupational Health - Centre of Ecology, Toxicology and Radiation Protection*, Ljubljana, Slovenia Environmental impact: *Unic Sub, Ugo Fonda s.p.*, Portorož, Slovenia

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1 Introduction

1.3 Rationale Underlying the Proposed Development

The Port of Koper is Slovenia's sole seaport, an intermodal transport hub which is also vital to the land-locked countries of Central Europe. Thus, given the lack of any other suitable location for the development of a new port at the head of the Adriatic, Koper is of strategic significance. In the renovation and upgrade of facilities, special attention is paid to restructuring and more intensive usage; the concern is to minimize any disturbance to the environment, and, in this context, assess the environmental impacts of individual projects and processes. Further to this concern, the port is situated adjacent an urban and tourist milieu, rich in elements of heritage which have to be sustained and preserved (see: Attachment No. 1: Overview).

The Port of Koper, which was established in 1957, has thus far exploited the existing spatial capacities at Pier I. In addition to the Container Terminal, Pier I also encompasses dry bulk and liquid cargo operations, whereas its immediate hinterland features storage areas for such wares as timber and vehicles. The Dry Bulk Terminal - minerals and grains - is located at Pier II and features silo storage and petrochemicals facilities (Attachment No. 2: Current Situation). Due to the fact that the existing capacities do not allow any increase in cargo throughput volumes (growth), *Luka Koper* - as the operator of the Port of Koper - decided to extend the south-western end of Pier I.

The project anticipated an approximately 160-metre long westward extension of the quayside (for vessel loading and unloading) beyond the existing Berth 7B, as well as reclamation of the hinterland area (for open storage of container freight). For more on this see the situation report in Attachment No. 3: The Development.

Comparison of the situation before and after the proposed development

The existing Container Terminal, covering an area of 155,600 m^2 and with an annual throughput capacity of cca. 180,000 TEUs, is located on the southern side of Pier I. Said capacity is dependent on the total capacity of container cranes, which will not in itself increase as a consequence of the proposed development. The extension at the southwestern end of Pier I. will increase the hinterland storage area by 14% - i.e. from 155,600 m^2 to 178,000 m^2.

The existing quayside is 452 m long and features 3 berths: one for vessels with drafts of up to 9.5 m, whilst the outer two allow a 11.2 m draft. The Terminal is replete with a twin-track rail head which facilitates wagon compilations up to 614 m in length. The westward extension of the berth 7B existing quayside of towards west will amount to 160 m, thus the total quayside length will amount to 612 m, which is a 35% increase. The seabed will be deepened to 14.5 m, which will allow mooring of larger (Postpanamax) vessels.

The existing Container Terminal was constructed in two stages; the original part built in the early 1970s was expanded to its present capacity in late 1980s. The environmental impact report considers the influence of the entire Container Terminal, i.e. the existing facilities together with those which would be afforded by its extension.

1.4 Purpose of this Report

This report provides analyses and assessment as to acceptability of the development from the perspective of all actual, predicted and possible environmental impacts and consequences, in relation to the environment as a whole as well as its individual constituent elements.

The report is elaborated to meet the requirements of attaining planning consent, in relation to environmental impact and protection issues, for the extension of quayside at Pier I and the expansion of Container Terminal operations at the Port of Koper.

4 Basis for Elaboration of the Report

2.1 Legal Basis

The report takes into consideration all pertinent environmental protection regulations which set standards and norms, codes of conduct as well as other basic conditions in terms of the proposed development.

The general legislative and statutory regulations, as well as the basis and methodology for the elaboration of this report and its contents, are as follows:

- *Environment Protection Act* /ZVO-1/ (Official Gazette of the Republic of Slovenia, No. 39/06 – official consolidated text)
- *Water Act* /ZV-1/ (Official Gazette of the Republic of Slovenia, No. 67/02, 110/02, 2/04, 41/04-ZVO-1)
- *Spatial Planning Act* (Official Gazette of the Republic of Slovenia, No. 110/02, 8/03, 58/03)
- *Construction Act* /ZGO-1-UPB1/ (Official Gazette of the Republic of Slovenia, No. 102/04 - official consolidated text - amendments)
- *Chemicals Act* /ZKem-UPB1/ (Official Gazette of the Republic of Slovenia, No. 110/03, 47/04-ZdZPZ)
- *Decree on the categories of activities for which an environmental impact assessment is mandatory* (Official Gazette of the Republic of Slovenia, No. 78/2006)
- *Guidance on methodology for the elaboration of environmental impact reports* (Official Gazette of the Republic of Slovenia, No. 70/96, 41/04)

Item 8.2 of Article 3 of the *Decree on the categories of activities for which an environmental impact assessment is mandatory* (Official Gazette of the Republic of Slovenia, No. 78/2006) addresses the anticipated intervention, namely: a commercial port or facility which is connected to land either for loading and unloading freight, or the international transport of people (with the exception of piers or jetties for ferries) – in relation to vessels with a displacement of more than 1,350 tonnes.

Regulations applied in the impact assessment and the acceptability of nuisance as well as alterations to individual components of the environment, are specified in the individual chapters of the report which address specific environmental components.

2.2 Other Bases for the Elaboration of the Report

Other bases for the elaboration of the Environmental Report include:

- *Unic Sub Environmental Impact Report on the Extension of the Luka Koper Container Terminal – Subaquatic Section.* Unic Sub Ugo Fonda s.p., Portorož; *2006*
- *ZVD Assessment of Noise Pollution at the Planned Multimodal Terminal at Pier III*. Report elaborated by F. Deželak and F. Petančič of the Ecology and Toxicology Dept at the Institute of Occupational Health, Ljubljana, Slovenia, on behalf of Luka Koper d.d. Report No. ZVD CET-00082; April 2001.
- *ZVD Assessment of Noise Pollution at the Planned Multimodal Terminal at Pier III – Corrections upon the Adoption of New Regulations*. Report elaborated by F. Deželak

and F. Petančič of the Ecology and Toxicology Dept at the Institute of Occupational Health, Ljubljana, Slovenia, on behalf of Luka Koper d.d.; August 2006.

Other reports are indicated as a source within each chapter herein.

2.3 The Content and Scope of this report

In terms of methodology, the report fulfils the provisions of the *Guidelines on the Methodology for the Elaboration of Environmental Impact Reports*; accordingly, it encompasses the following:

- description and assessment of the current situation of the environment, together with a description and assessment of the individual components thereof;
- explanation of the anticipated characteristics of the development;
- description, assessment and evaluation as to the impacts of the development, as well as acceptability of environmental nuisance and changes to the environment;
- additional proposals for mitigation and protection measures;
- proposals as to environment monitoring;
- notifications as to the complexity of the development and the report;
- final assessment as to the acceptability of the anticipated development.

Based on analyses and assessments of all actual as well as possible eventual environmental impacts and nuisances, the report identifies specific areas which are envisaged to be influenced by the proposed development.

The sources of information and references are indicated in the chapters to which they pertain.

The report addresses impact from the following perspectives:

- pollution
- environmental degradation
- damage to the environment
- environmental risks and hazards
- exploitation and use of natural resources;

as well as in relation to:

- environment quality – air
- environment quality – soil
- environment quality – waters
- environment quality – noise
- environment quality – waste and refuse
- environment quality – electromagnetic radiation
- natural heritage
- cultural heritage
- landscape and visual characteristics
- risk of eventual large-scale accidents.

2.4 Assessment and Evaluation Methodology

Assessment as to the environmental impacts of the proposed development are based on the assumption that in its planning and implementation, as well as in its operation, *Luka Koper* will apply the proposed mitigation measures compliant with the methodology prescribed by the *Guidance on methodology for the elaboration of environmental impact reports*.

Value scales are used to assess the acceptability of anticipated changes occurring as a consequence of the intervention in relation to individual environmental components, therefore rather than being a direct conversion of quantified changes of environmental components into value assessments, they provide an adequate interpretation of the anticipated modifications. Some elements have legally prescribed limit values, whilst others are assessed on the basis of the assessor's expert opinion.

The impacts as well as the environmental nuisance engendered by the intervention, as well as the acceptability of such changes are assessed and evaluated using a five-degree positive and negative value scale. Said scale is thus used in the assessment as to the acceptability of the project in relation to individual environmental components. Therefore rather than being a direct conversion of quantified changes of environmental components into value assessments, they provide an adequate interpretation of the anticipated modifications. Again, some elements have legally prescribed limit values, whilst others are assessed on the basis of expert opinion.

The descriptive assessment of environmental impacts is based on a positive and negative value scale (see Table 1 and Table 2 below). The current (initial) condition, denoted by the figure 0, represents the initial quality of the environment. A positive value scale indicates an improvement in the current condition of the environment, whilst a negative one indicates deterioration. The value criteria underlying the quantification are identified below, while the current condition (pre-intervention) used as a basis in the assessment equals zero (0)

Table 1: Impact Assessment – positive value scale

+1	Minor improvement in condition	=	Minor or marginal quantitative and/or qualitative change to the environmental component
+2	Moderate improvement in condition	=	Moderate quantitative and/or qualitative change to the environmental component
+3	Medium improvement in condition	=	Medium quantitative and/or qualitative change to the environmental component
+4	Considerable improvement in condition	=	Very large quantitative and/or qualitative change to the environmental component
+5	Immense improvement in condition	=	Enormous quantitative and/or qualitative change to the environmental component

Table 2: Impact Assessment – negative value scale

-1	Minor impact	=	Minor or marginal quantitative and/or qualitative change to the environmental component
-2	Moderate impact	=	Moderate quantitative and/or qualitative change to the environmental component
-3	Medium impact	=	Medium quantitative and/or qualitative change to the environmental component

-4	Considerable impact	=	Very large quantitative and/or qualitative change to the environmental component, on the verge of being unacceptable
-5	Immense impact (which is unacceptable)	=	Massive quantitative and/or qualitative change to the environmental component, i.e. one which exceeds the legally prescribed values and/or presents an unacceptable environmental impact

5 Site Description

3.1 The location

The proposed development at plot Nos. 1608/3 and 1608/4 k.o. Koper concerns a 160 m-long westward extension of the southwestern end of Pier I, namely: a westward continuance of the current quayside at Berth 7B together with a similar prolongation of the hinterland container storage area. The new quayside will be used for handling operations (container vessel loading/unloading), while the capacity of the open storage area at the Terminal will be increased from the current 155,600 m^2 to 178,000 m^2 as a result of the development (see: Attachment No. 2: Current Situation).

The immediate area encompasses the Container Terminal at Pier I of the Port of Koper, which is operated by *Luka Koper d.d*, whilst the broader area encompasses the city of Koper and its hinterland.

The closest residential property is located some 400 m from the planned development (south across Basin I.

Illustration 1: The quayside extension under consideration (source: Luka Koper)

3.1.5 Physical characteristics - geography

The industrialised shore-side and the depopulated countryside in the hinterland are indicative of the imbalance which, in terms of spatial planning, exists in the Koper region. The result has been the spatial and ecological aggravation of the immediate coastline and negation of the rural areas beyond. This said, however, a trend of de-urbanisation has been observed of late; namely, the number of rural inhabitants is increasing at a faster rate than the population of the city of Koper (source: Statistical Office of the Republic of Slovenia, 2003). Population density in the immediate coastal area is twice the average population density for Slovenia as a whole (232 inhabitants per square kilometre, compared to the national average of 98 inhabitants per square kilometre). More than 80% of population who inhabit the coastal zone live within 1.5 km of the sea.

The broader Koper district is a lowland area, much of which is barely above sea level; the coastal basin is rimmed by low hills to the north and south, with Sermin - a flysch monadnock (inselberg) hill - located immediately to the east. The lowland plain slopes towards the sea very gently, while much of the Port of Koper is built on reclaimed and backfilled salt marsh.

The entire shoreline from the Port of Koper's northernmost periphery, through Koper town to Simonov Zaliv, just to the west of the town of Izola, has been radically altered by human intervention. The natural characteristics of the area north of the port towards the headland at Debeli Rtic has at least in part been preserved its natural form, and enjoys official protection by Koper Municipality as a natural heritage area.

The protected natural heritage areas and sites in the vicinity of the Port of Koper are described in Item 3.2.1.

3.1.6 Land use potentials

The proposed development is situated within the city of Koper planning zone across areas which between 1986 and 1999 were designated by Koper's municipal authorities for use by the Port of Koper – and accordingly Luka Koper, as the operator of the port zone.

Land use designation for the area of the proposed development is regulated by the *Long-term Municipal Plan* issued and re-issued with amendments and supplements between 1986 and 2000 by Koper's municipal authorities (PN UO, Nos. 25/86, 10/88, 9/92, 4/93, 7/94, 25/94, 14/95, 11/98, 16/99, 33/01, Official Gazette of the Republic of Slovenia, Nos. 96/04, 97/04).

3.1.7 Development, infrastructure and communications

Both the port zone and the broader surroundings completely lack land which is in its truly natural state and exhibiting no signs of human intervention. The district is characterised by extensive agricultural areas interrupted by isolated industrial sites. Although the land is not densely populated, it encompasses road and rail network infrastructure which is of national importance. The area is bisected by the Rižana River (see Illustration 2).

The Port of Koper is bounded by Sermin Hill to the northeast, and to the southwest by the old city centre of Koper – which still reflects the outline of the erstwhile island on which it was founded more than 1500 years ago. To the west is the Bay of Koper, which itself lies at the

southern side of the Gulf of Trieste. Over recent decades this area witnessed fundamental changes and development, which remains ongoing. In addition to the existing infrastructure and plant, necessary for the provision of port services, development projects necessary for the creation and operation of a modern inter-modal facility are also underway Further to the reclamation of salt marsh and the simultaneous deepening of the basins which comprise the harbour, port infrastructure and facilities - buildings, transport infrastructure, utilities and other service provision - undergo constant modernisation and upgrade as a response to market requirements and the demands of environment-related statute.

Illustration 2: The Port of Koper, an aerial view from the west (source: Luka Koper)

The Port of Koper's surroundings have also been greatly altered, and hardly anywhere reflects its natural countenance. The city of Koper's central sewerage treatment plant is located directly behind the port, whilst the agricultural areas beyond the population centres (Koper and its satellites) are marked by industrial sites, an extensive road and rail network, as well as above-ground pipelines and power-lines.

The Rižana River, into which Koper's central sewerage treatment plant discharges, flows into the port's Basin No. II, whilst drains (surface run-off) from the area to the north, around Ankaran flows into Basin No. III. Further to this, the Škocjanski Zatok channel is also directed into Basin No. II (see Illustration 2).

Accessible by both land and sea, Pier I at the Port of Koper - the subject of the proposed development - is linked to the broader hinterland by the port's road and rail infrastructure. The two-lane asphalted road to Pier I traverses a bridge over the Rižana River. The unpaved road along the Rižana River is used for the maintenance of the oil derivatives pipeline (see Illustration 3).

Pier I has two railheads: one serving the Container Terminal (located centrally) – and one along its northern edge, both are directly connected to a marshalling yard and the main line serving Koper (see Illustration 4).

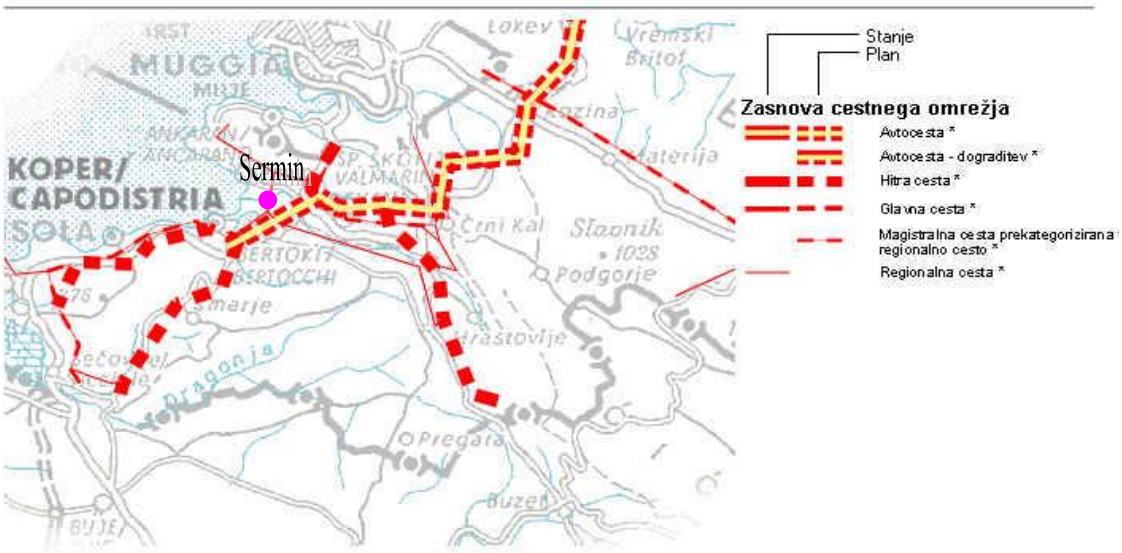

Illustration 3: Main highway network around Koper (source: Atlas of Slovenia)

Stanje = Existing
Plan = Projected

Zasnova cestnega omrežja = Main Highway Network
Avtocesta = Motorway
Avtocesta – dograditev = Motorway - upgrade
Hitra cesta = Expressway
Glavna cesta = Main road
Magistralna cesta prekategorizirana v regionalno cesto = Trunk road re-categorised as a regional road
Regionalna cesta = Regional road

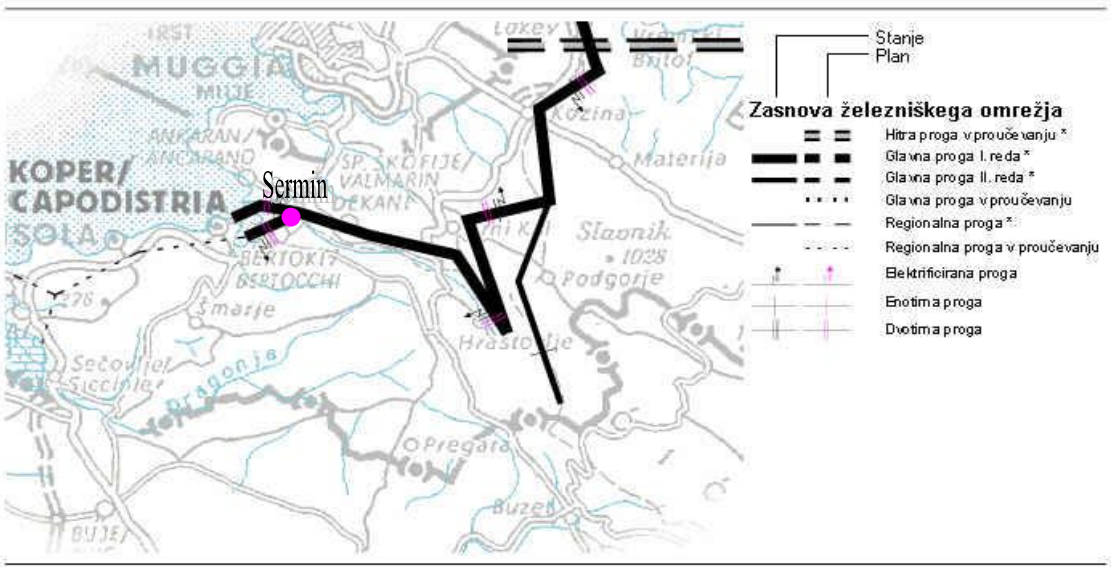

Illustration 4: Railway network around Koper (source: Atlas of Slovenia)

Stanje = Existing
Plan = Projected
Zasnova železniškega omrežja = Railway Network

Hitra proga v preučevanju = High speed line
Glavna proga I. reda = Category I main line
Glavna proga II. reda = Category II main line
Glavna proga v preučevanju = Projected main line
Regionalna proga v preučevanju = Projected regional line
Elektrificirana proga = Electrified line
Enotirna proga = Single-track line
Dvotirna proga = Double-track line

3.1.8 Sources

- *Long-term Municipal Plan* issued and re-issued with amendments and supplements between 1986 and 2000 by Koper's municipal authorities. PN UO, Nos. 25/86, 10/88, 9/92, 4/93, 7/94, 25/94, 14/95, 11/98, 16/99, 33/01, Official Gazette of the Republic of Slovenia, Nos. 96/04, 97/04).
- *Koper Municipality Social Plan* 1986 to 1990 with amendments and supplements. PN UO, Nos. 36/86, 11/92, 4/93, 7/94, 25/94, 14/95, 11/98, 16/99, 33/01, Official Gazette of the Republic of Slovenia, No. 96/04, 97/04
- *Decree on Spatial Planning Conditions for the Port of Koper Zone*. PN UO 45/1998, 20/01-resolution.
- *Annual Statistics Yearbook - 2003*; Statistical Office of the Republic of Slovenia, 2003.
- *Slovenia's Regions in Figures – 2006*; Statistical Office of the Republic of Slovenia, 2006.

16.2 Natural Characteristics of the Environment

16.2.1 Natural and other reserves

The broader area encompasses the following *Natura 2000* sites, which are indicated in Attachment No. 4.4.:

- saltmarsh at Sv. Nikolaj (2,200 m + distant from the subject area)
- seagrass meadow (*Posidonia oceanica)* Koper – Žusterna (2,200 m + distant from the subject area)
- Škocjanski Zatok wetland nature reserve (1,100 m + distant from the subject area).

Several features of natural heritage, located in close proximity of the anticipated development and described in more detail in Chapter 11., are as follows:

- plane tree at Belvedere quay
- Bonifika area
- Rižana River (described in Item 3.2.3.7.).

Both the sea (marine environment) and shore (coastal environment) in the vicinity of the anticipated development are of relevance in terms of environmental protection. The effects on the maritime ecosystem are described in chapters addressing the impacts on vegetation and wildlife.

Škocjanski Zatok Nature Reserve

The Škocjanski Zatok lagoon is an area just inland from the port zone where fresh and salt water mix; it is located to the west of the city of Koper and bounded to the southeast by the railway and motorway; the reclaimed land to the north is for the most part fallow. The periphery of the reserve is some 1,400 m away from the proposed Pier I development. Škocjanski Zatok was formed as a consequence of the gradual silting of waters, and reclamation of land, in the tidal area which once separated the island town of Koper from the mainland. Today the lagoon is connected with the sea at Basin II by a narrow channel. P
Protected as a nature reserve, Škocjanski Zatok is also a *Natura 2000* site – code SI5000008 – in relation to the *Council of Europe Directive 79/409/EU of 2nd April 1979 on the Conservation of Wild Birds*. In addition to being a potential site of community interest (SI3000252) the site also falls within the jurisdiction of the 1998 *Act on the Škocjanski Zatok Nature Reserve*, Official Gazette of the Republic of Slovenia, No. 20/98). The closest areas of Škocjanski Zatok are more than 1,100 m distant from the proposed extension of Pier I (see Attachment No. 4.4: *Natura 2000* sites).

Škocjanski Zatok:

ID Code No.	SI5000008
Name:	Škocjanski Zatok
Designation:	Directive on the Conservation of Wild Birds (SPA)
Area:	115,369 hectares
Natura 2000:	
ID Code No.	SI3000252
Name:	Škocjanski Zatok
Designation:	Potential site of community interest (pSCI)
Area:	113,826 hectares
Species and habitat types:	
Designation:	Mudflats and sandflats not covered by seawater at low tide
Heritage type:	Habitat
Species and habitat types:	
Designation:	Coastal lagoons
Heritage type:	Habitat
Species and habitat types:	
Vegetation:	*Salicornia* and other annuals colonizing mud and sand
Designation:	Habitat
Species and habitat types :	
Vegetation:	Mediterranean halophytic scrub including *Sarcocornetea fruticosi*
Designation:	Habitat
Species and habitat types:	
Vegetation:	Mediterranean halophytic scrub including *Sarcocornetea fruticosi*
Designation :	Habitats
Species and habitat types:	
Animal species:	Mediterranean killifish
Designation :	Fish
Latin name:	*Aphanius fasciatus*

Saltmarsh at Sv. Nikolaj

The Sv. Nikolaj saltmarsh lies along the coast to the northwest of the port zone, not far from the resort of Ankaran. This broader area, primarily used for tourism and recreation, also encompasses a marina and a campsite. The Sv. Nikolaj bay saltmarsh, some 2 km distant from the proposed extension of Pier I, should be protected against any further degradation. Its halophilic vegetation is of special interest and is very rare in Slovenia. In addition, it is the habitat of the following endangered species as defined by International Union for the Conservation of Nature: Schenkia spicata (*Centarurium spicatum*,) the protea (*Conospermum tenuifolium*) and lin (*Linum maritimum*), as well as other species rare in the territory of Slovenia. Sv. Nikolaj is approximately 2,000 m from the proposed extension of Pier I.

Sv. Nikolaj Saltmarsh:

ID Code No.	SI3000241
Name:	Ankaran - Sv. Nikolaj
Designation:	potential site of community interest
Area (in hectares):	7,223
Species and habitat types:	
Designation	Mudflats and sand-flats not covered by seawater at low tide
Heritage type:	Various habitats
Species and habitat types:	
Vegetation:	Mediterranean halophytic scrub including *Sarcocornetea fruticosi*
Heritage type:	Natural habitat

Koper – Žusterna seagrass meadow

In the Bay of Trieste, which marks the most northerly reach of the Adriatic, *Posidonia oceanica*, one of the most common seagrasses in the Mediterranean, is only be found in a single small area along the Slovene coast between Koper and Izola. The kilometre-long belt which is the Žusterna seagrass meadow extends from the shore to up to fifty metres out to sea, and to a depth of about four metres. Due to the fact that Žusterna is the only habitat of its type in Slovenia, as well as the most northerly site of *Posidonia oceanica* in the Mediterranean, mandates its importance as regards preservation, and consequently Žusterna is a potential *Natura 2000* site. The seagrass meadow lies about 1,400 m distant from the proposed extension of Pier I.

Natura 2000:

ID Code No.	SI3000251
Name:	Žusterna – seagrass meadow
Designation:	potential site of community interest
Area:	6,885 hectares
Species and habitat types:	
Vegetation:	Submarine seagrass meadow (*Posidonia oceanica*)
Heritage type:	Habitat

*16.2.2 **Geomorphology***

The Port of Koper was constructed by dredging the basins and infilling the hinterland areas of the marshes that encompass Koper Bay together with the submerged river bed and the alluvial flood plain of the Rižana River, an area which naturally declines towards the sea at a gradient of between 0.15 to 0.20%. Indeed the land's present form and countenance – not including, of

course, all the many man-made features – was created some 12,000 years ago when the area was inundated at the end of the Würm Ice Age. The coastal area and the seabed hereabouts is composed of flysch (60%) alluvial and Holocene sediments (29%) and limestone (11%).

The development under consideration is situated at the southeastern end of Pier I. The Pier area at the Container Terminal quay is some 2.5 m above mean sea level, while the depth of the adjacent sea (in Basin I) is currently cca. 12 m.

