PP7 AND PP10 PILOT ACTION REPORT

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Contents

1. Pilot Action Title

Defining measures for rehabilitation of ex industrial area Mlaka in Rijeka: Environmental and Economic rehabilitation of a harbour brownfield (PP7) & Assessment of the environmental impacts of a brownfield on the surrounding inhabited area.

2. Introduction

The pilot action refers to the common area, ie the area of the former Mlaka industrial zone. The project partners, the City of Rijeka and the Port of Rijeka Authority, have divided the activities within the pilot project according to their respective competencies. In this regard, the City of Rijeka addressed the issues of zone use, ownership, strategic plans, socio-economic indicators and the like, and the Port of Rijeka Authority, in the area under their responsibility, conducted basic research as a basis for proposing measures for future remediation and use plans. The importance of the pilot is precisely that research was carried out in areas of the former Mlaka industrial zone where this was possible (in line with the objectives of the project), and for the first time the whole area became a "zone" of strategic planning. The scope of the pilot action conducted in Rijeka, in the former industrial area of Mlaka and through partnership of the City of Rijeka and Port of Rijeka Authority can be summarized in several basic directions: to define the condition of ownership, use, plans and remediation options; to determine the state of the environment in the part of the area managed by the Port of Rijeka Authority: to propose remediation measures, taking into account that a large part of the area is privately owned and to establish a local partnership related to the area.

3. Place/area of PA implementation

The industrial area of Mlaka is part of the historical port - shipbuilding - industrial zone of Rijeka, which lies on the historical center of the town and extends in a narrow coastal zone to the west.

It covers an area of approximately 24ha and consists of four spatial units:

A. oil refinery facility (approximately 12.5 ha) and space used by Energo (approx. 2.5 ha)

B. space of the oil refinery tank above the railway (approx. 2.3 ha)

C. the Petroleum port Mlaka (approx. 3 ha)

D. mixed use area at the beginning of Milutin Barač Street (2.5 ha).

The premises of the oil refinery and the Energo Company are located between Milutin Barača Street in the south and the railway line in the north. The tank area is located between the railway and Zvonimirova Street.

Area of the Pilot Action

4. Duration of PA implementation

The activities started in May 2017 and ended in January 2019

5. Costs related to PA

Costs are related to the staff costs and costs for conducted studies for the both partners: City of Rijeka and Port of Rijeka Authority

- *Fundamental research of the enviromental status of the harbour area.*
- *Proposals of the measures for the rehabilitation of Petroleum port Mlaka*
- *Study of the future use of the Petroleum port Mlaka*
- *Spatial Planning, Urban and Social Aspects of the Future Use of the Mlaka Industrial Area,*
- *The proposal of measures for economic and ecological recovery and remediation of the industrial area of Mlaka*

6. Background and challenges faced

All of the documents produced under the GreenerSites project as well as outputs from the stakeholders meetings highlighted several major challenges:

- The area of the former refinery, both in the East and in particular in the West, continues into space that will undergo intensive transformation processes in parallel with it and needs to be uniquely viewed. This area is specific for its leveling accommodation in relation to the city, surrounded by port facilities on the one hand and the shipyard on the other, which presents a challenge for its integration into the surrounding urban tissue.
- This is also an area intersected by railway infrastructure, rich in industrial heritage buildings that additionally bear the burden of soil pollution. The industrial activities that took place in the project area are associated with long-term oil treatment and environmental quality can be compromised and pose a risk to future users when reusing land and facilities. Given the constitution of the soil, there is a possibility of groundwater pollution. Due to the close proximity of the sea there is a risk that stormwater, dangerous and predominantly carcinogenic compounds from the refinery, can be carried into the sea, the ecological system and consequently into the food chain.

- Remediation and redevelopment of the area requires extremely high investment and effort from all stakeholders in the process. With the development of the City of Rijeka, the industrial area of Mlaka reached the center of the city itself, which makes the process of space revitalization even more complex.
- The access to the Rijeka port basin and consequently, to the Petroleum port using the railway infrastructure is limited by the outdated transport elements. The existing railway system cannot ensure safe transport of larger amounts of cargo.
- In view of the fact that the Petroleum port area is limited to a relatively narrow strip along the coast, when selecting the future purpose, it is necessary to take into account the limited possibilities to expand the area of activities.
- The presence of the bitumen in the Petroleum Port embankment and that it is significantly saturated with hydrocarbons. What has also been found is an increased concentration (up to 55,867 mg/kg in dry matter) of mineral oil in the samples, which indicates the need for rehabilitation of the area concerned. Analysis of groundwater samples for mineral oil (samples collected at the Petroleum Port embankment) has revealed concentrations significantly higher that the rehabilitation threshold (measured 3,864 µg/l - the threshold is 600 µg/l)

