

**Strategic Environmental Impact Study
of the Transport Development Strategy of
the Republic of Croatia 2017-2030**

Non-technical summary

Zagreb, May 2017

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1 Introduction

Strategic Environmental Impact Assessment (hereinafter: SEIA) is a procedure for assessing the likely significant environmental impacts that may arise from the implementation of a strategy, plan or programme. The implementation of the SEIA is the basis for promoting sustainable development by integrating the conditions for environmental protection into the strategies, plans and programmes of a particular area. This enables the adoption of relevant decisions on the approval of strategies, plans and programmes taking into account possible significant impacts that the strategy, plan and programme could have on the environment and provides the persons responsible for the implementation with the framework of action and the possibility to include essential environmental protection elements in decision-making (Environmental Protection Act (Official Gazette of the Republic of Croatia 80/13, 153/13, 78/15)).

The designer of the Transport Development Strategy of the Republic of Croatia for the period 2017-2030 (hereinafter: the Strategy) is the Ministry of Maritime Affairs, Transport and Infrastructure¹ (hereinafter: the Ministry of Sea, Transport and Infrastructure). The SEIA procedure started on 21 July 2015 with the adoption of the *Decision on the implementation of the procedure for Strategic Environmental Impact Assessment for the "Transport Development Strategy of the Republic of Croatia for the period 2017-2030"* (Class: 340-03/15-10/03, Reg. No.: 530-08-2-3-2-15-4).

The SEIA procedure for the Strategy is implemented on the basis of the provisions of the Environmental Protection Act, the Regulation on the Strategic Environmental Impact Assessment of the Strategy, Plan and Programme (Official Gazette of the Republic of Croatia 64/08)² and the Regulation on Information and Participation of the Public and Interested Public in Environmental Issues (Official Gazette of the Republic of Croatia 64/08). This procedure assesses the likely significant impacts on the environment and human health that may arise from the implementation of the Strategy.

The Strategic Environmental Impact Study (hereinafter: the Study) is developed in the SEIA procedure, a professional background attached to the Strategy and includes all the necessary data, explanations and descriptions in textual and graphic form. The study identifies, describes and assesses the likely significant impacts on the environment and human health that may arise from the implementation of the Strategy. It is intended to ensure that the consequences on the environment and human health are assessed during the preparation of the Strategy, prior to the final proposal and referral to the procedure for its adoption.

SEIA procedure consists of steps provided in the table (Table 1.1).

Table 1.1 Steps in the implementation of the SEIA

| Step | Goal |
|---|---|
| Analytical review | Determine whether the strategic assessment is mandatory under the provisions of the Environmental Protection Act |
| Opinion of the body competent for nature protection | Implementing the preliminary acceptability assessment of the Strategy for the Ecological Network |
| Opinion of the body | Obtaining an opinion on the strategic assessment from the body competent for environmental protection |
| Defining the content of the Strategic Study | Defining the scope and level of details that shall be addressed in the assessment |
| Preparation of the Strategic Study and evaluation of its integrity and professional grounds | Assessment of likely significant environmental impacts as a result of implementing the Strategy |
| Public discussion | Discussion on the draft Strategy and Study |
| Evaluation of comments on the Draft Strategy and Study | Review of the comments received, alternative solutions, reasons for the selection of a variant |
| Report on the implemented Strategic Environmental Impact Assessment | <ul style="list-style-type: none"> - presentation of a manner in which the issues relating to environmental protection and ecological network have been integrated into the strategy, plan and programme - presentation of a manner in which the strategic study results, opinions of the bodies and/or persons, as well as comments, proposals and opinions of the public have been taken into account and considered when making a decision to adopt the Plan - explaining the reason for accepting a selected reasonable alternative strategy, plan or programme, compared to other considered reasonable alternatives - the method for monitoring the implementation of the measures included in the Strategy content - the method for monitoring significant environmental impacts of the Strategy adopted. |

¹ The Ministry of Maritime Affairs, Transport and Infrastructure changed its name to Ministry of Sea, Transport and Infrastructure, October 2016.

² From January 2017, a new Regulation on the Strategic Environmental Impact Assessment of the Strategy, Plan and Programme (Official Gazette of the Republic of Croatia 3/17) is effective.

The process of implementing the SEIA also provides the stakeholders with the opportunity to participate in the process, while providing information to the public and enabling their participation during the decision-making process. Directive 2001/42 /EC of the European Parliament and of the Council on the assessment of the effects of certain plans and programmes on the environment (SEA Directive) has been effective since 2001. In the Republic of Croatia, the legal framework for the development of strategic studies is aligned with the SEA Directive and in accordance with the Act on the Confirmation of the Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context (Official Gazette of the Republic of Croatia – International Agreements 7/09).

2 Environmental characteristics of the area that can be significantly influenced by the implementation of the Strategy

Environmental characteristics of the area that can be significantly influenced by the implementation of the Strategy are described in Section 3.3 Description of Environmental Components. This chapter describes identified expected impacts on the area environmental characteristics that can be significantly influenced by the implementation of the Strategy.

Air quality and climate features

At a strategic assessment level, when we exclude specific impacts that are either limited by legal regulations or are considered at the level of environmental impact, the Strategy has potentially positive and negative impact on air quality and climate features. Using the newly constructed transport infrastructure and increasing the number of vehicles shall increase the amount of harmful exhaust and greenhouse gases, which negatively affects the air quality. The implementation of the measures that contribute to the reduction of greenhouse gas emissions and the introduction of an intermodal system based on ecological and innovative solutions shall have a positive impact on the air quality and climate features.

Geodiversity

By analysing the locations of protected geoheritage sites and interventions planned in the Strategy, it has been established that there are no conflicts in the area, i.e. that the intervention shall not devastate the protected geoheritage sites.

Biodiversity

In the implementation of the Strategy, there are possible impacts on biodiversity, which are primarily reflected in additional fragmentation of rare and endangered habitats, disturbing species and reducing the stability of important ecosystems. Significant impacts are possible due to changes in hydromorphological conditions of water bodies, which may lead to changes in habitat conditions. In addition, new roads significantly reduce habitats by causing edge effects and barrier effects.

Landscape characteristics

Large transport infrastructure projects and associated infrastructure generate negative impact on the landscape. The impact intensity depends on the area through which it passes or its characteristics. The characteristics of each area are manifested through natural, anthropogenic (cultural) and visual experiential qualities. Given the number and types of projects, that is, the type of transport, the most significant impact of the Strategy is expected in the landscape region of the Lowland areas of northern Croatia.

Soil

The construction of railway tracks and roads shall lead to a negative impact on the soil in the form of soil contamination with pollutants which occur due to transport by trains and road vehicles and potential soil degradation due to erosion or soil displacement. Since the impacts on the soil are largely related to the narrow area around the roads themselves, significant impacts on the soil during the implementation of the Strategy are not expected.

Waters

Due to the implementation of the Strategy, negative impacts are expected due to potential pollution of water bodies and water for human consumption, as well as impacts on the hydromorphological condition of water bodies. However, it is estimated that these impacts shall not be significant if the existing legal regulations and water protection measures prescribed by the subject Study shall be applied.

Cultural and historical heritage

Due to the implementation of the Strategy, negative impacts are possible on the architectural heritage (individual buildings, cultural and historical units) and the cultural landscape, as well as the archeological zones and sites. Nevertheless, the preliminary analysis of the Strategy implementation does not show significant impacts, given that due to the character of the impact it is possible to implement protection measures for the conflict areas.

Agriculture

Realising the measures in the road and rail transport sector and inland waterway transport may result in the conversion and fragmentation of agricultural land P1 and P2. Given the presence of P1 and P2 land, the influence of the conversion of P1 and P2 land can be significant in the Dinarides.

Forestry

Significant impacts may be expected in the implementation of planned measures in the area of endangered lowland forests, in particular common oak forests that are regularly flooded. The construction of roads and railway tracks shall lead to fragmentation of forest areas, and the construction of the Danube - Sava canal to significant changes in the water regime, which shall have a significant impact on the stability of the lowland forest ecosystem.

Wild game and hunting

The main impacts that may arise from the implementation of the Strategy are the fragmentation of hunting areas, disturbance and fatalities of wild game on the roads.

Tourism

Transport capability to meet tourism needs is determined by the size and condition of the transport infrastructure and transport capacities as well as their ability to meet demand requirements with their services. The importance of tourism for Croatian economy is great and therefore the transport system appears as a factor for improving or limiting the development of tourism. The development and equipping of passenger terminals and accompanying facilities, a systematic improvement of infrastructure and transport service and the uniform development of all transport modes within the traffic system shall positively influence the accessibility of tourist destinations, the comfort, speed and safety of travel and the mobility of tourists within destinations, which shall synergistically affect the increase in the indicators of the tourism intensity and the possibilities of improving or creating new tourist products.

Socio-economic characteristics

Today, a harmonised economic development and valorisation of economic and natural resources is inconceivable without the adequate development of the entire transport infrastructure complex. It is even more important considering the attractiveness of the coastline and islands in our country and the primacy of the most developed tourist area where most of the country's GDP is generated. The wide offer of different means of transport, infrastructure and various transport systems has a major role to play in raising the quality of life of citizens by improving accessibility and increasing travel speeds. This strengthens the mobility of the population, ensures sufficient and rapid supply of remote parts of Croatia, which leads to the intensification of the business of economic entities, strengthening of tourism activities, increase in the number of employees and the growth of the general and economic well-being of the society. The synergistic impact of these effects is reflected in the slow economic emigration of the population from the emigration areas in Croatia, which directly affects the stable overall (general) movement of the population.

3 Environmental impacts of the Strategy

3.1 Impact assessment methodology

The impact assessment is based on a strategic level that excludes individual projects and a specific project-related environmental impact assessment. In line with the methodological recommendations for the development of strategic studies that analyse the strategies, plans and programmes proposed under the IPA 2010 project "Strengthening Capacities for Strategic Environmental Impact Assessment (SEIA) at Regional and Local Level" from 2014, the impact assessment was conducted through the selection of the strategic goal of the Study. The strategic goal of assessing the impact is "Compliance of the Strategy measures with the environmental and nature requirements". It is evident from the selection of the goal that the main methodological guideline for assessing the impact is an analysis of the acceptability of the measures proposed by the Strategy in relation to the relevant environmental topics with their components.

When assessing the impacts, four impact categories are used:

- *Positive impact* - describes the assessment that, due to the implementation of the measure, the state of the environmental elements in relation to the present situation shall be improved. This can be the result of solving some of the existing environmental problems, or due to the change in the existing negative trend.
- *Neutral impact* – the assessment has shown that there are no impacts on the environmental component.
- *Moderate negative impact* - describes the assessment that, due to the implementation of the measure, the state of the environmental elements in relation to the present situation shall slightly deteriorate, but not to the extent that it could lead to significant and persistent disturbance of the environment or nature. In this category, there are impacts involving the release of pollutants within the limits prescribed by legal regulations, taking of smaller parts of numerous or less valuable habitats, the risk of fatalities of a smaller number of individuals belonging to the species that are not in the protection regime etc.
- *Significantly negative impact* – describes the assessment that there is a risk that, due to the implementation of the measure, the state of the environmental elements shall deteriorate to the extent that it could lead to a significant disturbance of the environment or nature. A measure that would bring a significant impact to the level of moderate or eliminate it shall be prescribed for this impact.

In addition to the analysis of the Strategy measures, their justification in relation to the environmental and nature requirements is assessed, as well as possible direct, indirect, short-term, medium-term, permanent, cumulative and transboundary environmental impacts.

When describing the impacts of the proposed measures on the environment and nature, the following terms are used to provide a more detailed definition of the type and scope of individual impacts:

- *Direct impact* – if the measure is a direct source of the impact described
- *Indirect impact* – of the measure generates a change that is the source of the impact described (future)
- *Short-term impact* – if the impact on the environment/nature ceases within 5 years
- *Medium-term impact* – if the impact on the environment/nature ceases between 5th and 10th year from the beginning of the impact development
- *Permanent impact* – of the impact has permanent consequences on the environment/nature and does not cease even after 10 years
- *Cumulative impact* – if several measures from the Strategy generate equal impacts on the environmental component, their joint impact on this component is cumulative
- *Synergetic impact* - if several measures from the Strategy generate different impacts that jointly affect the environmental component in a manner that joint impact is stronger than the sum of individual impacts on the subject component, this impact is called synergetic
- *Transboundary impact* – if the measure can affect the environment/nature of other countries.

3.2 Environmental impact assessment of the Strategy

For the purposes of the environmental impact assessment, the measures defined by the Strategy are divided into four categories:

1. General measures
2. Development measures
3. Management and organisational measures
4. Spatially located measures

The first three categories contain all the measures pertaining to the organization and management of the transport system or to the development and improvement of the transport infrastructure without mentioning specific projects. For these measures, the environmental impact assessment is shown in the tables below (subsections 7.2.1-7.2.3).

The last category of measures contains specific projects in the area and the impact assessment of the measures belonging to the category of Spatially located measures is shown in subsection 7.2.4.

3.2.1 Analysis of general measures

| Code | General measure | Description of the measure | Environmental impact assessment |
|------|--|--|---|
| G.1 | National concept for cargo logistics | Croatia shall define a national concept for freight logistics that would cover all aspects of traffic. It is very important, among other things, to determine the role of the Port of Rijeka and Port of Ploče, as well as the Zagreb hub. A special study shall be developed to include all relevant stakeholders. The establishment of logistic centres to exchange modes of cargo transport shall be based on further studies, which shall also define the technical measures for specific logistics facilities and units. | Planning cargo transport at national level, while following the guidelines and legal provisions defining the goals of environmental protection and spatial characteristics of functional regions (and lower spatial units), can contribute to better freight management and reducing the risk of accidental situations. The planned measure at this level has no impact on the environmental components. |
| G.2 | Increasing access to international airports through public transport | The accessibility of airports by public transport is inadequate and therefore individual solutions tailored to the specific features of each airport shall be found. Solutions shall be considered in the context of the master plans of functional regions, taking into account the potential functionality of connections such as the connection between Velika Gorica and Zagreb, Trogir and Split. | This measure shall most likely be preceded by the adjustment of the existing legislative framework and alignment with the spatial plans of the city of Zagreb and the counties. This measure shall improve accessibility to airports, potentially reduce travel time and generally improve customer satisfaction. At a strategic level of assessment, this measure has no significant impact on the environment. Public transport in the Republic of Croatia today is not integrated. Intermodal terminals that allow switch from one transport mode to another, common timetables as well as common transport maps of different transport modes are not developed. Improving the public transport system, especially in terms of increasing accessibility of airports, shall greatly facilitate mobility and positively affect customer satisfaction. |
| G.3 | Improving the safety of the transport system | Since safety is one of the main goals of the Transport Development Strategy, it is imperative to raise the safety level in all aspects of the transport system. In order to raise the level of the safety in the railway system, specific measures such as removing rail-road crossings, if justified by traffic flows, shall be implemented or protection measures shall be determined in cases where rail-road crossings cannot be removed, devices for the detection of axle load and overheated axle bearings shall be placed. Specific studies shall specify specific measures for each part of the network. As regards road safety, the Commission has set as its general objective the zero number of accidents with deaths by 2050. In order to improve road safety in Croatia, the following measures shall be designed: - Road safety shall be included in each phase of project implementation based on the impact study, at a strategic level, of various options of infrastructure project on the road safety, as one of the important elements for the selection of routes and the final solution. In later phases of the project, road safety checks shall establish in detail the elements of uncertainty of the road infrastructure project and propose corrective measures. | The basic objectives of international and national regulations within the transport sector relate to the safety of traffic participants and to the environmental protection against emissions caused by traffic. This measure plans to modernize the rolling stock and road fleet by purchasing new vehicles that meet the highest safety and quality standards, raise safety standards for air transport and increase the number of vessels for monitoring the safety of navigation and environmental protection vessels. In addition, the measure is planned to increase safety and protection in urban areas. In accordance with the above, it can be concluded that this measure is in line with the obligations arising from international and national strategic and planning documents as well as international contracts, and it primarily relates to improving the conditions for the quality of life and protecting the environmental components against pollution and degradation. |

| Code | General measure | Description of the measure | Environmental impact assessment |
|------|-----------------|---|---------------------------------|
| | | <ul style="list-style-type: none"> - In order to reduce the negative impact in terms of accidents, the procedures shall be reviewed and upgraded to shorten the response time. Information channels shall also be improved and simplified and monitoring of the state on back spots shall be introduced. - In order to effectively mitigate the risks and the possibility of accidents, and to limit their negative consequences, it is necessary to introduce the highest safety standards of air transport in international, regional and national traffic. Airport infrastructure and aircrafts shall comply with all international safety regulations. - The maritime sector needs to be developed in a safe and sustainable manner. The goal is to continuously increase the efficiency of safety supervision and protective measures on Croatian vessels and crafts, as well as increase the share of energy-efficient vessels. It is necessary to develop a system of targeted inspections and technical examinations to establish the highest international, European and national safety standards on Croatian vessels and crafts, in accordance with established priorities. It is also necessary to establish an efficient system for monitoring recreational vessels. - In order to raise the level of safety on the waterways, in addition to the introduction of river information systems and timely availability of accurate information on the vessel movement, it is necessary to establish clear procedures for measures to be taken in the event of an incident, and to upgrade the existing navigation and tracking systems for inland waterways. For safety reasons, it is necessary to modernize ports and equip them with modern security systems. In order to achieve more efficient systems for monitoring the safety of navigation and inspection and install and maintain signalling systems on waterways, it is necessary to increase the number of vessels for monitoring the safety of navigation and vessels for environmental protection. - Safety and protection in urban areas shall be improved at least on two different levels: <ul style="list-style-type: none"> - identifying and removing black spots such as rail-road crossings, traffic signs and lights on pedestrian crossings, with additional protection of pedestrians and cyclists by building new sidewalks or bike paths at places where it is needed, - constructing pedestrian islands that would reduce the length of path and extending curbs where necessary and constructing new footpaths or sidewalks, which would provide easier access to stops and terminals for public transport vehicles. | |

| Code | General measure | Description of the measure | Environmental impact assessment |
|------|---|--|---|
| | | <p>- Rolling stock and road fleet intended for public transport shall be modernized. One of the priorities is the purchase of new public transport vehicles that are in line with the highest safety and quality standards, which shall be equipped with state-of-the-art safety-management-control systems (e.g. video cameras). Infrastructure and stops shall also be modernized with adaptations necessary to safety and accessibility to public transport, and the installation of monitoring and control devices shall increase safety as well.</p> | |
| G.4 | Increasing intermodality in the passenger traffic and development of passenger hubs | <p>In order to achieve the sustainability of the transport sector as a whole, it is important to increase the interoperability that shall enable the use of potentials of every transport mode. A network of intermodal terminals shall be set up, enabling passengers to easily switch from one transport mode to another. A well-designed, balanced intermodal network is key to achieving the maximum efficiency of the entire system and reducing customer inconveniences to the level as low as possible. The location and form of each terminal shall be determined according to the studies for the specific area (e.g. master plan). In the road transport sector, it is important to provide an appropriate level of accessibility in accordance with the needs, i.e. hubs in gravitation areas (such as sea, river and air ports, railway stations, workplaces, business zones, etc.). Larger number of parking spaces linked to public transport systems, sea, river and air ports shall stimulate the transition from one transport mode to another in favour of public transport, and thus reduce the number of bottlenecks on the roads.</p> | <p>In the Republic of Croatia, some projects are being prepared or implemented in order to promote the development of intelligent and integrated transport systems: Integrated Public Transport of the City of Zagreb, Zagreb and Krapina-Zagorje County, Integrated Development Project of Passenger Transport and Intermodal Cargo Transport in the Region of Northern Croatia (Varaždin, Međimurje, Koprivnica-Križevci Counties), Transport System of the City of Zadar: Intelligent Transport System and Reconstruction of Roads in the City of Zadar, Development of the Rijeka and Dubrovnik Region. As a priority of the public urban, suburban and regional mobility sector in the European Union (<i>Roadmap to a single European transport area — Towards a competitive and resource-efficient transport system, European Commission, 2011</i>), the introduction of integrated transport systems in major cities and their suburbs and/or regional areas has been defined. Spatial and organizational rationalization of ports and bus stations, establishment of signalling and information system of various forms of public urban and suburban transport, equipping of public transport stops, ports and piers with accompanying facilities and services, greater number of parking spaces, as well as monitoring the number of public transport users in order to adapt routes and frequencies according to the needs, has a direct positive impact on increasing the number of public transport users, the economic productivity of public transport companies and the comfort and safety of passenger travel.</p> |
| G.5 | Maintenance concept for various transport systems | <p>In general, transport infrastructure in Croatia is not well maintained. The owner of the national infrastructure should have a maintenance concept that shall guarantee the long-term sustainability of different transport modes.</p> | <p>When reliability and safety of signal-security devices are considered in the function of the availability of the railway system, then we talk about the reliability, availability, maintenance and safety, i.e. the process of managing these components.</p> |