16.2.3 Geology

The underlying geology was surveyed for the purpose of the Container Terminal construction at Pier I. Based on data from the reports, the ground is composed of the following characteristic layers:

- The seabed is composed of a very heterogeneous non-natural substrate, which derives from various periods of infill work. Its thickness varies, but on average extends to about 1.5 m below seabed level. In places this substrate has penetrated into the low-density clayey silt, which lies below and is in a malleable near fluid condition.
- On the western side of Pier I, at approximately 8 m below seabed level there is on average 12 m-thick layer of low-density clayey silt and greasy clay of a malleable and occasionally near fluid near consistency; at the depth of 20 m below seabed level this proceeds into greasy malleable clay containing organic matter.
- At some 27 m below seabed level is a layer of higher density, poorly granulated gravel-sandstone-siltstone.
- At some 49 m below seabed level there is brown marl mould containing sandstone particulate; below this strata is flysch marl.

The transitions between individual layers is most varied, which can be attributed to the years of dredging and infill work.

16.2.4 Soil – Pedology

Although Pier I was not been subject to any specific research, such was the case at the nearby Pier II, where the features of the natural substrate and infill (used in the land reclamation) were examined within the context of a project to plant natural vegetal windbreaks at the dry bulk cargo terminal. Both areas were dredged and filled under the same conditions and with similar materials. The results of the analyses produced by the Agricultural Institute of Slovenia indicate that the layer of marine sediment would inhibit the growth of most trees The layer above, composed of soil infill, is also lacking in essential nutrients, and in particular phosphorus, required for vegetative growth.

16.2.5 Waters

3.2.5.1 <u>The Rižana River</u>

The Rižana River flows into the sea at Basin II, near the north-eastern stem of Pier I. That particular stretch of the Rižana which flows through the port zone is outside the water protection area (see Attachment No. 4.2.: Potable water protection).

The main sources of pollution in the Rižana River are insufficiently treated sewerage emanating from Koper's municipal treatment plant, the effluent of which is discharged into its downstream section, together with other waste waters from the catchment area and industrial facilities (see Attachment 4.3: Waste water (UWWT) - Urban Waste Water Treatment agglomerations. The conditions get worse in summer when flow rates are low, as well during periods of high temperatures which stimulate anaerobic processes around the river's mouth. The results of saprobic analyses by the Environmental Agency of the Republic of Slovenia (published in 2002) reveal an improvement in the condition of the Rižana River since 1997.

Koper's central municipal sewerage treatment plant, which lies immediately behind the eastern periphery of the port zone, discharges partially treated water into the Rižana by way of an underwater outlet (a diffuser) that lies some 600 m distant from the river's mouth. The plant treats sewerage sludge mechanically and biologically, suspended particulate is removed by way of sedimentation and flotation; the waste water is a combination of municipal sewerage, rainwater and seawater (which is a consequence of the sea's penetration into the sewerage system). Such saline infiltration reduces the effect of biological water treatment.

The closest sampling point used to monitor the water quality of the Rižana, in compliance with the surface watercourses programme co-ordinated by the Ljubljana-based Ministry of the Environment and Spatial Planning – the Environmental Agency of the Republic of Slovenia (MOP-ARSO), is several kilometres upstream at Dekani. Water quality is also regularly assessed at the mouth of the Rižana River in the context of coastal waters monitoring. The annual *'Superficial Watercourses in Slovenia'* report (issued by MOP-ARSO 1997-2003 and NIB-MBP 2003-2005) regularly included analyses of the Rižana. According to the results, river pollution can mainly be attributed to the drainage of polluted waters from road surfaces, the leakage of waste waters from hinterland settlements, as well as run-off from agricultural areas. Various pollutants are even found to affect the quality of water at the river's karstic source.

3.2.5.2 The Sea

The Bay of Koper covers an area of some 18 km^2. It is relatively shallow and constitutes the submerged valley of the Rižana River. A somewhat poor circulation of water masses in the area reduces the natural cleaning ability of the sea. The influence of river outfall and leach agents from the marl hinterland is great; in addition to supplying large amounts of nutrients it also results in mud deposits on the seabed. Further to this, the dispersed sources of pollution encompass wash from both agricultural and urban areas, as well as pollutants flushed from the air. Said sources are not particularly related to the local pollution factors, and are often transported from very distant sources.

Tide and the sea level
Periodic alterations of seawater level are mainly related to the tide. The tide in Slovenia's coastal areas is of a mixed – semidiurnal and diurnal type. There is a linear relationship between atmospheric pressure and sea level – air pressure drops results in a rise in sea levels.

Waves
The formation as well as the fetch length of waves is related to the strength and duration of wind. The Bay of Koper is protected from the east thus easterly winds cannot form high waves. The highest anticipated wave height in the Bay of Koper over a 50-year period amounts to 2.50 m.

Currents
The constant currents in the Northern Adriatic run counter-clockwise – north along the Croatian and Slovene coast, and thence west and south along the coast of northeast Italy – their speed is about 0.5 m/s. Currents in the Bay of Koper were measured in the autumn of 1984; any alteration in their direction and speed depends primarily on tide and winds.

Iinfluence of winds on currents and the sea level
Winds of constant direction and larger strength form currents in the shallow Northern Adriatic.
The bora, a north to north-easterly katabatic wind, pushes the water's surface from the Gulf of Trieste Bay towards the central Adriatic, which results in lower sea levels along Slovenia's coast. A compensation current flows into the Gulf of Trieste parallel with the leeward Istrian coast, which causes increased salinity in Koper Bay.
Upon constant southerly winds, the surface layer of the sea is pushed into the Gulf of Trieste, and sea levels rise as a result, whilst the salinity in Koper Bay decreases due to the inflow of fresh water from the rivers of northern Italy.

3.2.5.3 Groundwater

The heterogeneous composition of the existing soil and artificial fill at Pier I prevents a uniform description of groundwater movement. Dredged material, composed of low-permeability clayey silt, responds very slowly to changes of the surrounding phreatic surface. The flysch aquiclude prevents the penetration of precipitation to lower strata; therefore the water is contained in the upper permeable stratum unless, of course, the surfaces are covered with a waterproof material.

The area under consideration is not located within the groundwater protection area for sources of drinking water (see Attachment No. 4.2.: Potable water protection).

16.2.6 Flora and Fauna

The constant changes to land and seabed configuration over recent decades (dredging, land reclamation and the infill of low-lying areas) has substantially affected the conditions for the formation of secondary habitats. The surface layer is composed of flysch marl, humus, stone and waste construction material - concrete and brick - fill. Naturally occurring and planted vegetation is to be found in those areas of Pier I which have been reclaimed from the sea.

Pier I shares the same environmental features as Pier II, which was – for the purpose of the construction of a multifunctional quayside – the subject of a 1998 study entitled *The Assessment of Impacts on the Living World* (U. Fonda, 1998). It was found that the area of Pier II and its hinterland was dominated by pioneer species (*Phragmites* – the common water reed, *Arundo donax* – the giant cane, and several species of alkali grass). As to fauna, there are only large flocks of seagulls which congregate around newly dredged areas, as well as occasional pigeons.

Naturally occurring aquatic and waterside vegetation colonises the drainage channels which link the sea with the marshes behind the port zone. This is an area which provides a habitat for wild birds, which are disturbed by the maintenance of the embankments and channel beds. The area of the liquid cargo terminal is overgrown with grass.

Based on the 2006 *Unic Sub* report, the site of the planned development used to be shallow shoreline replete with vast meadows of *Zostera noltii* and *Cymodocea nodosa* sea grass which grew atop several-metre thick layers of clayey silt. Today, such a typical seabed is only be found at some other locales along the Slovene coast such as from Ankaran to the Debeli Rtič headland, as well as in the vicinity of the erstwhile saltpans at Sečovlje.

Involving pile driving, the moving of huge quantities of material by dredging and the construction of embankments, the construction of piers, quays and berths at the Port of Koper has resulted in an absolute change in the topology and thereby - at particular points - to the impoverishment and even the complete destruction of the original ecosystem. Simultaneously, the newly formed solid seabed has engendered the introduction of a number of new plant and animal species.

Further to the *International Union for Conservation of Nature* (*IUCN*) classification, the *'Red list of endangered Mosses*' and the *'Red list of endangered fern and spermatophytes*' encompasses species which are to be found in the broader Koper – Ankaran area (indicated in the section 0448); the anticipated development, however, doesn't effect or impact any endangered flora or fauna. Such species (marine fauna excluded), indicated on the *Red lists* of endangered animal species in Slovenia live in the broader area of influence and are identified further in the text below (Fonda, 1998).

In its 1986-2000 plans, Koper's municipal authority identifies the lower section of the Rižana River, which passes directly through the port zone, as a potential natural heritage site. With the exception of the mouth of the Rižana River, which is approximately 800 m away, this area is located more than 1,500 m away from the planned development. The natural part of the Rižana outfall features such amphipods as *Echinogammarus sp.* and *Gammarus sp.* which as yet are not processed in terms of taxonomy, but nevertheless should be classified as vulnerable species whose natural habitat in Slovenia is probably most likely restricted to the brackish waters at the mouth of the Rižana, which is itself threatened by urbanisation and water pollution. The measure proposed for their conservation is the preservation of the existing environment around the mouth of Rižana. In addition, this area also features the pond shrimp *Palaemonetes antennarius*, a typical inhabitant of estuarine waters and thus a vulnerable and endangered species due to pollution and denaturalisation of its habitat. In Slovenia, such shrimps are only to be found at the mouths of the Rižana and Dragonja rivers, while their conservation necessitates the preservation of brackish water habitats and areas where freshwater enters the sea (Fonda, 1998).

Endangered bird species, observed in this area, are as follows:
• Common kingfisher (*Alcedo atthis*) listed among the endangered species (E) in particular due to the lack of suitable nest sites (i.e. riverbanks of adequate geological composition in which it can create its burrows);
• Grey heron (*Ardea cinerea*), which is listed among the vulnerable species (V); and
• Terns, of which the common tern (*Sterna hirundo*) and little tern (*Sterna albifrons)* are classified among the rare species (R); (Fonda, 1998).

16.2.7 Sources

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16.3 Climate and Meteorological Data

Climatic data for Koper is taken from the publication entitled *The Climate of Slovene Istria*. In the event that such data is not available for Koper, that pertaining to nearby Portorož is used instead.

With cool/cold winters and hot summers, the broader area is characterised by a coastal sub-Mediterranean climate in which olive trees flourish.

16.3.1 Wind

The tables in Attachment No.6 drawn up upon the observations of the Koper meteorological station of the *Hydro-meteorological Institute of Slovenia* for the period 1st January 1992 to 31st December 1998, indicate that the major portion of winds have a strength ranging from >0.0 to <1.5 m/s, and that 3% of days are windless. The portion of winds exceeding 10.1 m/s amounts to 1.1%, whereas winds can reach up to 12.8 m/s. Stronger winds most often blow in the period from November to March, i.e. from late autumn to early spring. Most commonly wind blows from an easterly or east-north-easterly direction.

16.3.2 Temperature and Precipitation

Attachment No. 6 provides climatic data. Table 7.1 provides information on the extreme and average monthly and annual air temperatures. January is usually the coldest month (average of 4.8ºC with lows of -8.4ºC;), whereas July is the warmest (average of 22.8ºC, with highs of 35.0ºC;), whilst the average (mean) annual temperature stands at 13.7ºC. Table 7.2 gives information on the average annual humidity, and Table 7.3 data on the duration of solar radiation (hours of sunshine) in Koper.

Table 7.4 includes information on the maximum daily amount of precipitation by month for Koper and Portorož, together with the average number of days in which precipitation exceeds 0.1 mm, 1.0 mm, 10.0 mm and 20.0 mm in Portorož. On average, most days in which precipitation exceeded 0.1 mm were in May (12.2. days), those exceeding 1.0 mm were in November (8.8 days), and more than 10.0 mm (3.7 days) and over 20.0 mm (2.0 days) were in September. Precipitation exceeds 0.1 mm on an average of 123.6 days per year. Between 1961 and 1975 the largest daily quantity of precipitation recorded in Koper was in October (114.2 mm), whilst between 1976 and 1990 the largest daily quantity of precipitation recorded in Portorož was in August (112.2 mm). We can see that Koper and Portorož data are of the same order of magnitude, there is merely a difference in the month in which the extreme (record) amount was recorded.

16.3.3 Sources

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16.4 Facilities in the Proximity of the Proposed Development

3.4.1 General description

The Port of Koper is of strategic importance in trade flows between the Middle and Far East and the countries of Central Europe. For vessels serving destinations east of Suez, Koper is some four days shorter journey than the major ports on the northwestern side of the European continent. Koper is also located on the EU's *Fifth Pan-European Transport Corridor* which links Central Europe with the Adriatic.

Vessels arriving at the Port of Koper from the Adriatic Sea enter the southern part of the Gulf of Trieste around the Savudrija peninsula and Cape Petelin. The navigation channel to the harbour runs in an ENE-WSW direction some 1,300 m offshore. The entrances to the harbour are marked with buoys and the natural access channels are between 18.5 to 20 m deep and don't require additional dredging. Pilotage is mandatory for all vessels over 500 GRT making the Port Koper, as well as for all vessels transporting hazardous cargos (see Attachment 1: Overview)

The Port of Koper is connected to its Central European hinterland by road (motorway), railway and oil derivatives pipeline. The port's main gate is located at the southern side of the zone and provides good access to terminals. The port has railheads and marshalling yards in the vicinity of its quaysides and warehouses, and these are linked to the Koper branch line

which at Divača junction joins the main Venice-Ljubljana line (with further main line connections to Vienna and Budapest).

The Port of Koper is comprised of three basins, bisected by two piers across which a series of terminals are located. There are also two pipelines: the first connects a berth at Basin II with the storage tanks for gas and light oils; the second transports oil derivatives from the unloading platform beside Basin II to the storage reservoirs under Sermin Hill.

In addition to the Container Terminal, Pier I also includes the:

- Liquid Cargo Terminal
- Bulk Cargo Terminal
- General Cargo Terminal
- Fruit Terminal (perishables)
- Car & Ro-Ro Terminal
- Livestock Terminal, and the
- Dry Bulk Cargo Terminal.

3.4.2 Description of the Container Terminal

The use of multi-modal containers in global trade is constantly rising, and this form of transport is deemed more environment-friendly.

Encompassing a total area of 155,600 m^2, the Port of Koper's *Container Terminal* is located at Pier I. Its throughput capacity, which depends on the overall handling capacity of container cranes, currently amounts to some 180,000 TEUs per annum. The quayside used by moored vessels is currently 452 m long, and is replete with three berths, of which the inner one can accommodate drafts up to 9.5 m, while the outer two may be used by vessels with drafts to 11.2 m. The Terminal's twin railhead facilitates wagon manipulation and the creation of rail container freight compositions up to 614 m in length.

Car-carries are unloaded at Basin I, for the most part at a berth within the Container Terminal. Storage parking, together with vehicle washing, servicing and repair work, as well as loading onto car transporter trucks (lorries) and wagons (rail) are all performed in the context of *Luka Koper*'s *Car Terminal* operation. The asphalted parking sites and temporary parking areas located within the port zone have an aggregate capacity of 50,000 vehicles. The multi-storey parking garage completed in 1999 provides an additional 3,350-vehicle facility. Passenger car loading and unloading operations employ a movable ramp.

Dry box, open top, flat rack (closed or open-sided), high cube, reefer and tank containers are all handled by the *Container Terminal*, and there are 175 electrical outlets for reefer (refrigerated) containers. Quayside crane capacity is between twenty and twenty-eight TEUs (twenty-foot long ISO containers) per crane per hour. Current open storage facilities cover an area of 65,770 m^2, capable of storing 11,500 TEU containers. The Terminal has a pair of rail tracks forming a 614-m long railhead, facilitating compilations of various types of 10', 20', 30' and 40' ISO container.

Working procedures – container handling operations:

- unloading – from ship, wagons and trucks to storage
- loading – from storage to ship, trucks or wagons

- transfer – within storage or from/to container repair workshop
- inspection – at storage area,
- container filling and stripping.

The Container Terminal also provides container repair services, washing and disinfection. Quayside cranes allow handling of containers up to 50 tonnes in weight. The mode of container storage is dependent on the container type and size, as well as prescribed by technical regulations.

3.5 Maritime Transport

3.5.1 Sources of Pollution in the Gulf of Trieste and the Mediterranean

Potential sources of pollution of Slovenia's coast derive from oil, petrochemicals and other hazardous substances being transported by sea in the Northern Adriatic, as well as onshore facilities, and in particular the following:

- some 30 to 31 million tonnes of oil and other hazardous substances (of unknown quantities) are transported to and from neighbouring Port of Trieste (Italy) every year;
- approximately 1 to 2 million tonnes per year of oil and oil derivatives pass through the Port of Koper, (oil tankers up to 60,000 tonnes);
- maritime transport of chemicals and special cargo to and from the Port of Koper;
- discharged oil wastes from vessels using the ports of Koper and Trieste (by accident or through negligence);
- washing the handling areas of ports and vessels is a minor, but nonetheless fairly common, source of pollution;
- waste or ballast waters from vessels, which might cause the introduction of foreign bodies into local waters; this is a specific issue that requires preventive control measures.

<u>Intentional and accidental discharges of hazardous substances at sea</u>

Accidents involving hazardous materials are undoubtedly one of the greatest potential threats to the marine environment. Dangerous substances transported by sea are - in compliance with the *MarPol* (Marine Polution) *Convention* – divided into oil (Annex I) and their hazardous derivatives (Annex II). Materials are, according to the old classification divided into four categories – A, B, C and D, while other pollutants and potential toxins are subdivided into three classes in accordance with a new proposed classification. The hazardous substances from groups A and B present a huge danger to the marine environment, and some 114 are regularly transported in Slovene seawaters; oil and oil derivatives account for 5 of these. A further 29 substances regularly transported, but not listed in the A or B group (under *Marpol* Annex II), are nevertheless identified as significant sea pollutants. *Luka Koper* handles from between 1,400,000 to 1,900,000 tonnes of liquid cargo per annum, and some 90 oil tankers a year call at the port, together with a further 580 vessels transporting category C and D hazardous substances.

The table below indicates that between 1997 and 2004, *SVOM* – Slovenia's national service for the protection of coastal waters - took action in 656 instances of pollution, of which 307 were attributed to oil; the perpetrator was identified in 146 cases, while in the remaining 510 incidents they remained unknown.

A slight increase in the number of reported pollution incidents was observed between 1992 and 2002, which is most likely due to an increased awareness among people who report information on such phenomena; over that same period there was also an increase in the number of smaller boats registered for recreational purposes (there are about 9,000 such craft in Slovenia). Regardless of the quality of the existing database it may be assumed that the illegal discharges of smaller quantities of oil and derivatives thereof into the sea has become prevalent in Slovenia. Considering the total number of observed and reported cases we may assume that, based on the local characteristics of territorial waters - a semi enclosed, shallow bay, with a relatively small volume of water, a large impact of climatic factors and a poor exchange of bodies of water - such pollutions exert substantial negative impacts on the marine environment, particularly when compared to deeper open seas.

Table 3: Number of reported marine pollution incidents in Slovenia's territorial waters – identified and unidentified perpetrators

perpetrator	Year	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Known	Number	0	0	0	0	0	0	5	0	14	5
Unknown	Number	3	2	24	38	5	16	4	1	2	0
Total	Number	**3**	**2**	**24**	**38**	**5**	**16**	**9**	**1**	**16**	**5**
perpetrator	**Year**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**
Known	Number	4	8	6	13	4	15	9	7	9	8
Unknown	Number	11	6	7	12	3	2	18	19	17	29
Total	Number	**15**	**14**	**13**	**25**	**7**	**17**	**27**	**26**	**26**	**37**
perpetrator	**Year**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**		
Known	Number	6	9	4	3	10	1	1	5		
Unknown	Number	46	63	49	46	43	23	12	9		
Total	Number	**52**	**72**	**53**	**49**	**53**	**24**	**13**	**14**		

Source: Data provided by *SVOM* – Slovenia's national service for the protection of coastal waters; 2005

Table 4: Number of reported marine pollution incidents in Slovenia's territorial waters – by type

	Year	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Petrochemical	Number	3	2	3	8	5	9	8	1	10	2
Other pollutants	Number	0	0	21	30	0	7	1	0	6	3
Total	Number	3	2	24	38	5	16	9	1	16	5
	Year	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**
Petrochemical	Number	7	9	3	15	5	11	18	18	15	15
Other pollutants	Number	8	5	10	10	2	6	9	8	11	22
Total	Number	15	14	13	25	7	17	27	26	26	37
	Year	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**		
Petrochemical	Number	30	29	22	24	16	8	7	4		
Other pollutants	Number	22	43	31	25	37	16	6	10		
Total	Number	52	72	53	49	53	24	13	14		

Source: Data provided by *SVOM* – Slovenia's national service for the protection of coastal waters; 2005

3.5.2 Information system and forms of rapid response in the event of a major pollution incident

The improvement of prevention and intervention plans in relation to maritime pollution incidents remains one of the primary goals of marine protection. Such is also determined by the *International Maritime Organisation* (*IMO*) and conventions upholding safety in maritime transport and proscribing pollution from ships, such as the *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter*, sometimes called the London Convention, together with *MarPol 73/78* - the 1973 *International Convention for the Prevention of Pollution From Ships,* as modified by the Protocol of 1978 - which is intended to minimise maritime pollution. Further to this there is preparedness and response in the event of a pollution incident, as well as culpability and provision of compensation for damage incurred by pollution. The *Protocol concerning Co-operation in Preventing Pollution from Ships and, in cases of Emergency, Combating Pollution of the Mediterranean Sea* is still in the process of ratification. In addition, the *1990 International Convention on Oil Pollution Preparedness, Response and Co-operation,* (*OPRC*), which requires its signatories to establish measures for dealing with pollution incidents, either nationally or in co-operation with other countries, has also been ratified by Slovenia (Official Gazette of the Republic of Slovenia, No. 9/01). Launched in June 2002, under the auspices of the *Slovenian Maritime Administration,* the mandatory navigation control regime with its report and alert system for vessels using Slovenia's territorial waters, is indicative of the successful integration of environmental protection in individual sector policies.

Information on pollution incidents is collected by the *Slovenian Maritime Administration,* the *Coastal Information Centre*, as well as the *Operative and Communication Centre* (*OKC*). All received reports are immediately dispatched to the *SVOM*. Simultaneously, a number of competent inspection and other services are initiated by the *OKC,* including the inspection service of the *Maritime Administration*, the *Internal Affairs Administration,* as well as - under suspicion that the law has been broken and the perpetrator has not been identified - the environmental and spatial planning inspectorate and the maritime police. The aforementioned inspectorates correspondingly act in accordance with regulations in their respective fields.
In the event that a pollution incident occurs out of the working hours, the *SVOM* (Slovenia's national service for the protection of coastal waters) duty officer receives all reports, and, if necessary, immediately alerts service personnel. According to the type and magnitude of a pollution event, the *SVOM* duty manager determines the response as regards the dispatch of resources, manpower and materials in order to prevent the spread of pollution, as well as the containment and treatment methods that shall be employed.

In the event *SVOM* detects a pollution incident during one of its patrols, it immediately takes all necessary measures and delivers information on these to the *Coastal Information Centre* and the *Regional Office of the Environmental Agency of RS* in Koper. Upon any sudden larger pollution event, the Trieste-based *Crismani* company assists in the intervention. In 1992 the efficiency of rapid response in the event of an emergency was tested in practice at a joint international drill entitled *Morje 92*.

Slovenia's *National Protection and Rescue Plan for Maritime Accidents* encompasses all necessary actions and measures to be taken upon accidents as well as sudden large pollution incidents which are often the consequence of such accidents. The Plan is designed according to the legislative provisions in relation to the *Ministry of Defence – Civil Protection*, *Ministry of the Environment and Spatial Planning*, *Ministry of Transport – Maritime Directorate*, as

well as other pertinent regulations.

The Plan is activated in the event of any large maritime pollution incident which can't be managed or contained by the competent services, or *Hidra Koper*, the coastal protection service. In such instances and upon a prior evaluation of conditions and instructions provided by the Koper Office of the *Ministry of Environment and Spatial Planning*, the responsible head of the service shall, via the Regional Notification Centre, enlist the services of the *Regional Civil Protection Authority*, which in turn may procure additionally available control and clean-up capacities both locally and further afield. In the event that the *Regional Civil Protection Authority* estimates that the additionally procured resources and manpower are unable to control the pollution incident, it shall solicit help from the *National Civil Protection Headquarters* which acts upon its plan and – if necessary – appeals for assistance from neighbouring states.

Each of the three countries with a northern Adriatic seaboard (Slovenia, Croatia and Italy) has their own national action plans in the event of major accidents at sea which might result in pollution. In addition to operational documents for the activation of local resources and experts in various fields, said plans also anticipate help and assistance from neighbouring states in the northern Adriatic region.

3.5.3 Shipping at the Port of Koper

In 2006, total shipping at the Port of Koper amounted to 2,262 vessels, distributed amongst the individual terminal operations as follows:

- Container Terminal: 690
- General Cargo Terminal: 310
- Fruit Terminal: 31
- Car Terminal: 406
- Timber Terminal: 251
- Dry Bulk Cargo Terminal: 134
- Energy Terminal (coal and iron ore): 440.

Recent years have witnessed an ever increasing proportion of world maritime trade accomplished using inter-modal containers, while resort to ever-larger ships has caused the actual number of vessels to remain about the same or even - despite ongoing growth in cargo throughput - decline. Annual Container Terminal throughput at Koper amounted to 200,000 TEUs in 2006.

3.5.4 Sources

- *Concept of Reduced Environmental Impact*; Luka Koper. April 2005.
- *SVOM* - Slovenia's national service for the protection of coastal waters
- *Tabular overview of pollutions* from the monthly reports produced by *SVOM* - Slovenia's national service for the protection of coastal waters.
- *Assessment of Dangers in Relation to Natural and Other Disasters*; issued by the Protection and Rescue Service Centre of Koper Municipality (*CO MOK*) on behalf of Koper Municipality; 2005.
- *List of Alerts and Accidents in the Mediterranean*; REMPEC (Regional Marine Pollution Emergency Response Centre) information system for the Mediterranean Sea region - Part C; 2004.

17 Characteristics of the Proposed Development

4.1 Construction and Operation

Luka Koper d.d., the operator of the Port of Koper, intends to extend the quayside and the hinterland storage area at the south-western section of Pier I. The new quayside and hinterland area will respectively be used for container handling (vessel unloading and loading) and storage. This project requires the construction of a cca. 160-metre long quayside (a westward extension of the existing berth 7B, together with an open storage area directly behind (to the north) of the new quay. The quayside berth will be deepened through dredging to a depth of 14.5 m.

The concept anticipates a phased project, the first part of which encompasses the sectional construction of 160-m long quay set on piles, whilst the second phase envisages the staged reclamation of the 22,570 m^2 hinterland area as a container storage site.

4.1.3 Climate

The development's design takes into consideration climate data elucidated in the project documentation.

Wind
The proposed facility is located within wind zone III and is not protected. Bollards, fenders and horizontal protection from the sea are dimensioned according to the recorded maximum (extreme) wind speed.

Tide
Tides in the Adriatic are of a mixed, semidiurnal and diurnal type. The mean value of annual averages, calculated through an assessment of mean daily water levels, measured mean sea level amounts to + 15 cm above the prescribed (base) sea level. The average high/low water was 33 cm above/below mean sea level over the monitored period, i.e. at + 48 cm and - 18 cm a.s.l.

4.1.4 Earthquake hazard

Compliant with the building regulations applicable to areas prone to seismic activity, the 12-divison European Macroseismic Scale (EMS) is applied. The Koper area falls into division 7 (damaging) in which earthquakes may cause moderate damage to buildings and other structures.