Urban transformation of the selected area brings with it a number of challenges and barriers, of which the key is a high degree of soil pollution, private land ownership, complexity and financial burden of soil remediation, space intersection with existing and future port related transport infrastructure, the need to find an adequate model of management and investment in space which will satisfy all key stakeholders as well as coordinate the many processes and interests that take place within the selected area and in its immediate vicinity.

7. PA objectives

The main objectives of the pilot action conducted in Rijeka through partnership of City of Rijeka and Port of Rijeka Authority can be summarized in several basic directions: to define the condition of ownership, use, plans and remediation options; to determine the state of the environment in the part of the area managed by the Port of Rijeka Authority: to propose remediation measures, taking

into account that a large part of the area is privately owned and to establish a local partnership related to the area.

8. Activities carried out

Defined through the Pilot Action objectives several studies have been carried out:

Fundamental research of the enviromental status of the harbour area. The study included testing air quality, soil contamination, sea sediment quality analysis, sea quality analysis, soil quality analysis, Biological status of demersal communities in waters of Petroleum port Mlaka.

Proposals of the measures for the rehabilitation of Petroleum port Mlaka included measures that need to be taken in order to enviromentaly rehabilitate the area, considering the amount of contamination.

Study of the future use of the Petroleum port Mlaka gave an overview of the economic, legislative and strategic status of the area with proposal for the future use.

Spatial Planning, Urban and Social Aspects of the Future Use of the Mlaka Industrial Area, provided an analysis of the existing situation through the territorial, demographic and economic aspects, institutional and political environment, administrative and procedural obligations. It also elaborated the spatial features, communal, transport and energy infrastructure, analysis of spatial planning documentation, interventions and development programs of the subject area, presentation of capacities for managing the development of the area and SWOT analysis and proposal of a plan for implementation of urban transformation of the selected area.

The proposal of measures for economic and ecological recovery and remediation of the industrial area of Mlaka included an analysis of the current state of the environment and an overview of the measures that need to be taken to remediate the environment, considering the amount of pollution, and the

proposal of phases of analysis and implementation of remediation of the contaminated area in accordance with the legislative context.

Also the stakeholders as well as local partnership meetings have been held.

9. Technical specifications and solutions tested

No specific solution testing was conducted in this pilot activity, but possible remediation solutions based on the basic research, experience of other partners and beyond were proposed within the studies.

Basic research conducted at the Petroleum Port showed that the Croatian legislation has not specified or prescribed the limits for polycyclic aromatic hydrocarbons, metals, or alkanes in the soil, it is not possible to determine whether the results above meet the statutory limits or not.

For this reason, a Dutch list has been taken for reference purposes. The Dutch list contains medium and intervention concentrations of pollutants in the soil, sediment, and water (values presented in the table).

According to the results obtained, it is evident that the soil at the Petroleum Port is heavily permeated with hydrocarbons, and that the figures increase with the depth. More detailed and deeper excavations need to be performed in order to determine the exact extent of pollution – excavations need to reach the impermeable, unpolluted layer, so that the scope of excavations and rehabilitation works on the soil at the Petroleum Port might finally be determined.

Rehabilitation measures proposed for the Petroleum Port in this document are based on the currently available data. In accordance with that, the following rehabilitation steps are proposed:

> construction of an impermeable barrier between the dry land perimeter of the Petroleum Port and the perimeter of upper INA's facilities, in order to prevent spreading and leakage of pollutants from the said facilities;

> construction of an impermeable dam between the Petroleum Port embankment and the sea, to prevent the spread of pollution during soil rehabilitation;

> rehabilitation of the Petroleum Port soil by excavating it, transporting the excavated polluted gravel to the hazardous waste incinerator, and replacement of the excavated material with a non-hazardous material, and flattening out the surface.

> marine sediment rehabilitation by excavating the polluted parts and disposing of them in the hazardous waste incinerator;

> breakwater rehabilitation and reconstruction, so that it may provide adequate protection for inbound ships.

Furthermore, it is necessary to point out that Petroleum Port Mlaka is an integral part of its surroundings, more specifically the former oil refinery. The refinery closed down in 2008, but the area has still not been rehabilitated.