| Code | General measure | Description of the measure | Environmental impact assessment |
|------|--|---|--|
| | | <p>An appropriate structure and organization of maintenance needs to be established to enable railway service to be efficient and effective, that is, sustainable. The concept shall be derived from the purposeful and concrete analysis of the situation in Croatia and the company "HŽ Infrastruktura d.o.o.", taking into account the technical and financial conditions as well as the needs of users, as set out in Directive 2008/57/EC on the interoperability of the relating to Railway applications - The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS) (HRN EN 50126). Road maintenance is essential for preserving the roads in their original state, protecting nearby resources and user safety as well as traveling comfort along the route. It is necessary to introduce a maintenance system that is efficient and effective, that is, sustainable and characterized by an appropriate structure and organization. The concept of the maintenance system shall be derived from the purposeful and concrete analysis of the situation in Croatia and relevant stakeholders, taking into account technical and financial conditions and the needs of users. The concept of maintenance for the maritime sector can be divided into maintenance of ports and port infrastructure, on the one hand, and maintenance of the fleet, on the other. An appropriate structure and organization of maintenance needs to be established to provide a maritime transport service that shall be efficient and effective, i.e. sustainable. The concept of maintenance system shall be derived from the purposeful and concrete analysis of the situation in Croatia and vessel operators, taking into account technical and financial conditions and the needs of users.</p> | <p>The first European standard mentioned in this context is HRN EN 50126, according to which the availability is the product's ability to perform the required function under the given conditions at a certain time or interval with external resources provided. In line with this, the availability of the railway system is the ability to provide a safe traffic flow in the function of passenger and cargo transport in line with the timetable.</p> <p>In recent years, many studies have been carried out and research on Intelligent Transport Systems has been conducted. In addition to a shift in terms of road safety and traffic jams, another benefit of these systems is reflected in reduced harmful emissions and fuel consumption. Significant progress in road traffic safety is expected from the development and implementation of the so-called cooperative systems, where data is exchanged between vehicles and between vehicles and infrastructure, enabling drivers to be informed at any time about the situation on the road.</p> <p>The development of the Republic of Croatia into a modern maritime country means that selective and thoughtful use of available potentials is necessary in order to improve and modernize all the activities of the maritime economy. The maintenance concept for the maritime sector shall be implemented in accordance with the provisions of nature protection documents, in particular taking into account the Program of measures for the protection of the marine environment and coastal area, whose measures relate to sustainable management while preserving marine and coastal biodiversity.</p> <p>The subject measure does not generate environmental impacts at a strategic level, but it may positively affect the environmental components in the long-term.</p> |
| G.6 | Increasing energy efficiency of the transport system | <p>According to the guidelines for the development of the trans-European transport network, promoting efficient and sustainable use of infrastructure is one of the priorities in infrastructure development. In this sense, it is necessary to raise the level of energy efficiency and to identify low-carbon energy sources and power systems as a priority. Further studies shall aim at analysing specific requirements.</p> | <p>With the purchase of more environmentally friendly vehicles (gas and biofuel drive) and investing in the renovation of the fleet, a positive impact on the environment is expected at a strategic level of impact assessment. Transport system improvement leads to reductions in harmful emissions into the air and reduced fuel consumption.</p> <p>Additional infrastructure shall be required for electric vehicles in traffic, in terms of electric vehicle charging stations. Additional infrastructure changes shall also be needed for future electrification of the railways. Hydrogen as a fuel can be in the form of gas or liquid, and the infrastructure it requires can be developed gradually with market demands by introducing hydrogen-fuelling systems at existing gas stations.</p> |

| Code | General measure | Description of the measure | Environmental impact assessment |
|------|---|---|---|
| | | | <p>Biofuels can be distributed through existing oil and gas pipelines, when and where possible. The transport of liquefied petroleum gas from the place of exploitation to gas stations includes the combination of pipes, tankers, etc. (European Expert Group on Future Transport Fuels, 2011). Infrastructure development, in terms of performing specific environmental interventions, can have adverse effects on the environmental components, which shall be recorded in the process of environmental impact assessment. If we exclude infrastructure needs, this measure has a positive impact on the quality of air and the quality of life of people due to reduced emissions of harmful gases. When it comes to biofuels, we need to consider the process of obtaining this energy product, that is, the impact of this process on the environment. Due to the unspecified biofuel resource, the impact assessment remains at this level. Replacing outdated vessels and purchasing new ecologically and energy efficient vessels shall have a positive impact on the environment, as it shall reduce emissions of pollutants into the environment and greenhouse gases into the atmosphere.</p> |
| G.7 | Reorganisation of the transport system for greater sustainability | <p>Public service contracts concluded in accordance with Regulation 1370/2007 on public passenger transport services by rail and road and repealing Council Regulations (EEC) No. 1191/69 and (EEC) No. 1107/70 are one of the basic mechanisms to guarantee the transparency and efficiency of the public transport service. Therefore, their wider application is necessary not only to comply with the Regulation but also as a first step towards increasing the sustainability of the Croatian transport system. The type and duration of a public service contract shall be determined on the basis of an analysis of each individual case in combination with an analysis of existing internal models, either for conformity check, or after a thorough examination of technical and financial conditions. Increasing financial sustainability is one of the goals of the trans-European transport network. To achieve this goal, the organization of transport systems shall be optimised and the efficiency of operations and maintenance shall be raised. The financial sustainability of the transport system aims to reduce the system dependence on the subsidies from public revenue.</p> | <p>Traditionally, the traffic infrastructure is built from funds raised by public funding, at the level of regions, countries or the European Union. This method is used to finance most road or rail projects. By introducing new procedures in the sphere of public contracts, the Commission is trying to encourage greater private equity participation in financing infrastructure projects. The EU White Paper on Transport presents a number of recommendations aimed at achieving the integration of all types of transport for the benefit of a more efficient, sustainable, competitive, accessible transport system that is user-friendly. Some of the main points are change in the modes of transport and comfort, modern infrastructure and smart financing, urban mobility, users in the center of traffic policy and the global dimension of traffic. At a strategic level, this measure contributes to improving the quality of life of people, while not generating negative impacts on the environment.</p> |

| Code | General measure | Description of the measure | Environmental impact assessment |
|------|--|---|---|
| G.8 | Adjusting the legal framework and planning guidelines to relevant EU requirements and policies | The legislation and planning guidelines shall support sector development and follow best practices and European regulations, particularly in the area of safety, interoperability, sustainability and environmental protection. The entire legal framework shall be aligned to enable large infrastructure projects to be implemented, individual procedures need to be simplified, and the definitions shall be harmonised in all legal and subordinate acts. | Along with the expansion, i.e. development of the transport system, there is a new imperative - sustainable development. The goal of achieving sustainable development has been introduced for the first time by the Treaty of Amsterdam and is achieved by integrating environmental requirements into the corresponding European Community policies. At a meeting of the European Council in Gothenburg it was agreed that the change in the representation of individual transport modes is a key topic of the sustainable development strategy. Measures presented in the White Paper on Transport could be considered the first basic step towards sustainable transport system. In order for the transport sector in the Republic of Croatia to meet the highest standards of safety and environmental protection, national legislation shall be aligned with internationally recognized documents (guidelines for sustainable traffic planning). The planned measure at this level has no impact on the environmental components. |
| G.9 | Preparation and compliance with the requirements of the Schengen Agreement | Possible future development of Croatia and neighbouring countries entering the Schengen Agreement area shall increase the importance of international traffic. Adaptation of transport systems requires removal of infrastructure and administrative bottlenecks. Removing the bottlenecks towards neighbouring countries outside the zone of application of the Schengen Agreement shall contribute to the growing importance of international transport in some corridors with international connections. Specific studies shall assess the technical conditions to be met in each particular case. | Effective international transport (removing bottlenecks) leads to improving travel conditions, reducing traffic jams and travelling time across EU countries. This has a positive impact on the quality of travel, that is, the customer's satisfaction. |
| G.10 | Increasing administrative capacity/training | Lack of administrative capacity and properly trained staff are some of the key problems that have been identified in the transport sector and one of the priorities of the European Union cohesion policy. The introduction of new technologies and increased demand for the surveillance of traffic and means of transport implies the necessity of training existing staff and newly employed in accordance with their specific needs. | The subject measure has a positive impact on socio-economic characteristics as it contributes to the creation of new jobs, while focusing at the same time on strengthening the existing capacity with regard to future development of transport technologies. |
| G.11 | Improving the public perception of the transport system in Croatia | Creating and promoting a positive image of the transport system in the public as a reliable, safe and ecological mode of transport is important for stimulating demand and thus investment. Better promotion requires the existence of complete and up-to-date information and knowledge of infrastructure, capabilities and development plans. | Spatial and organisational rationalisation of the transport sector, with the measure encouraging users to be informed about traffic condition, has a direct positive impact on the user's comfort and safety during travel. |

| Code | General measure | Description of the measure | Environmental impact assessment |
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| | | <p>In the road transport sector, it is extremely important that users are informed about traffic conditions and weather conditions so as to reduce traffic jams and number of accidents by informing users about alternative routes. It is also important for drivers to be informed about changes to existing regulations and new regulations in the sector relevant to users, as well as the current notification of incidents on motorways that require driving at a lower speed or a ban on driving in certain directions. For these reasons, it is extremely important that information technology and information channels are constantly adapted and renewed to improve the whole sector. It is also important to include more the media in transmitting information.</p> <p>In the maritime transport sector, information platforms shall be continually modernised and integrated in order to provide reliable and complete data and information to all users. It is also necessary to establish network services of electronic business for all users of public services, establish a unique port information system in ports to improve business processes and increase port competitiveness, set up a hydrographical information system, improve the maritime meteorology services, develop ICT solutions for emergency response at sea, and improve and develop nautical information service as well as public and free services relating to the safety of navigation of yachts and boats..</p> | |
| G.12 | Reduce negative environmental impacts of traffic | <p>Based on environmental monitoring, efficient planning / implementation of infrastructure and the establishment of necessary ecological protection measures, the negative environmental and socio-economic impacts of the transport system shall be reduced. The mitigation of negative environmental impacts of traffic shall be realised with greater energy efficiency, especially by using energy sources with low or zero hydrocarbon emissions and by reducing noise emissions and the volume of continuous pollution and waste generation. To prevent the pollution of the Adriatic Sea from marine facilities and vessels, it is necessary to renew and modernise the fleet of cleaning vessels, ensure availability of services, equipment and devices for operative action, in particular for interventions in case of large-scale sea pollutions. The conditions for a sustainable and accessible service for the reception and disposal of ship waste and freight residues shall be provided in accordance with international and EU regulations and ballast water management shall be enhanced based on the risk assessment and in accordance with internationally agreed guidelines. The timely response to prevent sea pollution is particularly important, as sudden pollutions of the sea may have far-reaching consequences.</p> | <p>Given that G.12 and G.13 measures have the same content, the description of the impact is equal (part of the impacts described under the G.6 measure also applies to the subject measures - the use of energy sources with low or zero hydrocarbon emissions). The need for sustainable transport development, i.e. the inclusion of environmental and nature protection in the planning of transport routes and technologies has long been recognized as the main objective of the transport development strategy in the European Union. This measure does not generate environmental impacts at the strategic level, but a positive direction in which the measure promotes transport development shall be emphasised, which contributes to protecting the environmental components and the quality of life of people in particular.</p> |

| Code | General measure | Description of the measure | Environmental impact assessment |
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| G.13 | Adapting to climate changes and their mitigation | The development of the transport sector in Croatia shall take into account the need to reduce CO ₂ emissions, and thus mitigate the impact of the traffic on climate changes. At the same time, the transport infrastructure and business shall be built, taking into account possible consequences of climate changes and extreme weather conditions on them. | |
| G.14 | Improving the data collection process | For further development of the transport sector, it is necessary to have the most recent data. The data collection system needs to be improved and simplified for easier access to data. | The subject measure does not generate environmental impacts, but it affects customer satisfaction in the long term. |
| G.15 | Enhancing interoperability with neighbouring countries | Enhancing the interoperability of the Croatian transport system in all sectors with neighbouring countries is very important to ensure proper connection and strengthen the role of Croatia as a transport hub for the Western Balkans, thereby increasing demand for transport on the Croatian territory. Harmonisation of technical standards in different sectors and simplification of the procedures at border crossings with Schengen and non-Schengen countries are examples of the tasks to be implemented. In order to determine the bottlenecks and to propose solutions, special studies are required in each sector. | The subject measure has a positive impact on socio-economic indicators of the Republic of Croatia, in particular taking into account the role of Croatia as a transport hub for the Western Balkans. |

3.2.2 Analysis of development measures

| Code | Measure | Description of the measure | Environmental impact assessment |
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| Urban, suburban and regional transport | | | |
| U.2 | Infrastructure development | Appropriate analysis of the existing situation and the anticipated development of the transport system and socio-economic context in urban and regional areas in the perspective of the functional region shall identify the needs for restoration/upgrading of the existing infrastructure or creation of new ones where the level of mobility allows it. On the other hand, this may also mean the termination or functional reduction of some parts of the network where the expected level of mobility becomes irrelevant. Infrastructure investments shall primarily focus on public transport and low/zero level of harmful emissions, and shall be accompanied by complementary mobility management policies and interventions along with appropriate ITS installations. | A quality transport system (infrastructure and services) is vital for the functionality of urban areas. Apart from contributing to all aspects of urban life in the form of safe and efficient mobility of a large number of people, it enhances the quality of life and has a wider economic impact. In addition to a positive impact on traffic safety and personal safety, the improvement of road, rail, air and maritime connections, shall contribute to environmental protection through focus on lower emission of greenhouse gases. |

| Code | Measure | Description of the measure | Environmental impact assessment |
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| Urban, suburban and regional transport | | | |
| U.3 | Development of stops | Appropriate analysis of the current state and expected movement in the transport system in the socio-economic context in urban and regional areas, and in the perspective of Sustainable urban mobility plans / Integrated transport plans shall identify the need for restoration/upgrading of existing stops or setting new ones where justified by the level of mobility. On the other hand, this may also mean the termination or functional reduction of some existing stops where the level of mobility is expected to become irrelevant. The development of the station shall primarily focus on improving access for passengers, particularly persons with reduced mobility, ensuring the safety of passenger movements and introduction of the information and speaker system. | The restoration / upgrading of existing stops or setting new ones would meet the needs of urban residents related to their mobility and ensure better and quality living conditions in the city and its surroundings. It is possible to increase the number of public transport users, the economic productivity of public transport operators and the comfort and safety of travel. Adjusting the stations to persons with reduced mobility would significantly contribute to their greater mobility, which indirectly positively affects their greater social inclusion. |
| U.4 | Separating transport modes – identifying priorities in public transport, elimination of bottlenecks | Public transport (mainly buses and trams) should simultaneously operate with personal cars, as available space in the cities is limited. In order to increase the efficiency of public transport, the level of separation of individual transport by cars and public transport shall be increased by the construction of dedicated public transport lanes and / or corridors intended for public transport (for trams and buses) and the implementation of the measures aimed at increasing the priority of public transport through traffic management systems such as traffic lights. Furthermore, obstructions and bottlenecks hindering the efficient operation of public transport shall be removed. Such obstructions and bottlenecks usually cause traffic jams for public transport vehicles and may even endanger road safety (e.g. railroad crossings). | Increasing the efficiency of public transport shall increase the use of public transport and the reduction in the use of personal cars, which may have an indirect positive impact on the quality of life of people in the city and its surroundings and the reduction of CO ₂ emissions and other pollutants. Removing the bottlenecks that hinder the efficient operation of public transport shall improve the aspect of traffic safety, which may positively affect the decrease in the number of deaths due to traffic accidents. Public transport provides access to smaller regional centres and rural areas. On the other hand, the population of these areas has access to centres of work and services. |
| U.6 | Alternative fuelling stations | Alternative fuels have considerably improved over the past few years, especially with regard to public transport in urban and suburban settlements. Consideration shall be given to constructing alternative fuelling stations with the aim of reducing the consumption of conventional fuels, CO ₂ emissions and poisonous particle emissions. In any case, in order to identify appropriate technology, special studies are required within the concept of functional regions. | This measure has a positive impact on air quality due to the reduction of gas emissions generated by the combustion of diesel and gasoline. |
| Railway traffic | | | |
| R.15 | ETCS L1, L2 on other railway lines, GSM-R | Installation of the European Train Control System – ETCS) on railway lines, except those described in other measures (Railway Network Elements) would enable the increase in the interoperability of the entire network. Depending on the operative concept, the installation of the ETCS system and GSM-R system (Global System for Mobile Communications – Railway) could be feasible on other Croatian network railway lines as well (comprehensive and those that are not part of the TEN-T). Through the concept of functional regions, specific needs | European standardisation of rail management aims to increase interoperability and facilitate the purchase of signal-security devices. Modernisation of signal systems improves infrastructure and traffic management. At a strategic level, the subject measure does not generate environmental impacts. |

| Code | Measure | Description of the measure | Environmental impact assessment |
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| | | shall be defined an technical parameters that shall be met in each individual case. | |
| R.16 | Electrification of other railway lines | Depending on the operational concept, the electrification of railways would increase the efficiency of the existing infrastructure. Further studies shall define the specific needs and technical parameters as the source of electricity (ensuring the environmental performance of the measure) to be met in each individual case. | The introduction of railway electrification leads to a reduction in air pollution, as there is no chemical pollution in case of electric railway vehicles. The necessary infrastructure development for the implementation of this measure is addressed in the process of environmental impact assessment. |
| R.17 | Restoration, upgrading of other railway lines | Individual case studies shall determine the need for restoration and upgrading of the railway lines along with those already described in the Strategy, taking into account the operational concept as well as the economic and environmental aspects. | Infrastructure development, in terms of performing specific environmental interventions, may have adverse effects on environmental components, which shall be recorded in the process of environmental impact assessment. |
| R.18 | Regional transport except Zagreb and Rijeka (Split, Varaždin, Osijek, etc.) | Railway transport can also play an important role in regional transport in regional centres that are not part of the basic TEN-T rail network due to the existing network configuration in these areas. Through the concept of functional regions, potential shall be analysed in cities such as Split, Varaždin and Osijek. These studies shall also assess the required technical parameters for each individual case. | The development of the railway network in cities can lead to negative impacts on the environment and nature at the level of implementation of specific projects, while at a strategic level, this measure is considered through a positive impact on the population if it contributes to a better connection and a potentially organised public transport system that can reduce the needs for daily commute by personal cars. |
| R.19 | Improvements and new railway yards | Through the concept of functional regions based on demand estimates, the need for the development of new railway yards or the improvement of existing ones shall be analysed in order to increase the railway potential in the cargo transport sector. | The measure contributes to better freight management, while the intensity of impacts on environmental components can be recorded when defining and analysing specific projects. |
| Road traffic | | | |
| Ro.17 | Reorganisation of toll collection system | The toll collection system in the Republic of Croatia is mainly under the jurisdiction of four concessionaires with different toll collection methods. A unique toll collection method is required. Further studies shall analyse a full range of existing options, as well as the option of introducing EETS or EU vignettes. | During the implementation of the measure, there may be a need to change certain regulations defining the organisation of the transport system (e.g. Toll Regulation (Official Gazette of the Republic of Croatia 130/13)). |
| Ro.18 | Development of the concept for the road network maintenance (including maintenance stations) | Covered by the G.5 general measure. | Description of the impacts as for G.5 measure. |
| Ro.19 | Secondary and tertiary restoration of roads and connection | In order to ensure the cohesion of the territory and enable appropriate access to the road network with a high level of service, the status of existing secondary and tertiary roads shall be analysed and the need for their restoration shall be identified. The main problems affecting this category of roads are the lack of maintenance and funding. | The improvement of secondary and tertiary roads in terms of regular maintenance contributes to a more quality transport system that has a positive impact on user satisfaction. Better connection between secondary and tertiary roads with higher priority categories ensures better regional accessibility. |

| Code | Measure | Description of the measure | Environmental impact assessment |
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| | | The conditions for proper maintenance shall be realised, in particular taking into account existing and planned levels of traffic on these roads. The concept of functional regions shall identify the need for constructing such roads and specific studies shall define the necessary technical parameters, taking into account the expected demand, the toll collection concept, and economic and ecological aspects. | In addition, the connections between the islands and the mainland are insufficient and hence the reconstruction of road links and other transport infrastructure indirectly positively contributes to the development of islands. |
| Ro.20 | Developing the concept of rest stops for the road network with a high level of service | According to Directive 2008/96/EU, a sufficient number of rest stops is very important for road safety. Rest stops allow drivers to rest and continue their journey completely concentrated. Therefore, an integral part of the road infrastructure safety management should be to provide a sufficient number of secure parking lots. Although a number of service facilities have already been constructed next to motorways and expressways, this number is still not enough to take into account the increase in traffic, especially during the tourist season. Furthermore, Directive 2010/40/EU states that it is necessary to improve the infrastructure of secure parking lots for trucks and buses. At the same time, renovation of old parking lots is planned by introducing new facilities (gas stations, restaurants, toilets, playgrounds). | At a strategic level, the measure does not generate environmental impacts. It is in compliance with Directive 2008/96/EU on road infrastructure safety, i.e. the European Union guidelines for safer traffic. Potential impacts on environmental components shall be recorded when defining specific projects. |
| Ro.21 | Traffic management and control, traffic counting and information system | New technologies shall be introduced to improve the methods and manners of collecting information to ensure that the collected information on traffic management meet the international level in terms of the content and quality. New technologies enable, inter alia, the collection of real-time data and control of traffic conditions. In order to use the benefits of new technologies, the need for new centralised traffic management centres shall be analysed, which would be equipped with the latest ITS (Intelligent Transportation Systems) solutions. Traffic management and control is of particular importance in managing incidents and traffic jams at the peak of the tourist season. This shall enable qualitative improvement of planning and monitoring alternative routes, information for passengers, traffic control and the collection of real-time data on traffic jams. | The introduction of intelligent transport systems, which improve traffic management and control, especially in increased traffic periods, contributes to the safety of passenger travel. |
| Ro.22 | Junction development plan | In order to improve the connection with road networks with a high level of service, a junction development plan is needed. The plan shall take into account the functionality of each road, and hence the number and locations of junctions shall be determined in order to avoid, for example, a large volume of local traffic on interurban corridors, which could worsen the level of service. Specific seasonal requirements of the tourist season shall also be considered. A new toll collection system shall be proposed and evaluated. | The junction development plan shall contribute to a better traffic organisation, reduction in traffic jams and cars stopping when passing through bottlenecks, which shall contribute to user satisfaction and better environmental conditions. |
| Ro.23 | Road transport safety | Covered by the general measure G.3. | |