4.1.3 Dimensions of container quayside – berth 7C and hinterland area

Harbour area

A portion of the harbour area will be dredged to provide an adequate depth and thus meet the requirements of mooring vessels of an increased draft. The anticipated dredging encompasses the northwest section of Basin I to a (minimum) depth of 14.5 m. The total quantity of dredged material is estimated to amount to 16,500 m^3.

Procedure for dredging the harbour area

Dredging

Prior to the commencement of dredging works, the area will be surveyed in order to provide a contour map of the seabed area from which cross-sectional profiles may be created.

The excavation works, executed using a suction dredger, will start at the highest point of the area; in accordance with the capacity of the suction unit, dredging will be implemented longitudinally in layers, from the top part downwards. Dredging will take place in two or three layers as per the anticipated depth and the quantity of excavation per individual profile.

Because the dredging area is extremely vulnerable to slip, the seabed profile (contour) will be controlled during dredging, while the spoil (dredged materials) will be transported away. The contractor will provide a continuous record of its ongoing operations, open to oversight and scrutiny by the clerk of the works as well as the building inspectorate.

Transport of spoil

The suction dredger, available at the Port of Koper, will also be used in the pumping of sludge spoil via a 3,000-metre long pipeline to a distant infill site, namely channel *8-8 on plot No. 879/1 k.o. Ankaran*. This pipeline will pass through operational areas of the Port of Koper following a route which will not present any disturbance to haulage routes or port operations.

Location and volume of the spoil deposit

An anticipated 16,500m^3 of spoil, in the form of seabed sludge from the new berth at 7C, is to be deposited at a site within the port zone, namely: channel 8-8 at plot No. 879/1. The location of this land reclamation site is stipulated in an agreement which already serves for the regular deposit of spoil from the port basins, i.e. material dredged from the berths and channels in order to ensure the maintenance of navigation and sufficient depth at the existing berths.

For security reasons, and in order to prevent unauthorised access, the entire dump area is already fenced off and replete with signs warning of danger. Although the surface of this deposit will soon give the impression of solidity, it will remain hazardous and un-traversable for several months. Accordingly, the dump site shall remain a restricted access zone even after completion of the proposed development.

Disposal of dredged material

The anticipated maximum elevation of the discharged dredging sludge - the surface of deposited spoil, mixed with water - is +2.20 m above current height. The discharge pipe is located at the southern end of the zone, from where the material will flow and sink northwards; the finer and more liquefied particulate matter will run off between embankments and flow into a lagoon that will collect the leachate. Excess water will run off the filtrate, and from the lagoon be conducted into the Ankaran peripheral channel to its outfall in Basin III.

Following drainage, the area will be suitable for preparation for its further use as a construction site, thus a bearing capacity necessary for construction work has to be provided. Upon drainage, the anticipated elevation of the deposited material will amount to +1.50 m; due to the fact that the projected elevation of this land shall be +3.00 m, additional landfill and grading will be necessary. The lower layer of infill shall consist of general stone or flycsh materials, whereas the upper layer will require a firmer composition containing harder materials, congruent with its anticipated use. All reclaimed areas of the port zone have been created using much the same series of processes.

Quayside at Berth 7C

The new quayside is dimensioned at 146.1 m (ultimately 160 m) by 34.4 m. The westward end of the quayside will be constructed in a manner which will allow the building of a further extension. The quayside platform shall have an elevation of +2.50 m above mean sea level.

Hinterland Storage Area

The anticipated final area of the open storage facility will amount to approximately 22,570 m^2. Its design and form is prescribed in the project documentation and is in compliance with the effective land use and planning ordinances. The area shall be composed of four slabs divided by dilatation joints, and accordingly construction work will be carried out in stages.

4.2 Technical Features of the Proposed Development

4.2.1 Foundation

The location of the proposed quayside at Berth 7C and its hinterland storage areas have not been subject to any site-specific geo-mechanical analysis; nonetheless, a survey carried out in relation to the quayside at Berth 7B, which lies adjacent the proposed 7C development, meets the design and construction requirements re the Container Terminal extension project.

The proposed quayside and storage area has been subject to a geo-technical investigation performed by the Dept. of Soil Mechanics at Ljubljana University's Faculty of Civil and Geodetic Engineering (No. E-13-06, 4th August 2006). This analysis also encompassed a loading test of foundation piles, and following its completion a geotechnical report will be elaborated within the context of project documentation. The investigations were treated in the following reports which pertain to the previous extension of the Berth 7 quayside:

- *Study results and geotechnical report on the area of the Container Terminal extension* (Berth 7B). *GZL IGGG*, No. 30-1/98; January 1989.
- *Laboratory test report on soil samples taken from the location of Luka Koper's new Container Terminal extension* (Berth 7B). *IMFM* Ljubljana, No. 1/20-98; 5th August 1989.
- *Report on driving the test piles at the extension of the Luka Koper Container Terminal* (Berth 7B). *IMFM* Ljubljana, No. 1/7-89; 8th February 1989.
- *Loading test report on steel pile tube E-22 at the extension of container quayside No. 2 at Luka Koper's Pier I* (Berth 7B). *IMFM* Ljubljana, No. 1/12-89; 16th March 1989.
- *Report on dynamic measurements of load capacity of driven steel piles JK 812 at the Luka Koper container quayside* (Berth 7B). Gradis, No. 135-1/89; April 1989.

- *Laboratory test report on soil samples taken at the location of the anticipated berthing dolphin at the extension of Luka Koper's container quay. IMFM* Ljubljana, No. 1/34-92; 18th August 1992.

Prior to the elaboration of the requisite project documentation necessary to attain a construction permit, the assumptions from previous geomechanical reports will be verified by a new investigation, according to the aforementioned programme.

4.2.2 Construction Design

Quayside platform at Berth 7C

The harbour area adjacent the quayside platform will be deepened to -14.5 m, which will allow the landing and mooring of container vessels with a deadweight tonnage (DWT) of up to 100,000 tonnes (and an overall length of up to 330 m, a 48 m beam, and with drafts up to 12.5 m). Further to this, the new quayside will facilitate the mooring of car carriers of up to 60,000 DWT. The quayside will also be able to handle smaller vessels above 46.2 m in length and beams of over 15.5 m

The top-structure is designed as a continuous double-sided reinforced concrete slab, supported on transverse and longitudinal precast concrete elements. It anticipates three longitudinal track bearers, on which the gantry crane track rails will later be mounted. The seaward rail of the gantry crane track will be +2.50 m a.s.l., while the rear (hinterland-side) rail of the 18-metre gauge track will be +2.45 m a.s.l. The rear (landward) rail of the 30-metre gauge track will be +2.50 m a.s.l.. The trackside shall be asphalted. Power will be supplied to the gantry crane from the seaward side via a *Panzerbelt*® covered cable duct system.

The quayside structure will rest on a raster of driven steel tube piles. Four positions for mobile cranes are anticipated. Those steel piles which will be within the range of seawater spray shall be protected by a reinforced concrete coating, whereas that portion which lies below the water line and below ground level will be provided cathodic anti-corrosion protection using an external power source.

The hinterland of the current container quayside features a pathway for pedestrians which is elevated by 0.17 m. Prior to the extension of the quayside platform, said path will need to be lowered to the same elevation of the quayside platform.

Hinterland platform behind Berth 7C

Resting upon a raster system of driven tubular steel bearing piles, topped by a semi-prefabricated reinforced concrete intermediate structure, the platform is designed as a continuous reinforced concrete slab which is cast on site. This slab will be cast in four sections (stages), divided north-south by dilatation joints, while four positions for mobile cranes are also anticipated.

Those steel piles which are within the range of seawater spray will be protected by a reinforced concrete coating, whereas that portion which lies below the water line and below ground level will have cathodic anti-corrosion protection using an external power source. In order to mitigate the consequences of differential subsidence, a slip joint will be created at the

transition between the existing and new hinterland platform structures of the Container Terminal handling and storage areas.

Service installations

A utility installation duct for low voltage power supplies (including cabling for the cathodic anti-corrosion protection of piles), potable water and telephone line, will be constructed at the sea-ward side of the berth 7C; a similar duct is anticipated on the hinterland side of the quayside structure.

4.2.3 Materials

Piles

All steel piles shall be manufactured of spiral welded tube steel - S 275 J2.

Concrete

All concrete mixtures shall conform with the provisions of the regulations on mechanical resistance and stability in construction works, Official Gazette of RS No. 101/2005 and the European standard EN206-1, Concrete - performance, production and conformity. Concrete exposed to a saline environment and atmosphere (exposure class XS2 and XS3 according to EN206-1) will be MB40 and water impermeable. All exposed parts of stirrup reinforced concrete shall have a 5 cm protection layer. Being constantly exposed to seawater, the concrete of load-bearing elements (transverse elements, longitudinal track bearers, bottom slab of the duct and suchlike) will be finished with an elastic acrylic-polymer resin coating, while the surface slab will also be waterproofed.

Reinforcement rods

Reinforcement steel used in concrete constructions shall also conform with the provisions of European standards.

4.2.4 Plant and Equipment

Bollards
The quayside will be fitted with steel bollards that will allow the mooring of vessels of up to 100,000 DWT. Bollards that shall be used to moor smaller vessels will also be installed at the quayside. The mooring bollard currently installed at the western end of the existing quayside will have to be removed in order to facilitate construction works.

Quayside fenders
The quayside will feature rubber fenders which will cushion the structure from the impact of mooring vessel (100,000 DWT at an impact of 8 cm/s). Fenders will be fastened on fixing rings at the front side of the installations duct.

Ladders and ducts
Vertical quayside ladders placed at a maximum distance of 40 m apart are anticipated at the seaward side of the quayside, adjacent the duct carrying the gantry crane power supply cable. It is anticipated that the seaward crane track and its cable duct will be extended from the

existing quayside, further to which the existing ladders at the end of the quay shall be removed.

Protection fence
The construction site will be fenced off from the existing storage area and operative quayside until the completion of the platform. The previous fence at the western end of the existing quays shall be removed to facilitate construction work.

Machinery
The project anticipates the removal of crane fenders at the end of the existing quayside, and, following construction, quayside installations for gantry cranes, i.e. cable duct, rails, fenders, pin locking devices and outlet mechanisms for cables. Such installation equipment is not the subject of the container quay construction project.

4.2.5 Special requirements

Due to direct exposure of the structure to the aggressive marine environment, the criteria of durability as regards foundation and construction has been strictly applied, in particular by way of the stringency of design and the use of quality materials. The guidelines as to the selection of materials and implementation of works that shall ensure corrosion prevention have been considered and will be implemented. The anticipated life span of the new quayside is 50 years.

4.2.6 Electrical power provision

New substation
The installation of new container cranes at the quayside extension (Berth 7C) will require an additional 400 kVA power supply. Due to the fact that the existing cable paths lack the capacity for the necessary new medium-voltage cabling – in particular that portion of the path to the west of berth 7A – it would be reasonable to build a new transformer substation from reinforced concrete at the existing SS14 floodlight tower. Such a facility could be used to provide a 400 kVA supply for the new container cranes as well as low-voltage transformer capacity to meet local secondary supply and, in particular, (flood-)lighting. The new substation - designated TP-KT1 - will also feature a rectifier for the cathodic anti-corrosion protection of the steel piles on which the new quayside rests. This will be supplied via a conduited medium-tension cable from the existing substation which is located at the eastern end of the Container Terminal.

Cable conduits
New tubular cable conduits will be laid from the floodlight tower SS13 to the new TP-KT1 substation which is to be situated at the SS14 floodlight tower. Another tubular cable conduit will lead from the new TP-KT1 substation to the quayside duct at Berth 7C. Tubular cable ducts will also be installed from the SS13 and SS14 lighting towers to two new floodlight towers.

Lighting
Two new 35-metre high towers replete with an array of 1 kW *Titanio* floodlights manufactured in Italy by *Disano*. These high-pressure sodium lamps are highly efficient and have a long life span. The floodlight towers will be installed as an in-line extension to the two existing series, and, like the others, will feature remote switch control.

Illustration 5: *Titanio* floodlight and visor to reduce glare

In order to reduce light pollution from glare, visors made by the same manufacturer will be installed on the new floodlights to direct the beam downwards, thus reducing light pollution and preventing the illumination system from disturbing distant observers.

Cathodic protection
Steel piles below water level and buried in the seabed will feature cathodic anti-corrosion protection provided by an external power supply.

Hydrant and potable water network
The hydrant network and potable water distribution system will be integrated into the new construction via separate hard polyethylene pipelines (HDPE PE 100), placed in the quayside utility installation duct. As to the distribution of potable water, two outlets replete with meters are anticipated along the quayside in order to provision moored vessels. The potable water supply will be linked to the existing pipeline at the Berth 7B quayside. The hydrant pipeline will be located below the reinforced concrete platform structure and connected to the existing network in the quayside hinterland. The implementation of supply outlets for moored vessels as well as underground hydrants will be similar to the solutions already in use at the port's quaysides. All PE pipelines will be coupled by electro diffusion welded joints.

4.2.7 Hydrant network and potable water supply

The hydrant network at the new quayside adjacent Berth 7C, together with its hinterland storage areas, as well the supply of potable water to moored vessels, require the implementation of the following supply installations:

a) Extension of the existing potable water distribution system from Berth 7B to Berth 7C.
b) Expansion of the existing hydrant network to Berth 7C and its hinterland open storage area.

<u>Distribution of potable water at Berth 7C</u>

The potable water distribution system at the quayside of Berth 7C is exclusively for the provisioning of berthed vessels with drinking water. The new distribution system will feature two outlets replete with meters, as well as drainage points for emptying the pipeline in order to prevent freezing during periods of low temperature.

Fitted with the appropriate stopcock valve (to isolate the system) and flanged couplings (at ship supply points), the potable water supply delivered via Ø110 mm PE 100 polyethylene pipe located in the quayside utility installation duct, and connected to the existing system at Berth 7B.

Hydrant network at Berth 7C and its hinterland

The existing hydrant system at the Container Terminal in the hinterland of Berth 7 is supplied via the Port of Koper potable water distribution system which is supplied from the Rižana waterworks. Separation of the hydrant supply from the potable water system is anticipated in the future. To this purpose, the existing hydrant system will at a later stage be connected to a separate independent supply.

The hydrant network at Berth 7C and its adjacent open storage areas will be connected to the existing network at the quayside hinterland of Berth 7. The Ø125 mm hydrant pipeline at the quayside of Berth 7C will be placed in the utility installation duct, whilst a Ø160 mm pipeline will be installed under the reinforced concrete platform structure of the hinterland storage area. As to regards the quayside hydrants, solutions similar to those used at other quaysides at the Port of Koper will be applied (below-ground installation of hydrants in the utility installation duct), whereas the container storage area platform will feature appropriately distributed and mechanically protected above ground standpipes located at the floodlight towers.

The complete hydrant system will be made of PE 100 polyethylene pipe rated for pressures of up to 16 bars, while the upright cast iron standpipes will include shut-off valves and flanged nozzles. The pipeline will be fixed within the quayside utility installation duct using galvanized steel fittings, as well as fastened to the concrete structure of the hinterland platform using non-corrodible materials.

4.2.8 Drainage

The existing area of the Container Terminal is connected to Koper's central treatment plant (CČN) via the communal urban drainage system. The drainage of the new quayside and its hinterland will be provided by inclines and collection channels which under normal circumstances allow surface water from precipitation to run off directly into the sea. These channels are, however, fitted with stopcocks which can be closed in order to isolate any spillage. Said system is in compliance with the *Decree on the Emission of Substances in the Discharge of Wastewater into Waters and the Public Sewerage System* (Official Gazette of RS, No. 47/2005) which is the standard applicable to highways.

In the event of any spillage, the stopcocks are closed in order to prevent the discharge of pollution into the sea. The closure and isolation of individual sections is also possible, whilst the area of any eventual spillage can further be protected by deployment of a floating boom.

The areas connected to the existing terminal quayside and storage area will be regulated by gradients (inclines) in order to drain to the utility installation duct extension which shall also feature an inlet connection to the existing shafts.

When not in service, the mobile container handling machinery and vehicles (tractor units, trailers, forklifts, reach-stackers) will be parked in an area adjacent the Container Terminal which is fitted with oil traps (collectors) in case of leakage.

4.2.9 Demolition work

In the area of the anticipated development, about 50 m west of the existing Berth 7B quayside, there is a separate isolated fender which will have to be removed prior to construction work. It comprises a 5 cm wide steel tube which is 142 cm in diameter, the top of which is replete with a fixing ring and rubber fender. The fender system also encompasses a buoy with a volume of 30 m^3 which is secured to the seabed by two anchors. The seabed also features an 850 cm by 425 cm by 300 cm reinforced concrete cube, the upper surface of which is 12.30 m below mean sea level. The buoy, anchoring system and concrete cube all lie within the within the area of the proposed Pier I extension, and will thus have to be removed prior to the commencement of construction work.

4.3 Machinery

4.3.1 General

The new quayside extension (Berth 7C) will be located to the west of the existing Berth 7B. quayside within the Pier I Container Terminal at the Port of Koper. The anticipated open storage area will also extend westwards from the existing hinterland storage area of the terminal. The installations together with the operations and procedures which derive from them will be the same as at the existing terminal facilities.

The machinery employed at the Pier I Container Terminal is preconditioned by the facility's configuration, the spatial limitations of its storage areas, and the necessary unloading, loading and storage operations. Container manipulation is accomplished using rubber tyred gantry cranes (RTGC); with the aid of semi-trailers powered by tractor units and reach-stackers, these mobile bridge cranes transport containers between the quayside and the hinterland storage area.

Quayside
The four panamax cranes currently installed at the existing quayside are adapted to work with a telescopic twin-lift spreader or a hook. Depending on the Container Terminal requirements, the extension will feature additional panamax or post-panamax cranes. There are traffic and shoulder lanes for tractors and trailers under the gantry cranes. Removed hatch covers /from vessels) are deposited on the hard, between the sea and crane rails; they cannot be deposited on the land side of the rails because of the hinterland basins (lagoons).

Storage areas
Storage areas are located to the north and east of the existing quayside. The hinterland to the north is reserved for full containers, which are stored in 5 longitudinal storage blocks separated by access ways which facilitate transport to and from the quayside area. Each storage block is replete with one or more bridge cranes (RTGC). These cranes can operate across a span of 25.5 m, thus they are able to reach across an access lane and a row of 7 containers. The anticipated storage height is three containers (3 x 9ft 6''). The disposition of

blocks allows the use of a reachstacker or a spreader fork lift for empty containers at one side of the block. The storage area is organised in such a manner as to allow a high degree of flexibility in the use of a variety of manipulation machinery. The area set aside for reefer containers features electrical power connections and gantries with ladders that provide access to the refrigeration units.

Located at the terminal entrance, the storage area for empty containers is also organised in a manner which facilitates optimum utilisation. The manipulation of empty containers is mainly executed using forklifts replete with a spreader, and, occasionally, also reachstackers. Empty containers, both standard (8’ 6") and high cube (9' 6") are stacked up to 4 in height.

Internal transportation
The transport of containers within the port - i.e. between the quayside storage areas, the railhead, CFS (Container Freight Station), washing facilities, inspection centres and the repair shop - is provided by terminal tractors replete with trailers. Trailers arriving at the CFS and other delivery points are manipulated using reachstackers or - as is the case with empty containers - forklifts.

Delivery and dispatch by road
The administrative part of the delivery and collection of containers by road is carried out at the entrance to the port (main gate), which also controls the status of any container entering or leaving the port. The loading and unloading of containers from trucks takes place within the terminal area, at the place where the container is stored. Rubber tyred gantry cranes (RTGC) are used for unloading and loading vehicles, other manipulation operations are carried out using a reachstacker or, if the container is empty, a forklift.

Delivery and dispatch by rail
There are three railway sidings at the north end of the Container Terminal storage area; here containers are loaded onto/from railway wagons using reachstackers and rubber tyred gantry cranes (RTGC). The construction of a fourth railway track, and with that the installation of a rail mounted gantry crane (RMG), is envisaged.

4.3.2 Maritime transport

Container Terminal's throughput at Koper’s Container Terminal amounted to 200,000 TEUs in 2006. Despite the ongoing increase in annual container freight throughput over recent years, the number of vessels calling at the Port of Koper has not risen significantly due to the trend towards the use of larger vessels.

The quayside extension together with the increase the depths of berths will allow the handling of bigger (longer, broader and with a greater draft) container ships and a larger number of containers; thus Container Terminal expansion is not anticipated in itself to be related to any increase in the number of vessels calling at Koper.

4.3.3 Overland transport

Container Terminal throughput is anticipated to grow by 50% over the following 3 to 5 years, which will result in a proportional increase in rail and road transport in Koper’s broader hinterland. At present container freight is transported fairly evenly between road and rail, and

in 2006 encompassed 50,000 trucks/lorries (carrying on average 2 TEUs each – i.e. a single forty foot container) and 35,000 rail wagons (each carrying an average 3 TEUs).

4.5 Requirements as to Land Use

4.5.1 Requisite geomorphologic characteristics

The construction of the quayside extension takes into consideration the topography of the site, to which the foundations and anticipated structures are adapted. The fertility of the soil is irrelevant in any assessment as to the acceptability of the project as this is currently an area below sea level.

4.5.2 Requisite geologic characteristics – stability and bearing capacity

The method of construction of the facility is predicated on local geologic characteristics. The foundation on steel-concrete piles and the creation of adequate embankments ensure the stability of the quayside extension and storage hinterland.

4.5.3 Requisite hydrologic characteristics – water

The anticipated development shall create a new shoreline from an area which is currently below sea level.

4.5.4 Requisite climatic characteristics

The project is adapted to the extant climate.

4.5 Alternative Solutions to the Proposed Development

This project is an extension to the existing Container Terminal which is deemed necessary to cope with growing demand. In the event that an alternative solution or technology had been selected, the entire operation of *Luka Koper*'s existing terminal would have to be reconsidered.

18 Environment Quality – Impacts on Air Quality

5.4 Statutory Regulations in Slovenia

- *Regulation on measures for the preservation and improvement of ambient air* (Official Gazette of RS, Nos. 52/02, 41/04)
- *Regulation on benzene and carbon monoxide in the ambient air* (Official Gazette of RS, Nos. 52/02, 41/04)
- *Regulation on ozone in the ambient air* (Official Gazette of RS, Nos. 8/03, 41/04)
- *Regulation on threshold, intervention and critical emission values of airborne substances* (Official Gazette of RS, Nos. 73/94, 52/02, 41/04) this regulation does not embrace SO_2, NOx, Pb, CO, benzene, particulate matter or ozone
- *Regulation on air emission from stationary sources of pollution* (Official Gazette of RS, Nos. 73/94, 68/96, 109/01, 41/04)
- *Regulation on volatile organic emissions from fuel storage and handling* (Official Gazette of RS, Nos. 11/99, 41/04)
- *Rules on initial measurements and operational monitoring of emissions from stationary sources of pollution, and terms for their implementation* (Official Gazette of RS, Nos. 70/96, 71/00, 99/01, 17/03)
- *Resolution on the determination of areas and levels of airborne pollution from sulphur dioxide, nitrogen oxides, particulate matter, lead, benzene, carbon monoxide and ozone in the ambient air* (Official Gazette of RS, No. 72/03).

Limit values of individual airborne substances, in compliance with the regulations effective in the Republic of Slovenia, are presented in the following table:

Table 5: Threshold values for sulphur dioxide, nitrogen dioxide and other nitrogen oxides, particles and lead (*Regulation on sulphur dioxide, nitrogen oxides, particulate matter and lead in the ambient air*).

Substance	Value	Measurement interval	Maximum concentration
Sulphur dioxide	Limit in relation to public health	(hourly) 1 hour	350 µg/m^3 (1)
		(daily) 24 hours	125 µg/m^3 (2)
	Annual limit in relation to environmental protection	calendar year, and winter-time from 1st October to 31st March	20 µg/m^3
Nitrogen dioxide and other nitrogen oxides	Limit in relation to public health	(hourly) 1 hour	200 µg/m^3 NO_2 (3)
		(annual) calendar year	40 µg/m^3 NO_2 (4)
	Annual limit in relation to protection of natural vegetation	calendar year, and winter-time from 1st October to 31st March	30 µg/m^3 NO_X
PM_{10} particles	Limit in relation to public health	(hourly) 1 hour	50 µg/m^3 (5)
		(annual) calendar year	40 µg/m^3 (6)
Lead	Annual limit in relation to public health	calendar year	0.5 µg/m^3

(1) can be exceeded a maximum of 24-times per calendar year
(2) can be exceeded on no more than 3 occasions during any calendar year
(3) can be exceeded on no more than 18 occasions during any calendar year
(4) effective as of 1st January 2010, until which time the permitted level of excess over the 40 µg/m^3 threshold is as follows: 2005: +25%, 2006: +20%, 2007: +15%, 2008: +10%, 2009: +5%
(5) can be exceeded a maximum of 35-times per calendar year; long-term orientation value for 1st January 2010 is the same, and it can be exceeded a maximum of 18-times per calendar year
(6) long-term orientation value for 1st January 2010 amounts to 20 µg/m^3

The alert threshold for sulphur dioxide is 500 μg/m^3, and for nitrogen oxides 400 μg/m^3.

Table 6: Threshold values for benzene and carbon monoxide (*Regulation on benzene and carbon monoxide in the ambient air*)

Substance	Value	Measurement interval	Maximum concentration
Benzene	Annual limit in relation to public health	calendar year	5 μg/m^3 (1)
Carbon monoxide	Annual limit in relation to public health	Max daily 8-hour mean value	10 mg/m^3

(1) effective as of 1st January 2010, until which time the permitted level of excess over the 5 μg/m^3 threshold is as follows: 2005: 50%, 2006: 40%, 2007: 30%, 2008: 20%, 2009: 10%

Table 7: Target and long-term ozone values (2002/2004 *Regulation on ozone in the ambient air*)

Substance	Value	Measurement interval	Maximum concentration
Ozone	2010 target in relation to public health	Max daily 8-hour mean value	120 μg/m^3 (1)
	2010 target in relation to protection of natural vegetation	AOT40 (accumulated dose over a threshold of 40 ppb) calculated from hourly values in the period May to July	18 mg/m^3 per hour (2)
	Long-term target in relation to public health	Max daily 8-hour mean value in calendar year	120 μg/m^3
	Long-term target in relation to protection of natural vegetation	AOT40 calculated from hourly values in the period May to July	6 mg/m^3 per hour

(1) cannot be exceeded on more than 25 days per calendar year, calculated over a three-year average
(2) as a five-year average

The intervention value for ozone amounts to 180 μg/m^3 (hourly average), whilst the alert threshold is 240 μg/m^3 (hourly average).