| Code | Measure | Description of the measure | Environmental impact assessment |
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| Ro.24 | Development of networks to intermodal hubs, agglomerations in accordance with the demand | Covered by the general measure G.4. | Impact assessment of general measures is given in chapter 7.2.1. |
| Ro.25 | Interoperability improvement (intermodal hubs, P&R facilities, etc.) | Covered by the general measures G.4 and G.15. | |
| Ro.26 | Environmental impact reduction | Covered by the general measures G.12 and G.13. | |
| Ro.27 | Energy efficiency | Covered by the general measure G.6. | |
| Air transport | | | |
| A.10 | Airport accessibility | Covered by the general measure G.2. | Impact assessment of general measures is given in chapter 7.2.1. |
| A.11 | Airport safety | One of the main goals of the Transport Development Strategy of the Republic of Croatia is to develop the highest standards of air traffic safety at the international, regional and national level in order to effectively reduce air traffic hazards, reduce the likelihood of accidents and their negative consequences. Airport infrastructure and aircrafts shall meet international safety standards. | The development of the highest air transport safety standards shall reduce the risk of accidents and other adverse consequences in air transport. Improving the quality of service shall have a positive impact on airlines' business intensity. Indirect impact of the subject measure is reflected in a neutral impact on the total movement of the population in areas from where the users of air transport are coming. |
| A.13 | Termination or change of the role/ownership of regional airports | In order to improve the efficiency and sustainability of the system, it is necessary to develop new airport management strategies while considering the possibility of changing the role / ownership of unsustainable airports. | Improving the efficiency and sustainability of the airport management system shall also positively affect the intensity of their operations. This can indirectly influence the improvement of socio-economic trends in the settlements where airports are located. |
| Maritime traffic | | | |
| M.1 | Increasing intermodality and accessibility | The modal share of maritime traffic is still very low in relation to road traffic. This share can be enhanced by increasing intermodality and improving access. The development of national ports shall be linked to the development of intermodal infrastructure (road and rail links and logistic zones). A planned extension shall be considered, as well as all the possibilities offered by a specific location for further development. | The improvement of organisational and operational system settings and the establishment of intermodal transport system are particularly important for islands and the hinterland settlements because increasing the number of intermodal nodes positively affects the integration and harmonisation of different types of public transport, enabling easier and faster flow of goods and services. |
| M.2 | Implementation of the "Motorways of the Sea" projects | Although there are already RO-RO lines connecting Croatian and Italian ports, the "Motorways of the Sea" projects are still to be implemented in a structured manner in Croatia. The implementation phases of the "Motorways of the Sea" projects in Croatia are the following: | The "Motorways of the Sea" project is of great interest to the Member States of the European Union, created with the intent to redirect traffic from loaded road networks to sea routes due to a shorter travel time and reduced transport costs caused by the congested road system. |

| Code | Measure | Description of the measure | Environmental impact assessment |
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| | | <ul style="list-style-type: none"> determining the main corridors in cooperation with the EC (combined “land-sea” routes) extending Croatian ports on the corridors for the acceptance of road and rail (RO-RO) traffic if necessary and extending road and air links from and to the port if necessary. The “Motorways of the Sea” concept shall be aligned with the logistic concept (general measure G.1). | In this context, the advantages of coastal transport connections are particularly emphasised, which, in addition to large economic impacts, can significantly contribute to the integration, cohesion and economic development of the entire Europe (T. P. Jugović, R. Sušan, 2013). On the other hand, when we talk about the impact on the environment and nature, we need to explore the Adriatic area in detail and define solutions that shall not degrade the marine environment. Potential threats arising from the “Motorways of the Sea” project may be significant for marine biodiversity, especially marine mammals and reptiles, but also other species. Apart from disturbing the species, this project can lead to pollution of the marine environment (primarily air, but also water due to possible accidents), significant increase in noise as well as entry and spread of foreign invasive species. |
| M.4 | Fuel distribution facilities for gas-powered ships and eco-ships | Croatian ship fleet shall be modernised in order to develop energy efficient eco-shipping by stimulating the purchase/construction of new eco-ships and adapting the existing ships in accordance with the highest ecological standards and MARPOL 73/78 Annex VI - Regulations for the Prevention of Air Pollution from Ships. Along with the development of eco-shipping, fuel distribution facilities for gas-powered ships and eco-ships shall be developed. | The modernisation of Croatian ship fleet in accordance with provisions of the MARPOL convention has a potential to positively affect the quality of marine environment due to the introduction of rules that prevent air pollution to the fullest extent, but also reduce the risk of other potential accidents that may result in the pollution/contamination of the marine environment. |
| M.5 | Navigability | Covered by the general measure G.3. | Impact assessment of general measures is given in chapter 7.2.1. |
| M.6 | Improving island port accessibility, development | Public transport in coastal line passenger transport is considered to be one of the key factors in the maritime transport segment, given that it provides a permanent and regular link between the islands and the mainland and between the islands themselves, without which the sustainable development of inhabited islands would be endangered. For the proper operation of maritime public transport, it is essential to ensure safety, regularity, reliability and comfort and to coordinate these services mutually and with an integrated land transport system. Ports need to be adapted and, if necessary, extended for the needs of coastal line passenger traffic, and availability and connectivity with ports need to be improved. | Better access to islands shall be facilitated through the development of public transport ports, which shall indirectly affect the social, economic and environmental sustainability of islands and the coast. Benefits shall be manifested through the development of business activities on islands, which shall contribute to improving the demographic image of the islands. Quality shall be improved through the adaptation and extension of the existing infrastructure, with attention being paid to planning future activities in the coastal belt, which is very sensitive due to its nature and visual qualities. |
| M.7 | Development of other ports (e.g. Korčula, Pula) | The Republic of Croatia has 418 ports open to public transport, of which 95 have at least one shipping line. In addition to 6 main ports of particular (international) economic interest, there are numerous county and local ports. Their development is important for island sustainability as well as tourism. In areas where this is important, existing public ports in the country need to be adapted to receive line passenger ships, and ports important for tourism shall be enabled to receive smaller ships on cruise journeys. The need for extension and reconstruction of existing county and local ports for the needs of the local | The development of public transport through their extension and reconstruction can have a positive impact on employment and entrepreneurship, especially during the season. Positive impacts shall be visible through increased economic productivity due to the transport of persons and goods and consequently the economic vitality and regeneration of islands and settlements in the hinterland. The modernisation and construction of new port infrastructure shall improve communication with islands and with other ports in the region. |

| Code | Measure | Description of the measure | Environmental impact assessment |
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| | | population and for tourists shall be aligned with the national port development plan. | Negative impacts followed by the development of ports shall be reflected through the noise in the coastal area and the marine environment and the potential spread of invasive species in the marine environment. |
| M.14 | Development of special-purpose ports (ports for shipbuilding, nautical tourism, military ports, industrial ports, fishing ports, sports ports) | Depending on the nature of their activities, special-purpose ports are classified as ports for shipbuilding, nautical tourism, military ports, industrial ports, fishing ports and sports ports. Since the Croatian coast is developing as a tourist destination, special-purpose ports are to be developed in this direction: new nautical piers, dry docks and yacht piers, etc. Fishing ports on islands are needed for the sustainable development of islands. Industrial ports are mainly piers for industrial plants such as thermal power stations and oil refineries. There is potential for the development of liquefied petroleum gas terminal at the industrial port on the island of Krk. Further analysis shall identify possible measures related to the development of special-purpose ports and determine their priority, taking into account the actual needs and potential according to the expected demand. | Special-purpose ports differ in a number of activities that generate impacts. Industrial ports are focused on the economic viability of the journey and goods. They have their own coast at their disposal and their own employees and therefore ships spend minimum time in the port, which contributes to the reduction of transport costs. Ports for shipbuilding are an important and necessary part of the industry that is located on the sea, and are therefore an important economic factor. Sports ports are intended for the local population for the purpose of mooring and anchoring small vessels. These vessels are not a threat to the environment, but the effect that a greater number of vessels create in a closed aquarium can be a significant source of pollution. Fishing ports also affect economic development. Ports for nautical tourism are linked to the territory of the city and the settlement in the aquatorium. The development of ports leads to changes in the environment and their planning shall be limited to areas already under anthropogenic pressure, where possible. Also, the future development shall be aligned with the research planned on the Adriatic Sea and aimed at protecting the marine biodiversity. |
| M.16 | Closure or change of the role/ownership of unused ports | Some military, industrial and shipbuilding ports are not in use. It is necessary to decide how to put these unused or abandoned ports in use for the purpose of economic development (tourism, fisheries and small industries). Further analysis shall identify possible measures in this regard and set priorities, taking into account environmental requirements and actual needs as well as the potential according to the expected demand. | Special-purpose ports that are not in use shall be converted or given a new function. This would improve the quality of life of people in the nearby area, especially if they would be used for economic purposes (fisheries and industry). Also, in the area of the mentioned ports, it is possible to organise public manifestations and other cultural events, so their function does not have to be strictly related to economic activity. |
| Inland waterway traffic | | | |
| I.1 | Improving the waterway of Danube and Drava rivers to Osijek | The Danube and Drava are part of the TEN-T Rhine-Danube Corridor. The total length of the Danube passing through the Republic of Croatia is 137.5 km. As the Danube tributary, Drava is also considered an international waterway to Osijek. It is therefore important to ensure the navigability of these international rivers in accordance with the required navigability levels according to class VIc for the Danube and IV for Drava to the port of Osijek, according to the European agreement on major inland waterways of international significance. For the purpose of meeting the navigability requirement, the dimensions of the waterways shall be increased and the bottlenecks shall be eliminated (using, among other things, dredging and / or building new waterway structures). | The realisation of the subject measure would have a potentially positive impact on the economy, but at the same time a negative impact on the environment and nature. The Drava area is significant for many wild species (especially its banks, which are very important for the nesting of sand martins), and the subject measure has the potential to endanger the habitat conditions in the area of river expansion to meet the navigability requirement. This measure shall be planned in cooperation with expert bodies (Croatian Agency for the Environment and Nature). |

| Code | Measure | Description of the measure | Environmental impact assessment |
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| I.2 | Improvement of the Sava River | The Sava River does not meet in its entire length on the territory of the Republic of Croatia the international requirements for the navigability of waterways under the AGN agreement. However, the navigability level is sufficient for current operational requirements. | Potential implementation of the measure may result in interventions in the area that could have a significant impact on the environment. When defining the activities for the implementation of the measure, expert bodies shall be consulted in order to consider the impacts and risks that may arise from the implementation of the measure at a plan level. As in the previous case, this measure would positively affect the economy. |
| I.8 | Safety, RIS, signalling system, etc. | Covered by the general measure G.3. | Impact assessment of general measures is given in chapter 7.2.1. |
| I.9 | Interoperability, accessibility to other transport modes | Covered by the general measures G.4 and G.15. | |
| I.10 | Energy efficiency | Covered by the general measure G.6. | |
| I.11 | Terminals for hazardous substances and waste management facilities | In accordance with the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways, the port area management authorities are obliged to ensure the separate storage, processing and disposal of non-hazardous and hazardous waste in ports, as well as the reception of waste from ships and the supply of vessels with fuel. Croatian ports of inland waterways are poorly developed and to increase the safety and protection of the environment, it is necessary to build and extend the terminals for hazardous substances and to extend ports with waste management facilities, primarily international ports, but also other ports where this is necessary. | Increasing safety in ports receiving hazardous substances reduces potential adverse environmental impacts and reduces the risk of accidents. Equipping ports with waste management facilities improves the prevention of environmental pollution. |
| I.12 | Environmental protection | Covered by the general measures G.12 and G.13. | Impact assessment of general measures is given in chapter 7.2.1. |

3.2.3 Analysis of management/organisational measures

| Code | Measure | Description of the measure | Environmental impact assessment |
|---|-------------------------------------|---|---|
| Urban, suburban and regional transport | | | |
| U.13 | Ticketing and common ticket systems | One of the biggest advantages for the users of integrated transport systems is the introduction of integrated tariff systems. The level of tariff integration and the type of tickets and technology for use (unique tickets and / or electronic tickets, smart cards) or contactless payment methods, etc.) shall be analysed case by case based on the expertise of the responsible traffic authorities, taking into consideration all options as well as the option to use "smart cards" for the payment of "Park & Ride" service, parking on the street, customs zone | Integrated tariff systems shall have a positive impact on increasing the use of integrated transport systems for due to simplification of ticketing. The transport system thus has the potential to become more efficient and more sustainable. Integrated transport system shall increase economic efficiency by reducing transport system costs that are visible through traffic congestion, accidents and construction and maintenance. A positive impact on the quality of life of the inhabitants / users would be visible |

| Code | Measure | Description of the measure | Environmental impact assessment |
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| | | etc. | through the reduction of congestion in traffic, less pollutant emissions and economic viability. |
| U.14 | Introduction of public transport services on-demand | Considering the fact that in some parts of the Croatian territory there is not enough demand for the introduction of regular transport lines (e.g. rural or poorly populated areas), the introduction of on-demand transport services shall enable the provision of transport services in these areas as well. | The introduction of on-demand transport services shall positively influence the increase of population mobility in rural areas whose traffic connection is very poor. The local population (especially the elderly) shall thus be provided with the access to the services provided by nearby larger settlements and this shall improve the quality of life of people and potentially prevent further depopulation. Flexibility of such transport has the potential to affect the increase in the number of users due to greater service satisfaction, and thus possible new employment. |
| U.15 | Harmonisation of timetables (coordination) | In order to increase the share of public transport in urban, suburban and regional transport, the reorganisation of timetables is required (e.g. TAKT <regular interval timetable>) with the aim of improving the connectivity, efficiency and coordination of different modalities. Further research shall analyse this option by taking into account the samples. | Given that cities have several public transport operators, very often the network of lines and timetables is not harmonised and well-coordinated. Problems occur at the expense of passengers who need to change buses/trains or wait for a long time to change e.g. a train and a bus. The harmonisation of timetables would lead to an integral public transport service and the improvement of settlement connectivity, which would positively affect the increase in the use of transport services, and thus the possible growth of employment. |
| U.16 | Administrative capacity and training | Covered by the general measure G.10. | Impact assessment of general measures is given in chapter 7.2.1. |
| U.17 | Purchase of the new fleet | Except for some exceptions, the existing public transport fleet is old and is based on obsolete and inefficient technology. In order to increase the competitiveness of public transport vehicles in relation to personal cars, it is necessary to modernise the fleet and ensure the highest standards of quality, safety and environmental protection as well as access to persons with reduced mobility. The purchase of a new fleet shall take place in coordination with the anticipated infrastructure improvement. The first step in the development of these measures is the preparation of a comprehensive analysis of the current organisational, operational and maintenance framework of relevant operators by analysing future requirements and operation and maintenance plans. Once the actual needs are identified, further research shall determine the technical requirements of the fleet. | The purchase of a new fleet shall increase the competitiveness of public transport, which shall positively impact the reduction of pressures on transport infrastructure due to a possible reduction in the number of personal cars. This could potentially lead to a change in part of the traffic infrastructure to the benefit of pedestrians and cyclists. Positive impact shall affect the population in terms of better mobility within a certain area. Also, the purchase of new and quality vehicles shall improve travel safety and environmentally friendly models shall have a positive impact on reducing CO ₂ and other harmful substances as well as human health. The long-term effect of this measure is reflected in the increase in the quality of life of the population. |
| U.18 | Transport reorganisation | Providing options competitive to the use of personal cars (taking into account the potential of car sharing service) is important for achieving the objectives of the Strategy and ensuring the sustainability of the transport system. Different transport hierarchy models shall be re-considered and transport shall be reorganised and integrated in order to give priority to the public transport and low-emission transport modes in relation to the transport by personal cars. | |

| Code | Measure | Description of the measure | Environmental impact assessment |
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| | | At the same time, more pedestrian zones shall be built in urban areas, bike paths for daily ride, public bicycle systems shall be introduced and traffic plans shall be developed with the aim of adapting to the requirements of the seasons. | There is a large number of travels on a daily basis involving going to and from work by personal cars in which only one person is travelling. Such a manner of transport creates traffic jams on roads. Car sharing service has a multiple positive impact on the community and the individual. The benefits for the community are manifested through reduced traffic congestion, reduced air and noise pollution and reduced parking lot occupancy. The benefits for the individual are manifested through reduced travel costs and company during travelling, but also psycho-physical health due to the possible increase in physical activity by developing cycling and pedestrian infrastructure. |
| U.19 | Information platform | Covered by the general measure G.11. | Impact assessment of the general measure G.11 is given in chapter 7.2.1. |
| U.20 | Support to non-profit organisations in the transport sector | The role of non-profit organisations promoting the use of alternative means of transport in relation to personal cars has proved to be very significant in many European cities. Among other things, there are organisations that promote the daily use of bicycles, organisations dealing with the rights of passengers, maintenance of footpaths or traffic control. These organisations (neighbouring associations or groups of common interest, non-governmental organisations, etc.) can assist local administration and traffic authorities in carrying out their duties and promoting the use of public transport vehicles. The involvement of these associations, local groups and non-governmental organisations in planning traffic-related decisions shall be further considered and promoted. | The role of non-profit organisations is very significant in the transport sector because they are familiar with the everyday situation in the field. Thus, for example, the Cyclists' Union advocates the improvement of conditions for riding a bicycle as a sustainable and healthy means of transport. Such means of transport contributes to the transformation of the city into the so-called "green city", or the city suited to a man. The operations and activities of non-profit organisations in the transport sector positively affect the safety of travelling of people and, in the long term, their psychophysical health. |
| U.21 | Traffic and logistics management and information | New technologies enable, among other things, the collection of real-time data and control of traffic conditions and the use of public transport. In order to use the benefits of new technologies, centres for centralised public transport management shall be constructed and equipped with the latest ITS devices. New public transport vehicles shall also be adequately equipped, ITS travel planning platforms shall be used and traffic signs shall be modernised, which shall then be integrated into the central management system (e.g. "Smart traffic lights" or setting priority measures relating to public transport). These measures shall lead to a quality improvement of public transport planning and control, use of information, traffic control and collecting data on traffic congestion and arrival time of public transport vehicles. | ITS solutions lead to improved flow, safety, comfort, and generally better conditions for the users. An additional positive effect of the mentioned measure relates to informing passengers, which is recognised as a significant factor in improving the overall satisfaction of the transport infrastructure users. The goals of introducing the ITS system in urban areas include, among other things, reducing energy consumption and gas emissions as well as improving the quality of life in the city. |
| U.22 | Review/updating of local/regional Master Plans | Regarding traffic planning obligations, functional regions and/or cities shall be required to develop relevant master plans for functional region (following the principles of the Sustainable Urban Mobility Plan - SUMP). | The obligation to develop sustainable urban mobility plans (master plans) at the level of one area or several cities that belong to a common agglomeration / functional region shall enable the needs of regional and local traffic to be met through an integrated set of infrastructure, organisational, operational and regulatory measures. |

| Code | Measure | Description of the measure | Environmental impact assessment |
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| | | These master plans for functional regions shall analyse the existing transport system status taking into account not only the infrastructure but also the operational and organisational aspects, and based on the results of these analyses, future needs shall be identified. The existence of these plans is a prerequisite for investments into the public transport system. The master plans shall be periodically reviewed and updated and shall be aligned with the high-level planning instruments such as the Transport Development Strategy of the Republic of Croatia. | Master plans enable the achievement of objectives related to: ensuring the basis for sustainable development of the sector, an integrated approach to transport planning at all levels (national, regional, local), identifying the needs of local mobility complemented with international mobility patterns identified in the Transport Strategy of the Republic of Croatia, identifying the actual needs for the development of a transport system as a tool to support contemporary socioeconomic trends (an increasing share of aged population, increase in the number of commuters, development of health services, tourism, industry, logistics, etc.) and so on. |
| Railway traffic | | | |
| R.26 | Reorganisation of charging fees for the use of railway infrastructure | The fee for the use of railway infrastructure can be used as a tool to improve the sustainability of the railway transport system. The fee for the use of the railway infrastructure shall be proportionate to the emission and is hence guided by the principle that those who pollute have to pay. Coordination of charging fees for the use of railway infrastructure with railway managers in neighbouring countries shall facilitate international traffic. | Payment of the fee for the use of railway infrastructure can contribute to improving its infrastructure through a fee financing system to ensure long-term competitive advantages. Such type of fees should be determined with regard to the condition, development, maintenance and management of the infrastructure. In the long run, this measure would have a positive impact on improving the air quality, reducing noise levels and safe disposal of hazardous and harmful substances. |
| R.30 | Improving the rolling stock for passenger transport | The existing rolling stock is outdated and is based on obsolete and inefficient technologies. In order to increase the competitiveness of rail transport in comparison with other means of transport, it is necessary to modernise the railway vehicles, in coordination with the anticipated infrastructure improvements. The first step in the implementation of this measure is a detailed analysis of the current organisational and operational structures and the maintenance structure of the railway operator, analysing the future needs, the operational plan and the maintenance plan. Once actual needs are identified, further studies shall define specific technical requirements for the rolling stock. | Improving the rolling stock for passenger transport shall result in increased quality of the passenger transport service. Positive results shall be reflected in a greater availability and reliability of rail vehicles with lower operating costs. Stable timetables with the possibility of increasing train frequencies shall affect the increase in the number of passengers. Reliable mobility has a positive impact on increasing the quality level and production time of the population. New trains shall contribute to reducing environmental pollution and reducing fuel consumption. |
| R.31 | Improving the rolling stock for cargo transport | The existing rolling stock for cargo transport consists mostly of conventional covered and open wagons, some of which are suitable for combined traffic operations. A large number of locomotives need to be replaced and it is estimated that as much as 70% of locomotives shall reach the end of their life span in the next decade. The first step in the implementation of this measure is a detailed analysis of current organisational and operative structures and the maintenance structure of the railway operator, whereby future needs, operative plan and maintenance plan shall be analysed. | Improving the freight rolling stock shall positively affect the quality and speed of cargo transport. This type of transport can be used for larger amounts of freight and thus reduce road infrastructure pressures. On the other hand, a positive impact on socioeconomic trends is expected, in terms of the growth in employment and increase in economic activity. |

| Code | Measure | Description of the measure | Environmental impact assessment |
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| | | Once actual needs are identified, further studies shall define specific technical requirements for the freight rolling stock. | |
| R.35 | Liberalisation of passenger transport | Gradual opening of the transport market and the provision of equal opportunities for all potential operators is one of the main criteria of compliance that Croatia has met in the process of aligning with the <i>acquis communautaire</i> , in accordance with the White Paper goals. Croatian administrative bodies such as regulatory bodies and the security agency shall be prepared for the future. | The liberalisation of passenger transport, in line with the White Paper goals, advocates the opening of the transport market, whose key measure is to create a railway company with an independent management and sound financial structure. This would increase the user interest in rail transport and make it competitive on the market. It would also have a positive impact on improving the quality and speed of rail services, given the increased competition in the sector, which is indirectly reflected in improving the quality of life of the population. |
| R.36 | Liberalisation of cargo transport | The liberalisation of the freight rail sector in Croatia has already begun and the following freight operators are active on the Croatian market: HŽ Cargo d.o.o., PPD Transport d.o.o., Rail Cargo Carrier Croatia Ltd., RAIL & SEA d.o.o., RTS Rail Transport Service GmbH, Train Hungary Kft, SŽ - Tovorni promet d.o.o. and Pružne građevine d.o.o. | The liberalisation of cargo transport, in line with the White Paper goals, advocates the opening of a transport market whose key measure is to create a railway company with an independent management and sound financial structure. This would contribute to increased interest in rail traffic, thereby reducing the pressure on road traffic. Possible increase in cargo transport would result in new employments not only in the rail transport but also in the related industry. |
| R.38 | Business/timetable reorganisation | In order to increase the share of railway transport, it is necessary to reorganise timetables (e.g. TAKT) in order to improve the connectivity and efficiency of the services provided. This option shall be analysed through the concept of functional regions, taking into account the patterns of the structure "destination-point of departure" as well as operational and infrastructure requirements. | Timetables shall be coordinated with other types of public transport through the integrated passenger transport system (IPT). This would enable faster and easier connections through a system of common stops where different means of transport stop. The IPT system usually uses the regular interval timetable, i.e. departures from each stop take place at regular intervals (e.g. every 10, 20, 30, 60 minutes). A positive impact is expected in terms of the improved quality of life of the population. |
| Road traffic | | | |
| Ro.28 | Updating of legal regulations and planning guidelines | Covered by the general measure G.8. | Impact assessment of general measures is given in chapter 7.2.1. |
| Ro.29 | Increasing administrative capacity/training | Covered by the general measure G.10. | |
| Ro.30 | Preparation/adaptation for Schengen borders | Covered by the general measure G.9. | |
| Ro.31 | Preparation/adaptation of non-Schengen borders | Covered by the general measure G.9. | |

| Code | Measure | Description of the measure | Environmental impact assessment |
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| Ro.32 | Improving financial viability of the road network and the toll collection system | Covered by the general measure G.7. | |
| Ro.33 | Information platforms | Covered by the general measure G.11 | |
| Ro.35 | Re-categorisation of the road network | A study shall be developed to analyse the need for re-categorisation of the road network in order to adapt it to the actual demand and functionality of each road for the purpose of increasing the efficiency and sustainability of the system. | Road re-categorisation aimed at increasing the efficiency and sustainability of the system shall improve traffic flow, its safety and raise the level of transport services. The long-term impact of this measure is reflected in increasing road user satisfaction. |
| Ro.36 | Implementation | In the White Paper on Transport Policy for 2010, the Commission has set a general objective in terms of road safety, according to which the number of fatalities should be reduced to zero by 2050. Research has shown that implementation is an important and effective manner of preventing and reducing the number of accidents, fatalities and injuries, but implementing actions are optimally effective only when combined with actions that raise public awareness of the implementing actions and the reasons why they are being implemented. Further studies shall assess specific actions in terms of raising public awareness, implementation and cross-border information management. | Reducing the number of accidents and reducing the number of fatalities to zero by 2050 shall positively affect the sense of user safety and total satisfaction relating to the use of road transport. |
| Ro.37 | Improving the data collection system | Covered by the general measure G.14. | Impact assessment of the general measure G.14. is described in chapter 7.2.1. |
| Air traffic | | | |
| A.15 | Enhancing cooperation with competent regional bodies | While the main role of air transport is related to passengers from distant destinations, good cooperation with relevant regional and local bodies is required in order to improve airport accessibility and ensure compliance of the airport development plans with the development plans of relevant cities and regions. | Airport development plans with city/region development plans shall positively affect the intensity of their business. Accordingly, a positive impact on socio-economic trends in the area of the airport may also be expected. |
| A.16 | Croatia Airlines restructuring | In order to increase the sustainability of the system, it is necessary to complete and finalise the restructuring of Croatia Airlines. Additional analysis should facilitate the company privatisation process and the search for strategic partners that would bring additional capital and create clear plans for future development and growth of Croatia Airlines. | Restructuring of Croatia Airlines can lead to improvement of the business and creation of investment conditions, which shall lead to positive business flows. Possible negative impacts of restructuring shall be reflected in the reduction in the number of employees in this sector. |
| A.19 | Cooperation with the aviation industry | The development of the aviation sector shall also be achieved through joint innovative projects for the modernisation of air navigation and aviation fleet, research, development and environmental protection, in cooperation with private investors and the Government of the Republic of Croatia in the form of special funds established for this purpose. | Modernisation of the aviation sector would have a positive impact on increasing the number of passengers and facilitating the flow of goods. This shall result in a higher traffic density and usability of air lines and possible lower flight costs and prices. |

| Code | Measure | Description of the measure | Environmental impact assessment |
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| | | More attention shall be paid to the application of innovation in transport technology and compliance with new technology standards. | It is also important to develop smaller airline companies and infrastructure, which would connect islands with the coast and wider area and thus contribute to the development of islands. |
| A.20 | Air traffic management, Single European Sky, SESAR | Developing a national coordination development plan for the implementation of the SESAR programme and the Concept of centralised services. Definition of national priority policy within the FAB CE integration as well as improvement of integration and cooperation with neighbouring countries and within the wider region. Regardless of the competitiveness of Hrvatska kontrola zračne plovidbe d.o.o. <Croatia Control Ltd.> in relation to regional operators and companies of similar size, it is necessary to increase the capacity, apply safety standards, achieve cooperation on common air navigation and to establish a flight control training centre. | The Single European Sky initiative, SESAR, was launched in 2004 by EU Member States to improve air traffic management regardless of national boundaries, which would result in the creation of a single European airspace. This would transform the existing airspace model, which would have the effect of reducing delays, reducing service costs, increasing safety and reducing environmental impact. |
| A.21 | Raising awareness of customer satisfaction | In order to raise awareness of customer satisfaction, the quality of the service shall be monitored using key performance indicators (KPIs). This should be used to define the differences between a high and low season (if any), passenger requirements, their perception of facilities, etc. The results should be made available in a clear and concise manner and include the opinions of the public and participants in the process. | For achieving the objectives of the Strategy, including the objectives related to the improvement of rail transport, specific key performance indicators have been defined with the aim of measuring the achievement of the objective. Additional indicators should be defined in order to identify potential additional customer requirements. The measure leads to a potential increase in the quality of the service, which shall be in accordance with the expectations of the users. |
| A.22 | Increasing financial viability of airports | Covered by the general measure G.7. | Impact assessment of the general measure G.7 is described in chapter 7.2.1. |
| A.23 | Limiting environmental impacts | Covered by the general measures G.12 and G.13. | Impact assessment of the general measures G.12 and G.13 is described in chapter 7.2.1. |
| A.24 | Revision/update of airport Master plans | Planning of infrastructure and the manner it deals with increased traffic is crucial to the development of a sustainable airport system in the Republic of Croatia. The first step is to coordinate the actions and activities that are planned by each airport Master plan. Upon the completion of Master plans, the next step shall be to coordinate action plans and prioritise them. | The coordination of actions and activities planned by the airport Master plan, as well as the prioritisation of action plans, can lead to a rise in the quality of services and can thus contribute to greater customer satisfaction. |
| A.25 | Cooperation/agreements with other international airports | Although Croatian airports are competitive in relation to airports of other neighbouring countries, cooperation in border crossing control and security standards is needed in the interest of all sides. It may also be possible to reach specialisation agreements, e.g. cargo airports, operating bases for airline operators, etc. | Cooperation/agreements with other international ports can lead to an increase in passenger and cargo transport, thus indirectly affecting employability. Border crossing controls and improved security standards shall increase the user sense of security. |

| Code | Measure | Description of the measure | Environmental impact assessment |
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| Maritime traffic | | | |
| M.17 | Cooperation with the shipping industry | Support to shipping shall be achieved through joint innovative projects in shipping and shipbuilding, research and development and environmental protection, with the participation of private investors and the Government of the Republic of Croatia in the form of special funds for this purpose. More attention shall be paid to modernising the fleet, implementing innovation in transport technology in line with new technology standards, and in cooperation with administration, working on the improvement of automated data exchange with information platforms of ship owners/companies. | Paying attention to the fleet modernisation and the implementation of innovations in transport technology in line with new technology standards shall positively influence the potential reduction of pollutant emissions into the marine environment. |
| M.18 | Strategic maritime definition | Croatian maritime strategy and intermodal transport strategy shall be developed with a view to increase the intermodality and accessibility of maritime transport. The development plans of the ports of international economic importance (Rijeka, Šibenik, Zadar, Split, Ploče, Dubrovnik) shall be aligned with national development plans and plans for the development of transport infrastructure. It is necessary to prepare a risk assessment relating to the safety of navigation and marine environment pollution caused by maritime traffic with a proposal for risk management, to classify the navigable areas, and to optimally dimension the projects, measures and the system of navigation safety as well as the protection of the sea against pollution from marine facilities. | Planning the development of ports of international economic importance shall be in accordance with the National plan for the development of ports of special (international) economic interest for the Republic of Croatia and with the Program of measures for the protection of the marine environment and the coastal area as well as other requirements for the protection of the marine and coastal area. |
| M.20 | Operational improvement plan (ship routing etc.) | A key part of Croatian shipping is passenger transport and it is therefore necessary to improve and develop an appropriate operational plan for optimising ship routing and planning services in cooperation with public transport systems in all relevant land cities. In the case of need for ship routing, the opening and closure of the lines between the islands shall be considered. Regardless of public transport, the operational plan shall be improved taking into account the need for passenger ships on cruises in ports with important lines of navigation due to the congestion of the port and the city. | Planning maritime transport in accordance with public transport systems in cities positively affects the passenger flow and travel comfort. This measure contributes to the development of islands due to their better connection with the mainland. |
| M.21 | Traffic management using the IT system, VTMISS | Traffic management using the ITS system (Intelligent Transport Systems) for public maritime transport shall be improved. Improvements of maritime safety and environmental protection can be achieved by increasing cooperation with neighbouring countries, modernising Croatian coastal radio stations and upgrading the Vessel Traffic Monitoring and Information System (VTMIS) to establish a comprehensive maritime surveillance and management service in inland sea waters, territorial sea and the Ecological and Fisheries Protection Zone of the Republic of Croatia in technical and operational segments. | Maritime traffic management using the Intelligent Transport Systems (IT system) and systems for automatic ship identification (VTMIS) as well as modernisation of Croatian coastal radio stations shall improve the working conditions in maritime traffic, thus positively affecting the efficiency of management and employee satisfaction in this sector. |

| Code | Measure | Description of the measure | Environmental impact assessment |
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| | | Furthermore, a system for early detection and removal of safety risks in maritime transport shall be established through the establishment, development and implementation of the e-Navigation concept for the collection, exchange and analysis of data on navigation, in particular for cruise ships. | |
| M.22 | Improvement of the Maritime Education and Training (MET) | Covered by the general measure G.10. | Impact assessment of general measures is described in chapter 7.2.1. |
| M.23 | Training and capacity building | Covered by the general measure G.10. | |
| M.24 | Reorganisation of the maritime transport system | Covered by the general measure G.7. | |
| M.25 | Information platform, database | Covered by the general measure G.11 | |
| M.26 | Concession agreements and reorganisation | Covered by the general measure G.8. | |
| M.27 | Inspections, cooperation with SAR (Search and Rescue) | Covered by the general measure G.3. | |
| M.28 | Modernisation of vessels (safety, energy efficiency and environmental protection) | The shipping industry shall be developed in a safe and sustainable manner. The aim is to continually increase the efficiency of the security surveillance system and safety measures for the protection of Croatian ships and craft as well as to increase the share of energy efficiency of ships. A system for targeted and technical supervision for the implementation of the highest world, European and national safety standards of Croatian vessels and craft shall be developed according to established priorities. An effective system for tracking pleasure craft and marinas shall also be established. | |
| M.29 | Cooperation/agreements with other international ports | In order to increase the traffic in Croatian ports, achieve their greater competitiveness on the international market and their alignment with the latest port technologies, cooperation with other international ports on the Adriatic shall be enhanced. | Cooperation/agreements with other international ports can lead to an increase in passenger and cargo transport, thus indirectly affecting employability in the maritime transport sector. |
| M.30 | Increasing financial viability | Covered by the general measure G.7. | Impact assessment of general measures is described in chapter 7.2.1. |
| M.31 | Maintenance concept development | Covered by the general measure G.5. | |

| Code | Measure | Description of the measure | Environmental impact assessment |
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| M.32 | Improving data collection | Covered by the general measure G.14. | |
| Inland waterway transport | | | |
| I.13 | Harmonisation of the national legal framework and the application of rules | Covered by the general measure G.8. | Impact assessment of general measures is described in chapter 7.2.1. |
| I.14 | Increasing administrative capacity/training | Covered by the general measure G.10. | |
| I.15 | Increasing financial viability | Covered by the general measure G.7. | |
| I.16 | Cooperation with Croatian ship owners | Support to Croatian ship owners shall be achieved through joint innovative projects in the field of shipping and shipbuilding, research, development and environmental protection, in cooperation with private investors and the Government of the Republic of Croatia in the form of funds specially created for this purpose. More attention shall be paid to the modernisation of vessels, the implementation of innovations in transport technology and the achievement of conformity with new technological standards. | Modernisation of vessels, implementation of innovations in transport technology and achievement of compliance with new technology standards shall have a long-term positive effect on the reduction of emissions in the environment and thus on the quality of air and water. Improving the quality of air improves life conditions along the waterways and also indirectly affects people's health. |
| I.17 | Information platform | Covered by the general measure G.11. | Impact assessment of general measures is described in chapter 7.2.1. |
| I.18 | Support to companies for inland waterway transport | Support instruments shall be established to facilitate the integration of ship owners into the European transport market. In order to stimulate the inland waterway transport, different fiscal policy measures in this sector shall be applied, especially in terms of fuel price formation. | The problem and limitation in the development of inland waterway transport is a diminished interest in shipping professions. This problem is felt the most by ship owners, but it is much wider and includes other participants in river traffic (ports, port administrations, port authorities, shipbuilders, Waterways Agency, etc.). Providing support and stimulation to inland waterway transport shall positively affect this sector, and indirectly the employment in it. |
| I.19 | Sector reorganisation | Covered by the general measure G.7. | Impact assessment of general measures is described in chapter 7.2.1. |
| I.20 | Increase the fleet of vessels for monitoring the safety of navigation and vessels for environmental protection | In order to achieve more effective monitoring of the safety of navigation and inspection, as well as the installation and maintenance of signalling systems on the waterways, the number of vessels for monitoring the safety of navigation and vessels for environmental protection shall be increased. | Increasing the fleet of vessels for monitoring the safety of navigation and vessels for environmental protection shall improve the control of vessels, as well as monitoring the protection of waterways from pollution from vessels. The implementation of this measure indirectly affects the reduction of pollutants from vessels to the environment. |
| I.21 | Cooperation/agreements with other international ports | The rivers Sava, Drava, Danube and Una are in some parts border rivers and therefore, close cooperation with neighbouring countries is necessary, especially in the area of security and application of River Information Services. Close cooperation of Croatian ports of inland waterways with other | Cooperation/agreements with other international ports can lead to an increase in passenger and cargo transport, thereby indirectly affecting employability in inland waterway transport. |

| Code | Measure | Description of the measure | Environmental impact assessment |
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| | | international ports is also necessary to achieve greater competitiveness in the international market and compliance with new port technologies. | |

3.2.4 Environmental impacts of spatially located measures

The impacts of the interventions arising from the measures listed in the table below are presented for all elaborated environmental components and are shown below.

| Code | Measure | Description of the measure |
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| Rail transport | | |
| R.1 | Zagreb – state border with Slovenia towards Ljubljana (TEN-T core network/TEN-T Mediterranean corridor / Pan-European corridor) | The M101 railway is part of the TEN-T core network and RH1 corridor and is one of the major international connections towards Zagreb and the only urban node of the core railway TEN-T network in Croatia. RH1 has historically been the most important corridor in terms of long-distance passenger transport. Future scenarios such as the entry of Croatia into the Schengen area shall increase the volume of traffic on this railway line. Although some activities are being developed to improve this railway line, the fact is that some parts of the M101 railway currently have a speed limit of up to 60 km/ h. Through the concept of functional regions, the technical requirements to be met in terms of capacity and allowed speed shall be assessed taking into account economic and environmental aspects. Since the subject railway line is also important for cargo transport, it shall meet the following minimum technical criteria: axle load (mass per axle) 22.5 t/a; usable length of railway tracks for reception and dispatch 750 m, ERTMS. |
| R.2 | Zagreb – Karlovac (TEN-T core network/TEN-T Mediterranean corridor/Pan-European corridor Vb) | The corridor connecting Zagreb and Rijeka is primarily important for cargo transport and partly for suburban passenger transport. The analysis shows that suburban passenger transport primarily takes place on the section from Zagreb to Karlovac. Currently, this part of the M202 railway is mostly single-track, which limits the potential to increase capacity. It is expected that the importance of this railway line for cargo transport shall increase in the medium to long term, given that Rijeka is defined as the main Croatian port within the TEN-T network. Further studies shall analyse planned speed and capacity needs, taking into account economic and ecological aspects. In addition to the capacity increase, cargo transport requires that the railway line meet the following technical criteria: axle load (mass per axle) 22.5 t/a; ERTMS; usable length of railway tracks for reception and dispatch depending on the logistic concept. |
| R.3 | Karlovac to Rijeka (TEN-T core network/TEN-T Mediterranean corridor/Pan-European corridor Vb) | The analysis shows that this part of the corridor connecting Zagreb and Rijeka is mainly used for cargo transport. Currently, this part of the M202 railway is mostly single-track and electrified, with some parts having a speed limit of 50 km / h. Rijeka is defined as the main Croatian port within the TEN-T network and therefore it is expected that the importance of this railway line for cargo transport shall increase in the medium to long term. This section should therefore meet the following technical criteria: axle load (mass per axle) 22.5 t/a; usable length of railway tracks for reception and dispatch depending on the logistic concept, ERTMS. Further studies will analyse planned speed and capacity needs, taking into account economic and ecological aspects. |
| R.4 | Railway network around Rijeka | According to current preliminary analyses, there might be potential for the reorganisation of the Rijeka railway node with the introduction of suburban lines, giving priority to the modal shift from the use of personal cars. Additional analyses should explore the capacity of the railway, taking into account the logistics concept and capacity of the Port of Rijeka terminals. The remaining capacity can be utilised for regional passenger transport. Improvement of the connection with Slovenia shall be harmonised with measures R.2 and R.3. |