Table 8: Threshold values for smoke and inhalable particulates as well as dust deposits (*Regulation on threshold, intervention and critical emission values of airborne substances*)

Substance	Value	Measurement interval	Maximum concentration
Smoke and inhalable particles	Hourly threshold	1 hour	200 μg/m^3
	Daily threshold	24 hours	125 μg/m^3
	Annual threshold	1 year	50 μg/m^3
	C98 (1) per year	24 hours	100 μg/m^3
Total dust deposits	Monthly threshold calculated per day of dust deposit	1 month	350 mg/m^2 per day
	Annual threshold calculated per day of dust deposit	1 year	200 mg/m^2 per day

(1) Percentage value which exceeds 2% of all half-hour average values or all 24-hour concentrations measured in a year

5.5 Description and Assessment of Current Situation

Based on the provisions of the *Resolution on the determination of areas and levels of airborne pollution from sulphur dioxide, nitrogen oxides, particulate matter, lead, benzene, carbon monoxide and ozone in the ambient air* (Official Gazette of RS, No. 72/03), Koper is identified as a class II. zone, i.e. a locale in which the ozone threshold value is exceeded. The concentration of nitrogen oxides and PM10 airborne dust particles is between the limit value and maximum admissible excess, whilst sulphur dioxide, lead, carbon monoxide and benzene are below the threshold values.

Between 1997 and 2002, Koper was subject to ongoing monitoring of 24-hour concentrations of smoke and acid gasses within the context of Slovenia's national measurement network. Threshold values were not exceeded during this period, while Koper was no longer subject to such monitoring during 2003 and 2004.

The results of 2000 and 2002 measurements in Koper indicate 8-hour ozone concentrations were often exceeded, and this can - in particular - be attributed to such local sources of pollution as vehicular traffic, industry and, in winter, combustion heating systems (ARSO, 2000). Airborne nitrogen oxide (NOx) pollution, which is most prevalent in the close proximity of roads and energy facilities, is on the increase. Above industry, road vehicles account for the major part (66%) of NOx emissions, whilst volatile organic compounds (VOC) are liable to produce photochemical oxidants. Emissions of aromatic hydrocarbons - benzene, toluene, and the derivatives m- and p-xylene - BTX as well as o-xylene have been measured in Koper's Semedela district. Their concentrations are rather high, which is characteristic of such an area prone to heavy traffic, and which in itself is likely to account for 70 to 80% of the abovementioned pollutants (ARSO, 2000).

Emissions from gas oil, jet fuel and o-xylene storage reservoirs and tanks are regularly monitored within the Port of Koper area, and there are no indications that the prescribed thresholds are being exceeded (ZDV, 2004).

Koper's European Energy Terminal, with its coal and iron ore deposits, lies some 1,200 to 1,300 north-northeast of the proposed development, beyond which are extensive parking areas for cars in storage. There are no industrial facilities in the vicinity, but about 400 m south across Basin No. 1 lies Koper's town centre with its local city traffic, and some further 1,200 m beyond that is the busy coastal highway.

As to the areas lacking permanent air quality monitoring, an automatic mobile station operated by the Environmental Agency of the Republic of Slovenia (ARSO) was stationed in the close proximity to the Port of Koper (on the northern periphery of the old town, just across Basin 1 and some 400 m from the proposed development) between 18th January to 26th June 2005. This station established the level of air pollution, in particular harmful inhalable PM10 particles, in the vicinity of the city of Koper, and accordingly the impact of particle emissions within the port zone. In addition to PM10 particulates, the survey encompassed sulphur dioxide, nitrogen oxides, carbon monoxide and ozone, as well as such meteorological parameters as insolation (solar radiation), wind speed and direction, temperature and humidity. This report is mentioned due to the fact that measurements were executed at Izolska Vrata No.1 in a narrow street directly between a residential neighbourhood on the northern periphery of Koper's old city centre, and the port zone - the southern periphery of which was

a mere 10 metres from the measuring point. The results of the study indicate that only the recorded concentrations of ozone and PM10 particles were above the prescribed threshold values. See Attachment No. 5 for an overview of results and a summary of the 2005 MOP-ARSO study report produced by Ministry of Environment and Spatial Planning (MOP) – The Environmental Agency of the Republic of Slovenia (ARSO).

5.6 Description and Assessment of Anticipated Impacts

5.7.1 Construction

During both preparatory and building work, a decrease in air quality is anticipated within the construction site as well as along roads serving the Port of Koper. There will, in particular, be an increase in dust emissions, as well as exhaust gasses related to the operation of construction and other machinery at the site.

Minor demolition works will also be executed underwater, which will not exert any appreciable impact on air quality as a result of dust or other emissions. Due to the campaign like nature of the development, the extant overall average concentrations of dust emissions are not expected to be exceeded during the preparatory and construction works. Due to the relatively small volume of works, exhaust gas emissions from machinery and construction vehicles should not considerably affect air quality in the area.

5.7.2 Operation

Upon the operation of the new facility, air quality will mostly be affected by container handling and transport operations; thus, as a consequence of any growth in throughput at the Container Terminal, a commensurate increase in emissions of NOx, volatile organic compounds as well as PM10 particulates is to be anticipated. Based on the assessment, the threshold values of said substances will not be exceeded by the growth in operations facilitated by the Terminal extension.

5.8 Mitigation and Protection Measures

5.8.1 Construction

The following measures would have to be undertaken during the construction works in order to prevent, or at least mitigate, any impact on air quality:

- Contractors must comply with legally prescribed regulations on emissions from construction vehicles and machinery; said requirements can for the most part be met by good vehicle and machinery maintenance.
- Deliveries of materials to the construction site should not – if possible – be performed in dry and windy weather when the dust emissions from vehicles and offloading are at their greatest.
- Surfaces should be sprayed with water in dry and windy weather in order to prevent dust emissions.
- Vehicle and machinery engines should not idle or run for longer than is necessary.

5.8.2 Operation

The criteria of minimal exhaust emissions and dust minimisation have to be fulfilled in the acquisition of new plant and machinery. Roads and transport routes must also be kept clean in order to prevent dust emissions.

5.9 Monitoring

5.9.1 Construction

On the basis of the location, evaluated impacts and effective regulations, it is our opinion that air quality monitoring is not required during construction of the new facility.

5.9.2 Operation

Further to the nature of the development, air quality monitoring is not required during its operation.

5.10 Evaluation as to Environmental Impact and Acceptability of the Changes

5.10.1 Premises and methods of evaluation

In conjunction with the results of monitoring, the premises of evaluation take into consideration the existing condition, assessed on the basis of a field visit to the proposed location of the development and its broader milieu.

In the evaluation as to environmental impacts, five-point of positive and negative scales have been applied (See Chapter 1 for details).

5.10.2 Construction

Although construction work will result in increased emissions as a consequence of dust and exhaust gasses from machinery, the work will be of a short duration and limited to a small area within the port zone.

With regard to air quality, and in particular due to the relatively short duration of construction work, the development will not exert any significant impact on air quality over and above the current situation. Thus the impact of construction is assessed as **-2 (moderate negative impact).**

5.10.3 Operation

The air quality will mainly be impacted by transport operations (vessels, (un)loading and storage operations, together with road and rail transport) above the current levels at the Container Terminal, which will be engendered by increased throughput arising as a consequence of this expansion project. Relative to the current burden of traffic in this area, the planned development will not considerably aggravate environmental nuisance. The impact of operation is accordingly assessed as **-2 (moderate negative impact)**.

5.11 Sources and References

- ZVD, 2004: *Report on Monitoring and Expert Findings*. Institute of Occupational Health and Safety (ZVD); No. LET 04168/G; 2004.
- MOP-ARSO, 2005: *Air Pollution Monitoring in Koper:18th January to 26th June 2005*. Ministry of Environment and Spatial Planning (MOP) – Slovenian Environmental Agency (ARSO); 2005.

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6.4 Regulations

- *Regulation on threshold, intervention and critical alert levels in relation to hazardous substances on land* (Official Gazette of RS, Nos. 68/96, 41/04)
- *Rules on operational monitoring in relation to the application of hazardous substances and fertilizers on land* (Official Gazette of RS, No. 55/97)
- *Rules on burdening the land through the application of waste and refuse* (Official Gazette of RS, Nos. 3/03, 44/03, 41/04)
- *Regulation on thresholds in relation to applications of hazardous substances and fertilizers on land* (Official Gazette of RS, No. 85/05)
- *Regulation on the application of hazardous substances and fertilizers on land* (Official Gazette of RS, Nos. 68/96, 35/01, 2/04, 29/04, 41/04, 84/05)

6.5 Description and Assessment of Current Condition

Classified as an industrial zone, the Port of Koper is located betwixt urban and agricultural environs. Due to the fact that neither agriculture nor viticulture is practised in close proximity to the proposed development, it is not addressed as a source of land pollution.

On the basis of the fact that the motorway, coastal highway and other local roads in the vicinity of Koper, utilised by the port are heavily burdened with traffic, one would expect the land to feature, in particular, increased lead content. In past decades, a large portion of lead released into the atmosphere by exhaust gasses fell on ground within 100 m of the roads. Lead emissions from fuel significantly decreased after 1995, which is attributed to the effect of legislation curtailing the use of lead additives in fuels; indeed, the sale of leaded petrol has been banned in Slovenia since 2001, and this has been one of the most important achievements in environmental protection over recent years. It has made a substantial contribution to lower emissions of lead from road vehicles, though it should be mentioned that the coastal freeway serving Koper and by-passing the old town was opened between 1995 and 1997 when the new regulations on fuel quality were already in force. The decrease in lead emissions in Slovenia and indeed throughout Europe has undoubtedly resulted in a reduction in roadside accumulations; in general, however, the data on land pollution is rather poor. This can be attributed to a lack of ongoing monitoring, both at local and the national level, where the accessible information is based on sporadic measurements and is thus of limited value. To date, the general issue of land pollution was only investigated across about 13% of Slovenian territory; as to the location in question, the proximity of congested roads would suggest somewhat increased but not excessive level of lead in soil.

Based on the 1995 template report on environmental condition (EPA 1378-3; 1996) the land in the Koper region features an increased content of heavy metals – nickel (Ni), chromium (Cr) and copper (Cu). The increased content of Ni and Cr can most likely be attributed to the composition of the land, namely flysch soils, whilst Cu - which is in particular present in the vineyards and orchards - is most likely a consequence of intensive agriculture. The soil samples taken from fields in the vicinity of the port zone didn't feature any concentrations of persistent organic pollutants (insecticides, herbicides, PCBs paraffin hydrocarbons, aromatic hydrocarbons or volatile phenol compounds) detectible through analytical methods.

6.6 Description and Assessment of Anticipated Impacts

6.6.4 Construction

Due to the absolute change in the configuration of the site - dredging of the harbour area land reclamation and construction of a facility upon piles in an area which was once sea - construction work can be said to have a major impact on the countenance of the land, and any such influence cannot be lessened or mitigated. Dredging operations will be executed underwater, thus it will only affect the form of the seabed and not its status, i.e. it will not become land. The deposit of spoil from dredging will permanently change the configuration of the dump site - a land reclamation project. The changed configuration of this land is, however, deemed to exert a positive impact and represents an intermediate stage in the provision of permanent anti-flood protection to a low-lying area.

The spillage of oils or lubricants from vehicles or machinery used in the construction work, as a consequence of accident or improper maintenance, represents a potential source of land pollution during construction; however, it is our assessment that the application of protection and mitigation measures will prevent any such incident.

6.6.5 Operation

The extension of Pier I quayside across areas which were formerly sea and the reclamation of the hinterland areas will result in a changed configuration of the coastline. The new quayside and hinterland storage site will be set on piles, an operation which will not affect the existing substrate composition.

Although the operations of the extended Container Terminal, in particular freight transport, will indirectly cause pollution of the land, this is not anticipated to be excessive.

6.7 Mitigation and Protection Measures

6.7.1 Construction

In order to prevent or lessen impacts to the land, the following measures must be applied during the construction works:

- The provision of impeccable construction machinery by the contractors.
- Undertaking of regular maintenance and servicing of construction vehicles and machinery at a repair shop or facility away from the site.
- The possibility of fuel or oil spillage from construction vehicles or machinery, together with the consequences of contamination should be taken into consideration by the contractors, and an action plan of rehabilitation measures should be prepared, including the transport of contaminated materials to a suitable location.
- Works must be accomplished using tried and tested technology and equipment.
- The very poor geotechnical characteristics of the dredging site will require the consistent application of the prescribed procedures.
- In order to minimise negative effects of seabed dredging, work must be executed in calm weather in order to reduce the spread of muddy water (containing suspended particulates).

- Based on the guidelines provided by Slovenia's Maritime Administration, the verge of the dredging operation as well as the route of the sludge transport pipeline must be adequately indicated in order to ensure safe navigation and manoeuvring in the dredging area.

6.7.2 Operation

The facility operator - *Luka Koper* - must ensure impeccable handling and transport machinery which meets the standards of minimal airborne and other emissions.

6.8 Monitoring

6.8.1 Construction

The seabed in the area which is to undergo dredging is very susceptible to slide, therefore it is extremely important that the gradient of the embankment created by excavation will at no stage exceed that which has been designated for the dredging operation. The condition of the embankment and trench should be examined during excavation through the provision pf cross-section surveys, which should be presented by the dredging contractor, together with progress reports, to the project engineer for inspection.

6.8.2 Operation

It is our assessment, based on the location, assessed impacts and effective regulations, that special land monitoring is not required for this development. Nevertheless, regular inspection of machinery and equipment, as well as orderly maintenance in compliance with the regulations on maintenance and operation adopted by *Luka Koper* shall be required.

6.9 Evaluation as to Environmental Impact and Acceptability of the Changes

6.9.1 Methods and premises of evaluation

The evaluation premises take into consideration the existing condition, assessed on the basis of field visit to the site and its broader milieu, as well as accessible references and data. As to the evaluation of environmental impacts, five-point positive and negative scales are used to quantify the evaluation (See Chapter 1).

6.9.2 Construction

Eventual changes and impacts as regards the land cannot be prevented if this development is to be realised. The largest influence in relation to the land is in relation to its fundamental structure, namely substrate-moving: the creation of a concrete quay in an area formerly occupied by sea, and land reclamation through pumping dredge sludge into a low-lying area. It is our assessment that the development will not exert any negative impacts on land quality; the erection of this pile-supported structure shall, however, result in a topographical change to both the land and marine environment. The configuration of the land will also be altered across the area where the dredged material is deposited. This secondary influence is assessed

as positive because it will protect a currently depressed area from flooding. Overall the impact of construction is assessed as **-2 (moderate negative impact)**.

6.9.3 Operation

The extension of Pier I will result in the configuration of new land within a narrow area of erstwhile sea. Through the adoption of adequate safety procedures, direct land pollution is not anticipated during the course of regular operations. The increase in Container Terminal operations that this development will facilitate will, however, indirectly cause pollution to land adjacent transport routes. In consideration of the current burden of traffic in the Koper area, the new facility is not anticipated to have any considerable impact on the environment. The overall impact of operations at the terminal extension is assessed as **-2 (moderate negative impact).**

(References - omis)

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7.5 Regulations

- *Water Act* /ZV-1 (Official Gazette of RS, Nos. 67/02, 110/02, 2/04, 41/04-ZVO-1)
- *Regulation on substance and heat emissions upon the discharge of waste water or sewerage into watercourses* (Official Gazette of RS, No. 47/05)
- *Regulation on substance emissions in the discharge of waste waters from cooling devices, as well as devices producing steam or hot water* (Official Gazette of RS, Nos. 28/00, 41/04)
- *Rules on the treatment and discharge of sewerage, waste water and precipitation* (Official Gazette of RS, Nos. 105/02, 50/04)
- *Rules on initial measurement and operational monitoring of waste waters as well as the terms of implementation* (Official Gazette of RS, Nos. 35/96, 29/00, 106/01)
- *Rules on monitoring subterranean waters for pollution with hazardous substances* (Official Gazette of RS, No. 5/00)

7.6 Description and Assessment of Current Condition

Due to the fact that the anticipated development exerts no impact on the area of the Rižana River nor the groundwater, this chapter solely addresses the sea.
Monitoring by national authorities is executed at two points in the Bay of Koper:
• point 0014 is located in Basin II of the Port of Koper, measuring pollution in the harbour area and from the outflow of the Rižana River; and
• point 00K - Koper Bay station - is located west of the Debeli Rtič headland which mark the northern side of the Bay of Koper, and indicate the general pollution level in the vicinity.

Sewerage outflows
The single most important source of pollution in the Bay of Koper is from uncontrolled discharges of sewage, as well as discharges from treatment plants and fresh water effluent from rivers.

Heavy metals
Seawater analysis conducted in 2003 reveal that zinc, cadmium, nickel, lead, copper and chromium are at levels below the detection limit. The highest concentration of soluble mercury was measured in August 2003 at the Piran station (0.00095 μg/l) some 12 km west-south-west of Koper, as well as in November at a station in the open sea within Slovenia's territorial waters (0.00090 μg/l). The lowest level of soluble mercury (0.00017±0.00012 μg/l) was measured at point 00K (Koper Bay station) (NIB-MBP, 2003). Recent years has seen the introduction of bio monitoring, as opposed to the measurement of the heavy metal content of waters.

During 2004 and 2005, marine organisms and sediment was monitored for heavy metal content at the Koper Bay measurement station (00K), but there were no indications of increased concentrations (NIB-MBP, 2004, 2005).

Polycyclic aromatic hydrocarbons (PAHs)
According to the annual NIB-MBP report for 2003, PAHs were identified in the water and in the sediment at the Koper Bay station (00K). Concentrations of all the various polycyclic aromatic hydrocarbons in the water were invariably below the detection threshold, with the exception of the February concentration of naphthalene which increased slightly (to 0.015 µg/l). Recent years has seen the introduction of bio monitoring, as opposed to measuring the the PAH content of water.

The table below indicates the results of hydrocarbon sediment monitoring in 2004 and 2005 (NIB-MBP 2005, 2006)

Table 9: Measurement results of total aliphatic and total aromatic hydrocarbon content in nano-grams per gram of seawater, (NIB-MBP 2004, 2005)

Measurement station:		**0014 Koper Harbour**	**00K Koper Bay**
2004	Aliphatic hydrocarbons	5937 ng/g	2358 ng/g
	Polycyclic aromatic hydrocarbons	1383 ng/g	766 ng/g
2005	Aliphatic hydrocarbons	9558 ng/g	3166 ng/g
	Polycyclic aromatic hydrocarbons	1314 ng/g	859 ng/g

The results of national monitoring also indicate comparable levels of pollution by polycyclic aromatic hydrocarbons in the Bay of Koper and at Piran. In both cases this is most likely attributable to maritime cargo transport in the vicinity of the Bay of Koper (ports of Trieste and Koper) as well as Marina Portorož in the Bay of Piran. The towns and cities along the coast also can also be accounted for their share.

Due to the increased volume of maritime traffic, sea pollution from oil and oil derivatives is becoming a series issue. Hydrocarbons can bond to floating particles and sink to the seabed. Bioaccumulation of hydrocarbons is thus particularly exhibited in organisms that live on or in the sediments and substrate, while the content of various hydrocarbons in such bottom-dwelling micro-organisms can several-fold exceed the concentrations of those same substances in the sediment. Accumulation is to a much lesser extent detectible in fish. Unsurprisingly, the highest aggregations of hydrocarbons have been recorded in ports and marinas, although these values have never exceeded 50 µg/l.

Due to the fairly dense population and various industries in its hinterland, the Bay of Koper is a most burdened aquatic environment, and because of its lower regeneration abilities it is also a very vulnerable area. The sea's features and pollution varies from one year to the next, mainly depending on weather conditions, although large oscillations have not been observed. Varying quantities of precipitation and a broad temperature spectrum might also affect the chemical and physical features of seawater, which also has influence on local bio-reproductive conditions.

The harbour area of the Port of Koper and the busy sea-lanes beyond, face potential danger from hydrocarbon pollution as a consequence of an accident or spillage from a vessel; such was the case in 2005 when bilge water spilled from a moored ship.

7.7 Description and Assessment of Anticipated Impacts

7.3.1 Construction

During the quayside construction, the driving of piles into the seabed of Basin I and other construction works will lead to increased turbidity. Sediment analyses in the Bay of Koper indicated pollution by PAH and mercury, thus it is most likely that dredging and other disturbances of sediment during construction will result in an increased content of said pollutants in the water. Another possible source of pollution are accidents involving spills from construction machinery. Nevertheless, we assess that the prescribed threshold values of parameters shall not be exceeded.

7.3.2 Operation

No major direct impacts on water quality are anticipated during the regular operation of the extended Container Terminal. There are no industrial waste waters, and transported freight is enclosed within containers. Surface waters are discharged through natural run-off, with the sea being their final recipient.

Water turbidity will occur sporadically as a consequence of regular maintenance works within Basin I. The impact of re-dredging the channels and berths in Basin I is deleterious due to the short-term decrease in the quality of water and its transparency, which exerts a significant impact on seabed organisms; said impact, however, is sporadic and transitory. Diving investigations indicate that – due to constant disturbances – fauna does not occupy the seabed in those channels and berths which undergo sporadic dredging. Such maintenance operations by the port operator are essential in order to keep the facilities accessible to vessels, so even if the new structure wasn't built, these impacts would remain; accordingly, they are not additionally assessed herein.

An accident during container handling or storage is not expected to exert any impact on water quality, due to the fact that containers are closed. In addition, the use of modern technology and safety regimes ensures the possibility of such an accident remains very small indeed. A small indirect influence on water quality may be anticipated due to the washing off of airborne pollutants, while mitigating this impact depends in particular on the employment new machinery and keeping working areas clean. Further to these conclusions, the prescribed threshold values are not anticipated to be exceeded.

The new structure will not result in any increased consumption of potable water over and above the level of current consumption at the Container Terminal.

7.8 Mitigation and Protection Measures

7.7.1 Construction

The following measures must be applied during construction work in order to prevent or at least mitigate negative impacts on water:

- Building contractors must provide impeccable construction machinery.
- Provision of regular maintenance and servicing of construction vehicles and machinery should be provided at a repair shop or facility away from the site.
- The possibility of fuel or oil spillage from construction vehicles or machinery, together with the consequences of contamination should be taken into consideration by the contractors, and an action plan of rehabilitation measures should be prepared, including the transport of contaminated materials to a suitable disposal site.

7.7.2 Operation

All cargo handling operations in the area will be performed using modern technology and safety regimes. The response and rehabilitation plan in the event of fuel of oil spill from construction machinery or transport means is elaborated.

7.8 Monitoring

Waste water monitoring is not necessary for the Container Terminal area.

7.9 Evaluation as to Environmental Impact and Acceptability of the Changes

7.9.1 Methods and premises of evaluation

The premises of evaluation take into consideration the extant condition, assessed on the basis of field visit to the site and its broader area, as well the results of current monitoring. As to the evaluation of environmental impacts, five-point positive and negative scales are used to quantify the evaluation (See Chapter 1).

7.9.2 Construction

The location in question is situated outside the water sources protection area; thus, based on the anticipated measures, the threshold values of parameters are not anticipated to be exceeded, and that the development is – from the perspective of environmental nuisance and change – acceptable. Construction work will exert a large, but short-tem impact on waters, which is assessed as **-3 (medium negative impact).**

7.9.3 Operation

Precipitation runoff from the Container Terminal will increase as a consequence of the facility's extension; this in itself will not cause pollution under regular operation. A small indirect influence on water quality may be anticipated due to washing of airborne pollutants; however, this impact in particular depends on the qualities of machinery and keeping the working area clean.

Based on the above, the prescribed threshold values of parameters are not anticipated to be exceeded during regular operation. In comparison with the current situation, the impact of the development is assessed as **-1 (marginally negative impact).**

7.10 Sources and References

- ZZV Koper, 2004: *Report on Operational Monitoring of Waste Waters*. Koper Occupational Health Institute, on behalf of Luka Koper. 2004.
- NIB-MBP, 2003: *Quality of Sea and Pollution Control*. Report by V. Turk, O. Bajt, M. Horvat, R. Milačič, P. Mozetič, A. Ramšak and A. Malej of the National Institute of Biology, Piran Marine Biology Station (NIB/MBP). 2003.
- NIB-MBP, 2004: *Sea Quality Monitoring and Control of Pollution From Land, in Compliance with Barcelona Convention*. Report by V. Turk, O. Bajt, M. Horvat, R. Milačič, P. Mozetič, A. Ramšak and A. Malej of the National Institute of Biology and the Piran Marine Biology Station; (NIB/MBP). 2004.
- NIB-MBP, 2005: *Quality of Sea and Pollution Control*. Report by V. Turk, O. Bajt, M. Horvat, R. Milačič, P. Mozetič, A. Ramšak and A. Malej of the National Institute of Biology and the Piran Marine Biology Station (NIB/MBP). 2005.

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8.4 Regulations

- *Regulation on noise from road and railway traffic* (Official Gazette of RS, Nos. 45/95, 41/04-ZVO-1).
- *Regulation on noise assessment and management* (Official Gazette of RS, No. 121/04).
- *Rules on initial measurement and operational noise monitoring and the terms of their implementation* (Official Gazette of RS, Nos. 70/96, 45/02, 41/04-ZVO-1)
- *Rules on noise emissions from machinery used outdoors* (Official Gazette of RS, Nos. 106/2002, 50/2005, 49/2006)
- *Regulation on noise threshold levels* (Official Gazette of RS, No. 105/2005).

New regulations impose new restrictions as to noise levels in the environment, together with statutorily prescribed thresholds for individual zones. Table 10 indicates threshold noise level values applicable to daytime, evening, night-time and average ($L_{day,}$ $L_{evening,}$ $L_{night,}$ & $L_{d\text{-}e\text{-}n}$), in relation to noise which is generated by machinery, plant, airfields, heliports, cargo handling facilities or open parking areas. Table 11 indicates peak noise levels.

Table 10: Threshold limits for noise levels

Level of noise protection / Zone		**L_{day}[dBA]**	**$L_{evening}$[dBA]**	**L_{night}[dBA]**	**$L_{d\text{-}e\text{-}n}$[dBA]**
Zone I	(Noise Sensitive Area)	47	42	37	47
Zone II	(Residential)	52	47	42	52
Zone III	(Commercial)	58	53	48	58
Zone IV	(Industrial)	73	68	63	73

Table 11: Peak limits for noise levels

Level of noise protection / zone	**L_1 – evening and night (dBA)**	**L_1 – daytime (dBA)**
Zone I	60	75
Zone II	65	75
Zone III	70	85
Zone IV	90	90

The assessment of noise during the construction and operation of the facility, as well as adequate mitigation measures, are provided in the report entitled *Assessment of noise pollution from the planned multimodal terminal at Pier III – corrections upon the adoption of new regulations* (ZVD-b, 2006).

8.5 Description and Assessment of Current Situation

Based on the *Regulation on noise threshold levels* (Official Gazette of RS, No. 105/2005), the Port of Koper is classified as an industrial area, i.e. a Zone IV classification.

The commercial and residential area to the south of the port facility is identified as a Zone III area, and lies more than 450 m distant from the development across Basin I. A road is also located between the port zone and residential areas.

During 2005, regular monitoring also encompassed noise level measurements within the port zone itself. According to the report on noise measurements, the levels recorded at selected measurement points (southwestern side: roof of warehouse No. 7-8; southeastern side: car terminal storage; northern side: second entrance gate) remained within the permissible limits for a Zone IV industrial facility.

Measurement station No. 1 near the northern periphery of Koper's old city centre, is located on the roof of warehouse No. 7-8; Y = 401298, X = 45875.