| Code | Measure | Description of the measure |
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| Rail transport | | |
| R.5 | Zagreb – Križevci (TEN-T core network/TEN-T Mediterranean corridor / Pan-European corridor Vb) | The corridor connecting Zagreb and Rijeka with Eastern Europe via Hungary is primarily important for cargo transport and partly for suburban transport. The analysis shows that suburban travels in this part of the corridor are mostly related to Dugo Selo (15 568 passenger trains in 2012) and Križevci (11 516 passenger trains in 2012). Currently, this part of the M201 railway line is double-track to Dugo Selo single-track to Križevci. This fact limits the potential to increase capacity, especially if it is taken into account that the importance of this railway line for cargo transport shall increase in the medium to long term given that Rijeka is defined as the main Croatian port within the TEN-T network. Since this line is important for cargo transport, in addition to increasing capacity, it shall meet the following minimum technical criteria: axle load (mass per axle) 22.5 t / a; usable length of railway tracks for reception and dispatch 750 m, ERTMS. |
| R.6 | Križevci – state border with Hungary towards Budapest (TEN-T core network/TEN-T Mediterranean corridor / Pan-European corridor Vb) | The analysis shows that this part of the corridor connecting Zagreb and Rijeka with Eastern Europe via Hungary is most important for cargo transport and partly for suburban transport. Hungary is currently working on the further development of this corridor (development of Gysev and Szekesfehervar network - the development of the Boba railway line). Currently, this part of the M201 railway is mainly single-track and electrified, with some parts having a speed limit of 80 km / h. Rijeka is defined as the main Croatian port within the TEN-T network and therefore, it is expected that the importance of this railway line for cargo transport shall increase in the medium to long term. For this reason and taking into account that this section is a part of the core network and TEN-T corridor, it shall meet the following minimum technical criteria: axle load (mass per axle) 22.5 t / a; usable length of railway tracks for reception and dispatch 750 m, ERTMS. |
| R.7. | Zagreb – Novska (TEN-T core network/Pan-European Corridor X) | The railway lines M102 and M103 are part of the core TEN-T network and RH1 corridor and are one of the major international connections towards Zagreb, the only urban node of the core railway TEN-T network in Croatia. RH1 has historically been the most important corridor in terms of long-distance passenger transport (over 59,000 passenger trains between Zagreb and Dugo Selo in 2012). Future scenarios such as the entry of Croatia into the Schengen area shall increase the volume of traffic on this railway line. Although some activities are being developed to improve the railway line from Dugo Selo to Novska, the fact is that currently some parts of both lines have a speed limit of up to 50 km / h. Further studies shall analyse planned speed and capacity needs, taking into account economic and ecological aspects. Since this line is also important for cargo transport, it shall meet the following minimum technical criteria: axle load (mass per axle) 22.5 t / a; usable length of railway tracks for reception and dispatch 750 m, ERTMS. |
| R.8 | Novska – state border with Serbia (TEN-T core network/Pan-European Corridor X) | The M105 railway is part of the core TEN-T network and RH1 corridor and one of the major international connections towards Zagreb. RH1 has historically been the most important corridor in terms of long-distance passenger transport. Future scenarios such as the entry of Croatia into the Schengen area or the entry of neighbouring countries like Serbia into the European Union shall increase the volume of traffic on this line. At present, the M105 railway line is double-track between Novska and Tovarnik, which was constructed as a border crossing between Croatia and Serbia on the core rail network. Further studies shall assess the technical requirements to be met, taking into account both the economic and environmental aspects. Since this line is also important for cargo transport, it shall meet the following minimum technical criteria: axle load (mass per axle) 22.5 t / a; usable length of railway tracks for reception and dispatch 750 m, ERTMS. |
| R.9 | State border with Hungary – Osijek – State border with Bosnia and Herzegovina (TEN-T core network/Pan-European Corridor Vc) | The M303 railway is part of the core TEN-T network in Croatia, and Slavonski Šamac is the border crossing of the core railway network with Bosnia and Herzegovina. The railway lines M301 and M302 are part of a comprehensive network, but serve as a link between Bosnia and Herzegovina - Croatia - Hungary, following the Pan-European Corridor Vc. The NPM shows that there is currently no traffic need. |

| Code | Measure | Description of the measure |
|-----------------------|---|--|
| | | The potential of this international corridor shall increase if the Schengen borders move in relation to the current position. |
| R.10 | Regional link Vinkovci – Vukovar (TEN-T core network/access to Pan-European Corridor X) | The railway line M601 Vinkovci - Vukovar shall serve as a railway connecting RH1 and the only Croatian port of internal waters of the core TEN-T network on the Danube, Vukovar. Future scenarios related to Vukovar port development shall increase the importance of cargo transport on this line in the medium to long term perspective. Further studies shall assess the technical requirements to be met, taking into account both the economic and environmental aspects. Since this line is also important for cargo transport, it shall meet the following minimum technical criteria: axle load (mass per axle) 22.5 t / a; usable length of railway tracks for reception and dispatch 750 m, ERTMS. |
| R.11 | Zagreb node | Current configuration of the Croatian railway network and the fact that Zagreb is the only urban node of the TEN-T core network demonstrate the importance of the Croatian capital in the entire transport system. In order to increase the importance of the role of the railway in the regional connection and the urban transport system, further studies shall analyse specific conditions to be met. |
| R.14 | Zagreb Central Station | Zagreb Central Station shall play a key role not only in long-distance transport but also in local and regional transport. It shall probably be necessary to adapt the existing access and platforms and the organisation of the movement of passengers inside and outside the station in favour of the modal hub. Specific technical requirements shall be the result of further studies that shall take into account economic, social and ecological aspects. |
| Road transport | | |
| Ro.1 | Connecting via the bridge near Gradiška | The bridge near Gradiška over the Sava River is part of the road corridor Hungarian border - Virovitica - Okučani - Bosnia and Herzegovina border (Stara Gradiška). This road is located on the corridor of the existing state road D5, and the bridge is an integral part of the international agreement between Croatia and Bosnia and Herzegovina. The Republic of Bosnia and Herzegovina has already completed the motorway from Banja Luka (Bosnia and Herzegovina) to Gradiška, however, a planned bridge shall be constructed to connect the motorway from Bosnia and Herzegovina with the existing Zagreb-Lipovac (A3) motorway. Border crossing Gradiška is one of the two largest border crossings between Croatia / EU and Bosnia and Herzegovina for all types of transport. |
| Ro.2 | A5 Osijek – state border with Hungary Pecs (TEN-T comprehensive network/Pan-European corridor Vc) | The A5 motorway is part of the comprehensive TEN-T network and the Pan-European Corridor Vc. The total length of the A5 motorway is 86.8 km and extends from the border with Bosnia and Herzegovina via Osijek and Beli Manastir to the border with Hungary. Various sections of the motorway are in various stages of construction. The section from Osijek to Hungarian border, the section Osijek-Beli Manastir (24.6 km) and the section Beli Manastir – Hungarian border (5 km) are at the earliest stage of construction. Other sections, like the bridge over the Drava River (2.4 km long), are part of the planned corridor and construction is in progress. Through the concept of functional regions, the stages of completion and schedule for the remaining sections shall be analysed, as well as the technical parameters required, taking into account the expected demand and economic and ecological aspects, for example the planned section passing through parts of the Natura 2000 area. |
| Ro.3 | A5 from A3 to the state border with Bosnia and Herzegovina (TEN-T comprehensive network/Pan-European corridor Vc) | The A5 motorway is part of the comprehensive TEN-T network and the Pan-European corridor Vc, and Svilaj is listed as a border crossing of the EU core network. The total length of the A5 motorway is 86.8 km and extends from the border with Bosnia and Herzegovina via Osijek and Beli Manastir to the border with Hungary. Various sections of the motorway are in various stages of construction. The section from Sredanci (A3 motorway) to the border with Bosnia and Herzegovina is 3.5 km long and is under construction. This section also includes the bridge over the Sava River (660 m long). The award of the contract for bridge construction is currently in the public procurement process. The extension of the section on the side of Bosnia and Herzegovina |

| Code | Measure | Description of the measure |
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| | | has already been built. |
| Ro.4 | A7 Križišće – Žuta Lokva (TEN-T comprehensive network/Adriatic-Ionian direction) | The NPM results show that there are certain disadvantages in terms of the capacity on the subject corridor, mainly during the tourist season and related to local / regional transport (including short tourist trips). Due to the aforementioned, certain corridor interventions may be necessary to increase the level of service. Through the concept of functional regions, problems shall be identified and further special studies shall determine the technical parameters, taking into account the expected demand and economic and ecological aspects, especially the orographic features due to the very complex terrain of the coastal relief. |
| Ro.5 | A11 Lekenik - Sisak | The A11 motorway Zagreb - Sisak, with a total length of 41.9 km, is divided into three sections: Jakuševac - Velika Gorica, south, 10.9 km long, Velika Gorica - Lekenik 20.2 km long and Lekenik - Sisak 10.8 km long. Two sections are open for traffic: Jakuševac - Velika Gorica south and Velika Gorica south - Lekenik, with a total length of 31.1 km. Through the concept of functional regions, the need to build a motorway to Sisak shall be analysed. In this case, special studies shall be prepared to determine the stages of completion and the schedule for the remaining sections in the terms of intermodality as well as the necessary technical parameters, taking into account the expected demand and the economic and environmental aspects. The stages of completion and the schedule for the remaining sections shall be determined through the concept of functional regions. |
| Ro.6 | DC 10 Vrbovec – Križevci – Koprivnica – State border with Hungary towards Kaposvár | State road DC10 was previously categorised as the A12 motorway. The A12 motorway is a partly built motorway in the central Croatia, northeast of Zagreb, and extends towards the town of Vrbovec. The two-lane 23 km long road is built between the A4 motorway and Sveta Helena. The state road DC12 is the western branch of the so-called "Podravski ipsilon", and it is planned that DC12 shall be the eastern branch and shall finally connect Zagreb with the Hungarian border towards Kaposvár. The corridor is divided into several sections and the completion stage of the project documentation (project and permits) differs from section to section. |
| Ro.7 | DC 12 junction Vrbovec 2 – Ivanja Reka – Vrbovec – Bjelovar – Virovitica – State border with Hungary towards Barcs | The state road DC12 is the eastern branch of the so-called "Podravski ipsilon", and it is planned that DC10 shall be the western branch and shall finally connect Zagreb with the Hungarian border towards Pecs. Currently, only the Vrbovec 2 junction and initial (western) section of the state road DC12 are completed. The rest of the corridor is divided into several sections, and the completion stage of the project documentation (project and permits) differs from section to section. Through the concept of functional regions, the completion stages and the schedule for the remaining sections as well as the required technical parameters shall be assessed, taking into account the expected demand and the economic and environmental aspects. |
| Ro.8 | Reorganisation of the main Zagreb network | Zagreb is the capital of the Republic of Croatia and the junction of the main road corridors. Currently, all corridors of the motorway are connected via the Zagreb bypass, the road with the highest traffic load in Croatia. The main road network within the city also needs to be reorganised, taking into account the effects calculated through the concept of functional regions. |
| Ro.9 | D2 from the state border with Slovenia to the state border with Serbia | D2 is the current state road for transit traffic in the northern parts of Croatia. It extends from the border crossing with Slovenia in Dubrava Križovljanska in the west, via Varaždin, Osijek, Vukovar, and ends on the bridge Ilok - Bačka Palanka at the border crossing with Serbia. Most of the D2 route is parallel to the Drava river (Podravska magistrala <main road in Podravina>). The relevant intensity of very high volume of cargo traffic affects the features of the existing route, thus evidently reducing the level of safety. A new corridor for D2 is planned but the construction stages and the schedule for the construction of sections shall be determined as well as the required technical parameters through the concept of functional regions, taking into account the expected demand and the economic and environmental aspects. At certain sections of this road, the NPM results show a lack of capacity. |

| Code | Measure | Description of the measure |
|-------|---|--|
| Ro.10 | Reorganisation of the Rijeka network | The Rijeka road junction is one of the main traffic junctions in Croatia and plays an important role in connecting the Croatian motorway network: A7 motorway connects the A8 motorway (Istarski ipilon <Istrian Y>) and the A6 motorway (Rijeka - Bosiljevo). Port of Rijeka is the most important Croatian port (the main port of the TEN-T network) and the development of the port shall be coordinated with road development. The planned Western container terminal in Rijeka shall be connected with the planned state road D403, whose feasibility has been proved by the created and adopted Feasibility Study. The Rijeka bypass is part of the A7 motorway and is one of the roads in Croatia with the highest traffic intensity. All these measures shall be coordinated with the reorganisation of the city's internal road network, taking into account the need for public transport and cycling and walking, port development and other relevant development plans of stakeholders such as railway companies. For these reasons, further analyses are needed through the concept of functional regions to determine the final package of measures as well as the necessary technical parameters, taking into account the expected demand and the economic and environmental aspects. |
| Ro.11 | Dubrovnik – State border with Montenegro | The corridor Dubrovnik – State border with Montenegro is in various stages of construction, depending on the section. By the construction of this corridor the Dubrovnik Airport should be bypassed. Through the concept of functional regions, the completion stages and the schedule of construction as well as the technical parameters needed shall be assessed, taking into account the expected demand and the economic and environmental aspects. |
| Ro.12 | Capacity increase – dedicated lane for public transport between Zagreb and Karlovac | The road corridor from Zagreb to Karlovac is covered by the European core network due to the international and regional importance of traffic coming from the direction of Rijeka towards the interior. The Zagreb - Karlovac section is one of the oldest sections of the motorway network in Croatia with poor ecological standards. According to the feasibility study, the limitations of the capacity are caused by the existing toll collection system and the need to increase the capacity in the medium term has not been proved to be necessary. The potential to change the toll collection system, see Measure Ro.18, would have a clear impact on this section of the motorway. Specific interventions to increase the safety and ecological standards on this section can be justified. |
| Ro.13 | Capacity increase – dedicated lane for public transport on the Zagreb bypass | Zagreb bypass is the busiest route in Croatia and the traffic level is constantly increasing. Some sections of the Zagreb bypass need to be extended with a new public transport lane. Through the concept of functional regions, the existing options for capacity increase shall be analysed, the stages and schedule of construction shall be assessed as well as the necessary technical parameters, taking into account the expected demand and economic, social and environmental aspects, as well as the development planned for other means of transport. |
| Ro.14 | Improving access to the Port of Slavonski Brod | Slavonski Brod, as the main port on the Sava River, is the only port of inland waterways in Croatia on the Sava River, which is an integral part of the core TEN-T network. The development of the port and the additional business zone needs to be coordinated with the improvements of other transport infrastructure, especially the road. The NPM points to the good accessibility of the Port of Slavonski Brod. |
| Ro.15 | Reorganisation of the Split network | Split is one of the main tourist centers in Croatia. Tourism related to cruise trips is particularly important for the road network because it creates large seasonal loads on the road network. The road network in Split shall be reorganised, taking into account the public transport system and the planned development of the city, the port and other transport systems such as the railway. One of the potential measures is the Split bypass: Trogir - Split - Omiš, which is planned for regional and local traffic, and different sections are in different stages of construction: the Split-Trogir section has already been completed, while the access road from Split to A1 motorway is under construction. Through the concept of functional regions, a final package of measures shall be set as well as the required technical parameters, taking into account the expected demand and the economic and environmental aspects. |

| Code | Measure | Description of the measure |
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| Ro.16 | Preparations for the accessibility of Dubrovnik after Croatia joins the Schengen Area (Pelješac Bridge) | The long-distance accessibility in the mid-term scenario shall certainly be realised through the airport, while for the local and regional needs and cargo transport, the Pelješac Bridge shall be constructed, in combination with the local road network on Pelješac and the Ston bypass. Not only shall it contribute to the accessibility of Dubrovnik and further towards Montenegro, but also to the accessibility of the peninsula of Pelješac, as well as the island of Korčula. |
| Air transport | | |
| A.1 | Dubrovnik Airport development (TEN-T comprehensive network) | Dubrovnik is one of the main destinations on the Adriatic coast. The main problem of this airport is the bottlenecks that are created at the peak of the season. Given the characteristics and geographic position of the surrounding area, which forms an enclave, it is necessary to maintain and improve the traffic connections to ensure good connectivity. Planned measures include the extension of existing transport / infrastructure capacities to maintain the existing quality levels of services, reduce/remove the bottlenecks, restore existing ones and build new road structures and facilities that are required for safe and unobstructed airport operations, the implementation of environmental protection measures, the implementation of measures to increase energy efficiency and the purchase of necessary equipment and devices. |
| A.2 | Pula Airport development (TEN-T comprehensive network) | Pula Airport is important for the accessibility of this region from distant locations. Airport traffic is seasonal, which can cause bottlenecks due to limited infrastructure. Two important operational aspects need to be considered, including: 1) the quality of service, primarily due to the competitiveness of neighbouring international airports and 2) the balance between safety and operational capacities. These aspects, among other things, point to the need for increasing the capacity of this airport by adding certain elements: access signalling system, runways, aprons, terminals, and access. Through the concept of functional regions, the feasibility of these measures and the schedule according to priorities shall be established, taking into account the environmental requirements, the actual needs and the potential according to the expected demand. |
| A.3 | Brač Airport development | The development of the Brač Airport is planned to improve the connectivity of the island of Brač with distant locations and thus the connection of Central Dalmatia, in line with various safety requirements and traffic demand. The analyses show the need for achieving the ICAO 3C code and compliance with ICAO, EASA and national standards. Through the concept of functional regions, feasible measures and the schedule according to priorities shall be established, taking into account the environmental requirements, the actual needs and the potential according to the expected demand. |
| A.4 | Mali Lošinj Airport development | The development of the Mali Lošinj Airport is planned to improve the connectivity of Mali Lošinj with distant locations and thus the connection of Northern Dalmatia, in line with various safety requirements and traffic demand. The analyses show the potential need for the extension of the runway, aprons and terminals. Through the concept of functional regions, feasible measures and the schedule according to priorities shall be established, taking into account the environmental requirements, the actual needs and the potential according to the expected demand. |
| A.5 | Osijek Airport development (TEN-T comprehensive network) | Regional connectivity and connectivity with distant locations, along with national cohesion, are the main reasons for the extension of the Osijek Airport taking into account cargo transport due to synergy with other means of transport. Through the concept of functional regions, feasible measures and the schedule according to priorities shall be established, taking into account the environmental requirements, the actual needs and the potential according to the expected demand. |
| A.6 | Rijeka Airport development (TEN-T comprehensive network) | Rijeka Airport shows a big increase in passenger transport and has additional potential for cargo transport due to synergy with the Port of Rijeka. The restoration/extension/replacement of the apron, operational equipment and control tower equipment is in progress. The aforementioned is part of the airport plan for development and alignment with ICAO, EASA and national standards. |

| Code | Measure | Description of the measure |
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| | | For the purpose of achieving energy efficiency and environmental protection, projects for a solar power plant, the facade of the passenger terminal building and wastewater treatment plant are planned to be realised. Through the concept of functional regions, the feasibility of these measures and the schedule according to the priority shall be established, taking into account the environmental requirements, the actual needs and the potential according to the expected demand. |
| A.7 | Split Airport development (TEN-T comprehensive network) | With similar levels of traffic as the Dubrovnik Airport, Split is the second most important access point to the Dalmatian coast when it comes to passenger transport. The main problem of this airport is the bottlenecks that are created at the peak of the season. By expanding the land and air facilities, which is currently in progress, the problem of seasonality and the quality of service shall be solved. |
| A.8 | Zadar Airport development (TEN-T comprehensive network) | The connection of central Dalmatia with distant locations is the main reason for expanding this airport. Analyses indicate that investments need to focus on improving the transport and infrastructure capacities of the airport for airplanes corresponding to ICAO 4E code. Through the concept of functional regions, the feasibility of these measures and the schedule according to the priority shall be established, taking into account the environmental requirements, the actual needs and the potential according to the expected demand. |
| A.9 | Franjo Tuđman Airport development (TEN-T comprehensive network) | Franjo Tuđman Airport is the main entry point in Croatia and operates as a hub for domestic and international traffic. It is currently operated by the concessionaire who founded the new company, Međunarodna zračna luka Zagreb d.d. <Zagreb International Airport Ltd.> and whose investment plan is periodically revised by the Ministry of Maritime Affairs, Transport and Infrastructure. The company Zračna luka Zagreb d.o.o. <Zagreb Airport Ltd.> is still active and now has the role of a mediator between the Government of the Republic of Croatia and the concessionaires with a view to further develop the infrastructure and all transport segments that are not the subject of Zračna luka Zagreb d.o.o. shall immediately take over the airport from the concessionaire to ensure the continuous and uninterrupted operation of the Zagreb Airport. The airport development plans include the construction of a new terminal to increase capacity. |
| Maritime transport | | |
| M.8 | Specialisation of the Port of Rijeka (container, liquid cargo transport and LNG terminal) | Port of Rijeka is classified as the only TEN-T core sea port in Croatia. It is a port open for public transport of particular (international) economic interest to the Republic of Croatia. This is the largest port in Croatia, whose advantage is the existence of the deepest natural canal on the Adriatic. Much of the traffic is comprised of transit cargo transport to the wider hinterland of central Europe, and with regard to volume, liquid and bulk cargo dominates, followed by container and general cargo. Further development of the port shall be focused on the specialisation of container and liquid cargo transport. For the success of the port, it is necessary to ensure the interoperability and accessibility of the port and to complement the development of the port with the necessary development of road and rail infrastructure and logistic areas. Further analyses shall identify the required project with the aim of realising this specialisation and determining priorities, taking into account environmental requirements and actual needs as well as the potential according to the expected demand. The feasibility of the construction of the LNG terminal on the island of Krk shall be further evaluated taking into consideration the National Energy Development Strategy as well as the potential demand and environmental protection. |
| M.9 | Specialisation of the Port of Ploče (container and bulk cargo) | Port of Ploče is classified as a TEN-T comprehensive port in Croatia, which is of particular importance to Bosnia and Herzegovina. Further development of the port shall be focused on the specialisation of container and bulk cargo transport. According to development plans, the focus shall be on the construction of a new terminal for dry and bulk cargo, a container terminal and modernisation of the existing infrastructure and new logistics area. |

| Code | Measure | Description of the measure |
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| | | Although it is beyond the scope of this strategy, it should be noted that the success of this port is directly linked to the development of road and rail infrastructure in the Republic of Bosnia and Herzegovina. Further analyses shall determine the feasibility of these measures and determine their priority, taking into account environmental requirements, actual needs and the potential according to the expected demand. |
| M.10 | Specialisation of the Port of Dubrovnik (cruise ships) | The port in Dubrovnik is classified as a TEN-T comprehensive port in Croatia. It is a port that is open for public transport of particular (international) economic interest to the Republic of Croatia. In recent years, the Port of Dubrovnik has become one of the most popular destinations for cruise journeys in Europe, and its development is focused on passenger transport on cruise ships. The planned development includes the modernisation and reconstruction of the passenger terminal and the expansion of the facilities for ferry traffic. Further analyses shall determine the feasibility of these measures and determine their priority, taking into account environmental requirements, actual needs, and the potential according to the expected demand. |
| M.11 | Specialisation of the Port of Split (RO-RO, passenger transport and cruise ships) | The Port of Split is classified as a TEN-T comprehensive port in Croatia. It is a port that is open for public transport of particular (international) economic interest to the Republic of Croatia. The port in Split is also called the doors to the islands. This is the largest passenger port in Croatia and therefore, its development is focused on passenger transport and cruise travels. The planned development shall be focused on the construction of new areas for anchoring ferries, road and rail traffic and cruise ships including the expansion of passenger piers. Further analyses shall determine the feasibility of these measures and determine their priority, taking into account environmental requirements, actual needs, and the potential according to the expected demand. |
| M.12 | Specialisation of the Port of Zadar (RO-RO, passenger transport and cruise ship traffic) | The construction of a new passenger port outside the core of the old town in Gaženica is in progress. The new port shall enable the expansion of the capacity for mooring larger international ferries and modern cruise ships (home port), as well as the international standard for port facilities for passengers and vehicles. Further analyses shall identify the necessary projects to achieve this specialisation and to determine the priorities taking into account actual needs and the potential according to the expected demand. |
| M.13 | Specialisation of the Port of Šibenik (smaller vessels and superyachts) | The Port of Šibenik is classified as a TEN-T comprehensive port in Croatia. It is a port that is open for public transport of particular (international) economic importance for the Republic of Croatia. Further development of the port shall be focused on the specialisation of passenger transport as a port for the exclusive navigation of smaller vessels (boutique boats) and superyachts. Further analyses shall identify the necessary projects to achieve this specialisation and to determine the priorities taking into account actual needs and the potential according to the expected demand. |
| Inland waterway transport | | |
| I.3 | Development of the Port of Vukovar (TEN-T core network) | The Port of Vukovar is located on the Danube and is classified as the core TEN-T port. Vukovar is a port of inland waters that can receive class 5 ships. It was assigned navigability class VIc. Passenger and goods traffic in the port is increasing. Further analyses shall identify the necessary measures and prioritise them, taking into account the actual needs and potential according to the expected demand. While waterway transport has the potential to lead to a change in the mode of transport and can contribute to the reduction of emissions, noise etc., environmental protection requirements relating to the Water Framework Directive, the protection of vulnerable protected areas and Natura 2000 shall be applied during the development of the measure. |
| I.4 | Development of the Port of Osijek (TEN-T comprehensive network) | Port of Osijek is located on Drava and is classified as a TEN-T comprehensive port. Passenger and goods traffic in the port is increasing. Port of Osijek has a great opportunity to become an intermodal logistics centre thanks to its size and excellent potential due to the connection with the hinterland by road and rail. Further analyses shall identify the necessary measures and prioritise them, taking into account the environmental requirements, the actual needs and the potential according to the expected demand. |

| Code | Measure | Description of the measure |
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| | | While waterway transport has the potential to lead to a change in the mode of transport and can contribute to the reduction of emissions, noise etc., environmental protection requirements relating to the Water Framework Directive, the protection of vulnerable protected areas and Natura 2000 shall be applied during the development of the measure. |
| I.5 | Development of the Port of Slavonski Brod (TEN-T core network) | Port of Slavonski Brod is located on Sava and is classified as a TEN-T core port. The potential of Slavonski Brod, which is of particular importance to Bosnia and Herzegovina, depends to a large extent on the development of the Sava River navigability in Bosnia and Herzegovina and Serbia and / or the construction of the Danube-Sava canal through Slavonia. Reliability and safety of navigation on the Sava River are key factors that affect the attractiveness of the port. Most of the cargo transport is comprised of crude oil transshipment and general cargo. Further development of the port depends on the logistics concept. |
| I.6 | Development of the Port of Sisak (TEN-T comprehensive network) | The Port of Sisak is located on the Sava River and is classified as a TEN-T comprehensive port. Reliability and safety of navigation on the Sava River are key factors that affect the attractiveness of the port. These factors are located at three locations: in the town of Sisak on the Kupa river, near the village of Crnac on the Sava river and in Galdovo on the Sava river. The potential of Sisak depends largely on the development of the Sava River navigability in the border area with Bosnia and Herzegovina and Serbia and / or the construction of the Danube-Sava canal through Slavonia. Construction of a new port of Sisak south of Crnac village is planned. Cargo transport is mostly related to the Refinery Sisak, that is, crude oil transport. Further development of the port depends on the logistics concept. |
| I.7 | Construction of the Danube-Sava multipurpose canal | It is planned for the Danube - Sava multipurpose canal to have four equally important functions: navigation, tourism, irrigation and drainage. Due to its multiple functions, the canal shall have an important impact on the Croatian economy. From the traffic perspective, the canal is part of the 560 km long intermodal transport corridor Podunavlje-Jadran, which includes the Sava River waterway and the railway connection with the Port of Rijeka. The acceptability of the canal construction shall be assessed through the results of the Canal Feasibility Study. |

The impacts of the interventions arising from spatially located measures are presented in tables according to environmental components.

3.2.4.1 Air quality and climate features

| Impact | Positive/ Negative | Direct | Indirect | Short-term | Medium-term | Permanent | Cumulative | Synergetic | Transboundary |
|-------------------------------|-----------------------|--------|----------|------------|-------------|-----------|------------|------------|---------------|
| Decrease of air pollutants | + | ✓ | x | x | x | ✓ | x | x | x |
| Increase of air pollutants | - | ✓ | x | x | x | ✓ | x | x | ✓ |
| Reduction of greenhouse gases | + | ✓ | x | x | x | ✓ | x | x | x |

Legend: + the impact is positive, - the impact is negative, ✓ the impact has the feature, x the impact does not have the feature

3.2.4.2 Biodiversity

| Impact | Positive/ Negative | Direct | Indirect | Short-term | Medium-term | Permanent | Cumulative | Synergetic | Transboundary |
|--|-----------------------|--------|----------|------------|-------------|-----------|------------|------------|---------------|
| Fragmentation of non-fragmented areas in the Republic of Croatia | - | ✓ | x | x | x | ✓ | ✓ | x | x |
| Fragmentation of wild species' habitats | - | ✓ | x | x | x | ✓ | ✓ | x | x |
| Wild species fatalities in traffic accidents | - | ✓ | x | x | x | ✓ | ✓ | x | x |
| Disturbance of wild species | - | ✓ | x | x | x | ✓ | ✓ | x | x |
| Entry and spread of invasive species | - | ✓ | x | x | x | ✓ | x | x | x |
| Disruption of protected areas | - | ✓ | x | x | x | ✓ | x | x | x |
| Degradation and loss of habitats | - | ✓ | x | x | x | ✓ | x | x | x |

Legend: + the impact is positive, - the impact is negative, ✓ the impact has the feature, x the impact does not have the feature

3.2.4.3 Landscape characteristics

| Impact | Positive/ Negative | Direct | Indirect | Short-term | Medium-term | Permanent | Cumulative | Synergetic | Transboundary |
|--|-----------------------|--------|----------|------------|-------------|-----------|------------|------------|---------------|
| Change (degradation) of natural, cultural and visual experiential qualities of the landscape | - | ✓ | ✓ | x | x | ✓ | ✓ | x | x |

Legend: + the impact is positive, - the impact is negative, ✓ the impact has the feature, x the impact does not have the feature

3.2.4.4 Soil

| Impact | Positive/ Negative | Direct | Indirect | Short-term | Medium-term | Permanent | Cumulative | Synergetic | Transboundary |
|-----------------------|-----------------------|--------|----------|------------|-------------|-----------|------------|------------|---------------|
| Soil pollution | - | ✓ | x | x | x | ✓ | x | x | x |
| Removal of vegetation | - | ✓ | x | x | x | ✓ | x | x | x |

Legend: + the impact is positive, - the impact is negative, ✓ the impact has the feature, x the impact does not have the feature

3.2.4.5 Waters

| Impact | Positive/ Negative | Direct | Indirect | Short-term | Medium-term | Permanent | Cumulative | Synergetic | Transboundary |
|---|-----------------------|--------|----------|------------|-------------|-----------|------------|------------|---------------|
| Pollution of surface and underground waters | - | ✓ | x | x | x | ✓ | ✓ | x | ✓ |
| Pollution of water for human consumption | - | ✓ | x | x | x | ✓ | ✓ | x | x |
| Change in hydromorphological condition | - | ✓ | x | x | x | ✓ | x | x | x |

Legend: + the impact is positive, - the impact is negative, ✓ the impact has the feature, x the impact does not have the feature

3.2.4.6 Cultural and historical heritage

| Impact | Positive/ Negative | Direct | Indirect | Short-term | Medium-term | Permanent | Cumulative | Synergetic | Transboundary |
|--|-----------------------|--------|----------|------------|-------------|-----------|------------|------------|---------------|
| Endangerment of architectural heritage (certain buildings, cultural and historical units) and the cultural landscape | - | ✓ | ✓ | x | x | ✓ | ✓ | x | x |
| Endangerment of archaeological zones and sites | - | ✓ | ✓ | x | x | ✓ | ✓ | x | x |

Legend: + the impact is positive, - the impact is negative, ✓ the impact has the feature, x the impact does not have the feature

3.2.4.7 Agriculture

| Impact | Positive/ Negative | Direct | Indirect | Short-term | Medium-term | Permanent | Cumulative | Synergetic | Transboundary |
|---------------------------------|-----------------------|--------|----------|------------|-------------|-----------|------------|------------|---------------|
| Conversion of P1 and/or P2 land | - | ✓ | x | x | x | ✓ | ✓ | x | x |
| Conversion of agricultural land | - | ✓ | x | x | x | ✓ | ✓ | x | x |
| Pollution of agricultural land | - | - | ✓ | x | x | ✓ | ✓ | x | x |

Legend: + the impact is positive, - the impact is negative, ✓ the impact has the feature, x the impact does not have the feature

3.2.4.8 Forestry

| Impact | Positive/ Negative | Direct | Indirect | Short-term | Medium-term | Permanent | Cumulative | Synergetic | Transboundary |
|--|-----------------------|--------|----------|------------|-------------|-----------|------------|------------|---------------|
| Loss of forest areas | - | ✓ | x | x | x | ✓ | x | x | x |
| Forest fragmentation | - | ✓ | x | x | x | ✓ | x | x | x |
| Change in the water regime | - | x | ✓ | x | x | ✓ | ✓ | x | x |
| Loss of growing stock | - | ✓ | x | x | x | ✓ | x | x | x |
| Reduction of the stability of the forest ecosystem | - | x | ✓ | x | x | ✓ | ✓ | x | x |
| Reduction of the potential allowable cut | - | ✓ | x | x | x | ✓ | x | x | x |
| Decrease in the quality of growing stock | - | x | ✓ | x | x | ✓ | x | x | x |
| Loss of beneficial forest functions | - | ✓ | ✓ | x | x | ✓ | x | x | x |
| Increased risk of forest fires | - | x | ✓ | x | x | ✓ | x | x | x |

Legend: + the impact is positive, - the impact is negative, ✓ the impact has the feature, x the impact does not have the feature

3.2.4.9 Wild game and hunting

| Impact | Positive/ Negative | Direct | Indirect | Short-term | Medium-term | Permanent | Cumulative | Synergetic | Transboundary |
|--|-----------------------|--------|----------|------------|-------------|-----------|------------|------------|---------------|
| Fragmentation and decrease in the number of areas productive for hunting | - | ✓ | x | x | x | ✓ | ✓ | x | x |
| Disturbance of wild game | - | x | ✓ | x | x | ✓ | ✓ | x | x |
| Game fatalities in traffic accidents | - | x | ✓ | x | x | ✓ | x | x | x |

Legend: + the impact is positive, - the impact is negative, ✓ the impact has the feature, x the impact does not have the feature

3.2.4.10 Tourism

| Impact | Positive/ Negative | Direct | Indirect | Short-term | Medium-term | Permanent | Cumulative | Synergetic | Transboundary |
|--|-----------------------|--------|----------|------------|-------------|-----------|------------|------------|---------------|
| Increased availability of tourist destinations | + | x | ✓ | x | ✓ | x | x | x | x |
| Increased comfort, speed and safety of travel | + | x | ✓ | x | ✓ | x | x | x | x |
| Better supply of tourist destination | + | x | ✓ | x | ✓ | x | x | x | x |
| Increased tourist mobility in the destination | + | x | ✓ | x | ✓ | x | x | x | x |
| Increased tourism intensity | +/- | ✓ | ✓ | x | ✓ | x | x | ✓ | x |
| Decrease in visual quality of the area due to intensified construction | - | x | ✓ | x | ✓ | x | x | x | x |
| Enrichment of the tourist offer and development of supporting activities | + | x | ✓ | x | ✓ | x | x | x | x |

Legend: + the impact is positive, - the impact is negative, ✓ the impact has the feature, x the impact does not have the feature

3.2.4.11 Socio-economic characteristics

| Impact | Positive/ Negative | Direct | Indirect | Short-term | Medium-term | Permanent | Cumulative | Synergetic | Transboundary |
|--|-----------------------|--------|----------|------------|-------------|-----------|------------|------------|---------------|
| Cohesion of the Croatian territory through increased accessibility and regional connections | + | ✓ | x | x | ✓ | x | x | x | x |
| Increased interoperability of transport systems | + | ✓ | x | x | ✓ | x | x | x | x |
| Growth of the quality of life | + | x | ✓ | x | ✓ | x | x | ✓ | x |
| Increase in the number of daily and weekly commuters | + | x | ✓ | x | ✓ | x | x | x | x |
| Regeneration, social inclusion and economic vitality of peripheral areas in terms of traffic | + | x | ✓ | x | ✓ | x | x | ✓ | x |
| More reliable transport systems | + | ✓ | x | x | ✓ | x | x | x | x |
| Improvement of bilateral relations between Croatia and Bosnia and Herzegovina | + | x | ✓ | x | ✓ | x | x | ✓ | ✓ |
| Increase in the number of employed persons | + | ✓ | ✓ | x | ✓ | x | x | ✓ | x |
| Traffic safety improvement | + | ✓ | x | x | ✓ | x | x | x | x |
| Growth of development index | + | x | ✓ | x | ✓ | x | x | ✓ | x |
| Increased risks to human health | - | x | ✓ | x | ✓ | x | x | x | x |
| Total population movements | + | x | ✓ | x | ✓ | x | x | ✓ | x |

Legend: + the impact is positive, - the impact is negative, ✓ the impact has the feature, x the impact does not have the feature

3.3 Transboundary impacts

Transboundary impacts are the result of certain activities that may cause change in environmental components in countries bordering with the territory of the country where a particular activity takes place.

The Act on the Confirmation of the Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context (Official Gazette of the Republic of Croatia 7/09) represents an international agreement which defines the cooperation with regard to the transboundary environmental impact. Parties shall assess the environmental impact of certain activities at an early stage of planning and communicate and consult each other in all major potential interventions which may have an impact on the environment across national borders.

The methods of testing and the criteria for determining the likely impact of the strategy, plan or programme on the environment include the identification of the characteristics/intensity of the impacts of the strategy, plan or programme, taking into account the transboundary nature of the impact.

The Republic of Croatia borders with the following countries for which the transboundary environmental impact³ has been estimated: the Republic of Slovenia, the Republic of Hungary, Bosnia and Herzegovina, the Republic of Serbia, Montenegro and the Italian Republic.

The strategy defines the goals, whose realisation shall probably have transboundary impacts:

³ Maps in the Study are informative and solely for the purpose of the subject document.

- SO1 Better coordinate traffic management with neighboring countries (BiH - Port of Ploče, road and rail links from BiH, Slovenia, Serbia, Italy, Montenegro and Hungary)
- SO4 Develop the potential of major logistics centers (port Rijeka, port Split, port Ploče, port Vukovar, port Osijek, Zagreb node)
- ŽP1 Improve the rail freight corridor from port Rijeka to the markets with the greatest potential for the port (Hungary, Bosnia and Herzegovina, Slovakia, Italy, South Poland and Serbia).
- CP7 Increase connectivity with neighboring countries in order to raise co-operation and territorial integration to a higher level.
- CP8 Increase the availability of areas in Croatia where the upper limit of motorway capacity has been reached and where there is no alternative road infrastructure (parallel motorways, etc.) - from Zagreb in the direction of Bjelovar and Varaždin in the direction of Koprivnica.
- RP1 Increase the competitiveness of ports in Vukovar and Osijek as main river ports for freight traffic.
- RP2 To cooperate with BiH in the development of the Slavonski Brod cargo port.

Measures which are connected with the subject goal, and may generate negative and positive impact on the neighboring countries are as follows:

Railway traffic:

- R.1 Zagreb – state border with Slovenia towards Ljubljana (TEN-T core network/TEN-T Mediterranean corridor / Pan-European corridor)
- R.6 Križevci – state border with Hungary towards Budapest (TEN-T core network/TEN-T Mediterranean corridor / Pan-European corridor Vb)
- R.8 Novska – state border with Serbia (TEN-T core network/Pan-European Corridor X)
- R.9 State border with Hungary – Osijek – State border with Bosnia and Herzegovina (TEN-T core network/Pan-European Corridor Vc).

Road traffic:

- Ro.11 Dubrovnik – State border with Montenegro
- Ro.9 D2 from the state border with Slovenia to the state border with Serbia
- Ro.1 Connecting via the bridge near Gradiška
- Ro.2 A5 Osijek – state border with Hungary Pecs (TEN-T comprehensive network/Pan-European corridor Vc)
- Ro.3 A5 from A3 to the state border with Bosnia and Herzegovina (TEN-T comprehensive network/Pan-European corridor Vc)
- Ro.6 DC 10 Vrbovec – Križevci – Koprivnica – State border with Hungary towards Kaposvár
- Ro.7 DC 12 junction Vrbovec 2 – Ivanja Reka – Vrbovec – Bjelovar – Virovitica – State border with Hungary towards Barcs

Maritime traffic:

- M.2 Implementation of the "Motorways of the Sea" projects
- M.9 Specialisation of the Port of Ploče (container and bulk cargo).

Inland waterway traffic:

- I.2 Improvement of the Sava River
- I.3 Development of the Port of Vukovar (TEN-T core network)
- I.5 Development of the Port of Slavonski Brod (TEN-T core network)
- I.6 Development of the Port of Sisak (TEN-T comprehensive network)
- I.7 Construction of the Danube-Sava multipurpose canal.

3.3.1 Italian Republic

The implementation of the Strategy could lead to negative impacts on the marine environment of the Republic of Italy, in the form of cumulative impacts due to increased maritime traffic and cargo transport lines.

The greatest pressure on the marine environment comes from economic maritime traffic, cruise ships and nautical tourism, including the construction of nautical ports and the discharge of untreated wastewater into the sea.

Measures that can adversely affect the marine environment (sea quality, biodiversity) of Italy are the implementation of the "Motorways of the Sea" projects and the development of sea ports in the context of traffic intensification.

Impacts are related to sea pollution and increased noise levels in the sea. In addition, the most significant negative impacts on the marine environment can occur due to accidents, especially ships carrying dangerous cargo.

3.3.1.1 Pollution

Potential pollution of the marine environment in the territory of the Italian Republic is possible due to the implementation of "Motorways of the Sea" projects and partly due to the development of ports. These projects, which at this stage of the Strategy are not yet clearly defined, lead to an increase in maritime traffic, i.e. maritime routes, which increases the risk of accidental situations that may lead to pollution of the marine environment. However, given that the Strategy plans to introduce systems to improve the safety in maritime navigation, the potential risks of accidents can be better controlled.

3.3.1.2 Accidental situations

Increased maritime traffic can also increase the risk of accidental situation, especially when it comes to ships carrying dangerous cargo. These are unpredictable situations that are difficult to prevent, but it is precisely for that reason that adequate intervention plans need to be in place to address potential accidental situations without significant consequences for the marine environment.

Pursuant to the provisions of the Intervention plan for sudden sea pollution (Official Gazette of the Republic of Croatia 92/08), reports on accidents are prepared and the public is informed through public media and other media about the actions taken. Furthermore, the Subregional intervention plan for the prevention, readiness for and response to the large-scale sudden pollution of the Adriatic Sea (Official Gazette of the Republic of Croatia – International Contracts 7/08) prescribes the obligation to notify the bodies of other states about the sea pollution.

If pollution by hazardous and harmful substances or exceptional natural event in the sea may endanger the marine environment, human health and economic use of the sea and may have consequences on two or more counties or when the amount of pollution by oil and/or oil mixture exceeds 2000 m³, command action is implemented by the Staff for the implementation of the Intervention Plan, in cooperation with the County Operational Centers.

According to the Intervention Plan, the supervision of operational action on the location of pollution is performed by the competent inspector of the port authority and the environmental protection inspector.

3.3.1.3 Noise

The impact of noise pollution on whales and sea turtles is an important segment of assessment, since they are largely dependent on the hearing as the main sense, which plays an important role in social interactions and sensory biology (Tyack and Miller, 2002).

Gordon et al. (2003) have divided the types of noise impacts into five major categories: physical impact (includes tissue damage, ear damage, permanent or temporary shift in the hearing sensitivity threshold), impact on perception (masking the sound produced by animals or the sound they should be able to hear, behavioural impact (disorder of normal behaviour - avoidance of some areas, changes in the dive pattern etc.), chronic impact (stress that leads to reduced likelihood of survival and to the development of diseases) and indirect impacts (such as reduced availability of prey).

ACCOBAMS (2013) has also defined categories into which negative impacts of noise on the marine mammals can be classified. The first group is physical trauma, i.e. temporary or permanent hearing loss, tissue injuries that do not lead to death and injuries that can potentially lead to the death of the organism in case of immediate exposure. There is also a group of impacts that lead to behavioural changes. Behavioural changes can be small, where the normal activity of the individual does not change, but can be more pronounced when the individuals stop performing their normal activities. The last category refers to noise below the level of the environment and does not affect the organisms.

The implementation of the Strategy can lead to increased ship traffic, but the impacts of ships on the level of noise in the sea are considered low-intensity impacts.