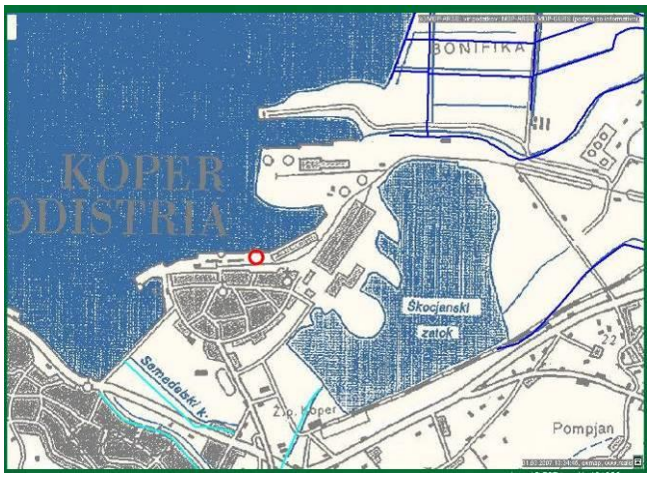
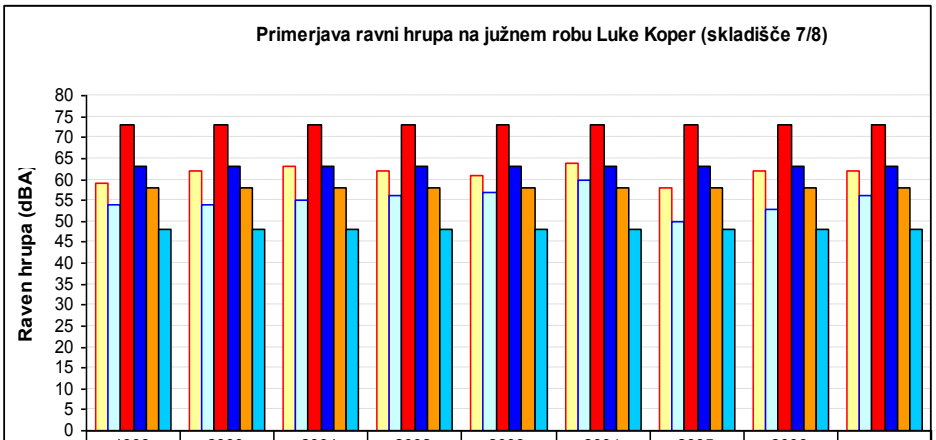


Illustration 6: Location of noise measurement station No.1, just to the north of Koper's old city centre

The average recorded noise levels at the Port of Koper, elaborated in March 2006 by Slovenia's national Institute Occupational Health and Safety (ZVD a), are indicated in Table 12. Values for measurements in previous years are calculated according to Regulation 105/2005, and such methodology solely permits the comparison of threshold values L_{day} and L_{night} as indicators.

Table 12: Comparison of average noise levels measured between 1998 and 2005 at the Port of Koper.



	1998	2000	2001	2002	2003	2004	2005	2006	povp
Ldan	59	62	63	62	61	64	58	62	62
Lnoč	54	54	55	56	57	60	50	53	56
LdanIV	73	73	73	73	73	73	73	73	73
LnočIV	63	63	63	63	63	63	63	63	63
LdanIII	58	58	58	58	58	58	58	58	58
LnočIII	48	48	48	48	48	48	48	48	48

Primerjava ravni hrupa na južnem robu Luke Koper (skladišče 7/8) =
Noise level recorded at measurement station No. 1, located on the roof of warehouse No. 7-8, near the northern periphery of Koper's old city centre

Raven hrupa = **Noise level (dBA)**

- **L_{day}**
- **L_{night}**
- **L_{day-IV}**
- **$L_{night-IV}$**
- **$L_{day-III}$**
- **$L_{night-III}$**

Legend:
L_{day} – daytime noise level at measurement station No. 1
L_{night} – night-time noise level at measurement station No. 1
L_{dayIV} – prescribed night-time threshold value of noise level for Zone IV
$L_{nightIV}$ – prescribed daytime threshold value of noise level for Zone IV
L_{dayIII} – prescribed night-time threshold value of noise level for Zone III
$L_{nightIII}$ – prescribed daytime threshold value of noise level for Zone III

Thus far, the noise measurements and analyses at the Container Terminal, namely the *Assessment of noise pollution of planned multimodal terminal at Pier III – corrections upon the adoption of new regulations* (ZVD-b, 2006), identified several noise sources which have a significant impact on the environment; these are:
- *Peiner* gantry cranes (four units)
- *Ormig* and *Belotti* pick and carry crane trucks (four units)
- straddle carriers for containers (three units)
- a number of trucks and folk lifts
- local railhead sidings

- refrigeration units on reefer containers
- ventilation units (in particular the gantry cranes)
- transport (road vehicles, railway locos and wagons, vessels in the harbour)
- audible warning signals of cranes, transport and other vehicles in motion

With the exception of the railhead which is only in operation during the daytime, the majority of the sources of noise continue both day and night. Of the external sources, road traffic is a major contributor to noise levels; mention should also be made of the impact of train transport which is not within the remit of the Port of Koper, though such mainly accounts to peak rather average noise levels.

8.6 Description and Assessment of Anticipated Impacts

8.7.1 Construction

The envisaged construction site presents a point source of noise for areas outside and beyond the Port of Koper zone. Construction machinery and equipment will be a major source of noise, though its intensity diminishes relative to distance from the source; theoretically this attenuation is 5dBA upon any doubling of the distance, with larger decreases in relation to more outlying locations due to the absorption of noise by the ground and the atmosphere. Machinery noise levels are usually assessed on the basis of the relationship between acoustic power and the level of sound pressure.

Construction operations will necessarily involve noise-producing operations related to work with dredgers, compressors, loaders, bulldozers, as well as the dispatch and delivery of materials by truck. Explosive demolition is not anticipated. Of all the listed noise-creating activities, pile driving and the transport of spoil and other materials is anticipated to have a major impact which will be perceptible across a broader area, in particular the residential districts at the northern side of Koper old town as well as along transport routes. The prescribed noise levels are not expected to be exceeded at distances of more than 300 m from the construction area (ZVD-b, 2006).

Certain problems may arise at shorter distances or with some procedures, such as pile driving. Accordingly, the use of less noisy vibration tools which engender resonance at a frequency of about 150 Hz are recommend. Based on similar experiences of quayside construction at the Port of Koper, such noise can be kept within the permissible limits under the condition that the works are controlled. This among other things, this includes implementation of several control measurements and – if necessary – the adoption of additional remedial measures as regards technical and organisational procedures (ZVD-b, 2006).

Table 13: Sound exposure levels in relation to trucks and construction machinery (ZVD-b, 2006)

Noise source	per unit (dBA)	exposure (dBA)
Trucks	Sound exposure level (SEL) (1truck, 100m)	L_{day} (200 trucks, 100m)
Older vehicles	65	40
Newer vehicles (L,G)	55	30
Loader and truck at 100 m distance		65 (L_{eq})
Road roller at 100 m distance		70 (L_{eq})
Pile driving at 100 m distance		85 (peak)

Crane at 100 m distance	50 (L_{eq})
Small compressor (<5m^3/min) at 100 m distance	50 (L_{eq})
Large compressor (>10m^3/min) at 100 m distance	55 (L_{eq})
High-performance dredger (>70kW) at 100 m distance	65 (L_{eq})

The closest premises exposed to operational noise from the site lie some 500 m distant from the construction area. Noise levels are anticipated to amount 57 dBA L_{day} during construction work, reaching estimated peaks of 72 dBA.

8.7.2 Operation

According to the *Assessment of noise pollution of planned multimodal terminal at Pier III – corrections upon the adoption of new regulations* (ZVD-b, 2006), the average noise level of the rubber-tyred gantry cranes at 50 m distance amounts to about 80 dBA, whereas the rail mounted cranes are equivalently rated at 75 dBA. Noise levels decrease by some 6 dBA per any doubling of distance, whereas at larger distances said decrease is – due to a variety of factors – even greater. Exposed premises lie more than 400 m away from the nearest cargo handling sites at the Container Terminal. At such distances, and as a result of the influence of geometric divergence and absorption, the noise level of quayside cranes will be below 45 dBA.

Due to the specific characteristics of railway transport within the Port of Koper, a combined method has been applied on the basis of measurements of noise levels of individual compositions. The values recorded for three train compositions within the port at a distance of 25 m served for the calculation of actual noise levels as well as average exposure. Table 14 (below) reveals the actual anticipated day- and night-time noise levels from new rail track at the Container Terminal at various distances. The anticipated length of compositions amounts to 25 wagons, while their frequency is 6 trains per day and 2 trains at night (or, on the basis of average train size equivalents, 1 to 2 trains in night time and 4 to 5 trains in daytime).

Table 14: Anticipated noise levels from the multimodal railhead at the Koper Container Terminal

Distance from source (m)	L_{day}(dBA)	L_{night}(dBA)
25	55	53
100	50	48
150	48	46
200	46	44
300	43	41
400	41	39
500	40	38
600	38	36
800	36	34

Source: ZVD-b, 2006

The night-time train composition standard is shorter (smaller) than during the day, while the actual number of night-time compositions is also less. The impact of any train composition - in itself - would not cause permissible noise thresholds to be exceeded during the day, evening or night.

Table 15: Noise levels produced by trucks (ZVD-b, 2006)

Noise Source	**Sound Exposure Level per vehicle (1 truck, 100 m)**	**L_{day} exposure (200 trucks, 100 m)**
Trucks		
Older vehicle	65 dBA	40 dBA
Newer vehicle (L,G)	55 dBA	30 dBA

The nearest exposed premises are located some 500 m distant, further to which a road prone to heavy-traffic separates them from the perimeter of the port zone. The anticipated noise levels attributable to operations amount to L_{day}=40 dBA, and L_{night}=38 dBA.

8.8 Mitigation and Protection Measures

8.8.1 Construction

In compliance with the *Rules on noise emissions from machinery used outdoors* (Official Gazette of RS, No. 106/2002), less noisy machinery should be used in construction operations. The aforementioned regulations anticipate the following limits on noise emissions in accordance with the Table below:

Table 16: Prescribed limits on noise emissions

Type of machine	**P – net power (in kW) m – hammer weight (in kg)**	**Permissible weighted sound power emission (in dB/1pW)**
Bulldozers, loaders and crawler excavators	P<55	106
	P>55	87 + 11logP
Bulldozers, loaders and wheel excavators, mobile cranes, non-vibrating rollers	P<55	104
	P>55	85 + 11logP
Hand-held concrete-breakers and picks	m<15	107
	15<m<30	94 + 11logm
	m>30	96 + 11logm
Compressors	P<15	99
	P>15	97 + 2logP

Source: ZVD-b, 2006-09-09

Other mitigation measures include:

- All noise-generating works (in particular pile driving) may only be executed between 6 am and 6 pm, when the noise limits are the least strict.
- The construction machinery used should – if possible – be of a more recent manufacture and certificated that its noise emission doesn't exceed the values prescribed in Table 15; the transport of materials to and from the site should be executed using trucks with the lowest possible noise emissions, which also have declarations that they are low-noise vehicles.
- Full consideration should be given to noise exposure, and the duration of noise-generation from operations should be limited to the minimum possible extent.
- Foremen must ensure proper discipline at the construction site. Acoustic signals should only be used in urgent cases, and the engines of machinery should not run idle.

- Control measurements of noise must also be carried out during construction works, and, according to their results, additional anti-noise measures adopted if the existing ones are proven to be deficient or insufficient.

Due to the fact that neither the contractors nor the heavy-duty machinery that is to be used on site are not, as yet, identified or detailed, noise control measurements should be implemented upon the commencement of construction works and – if necessary – additional anti-noise measures should be taken accordingly.

8.8.2 Operation

The Container Terminal extension will not result in any significant increase in noise levels over and above the current situation.

Should regular monitoring indicate any excess noise, i.e. over the prescribed levels, caused by the Port of Koper's operations as a whole, additional study as to the culpable source and additional measures necessary to reduce noise levels will have to be elaborated.

8.9 Monitoring

8.9.1 Construction

Noise monitoring should be implemented during the execution of more noise-intensive works; the frequency of such monitoring should be adapted to the degree of documented noise pollution, as well as in accordance with trends and changes.

Noise monitoring will be of major importance during construction works, due to the fact that the site could otherwise engender excessive noise pollution. Initial measurements should be taken upon the first operation of noisy machinery, whilst the frequency of further measurements will depend on the established degree of nuisance/pollution together with the mode of implementation of anti-noise measures. Particular attention will have to be paid to pile driving.

8.9.2 Operation

Legal provisions require initial and regular noise measurements. Initial measurements are, as a rule, executed during test operation, or, if test operation isn't determined in the operating permit granting procedure, following the establishment of stable operating conditions. Initial measurements have to be executed during a period when the multimodal Container Terminal is in full operational load, i.e. when maximum noise emissions are to be expected.

Regular measurements should be implemented in compliance with the existing regular operational monitoring of the effect of noise pollution from the Port of Koper on the environment as a whole.

8.10 Evaluation as to Environmental Impact and Acceptability of the Changes

8.10.1 Methods and premises of evaluation

The evaluation premises take into consideration the existing situation, assessed on the basis of noise measurement results, as well as a field visit to the location and its broader area. The assessment assumed that the investor, Luka Koper, will fully implement the prescribed mitigation and protection measures. As to the evaluation of impacts, five-point positive and negative value scales are applied (See Chapter 1 for details).

8.10.2 Construction

During construction, noise pollution will mainly be attributable to construction machinery (dredgers and compressors etc.), as well as manipulation and transport vehicles (loaders, cranes and trucks etc.). Said sources are not anticipated to exceed the permissible noise levels at a distance of more than 400 m. The noise impact on underwater ecosystems is not known.

The largest single source of noise will be pile driving, which could result in nigh-time threshold noise levels being broken; for this reason, pile driving must be implemented exclusively during the day.

Due to the operation of construction machinery, as well as the manipulation and transport of materials, construction will result in large, direct, but a relatively short-term impact on local noise levels. The impact is assessed as **-4 (very large negative impact)**, but this will be exerted only during the period of construction.

8.10.3 Operation

Based on technical advancement and, in particular, if EU guidelines are met, new machinery can legitimately be expected to have lower noise emissions than the existing plant. The operations of the expanded terminal won't significantly increase the noise emissions beyond the current levels, thus the threshold values shall not be exceeded. The impact of noise emissions is thus assessed as **-1 (marginally negative impact).**

8.11 Sources and References

- ZVD (2001): *Assessment of Noise Pollution from the Planned Multi-Modal Terminal at Pier III*. Report produced on behalf of Luka Koper d.d. by F. Deželak and F. Petančič of the Ecology and Toxicology Dept. at the Ljubljana-based Institute of Occupational Safety. Report No. ZVD CET-00082. April 2001.
- ZVD-a (2006): *Report on the Impact of Luka Koper d.d.'s Operations on Noise Pollution* produced by A. Novak of the Ecology and Toxicology Dept. at the Ljubljana-based Institute of Occupational Safety. March 2001.
- ZVD-b (2006): *Assessment of Noise Pollution from the Planned Multi-Modal Terminal at Pier III - Amendments upon the adoption of new regulations*. Updated report produced on behalf of Luka Koper d.d. by F. Deželak of the Ecology and Toxicology Dept. of the Ljubljana-based Institute of Occupational Safety. September 2006.

22 Environment Quality - Waste and Refuse

9.4 Regulations

- *Regulation in relation to the application of hazardous substances and plant fertilizers on land* (Official Gazette of RS, Nos. 68/96, 35/01, 2/04, 29/04, 41/04)
- *Rules on waste management* (Official Gazette of RS, Nos. 84/98, 45/00, 20/01, 13/03, 41/04)
- *Rules on the management of waste generated by construction work* (Official Gazette of RS, Nos. 3/03, 50/04, 62/04, 41/04)
- *Rules on the application of waste on land and pollution by waste* (Official Gazette of RS, Nos. 3/03, 44/03, 41/04)
- *Rules on the management of chemical batteries and vehicle batteries containing hazardous substances* (Official Gazette of RS, Nos. 104/00, 41/04)
- *Rules on waste oil management* (Official Gazette of RS, Nos. 85/98, 50/01)
- *Rules on the management of waste containing asbestos* (Official Gazette of RS, Nos. 105/00, 41/04)
- *Rules on the application of conditions for the removal of materials containing asbestos during renovation work or the demolition of premises, as well as in relation to maintenance work on premises, installations and devices containing asbestos* (Official Gazette of RS, Nos. 72/01, 41/04)
- *Rules on the management and disposal of waste electrical and electronic equipment* (Official Gazette of RS, No. 118/04)
- *Rules on the transport of hazardous and harmful substances as well as the construction and equipping of storage facilities in which hazardous and harmful substances shall be kept* (Official Gazette of SRS, No. 3/79).

9.5 Description and Assessment of Current Situation

Collecting, sorting, removing and disposing of collateral materials, wastes and refuse generated at the Port of Koper is performed by the company *Luka Koper INPO d.o.o.,* whereas the sorting and resale of secondary raw materials is undertaken by the Ptuj-based *Eko-les* company which is also responsible for the disposal of all hazardous and special wastes generated at the Port of Koper. The waste is divided into municipal (mixed general), organic and special waste, and – where such is possible – it is separately collected and processed.

Waste is collected in 5 to 7 m^3 skips at individual terminals or in 80 litre plastic containers. Two vehicles operate a regular disposal service to the disposal site at which a temporary recycling facility operates.

Table 17: Waste and refuse at the Port of Koper, 2005

Type of waste	EWC code number	Quantity (in tonnes)
Mixed municipal wastes	20 03 01	646.56
Sawdust, shavings, cuttings	03 01 05	1,816.53
Paper & cardboard packaging	15 01 01	168.60
Metal packaging	15 01 04	173.24
Animal manure	02 01 06	297.75
Timber packaging	15 01 03	119.40

Type of waste	EWC code number	Quantity (in tonnes)
Iron and metals	16 01 07	140.74
Other timber waste not included under 150103	20 01 38	24.55
Plastic packaging	15 01 02	66.26

Municipal wastes
A compost-processing facility aimed at sorting refuse not collected separately and processing bio-degradable waste began operations at the Port of Koper in 1998. Materials which, thus far, cannot be sorted, recycled or composted are transported by *Eko-les d.o.o.* to the municipal facility operated by Koper Municipality.

Bio-degradable wastes
A high percentage of waste generated in the Port of Koper is bio-degradable, which, within certain limitations can be processed into compost. Organic waste - such as perished fruit and vegetables, food leftovers, spoiled foodstuffs, bark and finely cut branches, dead plants, leaves, grass cuttings, wood chips, manure, sawdust, and materials swept from cereals silos - is bio-degradable and processed into a compost rich in minerals and nutrients.

Hazardous waste
Hazardous wastes from the Port of Koper is processed by *Luka Koper INPO* and *Eko-les*. It is reported that the following quantities of hazardous wastes were generated in 2005:

Table 18: Hazardous wastes generated at the Port of Koper in 2005, classified per European Waste Catalogue code numbers

Type of waste	EWC code number	Quantity (in tonnes)
Absorbents	15 02 02	12,620
Waste water solutions	19 13 07	98,206
Waste paints and varnishes	08 01 11	3,460
Absorbents, filtering agents	15 02 03	6,200
Solid wastes	19 13 01	3,220

9.6 Description and Assessment of Anticipated Impacts

9.6.3 Construction

During the construction preparation works, demolition of the western end of the existing quayside will result in cca. 102 m^3 of concrete waste, defined under EWC code No. 170101 – concrete waste.

Construction work is also anticipated to generate other wastes, including the hazardous ones which are listed in the Table below. Hazardous waste is anticipated in relation to the maintenance of construction vehicles and heavy duty machinery, some of which – if handled improperly – may present a potential danger to the environment.

Table 19: Hazardous wastes anticipated during construction works, classified per European Waste Catalogue code numbers

Type of waste	EWC code number	Hazardous
Waste engine, machinery and lubricating oil	13 02	Yes
Packaging containing residues of hazardous substances or which is polluted by hazardous substances	15 01 10	Yes
Absorbents, filtering agents, cleaning cloths and protective gear	15 02	Potentially
Soil, rock and spoil	17 05	(omis)
Separately collected fractions	20 01	Potentially
Mixed municipal waste	20 03 01	No

Rules on waste management (Official Gazette of RS, Nos. 84/98, 45/00, 20/01, 13/03)

The quantities of waste identified above cannot be calculated, but it is estimated that they will be relatively small. Appropriate organisation of the construction site, together with adequate collection and disposal regimes for hazardous waste, which must be delivered to a competent collector (registered as such at the Ministry of Environment and Spatial Planning) for further processing, shall ensure that the possibility of any harmful environmental impact is kept to a minimum.

The total quantity of excavated material (sludge spoil) shall amount to some 16,500 m^3 and will be deposited at plot No. 879/1 k.o. Ankaran. This location is stipulated by way of a contract, and already serves as a permanent site for the deposit of material dredged from the port basins in order to maintain navigational depth. The effect of such dumping, with regard to the change in the configuration of the land - insofar as it acts as a sea defence in a low-lying area and thus presents an intermediate operation in the provision of permanent anti-flood protection - is assessed as positive.

9.6.4 Operation

Waste will not additionally affect the environment, because the quantities and type of waste generated by the operations of the Container Terminal won't change. Wastes will also be collected from vessels by a special dedicated service.

9.7 Mitigation and Protection Measures

9.7.1 Construction

The following measures should be implemented in order to mitigate the negative environmental impact of waste materials deriving from construction works:

- Construction waste must be handled in compliance with the *Rules on management of waste generated by construction works*, and monitored through the provision of prescribed records. Luka Koper, as the investor, has to ensure that the contractors use a site for the temporary or permanent containment of construction wastes which shall not lead to any pollution of the environment. Furthermore, the collector of such waste materials has to be provided access for collection, in order that all materials may be dispatched for processing or other means of non-polluting disposal. If the construction waste cannot be kept or temporarily stored at the site, the investor must provide

containers where the waste can de deposited immediately upon its generation; these containers have to be placed at or next to the construction site, as well as adapted for the transport of construction waste without transferral to another means of transport.

- The *Construction waste management plan* of will be elaborated in compliance with the *Rules on the management of construction waste*.
- Facilities and schemes for the proper collection and disposal of waste, both hazardous as well as non-hazardous, have to be provided.
- Hazardous waste generated during construction works (vehicle batteries, materials contaminated by oil derivatives, residues of paints and varnishes and suchlike) – together with prescribed records mentioned above – have to be delivered to a person or agency authorised by the Ministry of Environment and Spatial Planning for the management of such hazardous waste.
- Unauthorised access to the construction site, and thereby unauthorised disposal of waste, must be prevented.

Further to the above, a waste management plan will have to be elaborated.

9.7.2 Operation

The following measures must be implemented in order to mitigate the environmental impact of wastes generated during the operation of the new Container Terminal facility:

- The storage of all hazardous substances and chemicals (including hazardous wastes) has to meet the provisions of the *Rules on the transport of hazardous and harmful substances as well as the construction and equipping of storage facilities in which hazardous and harmful substances shall be kept* (Official Gazette of SRS, No. 3/79).
- Hazardous wastes have to be collected separately from other, non-hazardous, wastes.
- Hazardous wastes must be disposed of and managed by a person or agency authorised for such by the Ministry of Environment and Spatial Planning
- Hazardous wastes must be properly registered through prescribed record keeping and, as is the case with all other generated waste, removed regularly for appropriate disposal or processing.

9.8 Monitoring

9.8.1 Construction

Special waste monitoring is not required during the construction operation. Nevertheless:

- Because the dredging area is extremely vulnerable to slip, the seabed profile (contour) should be controlled during dredging, while the spoil (dredged materials) should be appropriately transported off site. The contractor should provide a continuous record of its ongoing operations, open to oversight and scrutiny by the clerk of the works as well as the inspectorate of works.
- Based on the guidelines provided by Slovenia's Maritime Administration, the verge of the dredging operation as well as the route of the sludge transport pipeline must be adequately indicated in order to ensure safe navigation and manoeuvring in the dredging area.

9.8.2 Operation

- Wastes generated by the operations of the new Container Terminal facility will have to be further registered – together with prescribed records – in compliance with the provisions of the *Rules on waste management* (Official Gazette of RS, Nos. 84/98, 45/00, 20/01, 13/03, 41/04) ,

9.9 Evaluation as to Environmental Impact and Acceptability of the Changes

9.9.1 Methods and premises of evaluation

Evaluation premises take into consideration the extant condition, assessed on the basis of a field visit to the location of the proposed development, information provided by the investor, Luka Koper d.d., and available public information.

As to the evaluation of impacts, five-point positive and negative value scales are applied (See Chapter 1 for details).

9.9.2 Construction

The requisite construction works will not affect the current condition as regards environmental impact or nuisance. Accordingly the impact is assessed as **-1 (marginally negative impact).**

9.9.3 Operation

Due to the fact that during their regular operation the quayside extension and increased storage areas will not affect the quantity of waste, the impact is deemed negligible, and thus accordingly assessed as **0 (no impact).**

23 Environment Quality – Electromagnetic Radiation

10.1 Regulations

Based on land use, as well as in compliance with the *Regulation on electromagnetic radiation in the natural and living environment* (Official Gazette of RS, No. 70/96), the area of the proposed development is officially designated a Zone II area in relation to protection against radiation. Zone I is classified as an area encompassing residential neighbourhood, hospitals, schools, public amenities, tourist and recreation facilities (including sports fields and public parks); Zone II encompasses all other non-residential areas (i.e. industrial, manufacturing, trade, storage, service provision as well as transport infrastructure)

10.2 Description and Assessment of the Current Situation

The Port of Koper is supplied with electrical energy via a 1,000 kVA line from an existing substation, a transformer facility which is a source of electromagnetic radiation. Based on information provided by the *Slovenian Institute of Quality*, the highest assessed density of magnetic field is right next to the substation itself and it doesn't exceed 10 μT (ten micro-Tesla). The magnetic field falls rapidly with increasing distance from the substation, and electromagnetic radiation at a distance of five metres is considerably lower than the legally prescribed threshold, whilst beyond 10 m the magnetic field strength remains much the same (below 0.5 μT), the generally present level of background electromagnetic radiation.

23.2.1 Construction

Construction of the new facility will not present new sources of electromagnetic radiation.

23.2.2 Operation

A new medium-voltage transformer substation will be erected in a non-populated area and attested for quality. The new substation's rated power will amount to 400 kVA, thus the magnetic field strength at a distance of 10 m is anticipated to be below 0.5 μT.

10.3 Mitigation Measures

Construction and operation of the Container Terminal extension do not require any mitigation measures in order to reduce electromagnetic radiation.

10.4 Monitoring

Construction and operation of the Container Terminal extension do not require any monitoring of electromagnetic radiation.

10.5 Evaluation as to Environmental Impact and Acceptability of the Changes

As regards electromagnetic radiation, the Container Terminal extension will only affect the environment as a consequence of the transformer substation, and only within a 10 m radius. The area is non-populated; accordingly, the impact of construction is assessed as **0 (no impact)**, while the impact of operation is assed as **-1 (marginally negative impact).**

10.6 Sources and References

• SIQ, 1994; *Electromagnetic radiation: sources and protection measures;* a paper delivered by P. Gajšek at the International Seminar on Electromagnetic Sources and their Impacts on Humans; Ljubljana, 1997.