3.3.2 Hungary

Potential transboundary impacts of the Strategy on the environment of the Republic of Hungary are possible due to the implementation of measures relating to the construction or reconstruction of roads.

3.3.2.1 Pollution

Railway traffic:

- Križevci – State border with Hungary towards Budapest (TEN-T core network/TEN-T Mediterranean corridor/Pan-European corridor Vb)
- State border with Hungary – Osijek – State border with Bosnia and Herzegovina (TEN-T comprehensive network/core network/Pan-European corridor Vc)

Road traffic:

- A5 Osijek – State border with Hungary Pecs (TEN-T comprehensive network/Pan-European corridor Vc)
- DC 10 Vrbovec – Križevci – Koprivnica – State border with Hungary towards Kaposvár
- DC 12 junction Vrbovec 2 – Ivanja Reka – Vrbovec – Bjelovar – Virovitica – State border with Hungary towards Barcs

The impacts are manifested primarily in the form of air pollution due to increased traffic on the roads and potentially due to railway traffic, if it shall be powered by diesel. The study assessed the impact of the Strategy on air quality as moderately negative. For the territory of the Republic of Hungary, a moderate impact of the implementation of these measures relating to road and railway traffic on air quality was also assessed.

3.3.2.2 Natura 2000 areas

Road traffic:

- DC 12 junction Vrbovec 2 – Ivanja Reka – Vrbovec – Bjelovar – Virovitica – State border with Hungary towards Barcs

In addition to the aforementioned, the impact of roads on the Natura 2000 areas of the Republic of Hungary was also considered and it was concluded that DC 12 road junction Vrbovec 2 – Ivanja Reka – Vrbovec – Bjelovar – Virovitica – State border with Hungary towards Barcs could have potential impact (Figure 3.1).

Negative impact is largely possible during the construction and at the strategic level of assessment, it is not considered significant.

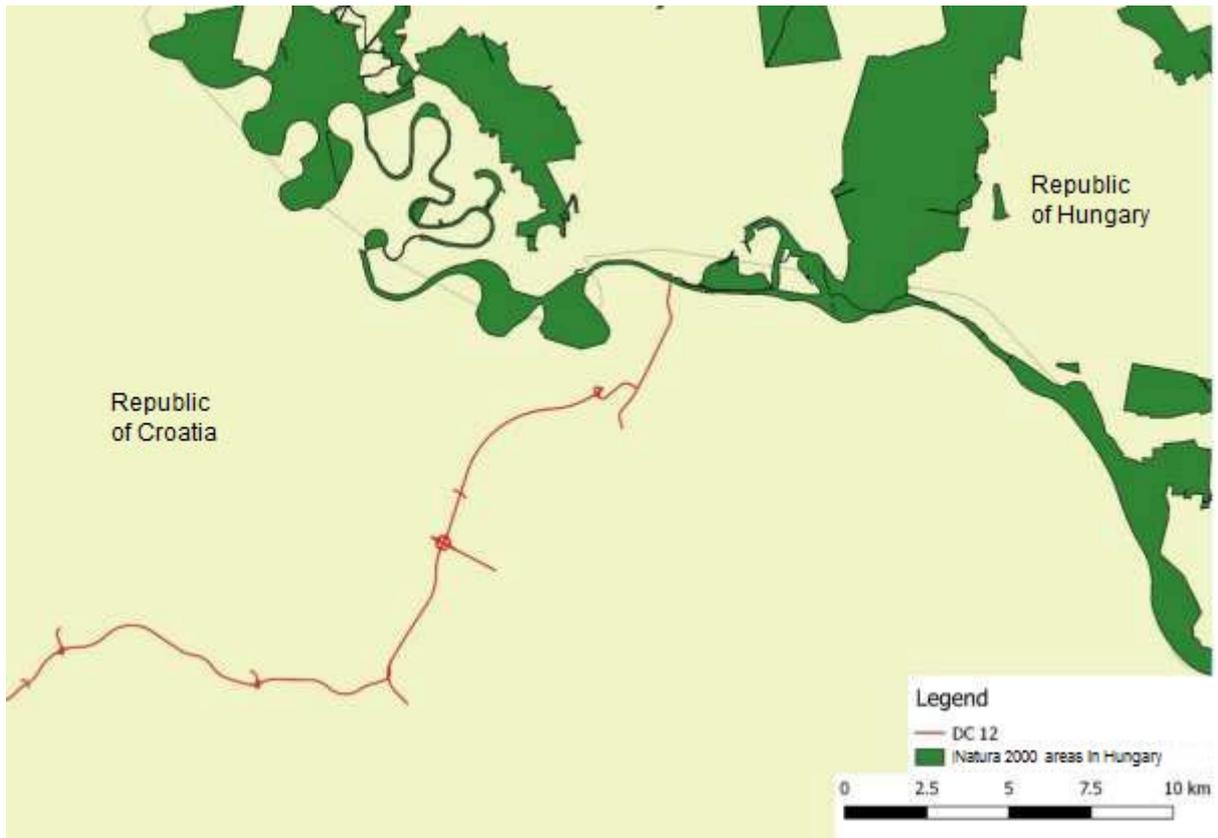


Figure 3.1 DC 12 junction Vrbovec 2 – Ivanja Reka – Vrbovec – Bjelovar – Virovitica – State border with Hungary towards Barcs in relation to Natura 2000 areas in Hungary

3.3.3 Bosnia and Herzegovina

3.3.3.1 Pollution

Railway traffic:

- State border with Hungary – Osijek – State border with Bosnia and Herzegovina (TEN-T comprehensive network/core network/Pan-European corridor Vc)

Road traffic:

- connecting by the bridge near Gacka
- A5 from A3 to the state border with Bosnia and Herzegovina (TEN-T comprehensive network//Pan-European corridor Vc) (Svilaj bridge).

Interventions that could potentially lead to air pollution in Bosnia and Herzegovina are related to road and railway infrastructure. Potential impacts are possible due to the use of roads (including bridges on the Sava river), that is, emissions of pollutants from vehicles. Since these are not entirely isolated areas, no significant impacts from road activities are expected at the strategic level, i.e. no exceedance of air pollutant concentrations is expected that could lead to a change in the category of air quality in the territory of neighbouring countries.

The impacts of the railway transport development relate to an increase in the volume of traffic on the existing sections. As already mentioned, negative impacts could be expected on wild species and habitats, primarily in the form of fragmentation of habitats and increased noise and vibration along the railway line. The impacts, on the other hand, are considered moderate because they can be mitigated by environmental protection measures during design.

As regards road traffic, it is important to emphasise that the A5 motorway sections from A3 to the state border with Bosnia and Herzegovina are in different stages of construction (Figure 3.2). The section from Sredanci (A3 motorway) to the border with Bosnia and Herzegovina is currently under construction. This section also includes the bridge across the Sava River. The award of a contract on bridge construction is currently in the public procurement process. The extension of the section on the Bosnian-Herzegovinian side has already been constructed.

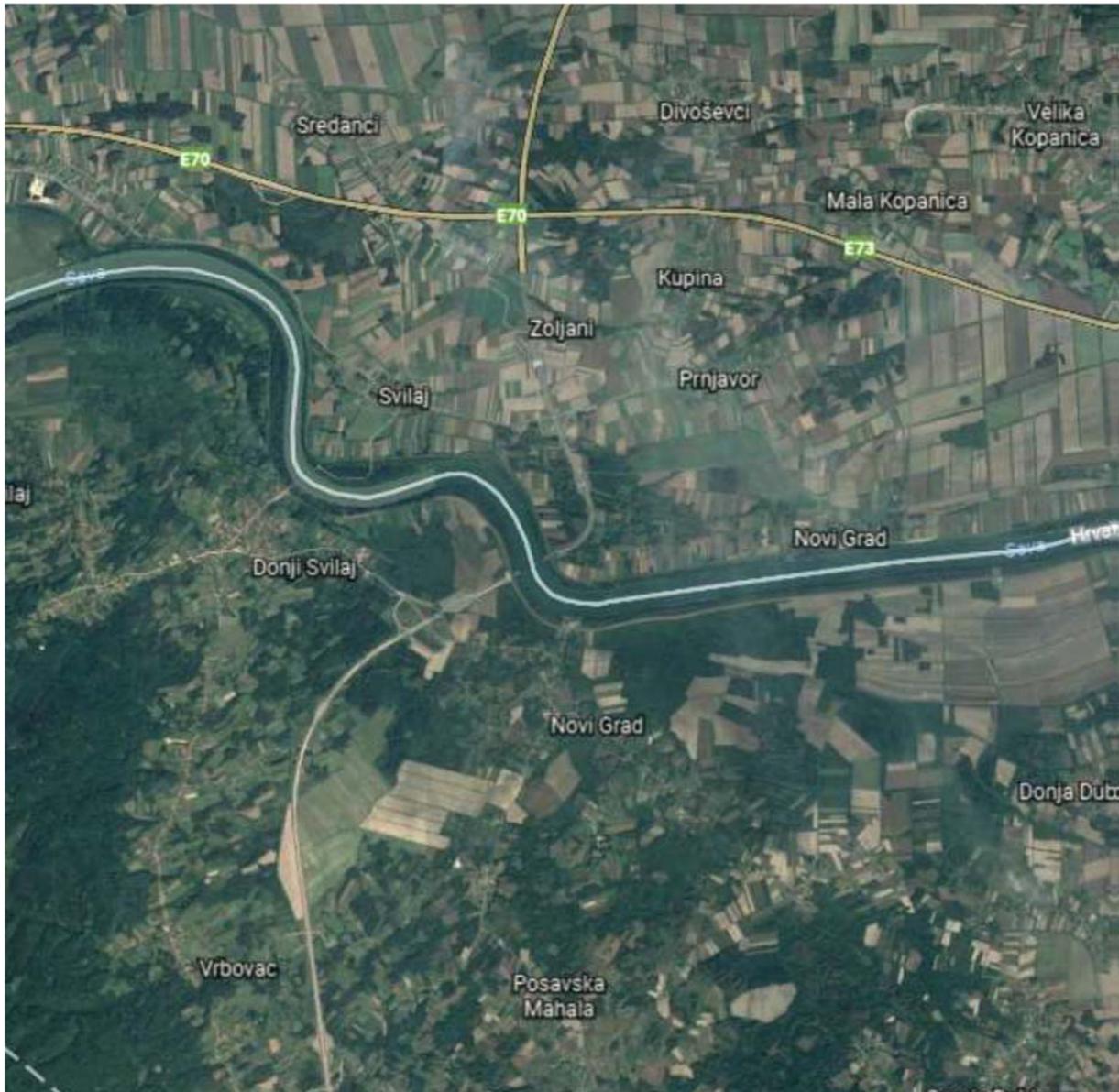


Figure 3.2 A5 from A3 to the state border with Bosnia and Herzegovina (TEN-T comprehensive network/Pan-European corridor Vc) (Svilaj bridge)

Inland waterway traffic

- improving the navigability of the Sava river
- construction of the Danube-Sava multipurpose canal

The negative impacts of improving the navigability of the Sava River and the construction of the Danube - Sava multipurpose canal are possible due to pollution of freshwater from ships.

As stated in the previous chapters, the riskiest impact of ships on the surrounding waters is caused by hazardous substances discharged from ships. The harmful impact and the intensity of the environmentally harmful impact depend primarily on the type of the ship. Although all ships pollute water to a smaller extent due to leakage of lubricants and similar substances, dissolving of biocide coatings or disposing waste, the main impacts depend on the type of cargo being transported by the ship. The type and intensity of the negative impact on the condition of water bodies depend on whether the liquid cargo, dry bulk cargo or other types of load (including passengers) is transported.

Stimulating the use of inland waterways by the EU directly affects the growth of transport demand on the Danube, thus potentially increasing the risks of surface and groundwater pollution due to the transport of hazardous substances by inland waterways.

In addition, negative transboundary impacts are possible due to the improvement of the navigability of the Sava River, which can lead to hydromorphological changes that may indirectly affect water habitats and wild species within the borders of Bosnia and Herzegovina.

3.3.3.2 Socio-economic characteristics

Road traffic:

- connecting by the bridge near Gacka
- A5 from A3 to the state border with Bosnia and Herzegovina (TEN-T comprehensive network/Pan-European corridor Vc) (Svilaj bridge).

In addition to the above mentioned impacts, the development of roads leading to the connection of Bosnia and Herzegovina with European major corridors would have a positive impact on the socio-economic characteristics within the area of Bosnia and Herzegovina, which would be connected with the Republic of Croatia by road. This would enable territorial integration of Bosnia and Herzegovina with Western Europe (A3 motorway), as well as Eastern and Northeast Europe (A5 motorway).

Inland waterway traffic

- development of the Port of Slavonski Brod
- development of the Port of Sisak

Maritime traffic

- specialisation of the port of Ploče (container and bulk cargo).

In addition to the negative impacts of river ports on water bodies, a positive transboundary impact of the development of ports of Slavonski Brod and Sisak is expected, through the realisation of favourable bilateral and economic relations between Croatia and Bosnia and Herzegovina.

The transboundary impact of specialising the port of Ploče is reflected in the importance of the Port of Ploče for the economy of Bosnia and Herzegovina, whose transport infrastructure directly depends on the performance of the Port of Ploče.

3.3.4 Montenegro

3.3.4.1 Impacts of maritime traffic Measure:

- M.2 Implementation of the "Motorways of the Sea" projects

Potential pollution of the marine environment in the territory of the Montenegro is possible due to the implementation of "Motorways of the Sea" projects and partly due to the planned development of the sea ports. The subject projects, which at this stage of the Strategy are not yet clearly defined, can lead to an increase in maritime traffic, thus increasing the risk of accidental situations that can significantly pollute the marine environment.

3.3.4.1.1 Accidental situations

Increased maritime traffic can also increase the risk of accidental situation, especially when it comes to ships carrying dangerous cargo. These are unpredictable situations that are difficult to prevent, but it is precisely for that reason that adequate intervention plans need to be in place to address potential accidental situations without significant consequences for the marine environment.

Pursuant to the provisions of the Intervention plan for sudden sea pollution (Official Gazette of the Republic of Croatia 92/08), reports on accidents are prepared and the public is informed through public media and other media about the actions taken. Also, the Subregional intervention plan for the prevention, readiness for and response to the large-scale sudden pollution of the Adriatic Sea (Official Gazette of the Republic of Croatia – International Contracts 7/08) prescribes the obligation to notify the bodies of other states about the sea pollution.

If pollution by hazardous and harmful substances or exceptional natural event in the sea may endanger the marine environment, human health and economic use of the sea and may have consequences on two or more counties or when the

amount of pollution by oil and/or oil mixture exceeds 2000 m³, command action is implemented by the Staff for the implementation of the Intervention Plan, in cooperation with the County Operational Centers.

3.3.4.1.2 Noise

By increasing maritime traffic, as a result of the implementation of the measure "Motorways of the Sea", there shall be increased noise emissions. Sound levels and associated effects on marine ecosystems have increased over the past periods, though there are few studies that can quantify these changes. Under water there is sound even without human influence. The main natural sources of sound are seismic (earthquakes, shifts, etc.), meteorological (wind, rain, waves, etc.) and biological (many organisms in the sea produce sound). Many organisms use sound in communication, detecting prey, and threats from predators. Part of their natural environment is in a sound environment, and by placing anthropogenic noise this environment changes, becomes unnatural so that marine organisms can suffer adverse effects. The input of sound energy occurs in a wide range, both in space and time. Anthropogenic sounds can be of short (impulse) or long (continuous) duration. Impulse sounds can be repeated at longer or shorter intervals, but such repetition can be "decomposed" with the distance from the source and the reverberation and become unrecognizable from the continuous noise. Higher frequencies of sound poorly spread in the marine environment, while low frequencies can travel longer. The main source of continuous noise is ship traffic, and impulse underwater noise is caused by the operation of ultrasonic devices (sonars, geological and seismic research), explosions and underwater works. The problem of noise exposure is complex because it includes a wide range of anthropogenic sources in the marine environment, numerous species inhabiting the environment and overlapping in space and time with noise sources. Potential adverse effects of noise exposure range from negligible to significant.

ACCOBAMS (2013) has also defined categories into which negative impacts of noise on the marine mammals can be classified. The first group is physical trauma, i.e. temporary or permanent hearing loss, tissue injuries that do not lead to death and injuries that can potentially lead to the death of the organism in case of immediate exposure. There is also a group of impacts that lead to behavioural changes. Behavioural changes can be small, where the normal activity of the individual does not change, but can be more pronounced when the individuals stop performing their normal activities. The last category refers to noise below the level of the environment and does not affect the organisms.

3.3.4.2 Impacts of road traffic

Measure:

- Ro.11 Dubrovnik – State border with Montenegro

The impact is manifested in the form of air pollution due to increased traffic. Since these are not fully isolated areas of traffic activities, at the strategic level no significant impacts are expected, i.e. no exceedance of concentrations of pollutants in the air is expected, which may lead to changes in the air quality category on the territory of Montenegro. At a strategic level, the impact of pollution caused by the new road traffic is assessed as moderately negative and no mitigation measures are prescribed, as the technical measures for mitigating local impact are defined when defining the project, i.e. using the environmental impact assessment.

3.3.5 Republic of Slovenia

3.3.5.1 Impacts of road and railway traffic

Interventions which may potentially lead to air pollution in the Republic of Slovenia are related to road and railway infrastructure. Potential impacts are possible due to increased use of routes, i.e. emission of pollutants from the vehicles.

Railway traffic:

- R.1 Zagreb – state border with Slovenia towards Ljubljana (TEN-T core network/TEN-T Mediterranean corridor / Pan-European corridor)

Road traffic:

- D2 from the state border with Slovenia to the state border with Serbia

The impact of measure R.1 has been rated as moderately negative, as these are not areas where there is no traffic infrastructure, i.e. new polluters. This measure implies improving the M101 track.

Road D2 is an existing corridor, but if new directions are defined, this shall be realized in the next steps of the Strategy implementation. Realization of the measure Ro. 9 is therefore also estimated as having a moderately negative impact on the strategic level.

3.3.5.2 Impacts of maritime traffic

Measure:

- M.2 Implementation of the "Motorways of the Sea" projects

Potential pollution of the marine environment in the territory of the Republic of Slovenia is possible due to the implementation of "Motorways of the Sea" projects and partly due to the planned development of the sea ports. The subject projects, which at this stage of the Strategy are not yet clearly defined, can lead to an increase in maritime traffic, thus increasing the risk of accidental situations that can significantly pollute the marine environment. However, given that the Strategy plans to introduce systems to improve maritime safety, the potential risks of accidents can be controlled more successfully.

3.3.5.2.1 Accidental situations

Increased maritime traffic can also increase the risk of accidental situation, especially when it comes to ships carrying dangerous cargo. These are unpredictable situations that are difficult to prevent, but it is precisely for that reason that adequate intervention plans need to be in place to address potential accidental situations without significant consequences for the marine environment.

Pursuant to the provisions of the Intervention plan for sudden sea pollution (Official Gazette of the Republic of Croatia 92/08), reports on accidents are prepared and the public is informed through public media and other media about the actions taken. Also, the Subregional intervention plan for the prevention, readiness for and response to the large-scale sudden pollution of the Adriatic Sea (Official Gazette of the Republic of Croatia – International Contracts 7/08) prescribes the obligation to notify the bodies of other states about the sea pollution.

If pollution by hazardous and harmful substances or exceptional natural event in the sea may endanger the marine environment, human health and economic use of the sea and may have consequences on two or more counties or when the amount of pollution by oil and/or oil mixture exceeds 2000 m³, command action is implemented by the Staff for the implementation of the Intervention Plan, in cooperation with the County Operational Centers.

3.3.6 Republic of Serbia

3.3.6.1 Impact of railway and road traffic

Measures that could potentially lead to transboundary pollution, i.e. local exhaust emission increases and pollution of surface and underground flows are as follows:

Railway traffic:

- R.8 Novska – state border with Serbia (TEN-T core network/Pan-European Corridor X)

Road traffic:

- Ro.9 D2 from the state border with Slovenia to the state border with Serbia

Increased concentrations of pollutants mostly occur the vicinity of the roads and their concentration, depending on weather conditions, decreases with distance. Also, concentrations of pollutants are greater by the roads with more heavy duty vehicles, as well as roads with higher speed limits.

3.3.6.2 Impacts of inland waterway traffic

Measures:

- I.3 Development of the Port of Vukovar (TEN-T core network)

- 1.7 Construction of the Danube-Sava multipurpose canal

The effects of the extension of the river ports are primarily related to the hydromorphological state of the surface waters, since the works shall change the natural appearance of the watercourse basin. The negative influence on the hydromorphological condition shall also affect the ecological state of the surface waters, as it is an integral part of the ecological condition.

Generally, the impact with the highest risk of ships on the surrounding water is caused by harmful substances discharged from ships. The manner of the harmful impact and the intensity of the environmentally harmful effects depend primarily on the type of vessel. Although all ships in a smaller quantity pollute water due to leakage of lubricants and similar substances, dissolving biocide coatings or rejecting waste, the main impacts depend on the type of cargo being transported by ship.

The construction of the Danube - Sava multipurpose canal shall divert a part of the Danube and Sava water, which shall affect the natural water regime of these watercourses, i.e. their water flow dynamics shall be changed. Water flow dynamics form an integral part of the hydromorphological state of surface water and, due to its modification, can lead to significant changes in the habitat conditions, thus making a negative impact on the biological state of surface water.

3.3.7 Conclusion

Estimated impacts of traffic pollution at strategic level have been assessed as moderately negative and local, and no mitigation measures have not been prescribed at strategic level. Measures to mitigate the local impacts of roads that are of technical character are prescribed at the level of environmental impact assessment.