24 Environment Quality – Nature and Marine Ecosystems

11.1 Regulations

- *Nature Conservation Act RS* / ZON-UPB2; (Official Gazette of RS, No. 96/04)
- *Act of Ratification of the Convention on the Conservation of European Wildlife and Natural Habitats* (Bern Convention) / MKVERZ; (Official Gazette of RS, No. 55/99)
- *Freshwater Fisheries Act RS* / ZslaR; (Official Gazette of SRS, Nos. 25/76, 21/78, 42/86, Official Gazette of RS, Nos. 29/95-ZPDF, 89/99-ZDru-A, 110/02-ZGO-1)
- *Decree on the categories of valuable natural features* (Official Gazette of RS, Nos. 52/02, 67/03)
- *Decree on habitat types* (Official Gazette of RS, No. 112/03)
- *Decree on special protection areas* (*Natura 2000* areas) (Official Gazette of RS, Nos. 49/04, 110/04)
- *Decree on ecologically important areas* (Official Gazette of RS, No. 48/04)
- *Decree on protected wild animal species* (Official Gazette of RS, Nos. 46/04, 109/04, 84/05)
- *Decree on protected wild plant species* (Official Gazette of RS, Nos. 46/04, 110/04)
- *Decree on prohibition of vehicles in the natural environment* (Official Gazette of RS, Nos. 16/95, 28/95, 35/01)
- *Rules on the designation and protection of valuable natural features* (Official Gazette of RS, Nos. 111/04, 70/06)
- *Rules on the inclusion of endangered plant and animal species in the Red List* (Official Gazette of RS, No. 82/02).

The *Decree on limit values due to light pollution of environment* is under preparation and not, as yet, effective. Said decree shall impose environment-friendly illumination, as well prescribe permissible power output. As to ports, these provisions shall apply in accordance with the provision of a level of illumination which ensures operational safety - namely, safety at work.

11.2 Description and Assessment of Current Condition

24.2.1 Flora and fauna

The description and assessment of impacts on flora and fauna herein is summarised from the 2006 *Unic-Sub Report*.

The site of the proposed construction doesn't feature natural land habitats due to the fact that this area is currently below sea level. In addition, there are no significant animal habitats in the adjacent land area which is used for container storage.

The extension of the quayside and hinterland storage area will reach to the sea. Piles driven into the seabed will support the operational quayside and hinterland storage area platforms. As has been the case with other areas in the harbour at the Port of Koper, a newly formed solid seabed and shoreline has facilitated its colonisation by a great many new plant and animal species (Unic-Sub, 2006). Dense populations of photophilic algae seaweeds – of

which the Adriatic brown alga (*Fucus virsoides)* is very common – provide the basis for a population of epibionts, and further to this offer shelter to many other free moving species of aquatic fauna and are essential for the development of their larvae.

Upon the examination of the shoreline, many species were observed that had previously only rarely been seen in this area: yellow boring sponge (*Cliona celata*), sea anemones (*Actinia equina* and *Anemonia sulcata*), marine molluscs (*Chiton* sp.); gastropods, such as *Patella* sp., *Haliotis lamellosa*, *Monodonta turbinata*, *Aplysia punctata*; a number of mussel species, such *Mytilus galloprovincialis*, oysters (*Ostrea* sp.); cuttlefish (*Sepia officinalis*), and crabs, such as hermit crabs (*Pagurus sp.*); barnacles of the genera *Balanus*, *Maia verrucosa*, *Carcinus mediterraneus*, *Pachygrapsus marmoratus*, *Eriphia verrucosa* and *Pilumnus hirtellus*; common prawns (*Palaemon serratus*); echinoderms, such as sea urchins (*Paracentrotus lividus*), brittle star (*Ophioderma longicaudum*); fish, such as annular seabream (*Diplodus annularis*), white seabream (*Diplodus sargus*), sheepshead bream (*Charax puntazzo*), gilthead seabream (*Sparus auratus*), cow bream (*Boops salpa*), European seabass (*Dicentrarchus labrax*), small-scaled scorpionfish (*Scorpaena porcus*), giant goby (*Gobius exanthematicus*), blenny (*Blennius* sp.), labrid (*Crenilabrus* sp.), several species of ray-finned fish (*Mugil* sp.), Mediterranean sand smelt (*Atherina hepsetus*), serran (*Serranellus scriba*), the long-snouted seahorse (*Hippocampus guttulatus*) and pipefish (*Syngnathus* sp.).

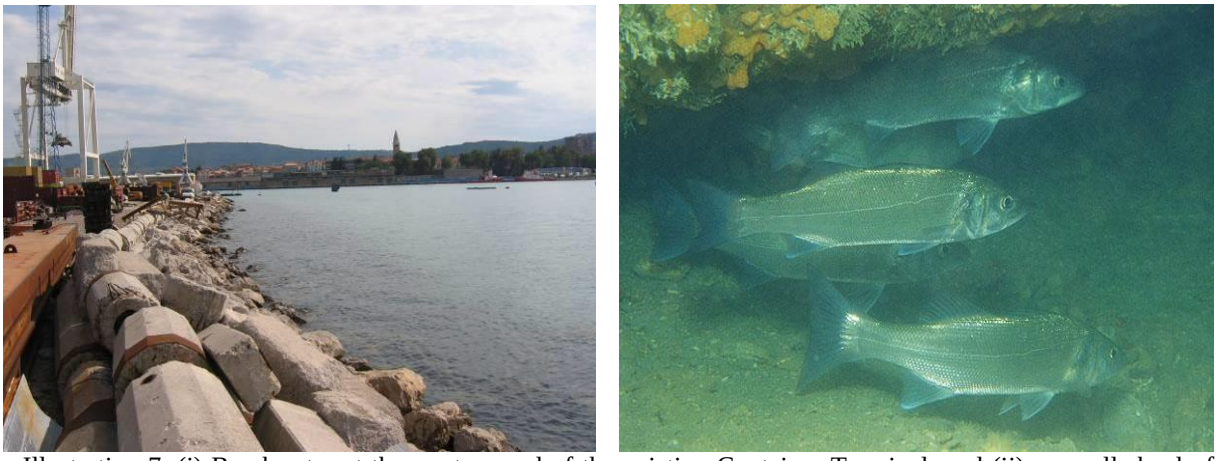


Illustration 7: (i) Breakwater at the western end of the existing Container Terminal; and (ii), a small shoal of European seabass (*Dicentrarchus labrax*) between the breakwater and quayside. (Photo: Unic-Sub, 2006)

At a spot which is about 10 to 20 m away from the end of the quayside, at the western periphery of Pier I, the breakwater infill ends and a belt similar to the original sea meadow habitat – which provides shelter for a great many species of marine organisms – begins. A five to ten-metre wide passage to this belt is nearly fully covered by green alga sea lettuce (*Ulva lactuca*).

Some twenty metres out to sea from the breakwater, and to the depth of about 10 m is the natural clayey-sand seabed, certain portions of which are bare, whilst elsewhere the area is almost totally covered with sea grass meadows. The following species were observed during an examination of this area: the sponge (*Suberites domuncula*) and tube anemone (*Cerianthus membranaceus*); snails, such as *Aporrahais pes-pelicani* and *Murex sp.*; marine annelid worms (*polychaeta*), such as the spiral tube worm (*Spirographis spallanzani*); a number of burrows have been dug into the muddy seabed by the mantis shrimp (*Squilla mantis*) and mud

shrimps (*Upogebia* sp.); there are also green Mediterranean shore crabs (*Carcinus mediterraneus*), sea urchins (*Paracentrotus lividus*) and tubular sea cucumber (*Holothuria tubulosa)*; as well as fish such as flounder (*Platichthys flesus luscus*), grey wrasse (*Crenilabrus cinereus*), common eel (*Anguilla anguilla)* and goby (*Gobius* sp.).

The existing quaysides at the Port of Koper are supported on rasters of reinforced steel piles capped with concrete to protect them from corrosion in the tidal area. The piles themselves provide an expansive surface for marine organisms to attach themselves, but these – with the exception of the outer lines – lack the necessary light for aquatic vegetation to flourish, and thus diverse marine habitats to develop. The report as to the impacts of the anticipated development is based on an inspection of the existing quayside areas.

The areas around the outer piles do, however, provide a variety of habitats for mainly filter feeders (suspension feeders) as well as other organisms which feed on them or are provided shelter by them. The most common of these are oysters (*Ostrea* sp.), Mediterranean mussel (*Mytilus galloprovincialis*), European squid (*Loligo vulgaris*), spiral tube worm (*Spirographis spallanzani),* barnacles of the genus *Balanus,* echinoderms, such as sea urchin (*Paracentrotus lividus),* brittle star (*Ophioderma longicaudum),* sea cucumber (*Cucumaria planci),* cyclostome bryozoan or sea-mat (*Sertella beaniana*), white sea-squirt (*Phallusia mammilata*), as well as fish, including very common and numerous species of mullet (*Mugil* sp.). In addition, there are also annular sea-bream (*Diplodus annularis*), common two-banded sea-bream (*Diplodus vulgaris),* white sea-bream (*Diplodus sargus),* sheepshead bream (*Charax puntazzo*), gilthead sea bream (*Sparus auratus*), cow bream (*Boops salpa*), European seabass (*Dicentrarchus labrax*), blenny (*Blennius* sp.), labrid (*Crenilabrus* sp.), Mediterranean sand smelt (*Atherina hepsetus)* and garfish *(Belone belone).* The following species were also observed around the piles at seabed level, where the waste remains of quayside assemblage – steel and concrete – have been left: musky octopus (*Eledone Moschata),* the European lobster (*Homarus gammarus),* European conger (*Conger conger),* sea raven (*Sciaena umbra*), black seabream (*Spondyliosoma cantharus*) and the brown comber (*Serranellus hepatus*).

24.2.2 Protected areas

The site of the proposed development is situated outside the *Natura 2000* areas as defined in the *Decree on special protected areas*. The closest such area is the Škocjanski Zatok lagoon, which lies more than 1,100 m distant from the Pier I Container Terminal extension.

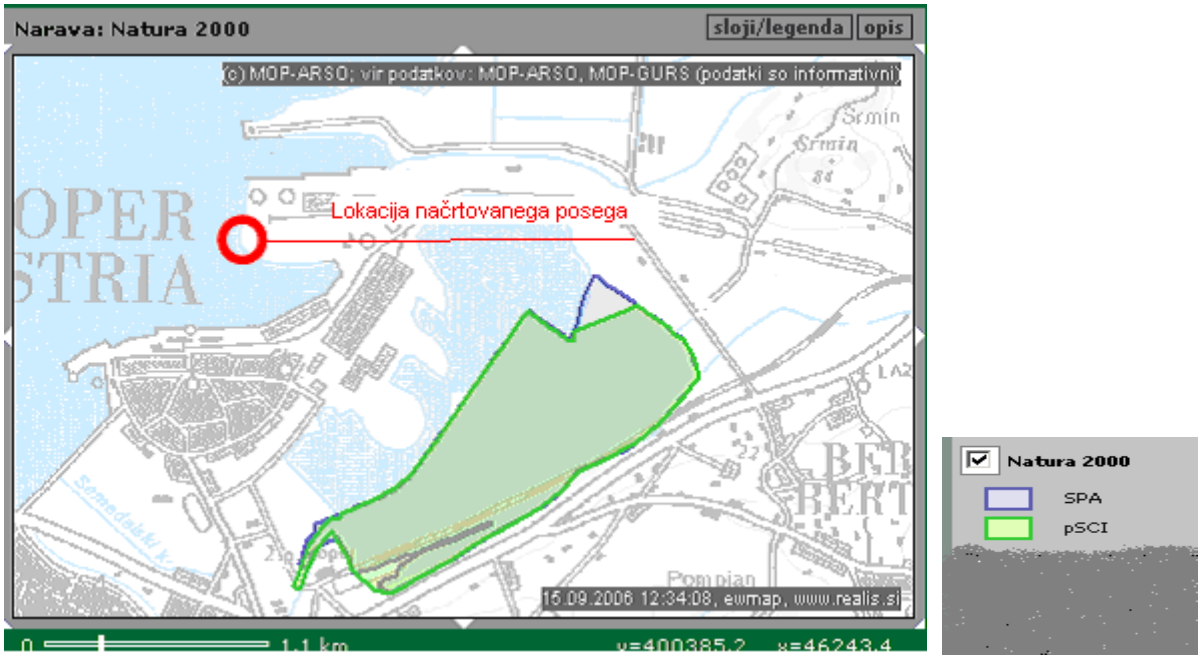


Illustration 8: *Natura 2000* areas in the vicinity of the proposed development

Lokacija načrtovanega posega = Location of the planned development
SPA = Special Protection Areas
pSCI = potential Site of Community Interest

24.2.3 Natural heritage

In the close proximity of the anticipated development, there are several natural heritage elements and sites which are listed below; their location is illustrated in Illustrations 8 and 9.

Natural heritage
Plane tree at Belveder quay, at the northern side of Koper's old city centre (Illustration 9):

Identification No.	3673
Short designation:	Plane tree of large dimensions in Koper
Heritage type:	Botanic heritage - tree
Distance from proposed development:	700 m.

Natural heritage
Škocjanski Zatok wetland (Illustrations 8 and 9)

Identification No.	1265 V
Name of site:	Škocjanski Zatok
Short designation:	Coastal lagoon with brackish waters, a significant ornithological site near Koper
Heritage type:	geomorphologic, hydrologic, botanic, zoological, ecosystem
Distance from proposed development:	more than 1,100 m

Natural heritage
Bonifika reed marsh (to the north of both Illustrations 8 and 9)

Identification No.	4813 V

Name of natural heritage:	Bonifika
Short designation:	Alluvial flatland with reed beds to the southeast of Ankaran
Heritage type:	zoological
Distance from proposed development:	more than 2,000 m.

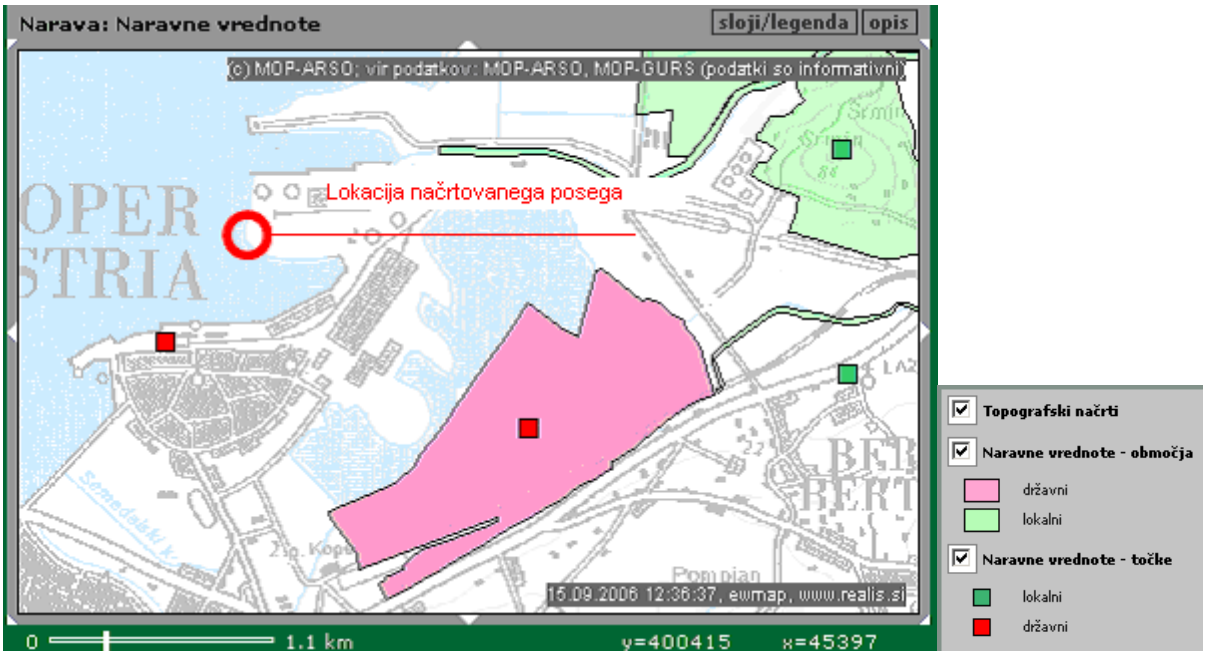


Illustration 9: Natural heritage sites in the vicinity of the proposed development

Lokacija načrtovanega posega = Location of planned development
Topografski načrti = Topographical map
Naravne vrednoste – območja
= Areas of natural heritage (pink = of national importance; green = of local importance)
Naravne vrednote – točke =
Individual element of natural heritage (red = of national importance; green = of local importance)

Natural heritage
Rižana river (northern part of Illustration 9)

Identification No.:	4836 V
Name of natural heritage:	Rižana
Short designation:	watercourse with karstic spring
Heritage type:	hydrology, ecosystem
Distance from proposed development:	more than 1,100 m.

24.2.4 Ecologically important areas

An ecologically important area, encompassing the proposed development, is the sea and the immediate shoreline. The anticipated impact on the marine ecosystem is described in chapter 11.3 Description and assessment of anticipated impacts.

Name:	EPO – sea and sea shore
Registration No:	70000

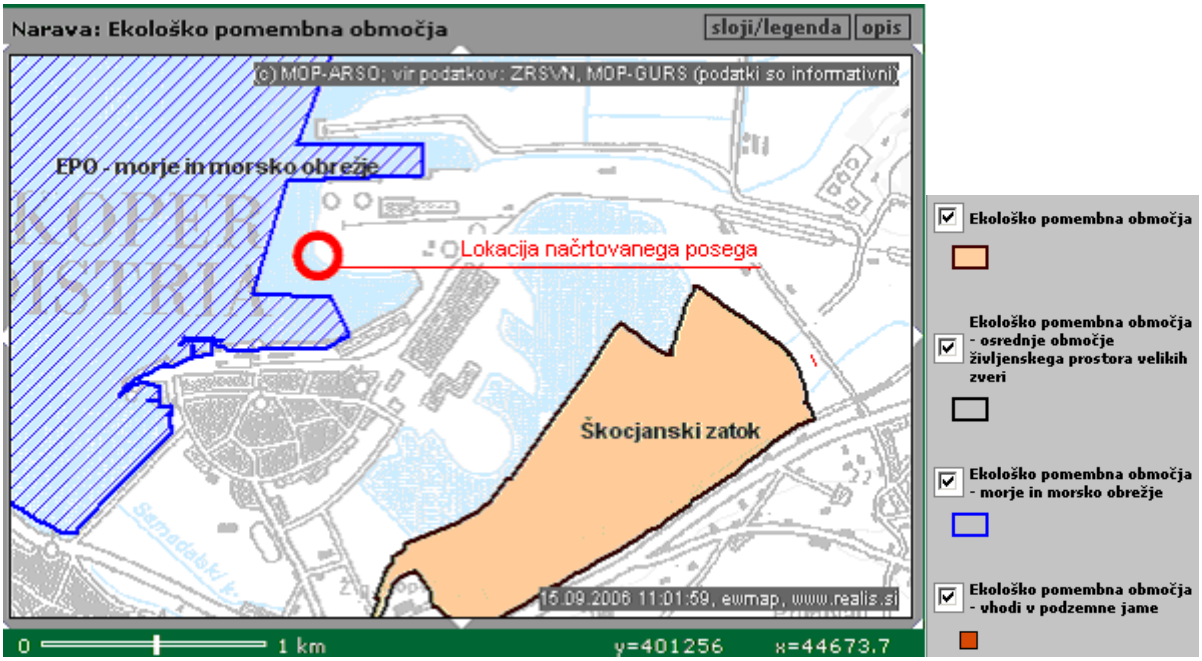


Illustration 10: Ecologically important areas in the vicinity of the proposed development

Lokacija načrtovanega posega = Location of planned development
Ekološko pomembna področja = Ecologically important area - *Škocjanski Zatok* reserve
Ekološko pomembna področja – osrednje območje življenjskega prostora velikih zveri
= Ecologically important areas – major habitat of large carnivores
Ekološko pomembna področja – morje in morsko obrežje
= Ecologically important areas – sea and sea shore
Ekološko pomembna področja – vhodi v podzemne jame =
Ecologically important areas – entrances to subterranean caves

Lying some 1,100-metre distant from the proposed development, the *Škocjanski Zatok* reserve is another ecologically important area which is described in previous chapters.

Name:	Škocjanski Zatok
Special grassland habitats:	None
Registration No.:	77600
Area [m^2]:	1,259,673 (126 hectares)

11.3 Description and Assessment of Anticipated Impacts

11.3.1 Construction

The development will not directly affect the protected natural heritage sites. The construction works shall, however, exert some impact on marine ecosystems. Generally speaking, the intervention within a highly transformed and for the most part degraded environment such as the Port of Koper will not provoke additional significant changes to the conditions faced by organisms which populate the area. Nevertheless, it should be pointed out, that this expansion of an existing facility will ultimately and irreversibly change an entire area encompassing 22,500 m^2. The man-made shoreline, at what is currently the western end of Pier I, and the natural marine meadows beyond, will be destroyed. The great majority of non-mobile organisms will die, whilst the remainder will retreat to other suitable areas. This development will see the destruction of a quality maritime ecosystem of rare value in Slovenia, for the very reason that this country's coastline is only 46 kilometres long, and therefore very precious. It should be mentioned that no endangered plant or animal species were detected in the investigated area, but broader studies would have to be implemented in order to totally confirm this supposition.

Quayside extension piles will be driven into the silty seabed which is fairly devoid of life due to previous deepening of the harbour channels and berths, further to which the silt is constantly being churned by manoeuvring vessels. The new piles will be populated by a variety of filter feeders, such as sponges, mussels, tunicate (sea squirts) and sabellidae (feather duster worms), as has been observed on the piles of the adjacent quayside (see Illustrations 17, 18, 19 and 20). Any such variegated aggregation will be most welcome, due to the fact that it will considerably help mitigate the effects of the eutrophication of bodies of water in the area of Koper harbour and the Škocjanski Zatok wetland reserve. The increase in the concentration of chemical nutrients into the local ecosystem can be attributed to the outflow of the non-treated waters of the Badaševica stream (Semedela canal) and the under-treated municipal sewage discharged via the Koper treatment plant into the Rižana River. In addition, this newly formed area will provide habitat for a number of molluscs, as well as species of crab and fish (Unic-Sub, 2006).

11.3.2 Operation

The proposed development will not exert any impact on protected areas or natural heritage sites; it will, however, affect the marine ecosystem. The operational effects, or the volume of activities in relation to the number of vessels using the new facility, may well impact the sea and local marine ecosystems more than the impact of short-term construction works. Thus special concern should be paid to ensuring that in its operations the Container Terminal exerts the least possible harm on the aquatic environment.

No systematic or ongoing impact is anticipated during the regular operation of the extended Container Terminal, nor is any dissipation or spillage of cargo. The marine environment will mostly be affected by vessels using the facility (propellers churning silt), while airborne emissions and noise from handling and transport activities on land are also significant factors in environmental impact**.**

From an environmental protection perspective, and taking into particular the small size of Slovenia's coast, any development involving destruction of its limited marine habitats should not be supported. But from a broader perspective, however, we are dealing with a stretch of shoreline which has already been – due to the development of the Port of Koper – completely altered in such a manner that the naturally indigenous sea grass meadows have become almost entirely destroyed or degraded. The intended construction works will destroy the secondary aggregations, but it is anticipated that in time the waters in and Container Terminal extension will be colonised by new organisms, an in particular the filter feeders, which now thrive in the waters around similar such pile-supported quaysides and storage areas at the port (Unic-Sub, 2006).

11.4 Mitigation and Protection Measures

11.4.1 Construction

During the construction works special attention will have to paid in order that construction materials, residues of concrete, steel reinforcement rods and tubes, paints and other protective agents, pneumatics, pipes, batteries, filters, barrels and other packaging, waste oil and similar such waste is not disposed of in, or otherwise allowed to pollute, the sea. Such waste may present a source of contamination which is difficult to remove or control for many long years to come. Further to this notion, any intentional disposal of any material into the sea is strictly prohibited by the law of the Republic of Slovenia.

Machinery used in construction works should be technically impeccable and contaminate the environment to a minimal degree. Any eventual repair or similar such maintenance works involving machinery must be performed off-site and not in the field.

11.4.2 Operation

No systematic or ongoing impact is anticipated during the regular operation of the extended Container Terminal, nor is any dissipation or spillage of cargo. The marine environment will mostly be affected by vessels using the facility (propellers churning silt), while airborne emissions and noise from handling and transport activities on land are also significant factors in environmental impact**.** Light pollution will be reduced by the use of floodlighting which is directed downwards towards the ground, thus minimising disturbance to distant observers.

11.5 Monitoring

Monitoring shall not be required during the construction or operation of the new Container Terminal facility.

11.6 Evaluation as to Environmental Impact and Acceptability of the Changes

11.6.1 Methods and premises of evaluation

The evaluation premises take into consideration the existing condition, assessed on the basis of field visit to location and its broader area, as well as information in relation to nearby

natural heritage sites, protected zones, ecologically important sites and special protection areas.

As to the evaluation of impacts, five-point positive and negative value scales are applied. The assessment and acceptability of denudation or harm to the natural environment is based on effective regulations.

11.6.2 Construction

The construction of the facility will have a considerable affect on the local waters and the marine ecosystem; however, its impact will indeed only be of a local nature. It is assessed that due to their distance, other natural heritage sites and protected areas will not be subject to any increased impact. The overall impact is thus assessed as **-3 (medium to large impact).**

11.6.3 Operation

The seabed area below the new quayside and its hinterland will be left without direct sunlight which will result in a local change to the ecosystem. It is assessed that due to their distance, other natural heritage sites and protected areas will not be subject to any increased impact. The overall impact is thus assessed as **-3 (medium to large impact).**

11.7 Sources and References

- *Interactive Atlas of Nature Conservation* (ARSO; http://kremen.arso.gov.si/nvatlas/)
- *Field visit to location of proposed construction site* (July 2006)
- *Unic Sub Environmental Impact Report on the Extension of the Luka Koper Container Terminal – Subaquatic Section.* Unic Sub Ugo Fonda s.p., Portorož; *2006.*

25 Environment Quality - Cultural Heritage

12.1 Regulations

- *Rules governing the cultural heritage monument register* (Official Gazette of RS, No. 25/02)
- *Cultural Heritage Protection Act* / *ZVKD* / (Official Gazette of RS, Nos. 7/99, 110/02, 126/03)

12.2 Description and Assessment of Current Condition

The immediate area around the proposed development doesn't feature any premises, monuments or remains protected as cultural heritage.

12.3 Description and Evaluation of Anticipated Impacts

The construction and operation of the facility will exert no impact as regards cultural heritage, thus impact is assessed as **0 (zero impact).**

26 Environment Quality - Landscape and Features of the Land

13.1 Regulations

- *Nature Conservation Act* (Official Gazette of RS, No. 96/04)

According to the definition of the Nature Conservation Act, landscape is a spatially complete element of nature which has – due to physical elements and the features created in its context as a living environment as well as a consequence of human activity – an extant distribution of structures, whilst the diversity of landscape is created by the particular spatial structures of natural and anthropogenic elements. The variety of landscape and those features which are essential in the conservation of bio-diversity should be preserved, developed and, where lost or lacking, re-established. In the planning and execution of any change or development, the preservation of the landscape's features and its diversity, has to be the number one priority.