The negative impacts of inland waterway traffic at a strategic level (including accidental situations) may cause significant consequences on the environment and nature. No mitigation measures have been prescribed at the strategic level since the intensity of impact can not be accurately defined without detailed information on the interventions.

In order for the planning of inland navigation not to have significant consequences for surface and ground water and biodiversity of the Danube region, transboundary cooperation has been established within the European Strategy for the Danube Region. The objective of joint management is to define guidance and instructions for decision-makers dealing with water management with the aim of environmentally acceptable planning of inland waterway navigation.

The implementation of the measures proposed by the Strategy shall have a positive impact on traffic connection between the Republic of Croatia and the neighboring countries. Graphic presentations in the study are for the purpose of analyzing the potential impacts and the subject document does not prejudice the boundaries.

4 Environmental protection measures

4.1 Soil

If the intervention is planned in the area of moderate and high risk of erosion, agrotechnical mitigation measures shall be used in accordance with the Ordinance on Agrotechnical Measures.

4.2 Waters

When constructing railway lines, concrete sleepers shall be used as much as possible, i.e. wooden sleepers that need to be treated with chemicals before use shall be avoided.

During the design and construction of railway lines and roads, the road routes shall be defined in a manner that minimises the impact of changes in the existing river and lake basins to reduce the impact on their hydromorphological condition. When constructing roadways in vulnerable, sensitive or protected areas, at the level of the project, an analysis of potential pollution of the surrounding water bodies shall be conducted and appropriate protection measures shall be prescribed.

During the works on the expansion of airports, wastewater drainage system shall be constructed as well as wastewater treatment facilities of the appropriate category.

All line and point interventions shall be designed in such a manner as to avoid areas of special water protection - sanitary protection zones.

Each newly constructed port, before the preparation of the main design or before the start of use of the port, if the main design is not required, shall have a maritime study accepted and certified by the Port authority in accordance with Article 5 of the Regulation on Conditions to be met by the Ports (Official Gazette 110/04).

In planned ports, solid waste collection shall be organised and adequate infrastructure shall be provided for wastewater collection from ships.

New sea and river ports are planned at locations where the morphological condition of water bodies is rated as very good, i.e. at locations where there are no existing hydromorphological pressures.

4.3 Biodiversity

The development of the railway traffic on the Karlovac-Rijeka section is based on a variant solution that passes through the south of the Zlobin village in Primorje-Gorski Kotar County with the renovation of the existing railway line.

Motorways and other roads with a planned traffic density of more than 5000 vehicles per day are planned in a manner that shall enable the establishment of adequate capacity for wild species in the next stages of their realisation, taking into account existing transport infrastructure.

The transport infrastructure in areas that are evaluated as non-fragmented shall be planned primarily in habitats that are under higher anthropogenic influence with the use of the shortest possible sections through non-fragmented areas. The transport infrastructure shall be planned in a manner that enables the implementation of green infrastructure.

The improvement of the maritime transport shall be planned in such a manner as to avoid the areas inhabited by the species *Tursiops truncatus* (bottlenose dolphin) and fish hatches in the Adriatic.

The new eastern port on the Danube in Vukovar shall be planned completely outside the borders of the Special reserve of forest vegetation on the Island of Vukovar on the Danube.

The section of the road that is planned within the boundaries of the Significant landscape Cetina – Donji tok, and is covered by the measure of Ro. 15 Reorganisation of the Split network, shall be constructed in such a way to avoid disturbing the features of this protected area.

The traffic corridor envisaged by measures R.11 Zagreb Node and Ro.8 Reorganization of the main Zagreb network, in which several types of parallel line transport infrastructure are planned to be implemented with a view to mitigate cumulative impacts, shall be constructed in cooperation of all the transport sectors involved, as well as the bodies competent for expert nature protection activities and bodies competent for forest management in the given area, in order to enable adequate capacity for wild species through parallel roads with minimum disturbance of forest habitats.

4.4 Cultural and historical heritage

Protection of archaeological heritage

Prior to undertaking the interventions in the area that arise from spatially located measures, the archaeological field examination shall be conducted and, if necessary, test archaeological research on the positions of known and recorded archaeological sites, which shall determine the scope of protective archaeological research, documentation and conservation of the findings and sites. Archaeological field examination shall be conducted at the locations of potential archaeological sites with indicative names, toponyms and places where changes in relief caused by human action in history are evident.

If protective archaeological research results in significant findings that need to be preserved and presented, there is a possibility of relocating the infrastructure route and other planned structures on the locations of such sites.

Protection of cultural and historical units, historical structures and buildings

The protection measure system includes the exploration and documentation of the endangered cultural heritage with maximum preservation to mitigate the negative impact on the spatial and visual integrity of the architectural heritage.

Protection of historical cultural landscape

Measures for the protection of the historical cultural landscape shall be implemented during the project design stage by designing a landscaping design of the intervention zone area.

A landscape sensitivity study shall be prepared prior to the landscaping design.

4.5 Agriculture

In the area of Pannonian Croatia, the implementation of the measures that can generate conversion and fragmentation of P1 and P2 land capability class shall be planned to avoid by all means, except in exceptional circumstances, taking P1 and P2 land capability classes.

In the area of Dinarides, the measures that can generate conversion and fragmentation of P1 and P2 land capability class shall be implemented outside P1 and P2 land capability class.

Measures that can generate conversion and fragmentation of agricultural land shall be planned to maximise the use of existing infrastructure and avoid unnecessary conversion and fragmentation of agricultural land.

4.6 Landscape characteristics

The measures envisaged by the Strategy shall be incorporated into the landscape through green infrastructure projects, or projects of Landscaping by an expert (landscape architect).

4.7 Socio-economic characteristics

When designing roads, the significance of impacts shall be assessed taking into account the estimated traffic increase and, if necessary, appropriate noise protection measures shall be implemented.

4.8 Climate changes

All infrastructure projects arising from the measures of the Strategy shall be planned taking into account the potential climate phenomena in the area of measure implementation. The project design shall be realised in accordance with non-formal guidelines: „*Non-paper Guidelines for Project Managers: making vulnerable investments climate resilient*“ (European Commission, Directorate-General for Climate Action).

5 Study of the Main Acceptability Assessment of the Strategy for the Ecological Network

On 13 July 2015, the Ministry of Environment and Energy issued a Decision (Class: UP/I 612-07/15-71/136, Reg. No.: 517-07-2-1-15-4) that for the Transport Development Strategy of the Republic of Croatia for the period 2017-2030, the possibility of significant negative impacts on the conservation objectives and the integrity of the ecological network area cannot be ruled out and the implementation of the main acceptability assessment for the ecological network shall be mandatory for the subject Strategy. The Decision is attached as Appendix 14.3 pursuant to Article 26 of the *Nature Protection Act* (Official Gazette of the Republic of Croatia 80/13) for the strategies, plans and programmes subject to the strategic assessment, the Main assessment shall be conducted within the procedure for strategic environmental impact assessment of the strategy, plan and programme (SEIA).

5.1 Description of the impact prediction method

Given that the scope of the Strategy covers the entire territory of the Republic of Croatia and therefore overlaps with the scope of the ecological network proclaimed by the Regulation on the Proclamation of Ecological Network (Official Gazette of the Republic of Croatia 124/2013, 105/15), the scope of the possible influence of the Strategy refers to the territory of the Republic of Croatia covered by ecological network.

For indicating the significance of the influence, the scale with five values is used, ranging from -2 (significant negative impact) to +2 (significant positive impact). Each target species and habitat type on which the intervention could have an impact is evaluated with one the values according to the following table (Table 5.1). Additionally, for strategic planning documents, the value "?" is added, where the impacts depend on the manner of implementing specific interventions.

Table 5.1 Applied scale for the intensity assessment of the impact of the planned intervention (Source: Manual for Acceptability Assessment of the Intervention for Ecological Network)

| Value | Description | Explanation of description |
|-------|---|--|
| -2 | Significant negative impact (unacceptable adverse impact) | Significant disturbance or destroying impact on target types or species, significant changes in ecological conditions of habitats or species, significant impact on habitats or the natural development of species. Significant adverse impacts shall be reduced by applying mitigation measures to the level below the significance threshold. |
| -1 | Moderate negative impact (adverse impact that is not significant) | Limited / moderate / negligible negative impact Moderately problematic impact on habitats or species population; moderate disturbance of ecological conditions of habitats or species; edge impact on habitats or the natural development of species. Elimination of impacts is possible by applying the proposed mitigation measures. |
| 0 | No impact | The Strategy has no visible impacts. |
| +1 | Positive impact that is not significant | Moderate positive impact on habitats or populations; moderate improvement of ecological conditions of habitats or species; moderate positive impact on habitats or the natural development of species. |
| +2 | Significant positive impact | Significant positive impact on habitats or populations; significant improvement of ecological conditions of habitats or species; significant positive impact on habitats or the natural development of species. |
| ? | Impact significance assessment is not possible | For plans, programs, and strategies with a lack of localised elements (e.g. sector operational programmes) or documents with a low level of details, where the impact of their elements can range from -2 to +2, depending on the manner of implementation of specific interventions. |

5.2 Description of the impacts of the Strategy on ecological network

The impacts of transport development on biodiversity, that is, the target species and target habitat types of the ecological network are manifested in several ways, depending on the type of transport that is divided into the following sectors in the subject Study: public transport, road transport, railway transport, air transport, maritime transport and inland waterways transport.

When it comes to the transport infrastructure, the interventions differ largely only in size and accordingly in the intensity of the impact. The size of the intervention ranges from constructing a new road to extending or reconstructing an already existing road by adding traffic lanes, intersections, crossings, etc. The impacts that traffic interventions can have on the target species and habitats of the ecological network are mostly of a similar nature. The impact assessment depends on the size and project design of a particular intervention.

According to the HAOP <Croatian Agency for the Environment and Nature> Expert Guidelines, the three major sources of intervention impact should be distinguished for the purpose of assessing the impact of traffic interventions on the ecological network. The first source of impact is the performance of construction works, the second is the facility itself, and the third is the traffic activity. Depending on the original source of impact, they differ in terms of intensity, coverage, duration, and characteristics. The impact is usually most pronounced during construction works. However, it is also of a limited duration depending on the size of the intervention. During the construction of large motorways, the works of different intensity may last several years. Once the works are completed, the construction stage impact is reduced, but it still remains present for a longer period of time. On the other hand, the impact of the traffic itself is usually increased over time and depends largely on the density and amount of vehicles.

The following impacts are possible during construction:

- Loss of land/area use: Temporary used areas (outside the location of the road, work belt), e.g. for storage purposes, work machines, etc.
- Change in the landscape layout (geomorphology): Visual changes are greatest during construction works, since construction often requires the transfer of large quantities of land. The underground parts of the structure itself need to be dug in, construction works require a larger space for e.g. storing and moving, than the road itself.
- Change in functional connection: the construction site hinders connectivity, especially in areas of intensive works.
- Noise: Construction sites are usually a source of great noise, which is continuous during the performance of works (e.g. machine operation, etc.), and the most noise is produced by works such as mining or drilling.
- Air pollution: Machines emit substances that pollute the air, dust is spread, mining causes great amount of dust
- Water pollution: Normal operation of work machines causes the release of substances that pollute the water, but also possible release of fuel, oil, etc.
- Vibrations: Construction works, trucks and large machines cause vibrations, which are most intense during mining or drilling.
- Changes in the hydrological regime (quality and quantity): Construction works can temporarily disrupt the hydrological regime, and it may be necessary to move underground and surface water flows.

Line facility with secondary structures may have the following impacts:

- Loss of land/area use: Permanent use of areas where the road is located, but also secondary structures such as auxiliary roads, structure for water source protection, etc.
- Asphaltting: Mainly roads, but also secondary structures such as auxiliary roads
- Change in the landscape layout: Dams, bridges and crossings change the layout, but after the completion of the works, efforts are made to integrate the road into the surrounding landscape where possible (growing vegetation).
- Change in functional connection: Roads can interrupt connectivity (depending on the structure); if there are no mitigation measures, the connection is terminated permanently.
- Changes in the hydrological regime: The facility may permanently disturb the hydrological regime due to e.g. laying the foundations, which affects groundwater.

During the use, the transport infrastructure interventions may have the following impacts:

- Noise: Traffic emits the noise of different volume, intensity, characteristics, and frequencies depending on the traffic density, which may vary depending on the time of the day, but also the type of traffic, e.g. only cargo vehicles or only personal cars (the noise emitted by the railway has completely different characteristics than the noise emitted by car traffic).

- Air pollution: substances that pollute the air largely depend on the type of traffic, vehicles (e.g. trucks, cars), traffic density, speed limits, etc.
- Light: Roads of great importance usually do not have lighting, but vehicles in motion emit light.
- Water pollution: depends on the traffic density, accidents during the transport of dangerous cargo, etc.
- Vibrations after the start of using the infrastructure: Vibrations are mostly caused by the railway, while cars usually do not cause vibrations, but goods vehicles and trucks do cause vibrations, mostly in a relatively small range.
- Change in functional connection: Traffic density is often a key factor that conditions whether or not the connection shall be interrupted.

The construction and use of line facilities has different impacts on habitat types and plant and animal species. The impacts are different in the construction stage and in the stage of using the line object, whereby the impacts at the construction stage are mostly short-term while the impacts in the use stage last for much longer.

The following has been concluded by the analysis of possible impacts of the Strategy on the ecological network:

- The Strategy contains general, development and management-organisational measures that have a neutral impact or impact that cannot be assessed.
- The analysis of spatially located measures indicates that one measure has a significant negative impact on the ecological network.
- The negative impacts of implementing the Strategy measures have been identified during the construction of certain interventions envisaged by the measures and during use.
- Given that some parts of the measures (i.e. some sections within the scope of the measure) are constructed or under construction (according to the most recent digital orthophoto data), the assessment of impacts on the ecological network focuses on the period during the use of the scope of the measure. Measures that have not yet been implemented and could have an impact on the ecological network can be made acceptable for the ecological network by conducting the acceptability assessment for ecological network within lower-level implementation programmes.

The methodology applied in the analysis led to a conclusion that a significant negative impact cannot be excluded for the measure. I.7 Construction of the Danube - Sava multipurpose canal, given that there are no adequate measures for the reduction, avoidance and mitigation that could be implemented in the Strategy, but there is the possibility of defining the subject measures when assessing the environmental impact at later stages of project development.

5.3 Measures to mitigate the negative impacts of the intervention on conservation goals and the integrity of the ecological network area

Spatially located measures

Road traffic

1. During the preparation of the project for measure Ro.1, Connecting by the bridge near Gradiška, the time of construction and planning of use shall be harmonised with the objectives of conserving the ecological network area HR1000004 Donja Posavina and the construction of the bridge shall be avoided in the period of the largest activity of the target fish species in the ecological network area HR2001311 Sava nizvodno od Hrušćice.
2. For measure Ro.4 A7 Križišće – Žuta Lokva, the possibility of mitigating significantly negative impacts on target species in the ecological network area HR2000200 Zagorska peć kod Novog Vinodolskog shall be considered, by the implementation of adequate mitigation measures for target species of bats (e.g. directing the species that follow the vegetation during flying to the greater height with structures that enable bats to hop-over the road using closed screens).

When setting the work belt, any activity near the area of the ecological network HR2000131 Škabac špilja and HR2001154 Orlovac špilja shall be excluded.

When planning the part of the route passing through the area of the ecological network HR5000019 Gorski Kotar i sjeverna Lika, and passing through the habitat highly suitable for target species of large carnivores (bear, wolf and lynx), adequate mobility across the road shall be provided by constructing green infrastructure elements.

3. When implementing measure Ro.5 A11 Lekenik – Sisak, noise protection of the ecological network area HR1000003 Turopolje shall be planned on the design level in cooperation with an expert – ornithologist, and during the construction of connecting roads over the Kupa river, interfering with habitat types 91E0* Alluvial forests (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) and 7220* Petrifying springs with tufa formation (*Cratoneurion*) – point or linear formations dominated by moss from *Cratoneurion commutati*.
4. When implementing measure Ro.6 DC Vrbovec – Križevci – Koprivnica – State border with Hungary towards Kaposvár, additional mitigation measures shall be considered, such as the construction of opaque fences along the road for the protection against noise.
5. The route envisaged by measure Ro.7 DC junction Vrbovec 2 – Ivanja Reka – Vrbovec – Bjelovar – Virovitica – State border with Hungary towards Barcs shall be relocated so that it does not interfere with the ecological network area HR1000009 Ribnjaci uz Česmu.
6. Along the part of the section envisaged by measure Ro.8 Reorganisation of the main Zagreb network that passes through the area of ecological network HR1000003 Turopolje, opaque fences for the protection against noise shall be integrated. In the part of the section passing along the ecological network area HR2000589 Stupnički lug, damage to the surrounding trees of the habitat type 9160 Sub-Atlantic and medio-European oak or oak-hornbeam forests of the *Carpinion betuli* shall be avoided.
7. The section provided for by measure Ro.9 D2 from the state border with Slovenia to the state border with Serbia passing through the ecological network area HR2001500 Stepska staništa kod Bapske shall be relocated and overarched with a viaduct in order to prevent the conversion of the habitat type 6240* Sub-Pannonic steppic grasslands (*Festucion vallesiaca*).
8. During the construction of the part of the section under measure Ro.15 Reorganisation of the Split network: Split – Omiš, attention should be paid to the part passing along the ecological network area HR2001376 Područje oko Stražnice and adjust the time of construction to the ecology of the target species lesser mouse-eared bat - *Myotis blythii*. During the use of the section mitigating measures shall be planned for bats (enable bats to hop-over the road) and mitigate light pollution.

Railway traffic

9. When improving the railway lines envisaged by measures R1, R2, R3, R4, R5, R8, R9, R10 and R11, mitigation measures shall be planned to reduce target species fatalities (especially large carnivores) above and under the planned roads.

Air traffic

10. During the implementation of measure A.8 Zadar Airport development, expanding the airport in the areas of ecological network HR1000024 Ravni kotari and HR2001361 Ravni kotari shall be avoided.

Maritime traffic

11. During the construction of the new terminal provided for by measure M9 Specialisation of the Port of Ploče (container and bulk cargo), interference with the habitats of the ecological network HR1000031 Delta Neretve and HR5000031 Delta Neretve shall be avoided.

Cumulative impacts

12. Due to the recognised negative cumulative impact on the ecological network area HR2001311 Sava nizvodno od Hrušćice, the construction of bridges and works of reconstruction of river ports on Sava shall be performed at different times.

13. If it is planned under the measure R11 to build new railway sections, they shall be aligned with the measure Ro8 Reorganisation of the main Zagreb network so that it follows the road infrastructure and does not occupy parts of the ecological network area (especially the ecological network area HR2000589 Stupnički lug).

Development measures

14. Due to the possible negative impacts of the measure I.1. that includes the improvement of the waterway to Osijek, project activities shall be defined in cooperation with expert bodies for nature protection (HAOP and the Public Institution Agency for the Management of Protected Natural Values in Osijek-Baranja County)
15. Measure I.2 Improvement of the Sava River shall be implemented in cooperation with expert bodies for nature protection (HAOP and competent public county institutions for the management of protected natural values)

Monitoring of mitigation measures is essential to determine their effectiveness. Sometimes only minor changes are sufficient to significantly increase their functionality. Furthermore, based on the data collected through monitoring, future projects and mitigation measures can be better planned. Monitoring should be anticipated during the planning of mitigation measures in the intervention approval procedure.

6 Conclusion

Based on the analysis of the existing environmental situation and existing environmental problems, a set of measures set out in the Strategy relating to all transport sectors was analysed in the Study.

By implementing the measures from the Strategy, additional environmental loads are expected, primarily in the emissions of pollutants into the air, greenhouse gas emissions, noise emissions, emergence of ballast and waste waters and possible accidental situations. Measures suggest activities that are related to improving the infrastructure of different transport systems, but also to operational and organisational aspects. Furthermore, the Strategy defines measures that are largely concerned with improving the safety and environmental protection. General measures as well as management and organisational measures at the level of transport as a whole define the concepts of transport development, capacity increase, improvement, improvement of processes, etc., and as such, at a strategic level do not generate environmental impacts and may positively affect the environmental components in the long run.

Part of the development measures in the future shall result in spatially defined activities (e.g. implementation of the "Motorways of the Sea" projects, port development, etc.) and at this stage, apart from positive or neutral impacts, they are expected to generate negative environmental impacts as well. For all of the above mentioned types of measures, their impact on the environment and health is assessed on the basis of their description. Spatially defined measures describe in more detail the planned activities and their impact assessment is conducted at the level of the environmental components, which has resulted in proposing measures to mitigate adverse environmental impacts.

At a strategic level of assessment, when we exclude specific impacts that are either limited by legal regulations or are considered at the level of environmental impact assessment, the Strategy has potentially positive and negative impacts on environmental components. To mitigate the identified negative impacts, the Study sets out the measures for environmental protection, i.e. mitigation of potential impacts of the Strategy.

During the environmental impact assessment of the Strategy, potential transboundary impacts mainly related to air pollution, pollution of water bodies and noise pollution have been identified, but positive impacts have also been identified in terms of improving the economic and socio-economic image of neighbouring countries (transport links to corridors of European significance).

Within the process of the strategic environmental impact assessment of the Strategy, a process of acceptability assessment of the Strategy for the ecological network was conducted. Potential negative impacts of the Strategy on the ecological network have been identified and mitigation measures have been defined.

Adequate protection measures, i.e. measures to mitigate negative impacts have been prescribed for the impacts of the Strategy assessed as significantly negative. By implementing the defined environmental protection measures as stipulated in the Study, the Strategy is acceptable for the environment and for the ecological network of the Republic of Croatia.