13.2 Description and Assessment of Current Condition

Located within an industrial area, the anticipated development shall be used for container handling and storage; it shall co-exist with an existing such facility which features regulated sewerage utility and transport infrastructure.

Due to its position immediately adjacent the sea, said location is exposed, most visible from the northern side of Koper old town as well as from the surrounding hills, but less visible from the Koper bypass.

13.3 Description and Assessment of Anticipated Impacts

13.3.1 Construction

The visible impacts will in particular encompass construction and transport machinery at the site of the development, but this impact will only be for a relatively short duration.

13.3.2 Operation

The anticipated development is a seaward extension of the existing Container Terminal at the Port of Koper, as a consequence of its position immediately adjacent the sea, said location is exposed, most visible from the northern side of Koper old town as well as from the surrounding hills.

13.4 Mitigation and Protection Measures

In order to reduce light pollution, floodlights with a minimum disturbing effect upon adjacent areas will be used to illuminate the operational and storage areas.

13.5 Monitoring

Monitoring is not required during the construction or the operation of the facility.

13.6 Evaluation as to Environmental Impact and Acceptability of the Changes

13.6.1 Premises of evaluation

The evaluation premises take into consideration the existing state, assessed on the basis of field visit to the location and its broader area.

As to the evaluation of impacts, the five-point positive and negative value scales are applied (see Chapter 1). The assessment and acceptability of the impact of this proposed development on the landscape and visual characteristics is based on land use and planning terms, together with an evaluation as to the visibility of the construction site as well as the structure following its completion.

13.6.2 Construction

The impact of construction works on the landscape and visible features of the land can in particular be attributed to the presence of special construction machinery (pile driving) which will only be of short duration. Thus the impact is assessed as **-1 (marginally negative impact).**

13.6.3 Operation

The Port of Koper facilities at Pier 1 will be extended seawards, which is congruent with the effective land use and planning terms applicable to this area. The impact of the quayside and its operations on the landscape and visible features is assessed as **-2 (moderate negative impact).**

13.7 Sources and References

- *Long-term Plan of Koper Municipality, 1986 to 2000*, with amendments and supplements. PN UO Nos. 25/86, 10/88, 9/92, 4/93, 7/94, 25/94, 14/95, 11/98, 16/99, 33/01 (Official Gazette of RS, Nos. 96/04, 97/04);
- *Preparation of a comprehensive land use and planning programme in relation to the Port of Koper and the creation of the National Spatial Plan*. (Official Gazette of RS, No. 86/2006).

27 Safety Aspects of Operation

14.1 Regulations

- *Decree on measures to reduce the risk of major accidents involving hazardous chemicals* (Official Gazette of RS, Nos. 46/02, 88/05)

14.2 Description and Assessment of Current Situation

The Container Terminal itself at Pier I doesn't present a source of environmental risk of any magnitude according to the provisions of the *Decree on measures to reduce the risk of major accidents involving hazardous chemicals* (Official Gazette of RS, Nos. 46/02, 88/05). The facility is used for the handling and storage of containers which can, in principle, transport any cargo – including hazardous substances. Regulations dictate the adequate protection and packaging of such substances, and to date no incidents have been recorded at the Terminal which could have resulted in a major accident. The quantities of hazardous substances passing through the Container Terminal are below those required to fall under provisions of the afore-mentioned Decree.

Article 2 of Decree *on measures to reduce the risk of major accidents involving hazardous chemicals* (Official Gazette of RS, No. 88/05) stipulates some exceptions, for example, the Decree is not effective for the transport of hazardous substances by road, rail or air, or by sea and inland waters beyond the (Terminal) premises.

Safety at sea issues in relation to maritime trade and shipping are regulated on the basis of international legislation prescribed by the *IMO* (*International Maritime Organisation*) and international conventions, including the *Convention for the Protection of the Mediterranean Sea against Pollution*; maritime safety conventions; the *International Convention for the Prevention of Pollution From Ships* (*MARPOL 73/78*), the *International Convention on Oil Pollution and Preparedness, Response and Co-operation*, as well as the *Convention on Liability and Compensation for damage caused by pollution.*

The *Protocol concerning co-operation in preventing pollution from ships and, in cases of emergency combating pollution of the Mediterranean Sea* is currently pending ratification, while the *1990 International Convention on Oil Pollution Preparedness, Response and Co-operation* (Official Gazette of RS, International Agreements, No. 9/01) has been ratified.

Provision of safety at sea

Safety at sea issues were also the subject of an *Analyses of safety measures in the event of oil spillage in the Bay of Koper*. The November 2006 study undertaken by the Mozaik Association and Koper Municipality involved a simulated spill (see Attachment 8).

A protection and rescue plan in relation to accidents at sea has been elaborated at the state level.

Luka Koper has prepared an action and notification plan to be rolled out in the event of the spill of any hazardous substances in the sea; the primary response encompasses Luka Koper personnel and subcontractors at the Port of Koper, whilst secondary and tertiary intervention levels encompasses a regional response, a full phase four alert involves state services and possible international co-ordination.

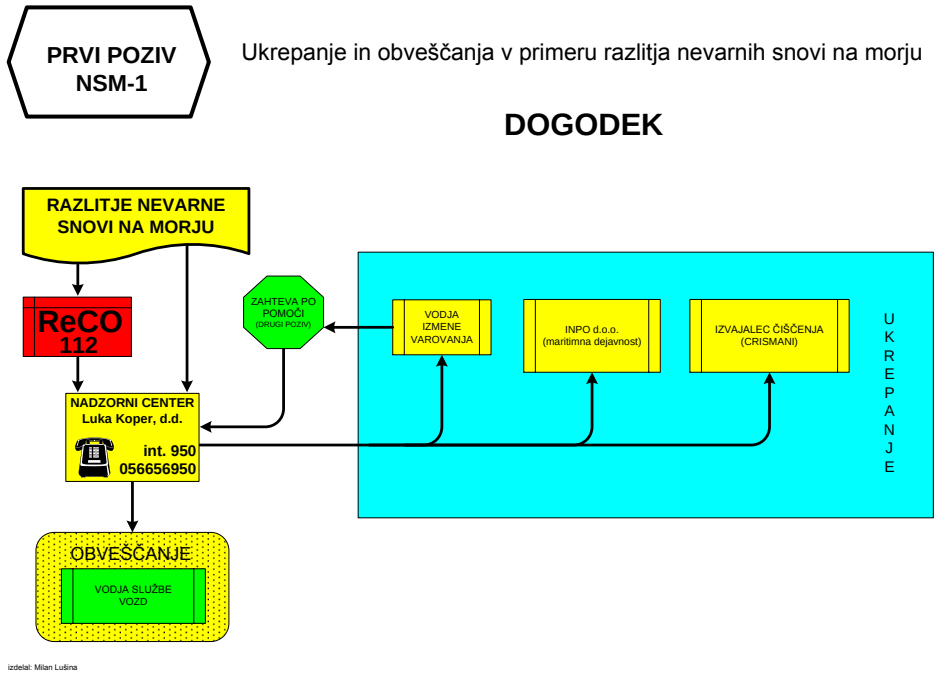


Illustration 11: Phase One Spill Response Plan - Initial intervention in the event of a hazardous spill

Ukrepanje in obveščanje v primeru razlitja nevarnih snovi na morju =
Action and notification in the event of the spill of hazardous substances into the sea
PRVI POZIV = **Phase One Alert (initial intervention)**
DOGODEK = **Event**
RAZLITJE NEVARNE SNOVI NA MORJU = **Hazardous spill into the sea**
NADZORNI CENTER LUKA KOPER = ***Luka Koper* Control Centre**
OBVEŠČANJE (VODJA SLUŽNE VOZD) =
Notification - Head Occupational Health and Safety Service
ZAHTEVA PO POMOČI (DRUGI POZIV) = **Request for assistance (Phase Two Alert)**
VODJA IZMENE VAROVANJA = **Duty Manager of Security Service**
INPO d.o.o. (maritimna dejavnost) = ***INPO d.o.o.* (maritime activities)**
IZVAJALEC ČIŠČENJA (CRISMANI) = **Cleaning Contractor (*Crismani s.r.l.*)**
UKREPANJE = **Remedial Measures**

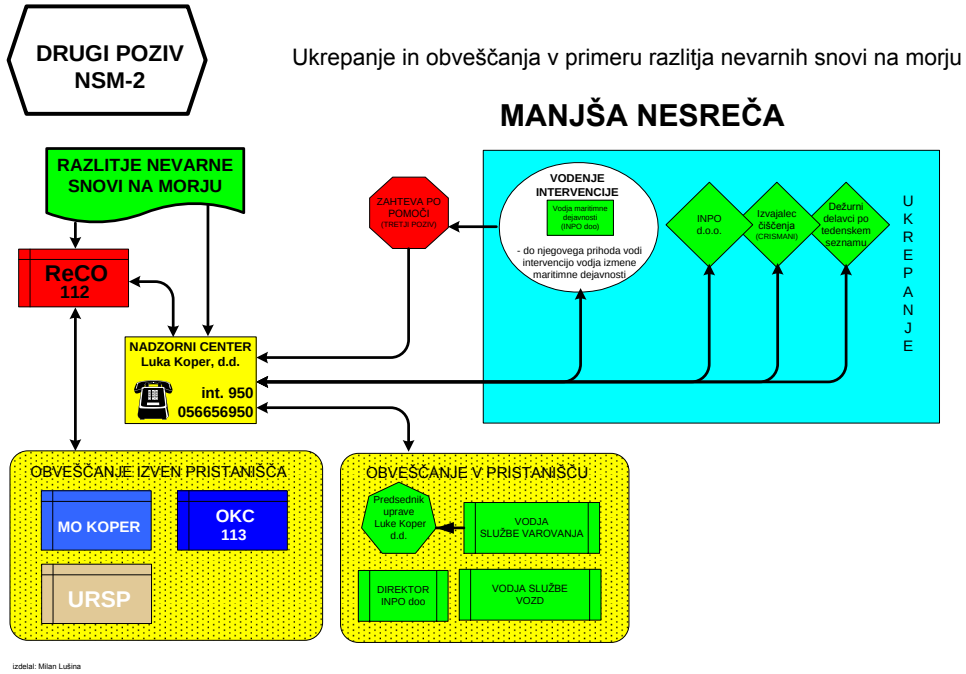


Illustration 12: Phase Two Spill Response Plan - Secondary intervention in the event of a hazardous spill

Ukrepanje in obveščanja v primeru razlitja nevarnih snovi na morju = **Action and notification in the event of the spill of hazardous substances into the sea**
Drugi Poziv = **Phase Two Alert (secondary intervention)**
Manjša Nesreča = **Minor incident**
Razlitje Nevarne Snovi Na Morju = **Spill of hazardous substance into the sea**
Nadzorni Center Luka Koper = ***Luka Koper* Control Centre**
Obveščanje Izven Pristanišča = **External notification at port**
Obveščanje V Pristanišču = **Internal notification within port**
Vodja Službe Varovanja () = **Head of Security Service**

Predsednik Uprave Lk **President of *Luka Koper* Management Board**
Vodja Službe Vozd = **Head of Occupational Health and Safety Service**
(Direktor Inpo) = **Managing Director of INPO d.o.o.**
Zahteva Po Pomoči (Tretji Poziv) = **Request for assistance (Phase Three Alert)**
Vodja Intervencije = Head of Remedial Action
Vodja Maritimne Dejavnosti = Head of Maritime Operations

Do njegovega prihoda vodi intervencijo vodja izmene maritimne dejavnosti = **The duty manager of maritime operations shall be in charge of remedial action operations prior to the arrival of the Head of remedial action**
Izvajalec čiščenja = **Cleaning contractor (*Crismani s.r.l.*)**
Dežurni delavci po tedenskem seznamu = **Employees on duty according to the weekly rota**
Ukrepanje = **Remedial Measures**

Luka Koper, as the operator of the Port of Koper, has a standing agreement with two subcontractors - *Luka Koper INPO d.o.o.* and *Crismani s.r.l.* - for the provision of intervention services. Said subcontractors are on permanent stand-by duty 24-7, and, on the basis of the scheme endorsed by Slovenia's ministries of transport, defence (civil protection administration), environment and spatial planning, as well as Koper's municipal authorities, ready to undertake primary and secondary intervention and remedial action in the event of a

spillage. Both *Luka Koper INPO* and *Crismani* have vessels replete with suitable equipment for the provision of remedial action in the event of a pollution incident.

In the event of a higher - Phase Three - alert, two other partners - *Sirio* and *Adria-Tow* - remain on standby. *Sirio* is able to supply additional vessels, whilst *Adria-Tow* can provide tug services to vessels in distress, as well as tackle fires at sea; intervention and civil and protection equipment can also be deployed by tugs.

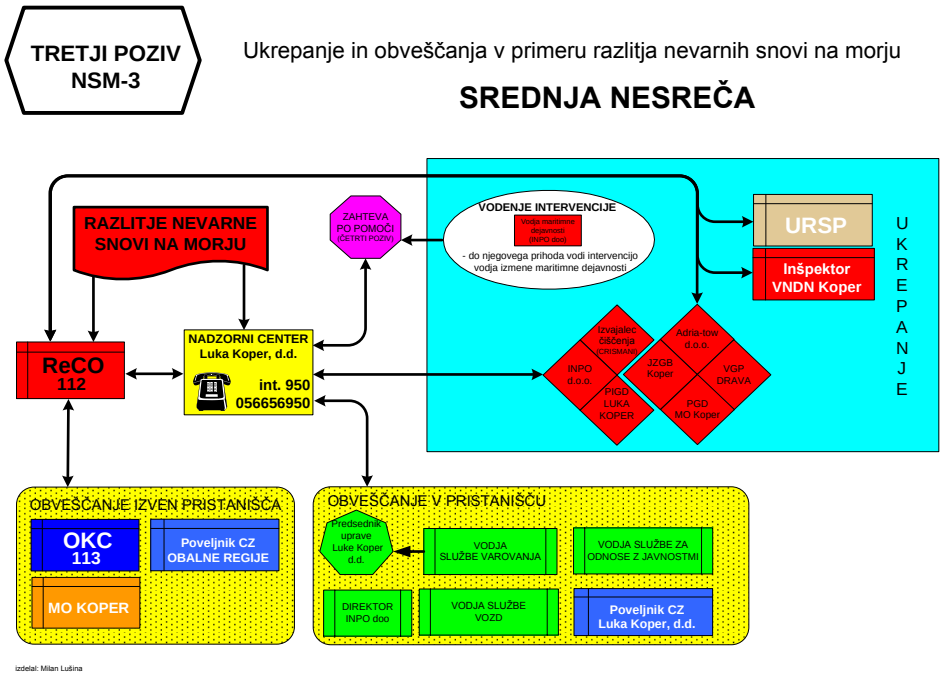


Illustration 13: Phase Three Spill Response Plan - Tertiary intervention in the event of serious spill involving dangerous substances

Ukrepanje in obveščanja v primeru razlitja nevarnih snovi na morju = **Action and notification in the event of a serious spill of hazardous substances into the sea**
TRETJI POZIV = **Phase Three Alert**
SREDNJA NESREČA = **Medium-sized incident**
RAZLITJE NEVARNE SNOVI NA MORJU = **Spill of hazardous substances into the sea**
NADZORNI CENTER Luka Koper d.d. = ***Luka Koper* Control Centre**
OBVEŠČANJE IZVEN PRISTANIŠČA = **External notification at port**
OKC 113 – **emergency number**
MO KOPER - **Koper Municipal Authority**
Poveljnik CZ OBALNE REGIJE = **Director of Civil Protection - Coastal Region**
OBVEŠČANJE V PRISTANIŠČU = **Internal notification at port**
Predsednik Uprave Luke Koper d.d. = **President of *Luka Koper d.d.* Management Board**
VODJA SLUŽBE VAROVANJA / **/=** **Head of Security Service**

VODJA SLUŽBE ZA ODNOSE Z JAVNOSTMI = **Head of PR Department**

DIREKTOR INPO d.o.o. /= **Managing Director *INPO d.o.o.***
VODJA SLUŽBE VOZD /= **Head of Occupational Health and Safety Service**
Poveljnik CZ Luka Koper d.d. = **Chief of Civil Protection *Luka Koper d.d.***
ZAHTEVA PO POMOČI (ČETRTI POZIV) = **Request for assistance (Phase Four Alert)**
Vodja Intervencije = **Head of Remedial Action**

Vodja Maritimne Dejavnosti = **Head of Maritime Operations**

– do njegovega prihoda vodi intervencijo vodja izmene meritimne dejavnosti = **The duty manager of maritime operations shall be in charge of remedial action operations prior to the arrival of the Head of Remedial Action**

URSP - Uprava Republike Slovenije za Pomorstvo = **Slovenian Maritime Administration**
Inšpektor VNDN Koper = **Koper inspectorate of protection against natural and other disasters**
Izvajalec čiščenja = **Cleaning contractor (*Crismani s.r.l.*)**
UKREPANJE = **Remedial Action**

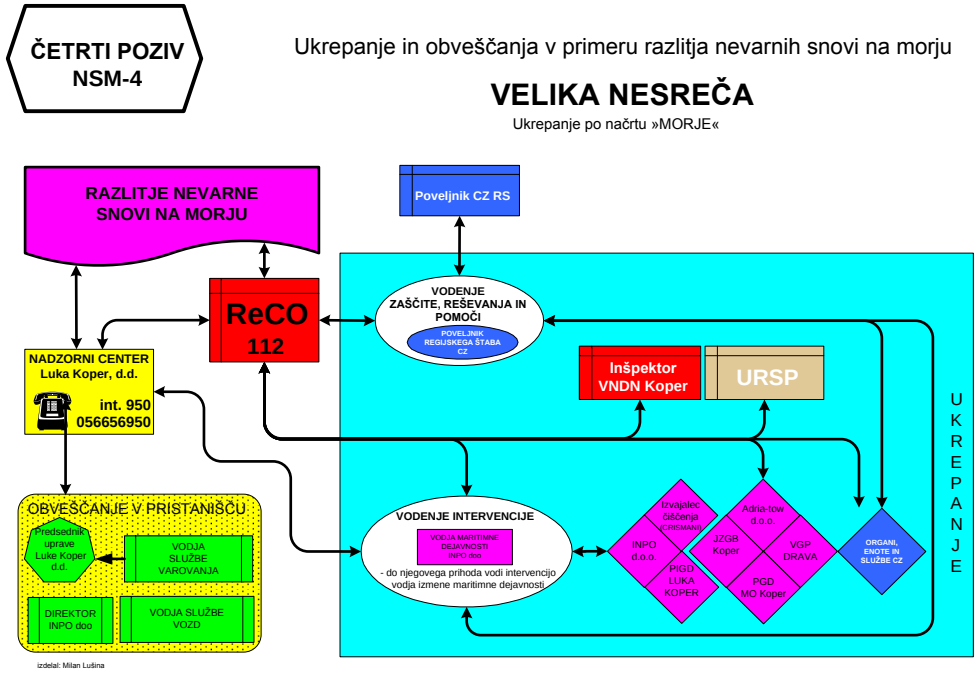


Illustration 14: Phase Four Spill Response Plan – Stage four intervention in the event of a very serious spill involving dangerous substances

Ukrepanje in obveščanja v primeru razlitja nevarnih snovi na morju = **Action and notification in the event of a very serious spill of hazardous substances into the sea**

ČETRTI POZIV = **Phase Four Alert**
VELIKA NESREČA / = **Large-scale incident**
Ukrepanje po načrtu »MORJE« / **Action according to the »SEA« response plan**
RAZLITJE NEVARNE SNOVI NA MORJU = **Major spill of a hazardous substance into the sea**
NADZORNI CENTER Luka Koper d.d. = ***Luka Koper* Control Centre**
OBVEŠČANJE V PRISTANIŠČU = **Internal notification at port**
Predsednik Uprave Luke Koper d.d. **President of the *Luka Koper d.d.* Management Board**
VODJA SLUŽBE VAROVANJA / **Head of Security Service**
DIREKTOR INPO d.o.o. = **Managing Director of *INPO d.o.o.***
VODJA SLUŽBE VOZD = **Head of Occupational Health and Safety Service**

Poveljnik CZ = **Director of Civil Protection**

VODENJE ZAŠČITE, REŠEVANJA IN POMOČI = **Management of Protection, Rescue and Intervention**
(POVELJNIK REGIJSKEGA ŠTABA CZ) = **Director of Regional Civil Protection Headquarters**
Inšpektor VNDN Koper = **Koper Inspectorate of Protection Against Natural and Other Disasters**
URSP = **Republican Inspectorate of Environmental and Spatial Planning**
Vodja Intervencije = **Head of Remedial Action**
Vodja Maritimne Dejavnosti = **Head of Maritime Operations**

– do njegovega prihoda vodi intervencijo vodja izmene meritimne dejavnosti = **The duty manager of maritime operations shall be in charge of remedial action operations prior to the arrival of the Head of Remedial Action**

Izvajalec čiščenja = **Cleaning contractor (*Crismani s.r.l.*)**
ORGANIZIRANJE ENOT IN SLUŽBE CZ = **Organisation of Units of the Civil Protection Service**
Ukrepanje = **Remedial Action**

14.3 Description and Assessment of the Current Situation

The planned extension of the Container Terminal is most likely to contribute to the general growth in container freight throughput and transport at the port. Accordingly, the quantities of toxic or harmful substances present in this area shall also rise, thus contributing to an increased potential for an accident which will have deleterious consequences for the environment. Due to the anticipated quantities of hazardous substances - i.e. single containers - a large-scale accident is not a likely occurrence.

The extension of the Container Terminal and the resultant deepening of the harbour through dredging, will facilitate the berthing of bigger vessels of a greater draft and a larger number of containers aboard. For this reason, and regardless of any increase in container freight throughput, the overall number of ships using the Container Terminal facility is not anticipated to rise.

14.4 Mitigation and Protection Measures

The extant mitigation and protection measure lies in consistency as regards the safe manipulation and storage of container freight; further to the requirements of environmental protection, it is in the port operator’s, shipping agency's and owner's interest that cargo remains intact and undamaged.

All effective safety measures in relation to shipping and maritime trade must be applied consistently.

14.5 Evaluation as to Environmental Impact and Acceptability of the Changes

14.5.1 Evaluation premises

The premises of the evaluation take into consideration the existing condition, assessed on the basis of a field visit to the location and the broader milieu.

As to the evaluation of impacts, five-point positive and negative value scales are applied (see Chapter 1 for details). The assessment and acceptability of the impact of the proposed development on the landscape and general countenance is based on land use planning terms and the evaluation of visibility of the construction site as well as the structure after its completion.

14.5.2 Construction

During the construction process, an increase in the number of people and equipment in the operational area might present an increased risk of accidents. The site is separated from other terminals which are subject to higher risk, therefore the impact is assessed as **-1 (marginally negative impact).**

14.5.3 Operation

Deepening the harbour area will allow larger vessels to use the Container Terminal. This will not contribute to any increase in the risk of accidents. The impact is thus assessed as **0 (no impact).**

14.6 Sources and References

- *Concept of Reduced Environmental Risk*; Luka Koper d.d.; 2004.

28 Note as to the Complexity of the Proposed Development and the Elaborated Report

This Report which pertains to the construction of new quayside and storage facilities in a designated industrial zone within the Port of Koper has been compiled in accordance with the *Instructions on Methodology for the Elaboration of Environmental Impact Reports.*

The concept used in the elaboration of this Report was Project No. B-1500/1: P*ier I Berth 7C with its Hinterland Storage Area* elaborated by the *Institute for Water of the Republic of Slovenia*; Ljubljana 2006. The Report's findings as regards impacts on the marine environment are based upon the *2006 Unic Sub Environmental Impact Report on the Extension of the Luka Koper Container Terminal – Sub-aquatic Section* elaborated by the Portorož-based *Unic Sub Ugo Fonda s.p*. together with data from studies conducted in previous years. The appraisal as to noise pollution has been based on the April 2001 and August 2006 *ZVD Assessments of Noise Pollution at the Planned Multimodal Terminal at Pier III*. These reports were elaborated by F. Deželak and F. Petančič of the Ecology and Toxicology Dept at the Institute of Occupational Health, Ljubljana, Slovenia, on behalf of Luka Koper d.d.. Data from other studies conducted in previous years has also been used.

The environmental assessment and the anticipated impacts of the development have been based on the results of regular monitoring programmes conducted by the client, Luka Koper d.d., as well as other sources listed in the individual chapters; these comprise of publications, unpublished sources of information and applicable legislation. As to the broader area, the most recent publically accessible data as regards the environmental situation was used.

Some assessments of impacts on individual environmental components and some mitigation and protection measures are only indicated generally, and elucidated on the basis of assumptions and experience with similar projects, in particular the construction stages. In addition to environmental protection measures anticipated in the construction design, it is our belief that the mitigation and protection measures, expounded in this Report, together with mandatory monitoring, ensure sufficient protection against excessive pollution.

16 Special Measures and Responsible Persons

Connected to the existing facility, the proposed extension to the Container Terminal at the Port of Koper shall also be subject to special safety measures prescribed for container handling and storage. Further to this, responsible persons shall be appointed for the control of individual procedures prior to, during, and after cargo handling, as well as for ensuring prescribed maintenance work and periodical inspections of facilities, equipment and containers in storage.

Such responsible persons have to be especially appointed and mandated, and, in the case of any event which might lead to accident, entrusted to take action in relation to previously prescribed procedures. Records of events at the Container Terminal, its operations, maintenance, as well as of incidents and accidents of all magnitudes must be properly maintained and stored.

17 Identification Of Influences

17.3 Premises

The area of influence is determined by the *Nature Conservation Act RS* / ZON-UPB2; (Official Gazette of RS, No. 96/04), Item 6 of Article 54 of which requires the identification of an area where a development may cause environmental nuisance or damage, or which might affect public health. The magnitude of influence was thus identified and assessed under the following headings and elements:

Environment Quality – Air
Environment Quality – Land
Environment Quality – Waters
Environment Quality – Noise
Environment Quality – Wastes
Environment Quality - Electromagnetic Radiation
Environment Quality - Nature and Ecosystems
Environment Quality - Cultural Heritage
Environment Quality - Landscape and Natural Features
Safety Aspects of Operation

17.4 Identification of the Area of Influence

If all anticipated and proposed mitigation, protection as well as monitoring measures are considered and properly implemented, it is our assessment that the anticipated development will not overburden the environment to an extent that might affect public health or property.

On the basis of the anticipated low emissions, in accordance with the ZVO-1 *Environment Protection Act RS* (Official Gazette of the Republic of Slovenia, No. 39/06), and the land use, the area of influence is – both during the construction and operation – limited to the Port of Koper (industrial) zone, and in particular plots Nos. 1608/2 and 1608/3, k.o. Koper.

The dredging of the harbour area, which is already regularly executed and shall continue to be undertaken in the future, effects the sea plot No. 2718 k.o. Morje. The dredged material (sludge spoil) shall be pumped to an infill site at plot No. 879/1 k.o. Ankaran.

The list of all plots in relation to the area of influence is provided in Attachment 7.

During construction works and post construction operation, no excessive impacts are anticipated at Pier I due to the fact that this area doesn't involve the handling of larger quantities of hazardous substances.

18 Report Summary and Overall Assessment as to Acceptability of the Proposed Development

18.1 Mitigation and Protection Measures to be Applied During Construction

In order to prevent or mitigate the negative impacts on the environment – namely the land, waters and air - as well as ensure minimal pollution through noise and other potential contaminants, the following measures have to be considered during construction:

- Construction contractors must comply with legally prescribed regulations on emissions from construction vehicles and machinery; said requirements can mostly be met by good vehicle and machinery maintenance.
- Works, including earth-moving operations must be accomplished using tried and tested technology and equipment.
- Deliveries of materials to the construction site should not – if possible – be performed in dry and windy weather when the dust emissions from vehicles and offloading operations are at their greatest.
- Surfaces should be sprayed with water in dry and windy weather in order to prevent dust emissions.
- Vehicle and machinery engines should not idle or run for longer than is necessary; furthermore they should not unnecessarily run during loading/unloading operations.
- Contractors must provide and use impeccable construction machinery which should – if possible – be of a recent production and certified as to noise emissions in compliance with legal provisions, including the *Rules on noise emissions of machinery used outdoors* (Official Gazette of RS, No. 106/2002).
- Provision of regular maintenance and servicing of construction vehicles and machinery must be undertaken at a repair shop away from the site.
- The possibility of fuel or oil spillage from construction vehicles or machinery, together with the consequences of contamination should be taken into consideration by the contractors, and an action plan of rehabilitation measures should be prepared, including the transport of contaminated materials to a suitable location for disposal.
- All noise-generating works (in particular pile driving) may only be executed between 6 am and 6 pm, when the noise limits are the least strict.
- Foremen must ensure proper discipline at the construction site.
- Acoustic signals on vehicles and machinery should only be used in urgent cases.
- Control measurements of noise must also be carried out during construction works, and, according to their results, additional anti-noise measures adopted if the existing ones are proven to be deficient or insufficient.
- Construction waste must be handled in compliance with the *Rules on management of waste generated by construction works*, and monitored through the provision of prescribed records.
- Luka Koper, as the investor, must ensure that the contractors use a site for the temporary or permanent containment of construction wastes which shall not lead to any pollution of the environment. Furthermore, the collector of such waste materials has to be provided access for collection, in order that it may be dispatched for processing or other means of non-polluting disposal. If the construction waste cannot be kept or temporarily stored at the site, the investor must provide containers where the waste can de deposited immediately upon its generation; these containers have to

be placed at or next to the construction site, as well as adapted for the transport of construction waste without transferral to another means of transport.

- A *Construction waste management plan* should be elaborated in compliance with the *Rules on the management of construction waste*.
- Facilities and schemes for the proper collection and disposal of waste, both hazardous as well as non-hazardous, have to be provided.
- Hazardous waste generated during construction works (vehicle batteries, materials contaminated by oil derivatives, residues of paints and varnishes and suchlike) – together with the prescribed records in relation to such – have to be delivered to a person or agency authorised by the Ministry of Environment and Spatial Planning for the management of such hazardous waste.
- Unauthorised access to the construction site, and thereby unauthorised disposal of waste, must be prevented.
- Any intentional disposal of any waste into the sea shall be prohibited.
- The very poor geotechnical characteristics of the dredging site will require the consistent application of prescribed procedures.
- In order to minimise negative effects of seabed dredging, work must be executed in calm weather in order to reduce the spread of muddy water (containing suspended particulates).
- Based on the guidelines provided by Slovenia's Maritime Administration, the verge of the dredging operation as well as the route of the sludge transport pipeline must be adequately indicated in order to ensure safe navigation and manoeuvring in the dredging area.

18.2 Additional Mitigation and Protection Measures to be Applied During Operation

- All new machinery acquired must feature low exhaust and noise emissions.
- In order to minimise dust emissions, the transport routes must be kept clean.
- The remedial plan and immediate response in the event of fuel or oil spill from machinery or vehicles has to be adapted to the new circumstances.
- In the event that regular monitoring indicates values above the prescribed maximum noise emission levels as a consequence of operations at the Port of Koper, an additional study into the relevant sources of noise, as well as measures aimed at reducing noise locally have to be implemented.

18.3 Final Assessment

The Port of Koper is Slovenia's only seaport, an intermodal hub and a maritime gateway linking a vast swathe of landlocked Central Europe with continents beyond. Further to its international significance, this port is of strategic importance to Slovenia, and due to the fact that there is no other possibility of creating a seaport in this country, it is forever the subject of special attention. In accordance with its pre-eminent position as the operator of the port, Luka Koper is engaged in the provision of handling, warehousing and transhipment services for a variety of goods, including container freight, vehicles, general bulk and liquid cargoes, timber, livestock and fruit.

The Port of Koper, which inaugurated its first berth (Berth 1) in 1957, has thus far exploited the existing land potentials at Pier I. Current capacities don't allow any increase of cargo throughput, thus pertaining handling and storage operations also extend to other piers. For this reason Luka Koper decided upon the extension of the Container Terminal quayside and the creation of new hinterland storage areas at the south-western end of Pier I. The quayside and hinterland platforms shall respectively be used for container handling and storage.

This Report addresses the anticipated extension of the quayside and hinterland storage area at the Container Terminal; namely, the construction of a cca. 160-metre long westward extension of the existing quayside beyond berth 7B, behind which an open storage area for containers would be created. The development will take place at plot *Nos. 1608/3* and *1608/4 k.o. Koper*. The dredging of the harbour area, which has already been performed regularly, will extend to the sea plot (*2718 k.o. Morje* (Sea)). Sludge spoil from dredging operations is anticipated to be disposed of at plot *No. 879/1 k.o. Ankaran*.

In this final overall assessment as to the acceptability of the development it has been assumed that the investor, Luka Koper d.d., will comply with all effective regulations and provisions as to environmental protection, as well as implement mitigation and protection measures to minimise the effects of pollution. Based on an evaluation of the current condition of this site as well as the broader area beyond, available information as to the anticipated development, assessment of its impacts in relation to individual environmental components, as well as within the context of effective regulations, we herein establish the following:

Table 20: Summary of assessed impacts of the proposed development on individual environmental components

Environmental Component	Impact during construction	Impact during operation *
Environment Quality - Air	-2	-2
Environment Quality - Land	-2	-2
Environment Quality - Waters	-3	-1
Environment Quality - Noise	-4	-1
Environment Quality - Wastes	-1	0
Environment Quality - Electromagnetic Radiation	0	-1
Environment Quality - Nature and Ecosystems	-3	-3
Environment Quality - Cultural Heritage	0	0
Environment Quality - Landscape and Natural Features	-1	-2
Safety Aspects of Operation	-1	0

* The premises of the assessment take into consideration the existing condition, evaluated on the basis of a field visit, information provided by the investor, and available public information.

- Moderate short-term air pollution from dust particulate matter as well as other emissions are anticipated during the construction process as a consequence of the operation of machinery. Airborne emissions will rise in accordance with the increased

amount of machinery and vehicles operating at the Terminal, but no excessive pollution is anticipated. The impact is assessed as moderate.

- The development does not present any source of land pollution as such, though the construction will change the use, form and configuration of the ground as well as the seabed in this section of the harbour at the Port of Koper. Moderate indirect pollution of land in the vicinity of the routes used by construction vehicles is anticipated during construction operations.
- Sea turbidity will increase during pile driving and dredging operations, which will result in a short-term increase in concentrations of pollutants from sediments. Operations at the extended Terminal, will also see an increase in the quantity of precipitation run-off from the enlarged storage areas, while an indirect impact is expected due to the increased operations of machinery. Terminal operations will in no way whatsoever effect or alter the use of potable water beyond the current situation.
- Noise pollution will increase considerably during construction works, although by employing mitigation and protection measures the threshold values are not anticipated to be exceeded. A larger amount of machinery than is already present at the Container Terminal will result in increased noise pollution, but the threshold values are not anticipated to be exceeded.
- The employment of the prescribed measures will reduce the impact of waste materials and refuse generated during the construction process. As to Terminal operation, the pollution from waste is not expected to rise above the current levels.
- During the operation of the facility, electromagnetic radiation will be increased very locally (i.e. within a 10-metre radius of transformer facilities), therefore the situation won't be any different than at present.
- Although construction works will exert a massive impact on the marine ecosystem, such will be locally restricted. During the operation, the impact will rise somewhat due to the expected growth in transport operations deriving from increased throughput at the Container Terminal. Neither the construction nor operation of the Terminal will exert any impact on protected areas or heritage sites.

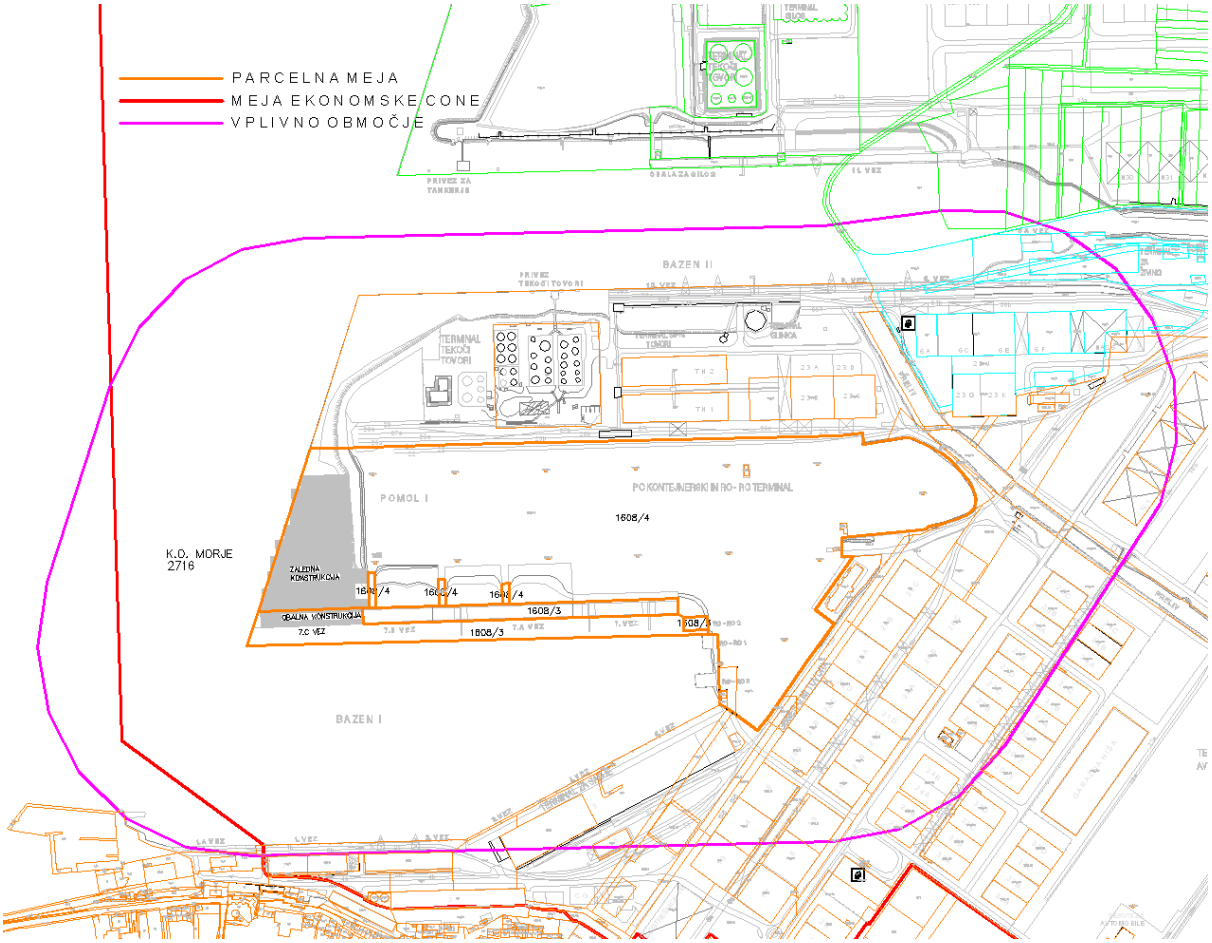


Illustration 15: The area of influence of the proposed development

Parcelna Meja = Boundaries of Plots
Meja Ekonomske Cone = Port Zone
Vplivno Območje = Area of Influence

- The anticipated development will exert a moderate impact on the visual countenance of the shoreline.
- Construction works may increase the possibility of an accident which may pollute the environment; by employing mitigation and protection measures, however, excessive pollution is not anticipated. The dredging of the harbour area will allow the berthing of larger ships, but the overall number of vessels is not expected to increase, and nor is the possibility of major maritime transport accidents.

The area of influence of the proposed development will be restricted to the port zone and the immediate harbour area. The list of plots within the area of influence is presented in Attachment 7 (Illustration 9). No excessive impacts are anticipated in the vicinity of Pier I during the construction or operation of the Terminal.

The **environmental impact** of the quayside extension and expansion of the hinterland area at the Koper Container Terminal as proposed by the investor, Luka Koper d.d., is assessed as **acceptable** due to the fact that permissible pollution levels will not be exceeded.

20 Attachments:

No. 1 Overview Scale: 1:10 000
No. 2 Current Situation Scale: 1:1 000
No. 3 The Development Scale: 1:1 000
No. 4 Spatial Arrangement:
- **4.1 Protected areas**
- **4.2 Potable water protection**
- **4.3 Waste water (UWWT)**
- **4.4 *Natura 2000* sites**

No. 5 Air Pollution (measurements recorded in Koper between 18th January and 26th June 2005, by the Ministry of Environment and Spatial Planning – the Environmental Agency of RS.)

No. 6 Climate Data

ATTACHMENT No. 1

Overview

Scale: **1:10 000**

ATTACHMENT No. 2

Current Situation

Scale: **1:1 000**

ATTACHMENT No. 3

The Development

Scale: 1:1 000

ATTACHMENT No. 4

4.1 Protected Areas
4.2 Potable Water Protection
4.3 Waste Water (UWWT)
4.4 *Natura 2000* Sites

Source: MOP-ARSO: NVatlas

ATTACHMENT No. 5

Air Pollution

Source: Air pollution measurements recorded in Koper between 18th January and 26th June 2005, by the Ministry of Environment and Spatial Planning – the Environmental Agency of RS.

Overview of Results

Sulphur dioxide

Due to the fact that there are no large emission sources of SO_2 in the close proximity of the measurement point, the concentrations of sulphur dioxide are low. The highest hourly value of 114 µg/m^3 amounts to 33% of the permitted value, whilst the highest daily concentration of 44 µg/m^3 totals 35% of the admissible threshold. Concentrations were at their highest at about 9 am, whereas the evening peak value was not distinctive. The weekday concentrations were 29% above the weekend ones.

Nitrogen oxides

The highest hourly concentration of NO_2 totalled 119 µg/m^3, which is half of the permissible threshold. The average NO_x concentration during measurements was 30 µg/m^3, an amount equal to the calendar year permitted limit value in relation to vegetation. The daily variation of nitrogen oxides, with their morning and evening maximums attributable to vehicle emissions during rush hours, is clearly visible, and this attribution is also corroborated by considerably higher concentrations - i.e. +40% more NO_2,, and +60% more at NO_x - on weekdays than during weekends.

Ozone

Ozone concentrations often exceeded the 8-hour target value, and only once did they surpass the hourly threshold limit. The maximum at daily variation between 3 and 4 pm is evident, which is typical of lowland localities. The highest concentrations occur when the wind is blowing from the west or northwest (mistral), which is – due to the fact that there's only sea in said directions – indicative of pollution arriving across the Northern Adriatic from neighbouring Italy. The weekday concentrations were only 13% higher than the weekend ones. Together with the town of Nova Gorica on the Italian frontier, Koper suffers worst ozone pollution in Slovenia.

PM_{10} particles

Air pollution by PM_{10} particulates exceeded the permitted 24-hour value limit 20-times during the 160-day measurement period. The highest daily concentration amounted to 83 µg/m^3, which is 166% of the permissible threshold. The concentrations are at their maximum in the morning and late in the evening; the weekday concentrations were only 3% higher than the weekend ones. Visibly increased concentrations occurred in the late evening of 30th April as a consequence of emissions from bonfires lit in celebration of the 1st May holiday.

The highest 8-hour concentration amounted to 1.6 mg/m^3, which is 16% of the threshold value. As to the daily variation, there is a considerable increase in concentrations during the morning and evening, which point towards rush hour road traffic as being culpable. Weekday concentrations were only 2% ahead of the weekend ones.

Meteorological parameters

As to wind, which is the meteorological factor which most affects air quality, there are weak local winds effecting the shoreline and which occur during otherwise clear weather due to warming of the land in the daytime and its cooling at night, as well as stronger winds which can be attributed to more comprehensive weather activity. Due to the fact that high winds transport pollutants longer distances, they in general affect air quality more than the lighter local winds, which tend to blow northeast and southeast and thus do not transport pollutants from Italy.

The daily variation in wind direction at the Koper meteorological station reveals that the night circulation of air from land to the sea, which is predominantly in an easterly direction, commences at about 4 pm in the winter and ends at about 11 am, whereas in spring and early summer it starts at about 8 pm and ends at 8 am. The daily circulation from the sea to land is in the principally WNW. The impact of this cyclical change in local winds - which also to a greater or lesser extent coincides with the morning rush hours - on the daily concentrations of various pollutants has not been addressed in detail in this Report.

In close proximity, indeed just to the southeast of the Koper city measurement station, is a single-storey house which has a particular affect on wind and solar radiation measurements. Thus the wind measurement results at the Port of Koper measurement station are also displayed.

Stronger winds, which occur as a consequence of more general continental meteorological conditions are of the predominant south-easterly (scirocco) and north-easterly (bora).

Summary

According to the summary of 2005 *MOP-ARSO* report, the measurements in Koper were executed in winter, spring and early summer. With the exception of ozone, the levels of the various airborne pollutants recorded during this survey period were amongst the lowest in Slovenia and decreased from winter towards summer. Such a seasonal trend is even more visible in continental Slovenia and can be attributed to poor circulation of air during the coldest months of winter; this is due to cold nights and weak solar radiation, the Earth's surface cools down which results in a stable vertical stratification of atmosphere above ground level. The coastal area is under the direct influence of the sea, which is generally warmer than the air in winter; accordingly, the winter stratification effect is less distinctive in coastal regions.

Air pollution by ozone is greatest in summer when more intense solar radiation and higher air temperatures stimulate the photo-chemical reactions that engender it. The emission or the presence of ozone precursors, such nitrogen oxides and hydrocarbons from vehicles and industry, play a crucial role in this process. Thus the highest ozone concentrations occur in cities slightly distant from traffic arteries. Due to higher levels of sun (total hours of sunshine) and generally higher temperatures in the coastal regions than in inland areas, the ozone concentrations recorded in Koper are somewhat higher than in other parts of Slovenia.

Regardless of the season, and upon more intense meteorological conditions, the predominant winds in Slovenia are south-westerly and north-easterly, which cause more intensive mixing of ground-level air and thereby have a cleaning effect on the air. At the coast, these are the scirocco wind, which blows predominantly in an ESE or south-easterly direction, and the bora which blows from points NE to ENE and even in an easterly direction. In clear and calm weather, a weak ENE–SE wind blows seawards at night and during the morning; during the day such a wind reverses WNW–NW and blows landwards. The duration of such landward wind is much shorter in winter due to the shorter days, whilst the seaward wind blows longer and stronger in winter.

As is the case with other measurements points in Slovenia, morning and evening maximums can be observed in the daily variations in the concentrations of pollutants other than ozone; these are the result of increased emissions from road vehicles during rush hour periods, as well as higher wind speeds during the day. Pollution measurements at the Koper meteorological station are also subject to daily variation, and affected by the morning and evening reversals of seaward and landward winds. There is also a visible discrepancy between two morning and evening maximums in relation to season. The evening maximum is definitely affected by the seaward wind switch which brings polluted air from the city and inland highway to the measurement site, whereas the morning maximum is subject to various factors; indeed, seaward and landward winds in stable weather conditions at the Italian side of the Adriatic coast should be studied in more detail in order to identify the potential transport of pollution from the west.

Measurements indicate that PM_{10} particulate concentrations in Koper are among the lowest in Slovenia, although there is no data on PM_{10} particle emissions from the port facility, it can be seen that that it exerts a small impact on the air quality of the city of Koper, and this is especially due to the low frequency of (NNE-NE) wind blowing from the port zone towards the city (the wind blows from the direction of coal dumps very rarely - just 3% of time to the Koper city meteorological station and 7% at the port meteorological station). Based on the measurement results it is difficult to establish what portion of concentrations can be attributed to emissions from the nearby roads, and what to operations at the Port of Koper.

The only certain thing is that the direct transfer of particles from the port's dry bulk cargo terminal to the location of the meteorological station in Koper city occurs but rarely. Based on the results of nearly six-months of measurement, the permitted annual threshold for the concentration of PM_{10} particles might be slightly exceeded, and that such excess will be similar to those already being recorded by stations across Slovenia (such as Nova Gorica, Ljubljana-Bežigrad, and Rakičan near Murska Sobota) which are not under any direct impact by either traffic or industry, and considerably lower than those in the country's more polluted cities (such as Celje, Maribor and towns in the Zasavje region).

During summer, ozone pollution in Slovenia's littoral region of Primorska is the highest in the country. For years the highest concentrations in Slovenia have been recorded in Nova Gorica during weak winds from the west or southwest, which – according to the location of the measurement point – indicates the influence of emissions from vehicles and industry in Nova Gorica and the adjacent town of Gorizia in neighbouring Italy, and most likely too the broader region of the northern Italian plain. The ozone concentrations recorded at Koper, occurring during westerly and north-westerly winds are lower than those in Nova Gorica. As is the case elsewhere, the maximum concentration of ozone in Koper is recorded in the afternoon, when the air temperatures are at their highest and solar radiation is still strong. In the afternoon when the weather is stable, the dominant wind is the mistral; at the same time such high concentrations are at least partially the result of the transport of ozone-polluted air from neighbouring Italy. The sea lies to the west and northwest of the measurement point, therefore there are no local pollution emission sources which could engender the simulation of ozone.

ATTACHMENT No. 6

Climate Data

Tables of average wind directions and strengths

Wind data is from the Koper meteorological station.

The measurement period is from 1st January 1992 to 31st December 1998

Average wind directions and speeds ranging from 0.0 to 3.1 m/s

Direction	Frequency (% total time)	Average speed (m/s)	Frequency (% total time)	Average speed (m/s)	Frequency (% total time)	Average speed (m/s)
Speed interval:	0.0 - 1.5 m/s		1.5 - 3.1 m/s		3.1 - 5.1 m/s	
N	0.5	0.8	0.3	2.2	0.1	4.0
NNE	0.5	0.8	0.4	2.4	0.3	4.0
NE	1.2	1.0	0.9	2.4	1.4	4.1
ENE	6.5	1.0	5.7	2.1	3.8	4.2
E	12.0	1.0	9.6	2.0	2.6	4.0
ESE	4.6	0.9	3.2	2.2	1.1	3.8
SE	2.1	0.9	1.4	2.2	0.7	4.0
SSE	0.5	0.9	0.6	2.3	0.4	4.1
S	0.4	0.8	0.5	2.4	0.4	4.0
SSW	0.4	0.8	0.4	2.4	0.3	3.9
SW	0.5	0.9	0.4	2.4	0.4	4.0
WSW	1.4	0.9	0.5	2.3	0.4	4.0
W	1.7	1.0	2.9	2.4	2.8	3.9
WNW	1.0	0.9	4.0	2.4	3.4	3.9
NW	0.6	0.8	1.0	2.3	0.5	3.9
NNW	-	-	0.3	2.2	0.1	3.9
No measurable wind	3.0 %					
% of total time per the speed interval:	0.0 - 1.5 m/s = 37.9 %		1.5 - 3.1 m/s = 31.9 %		3.1 - 5.1 m/s = 18.8 %	

Average wind directions and speeds ranging from 3.1 m/s to 10.1 m/s

Direction	Frequency (% total time)	Average speed (m/s)	Frequency (% total time)	Average speed (m/s)	Frequency (% total time)	Average speed (m/s)
Speed interval:	5.1 - 8.2 m/s		8.2 - 10.1 m/s		above 10.1 m/s	
N	0.0	6.3	0.0	9.0	0.0	11.4
NNE	0.1	6.3	0.0	9.0	0.0	10.2
NE	1.3	6.4	0.3	9.1	0.3	12.2
ENE	4.3	6.5	1.1	9.1	0.8	12.0
E	1.2	6.3	0.1	8.9	0.0	11.4
ESE	0.1	6.0	0.0	8.7	0.0	0.0
SE	0.3	6.3	0.0	8.8	0.0	11.5
SSE	0.2	6.1	0.0	8.7	0.0	0.0
S	0.1	5.8	0.0	8.5	0.0	0.0
SSW	0.0	5.7	0.0	8.5	0.0	0.0
SW	0.1	6.0	0.0	8.3	0.0	10.6
WSW	0.1	5.9	0.0	9.3	0.0	12.8
W	0.5	5.9	0.0	8.9	0.0	12.1
WNW	0.3	5.8	0.0	9.2	0.0	12.7
NW	0.1	6.0	0.0	8.9	0.0	0.0
NNW	0.0	6.0	0.0	8.8	0.0	0.0
Measurement						

period:	01.01.1992 to 31.12.1998	01.01.1992 to 31.12.1998	01.01.1992 to 31.12.1998
% of total time per the speed interval:	5.1 - 8.2 m/s 8.8 %	8.2 - 10.1 m/s 1.6 %	above 10.1 m/s 1.1 %

Monthly temperatures, humidity and precipitation

Source: Climate of Slovene Istria

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Year
Max	17	16	22	27	28	32	35	34	32	26	21	16	35
Min	-8.4	-7.6	-7.0	0.7	4.2	8.6	10	11	8.0	2.4	-3.2	-6.1	-8.4
Average	4.8	6.1	8.6	12	16	20	22	22	19	14	10	5.9	13

Extreme and average monthly and annual air temperatures in Koper (in ºC).
Data for the period 1961-1975.

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Average	75	70	70	76	65	68	63	68	65	75	75	75

Average monthly air humidity (%) in Koper. Data for period 1957-1971.

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Year
Hours per month	99	120	159	198	247	274	309	288	220	175	95	100	228
Hours per day	3.2	4.3	5.1	6.6	7.9	9.1	9.9	9.3	7.3	5.6	3.1	3.2	6.2 average

Duration (in hours per month and hours per day) of solar radiation in Koper.
Data for the period 1960-1979.

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Koper	44	35	53.5	46	58.4	76	71	73	61.3	114	87.2	105	114
Portorož	55	41	73.5	49	53.5	49	47	73	112	67.0	90.7	55.5	112

Maximum daily precipitation (in mm) for Koper and Portorož.
Data for period 1961-1975 (Koper) and 1976-1990 (Portorož).

Ppt. mm	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
>0.1	10	9.5	9.9	10	12	11	8.7	9.3	8.5	9.5	11	11	123
>1.0	7.8	7.2	7.2	8.1	8.8	8.3	6.8	7.2	7.3	7.5	8.8	8.4	93
>10	2.6	2.1	2.2	2.7	2.7	3.2	2.7	2.8	3.7	3.1	3.6	3.2	34
>20	0.9	0.6	0.8	1.1	0.9	1.5	1.5	1.2	2.0	1.5	1.7	1.0	14

Average number of days in which precipitation was more than 0.1 mm, 1.0 mm, 10.0 mm and 20.0 mm in Portorož, Slovenia. Data for the period 1951-1980.