Proposal for the new measuring stations

In this scope it is necessary to determine the value of land (relatively attractive - the example of the construction of the West Shopping Center near the contaminated area is good indicator of that) and then reduce this value for the estimated cost of remediation. Without such information, any entry of public institutions into the project is not advisable. After that, it will be possible to determine optimal financial management models and there will be need for review listed recommendation.

Due to the current ownership of the site, land attractiveness, researches previously conducted on the site and investment plans, it is possible to identify the following key limitations and recommendations for further development.

Key factors that limit the financial capability of implementing the entire project are:

Legal restrictions on the amount of city public investment for which loan is required,
Low public confidence and poor experience in implementing PPP projects in Croatia and preferring the implementation of traditional projects,
The limited budget of the city of Rijeka for the implementation of complex project,
Lack of expertise in the preparation and implementation of complex projects which require a balanced mix of revenues and other financial operations which ensure financial sustainability,
Long programming and approval procedures for grants funded projects

Restrictions on State Aid to Entrepreneurs,

Lack of public information on the current financing possibilities for such a project and frequent overlapping of programs and financial instruments
Lack of national funding program to facilitate and assist in the implementation of land remediation projects
Given the assumption that ensuring the financial structure of the project

implementation is the key factor of the project launch, recommendation for further financial engineering can be given - in order to close future financial structure:

Considering the formation of a joint "task force" team composed of experts - representatives of involved actors - INA d.d., the City of Rijeka, University of Rijeka and external experts; establishment of effective and transparent data exchange systems among stakeholders, in particular data on pollution status, remediation modes and cost of remediation;

Developing of project preparation activity plan with deadlines, expected results and risk avoidance measures; delegation of plan implementation activities to “task force” with defined responsibilities

Include institutions (ministries, agencies) in the project preparation and in proposal to register project area in Croatian register of black spots, what would

create additional funding channel for remediation program by the Environmental Protection Fund

Considering that the project of a technology park establishment is a public initiative of the city and the university of Rijeka and by taking into account limits of government financing opportunities due to "polluter pays" in the part of environmental remediation opportunities for transferring land ownership to the public sector should be considered. That would allow public sector financing opportunities in soil remediation phase. Key factor for that is quality determination and definition of the remediation cost, risks and risk sharing

During infrastructure development, financing with EU grants to the fullest extent should be considered and taken into account (European Regional Development Fund and similar);

Inclusion of investment banks in project preparation and financing;

Presentation of the project to potential private investors and potential new infrastructure operators who would commit to set up innovative and technology- intensive companies in the revitalized area.

10. Impact/ results/ experience (how many target groups/ stakeholders were reached, pilot events)

The brownfield pilot area has long been economically abandoned. This project has informed and made aware the stakeholders about its importance and possibilities. The stakeholders are organized into a local group and motivated for active work even after the formal finish of the project.

Local stakeholders represent all relevant competent companies for the rehabilitation and future management of the area where the pilot project will be implemented. Local stakeholders are: utility societies, companies who deals with prevention and sanitation of pollution, energy agencies and institutions responsible for controlling the health conditions in the county and urban planners.

Local stakeholders were involved in preparation of studies, data collection, data analysis, discussion on potential measures and findings during organised events. Their input was on utmost importance. Due to the fact that they become homogeneous interest group, the great benefit is their mobilisation for future activities.

In the scope of the project City od Rijeka and Port of Rijeka Authority organized together stakeholder meetings, pilot events, trainings and conferences.

11. Contribution to project objectives

For the first time, the Strategic Action Plan for renovation of brownfield and its conversion will be made.

Documents that have been produced during the implementation take full account of the space, including its sea area. The materials thus prepared give a clear picture of the entire area's recovery and a meaningful vision of changing the space.

For the first time fundamental research and proposal of measures for the remediation of the area have been done.

12. Transnational added value - how PA contributed to other activities implemented by the project & added value for partners

The City of Rijeka and port of Rijeka Authority benefitted from the joint implementation of project activities in many ways: in a situation where due to complex ownership relationships, high remediation costs and national legislation, the right processes have not even begun - to transfer the knowledge gained through participation in project activities to local stakeholders is invaluable. Studies made within the project may find their application in other parts of Croatia, which face similar problems.

13. Compliance with the sustainability principles

The pilot action in Rijeka complies with the sustainability principles as all the activities aimed at making the current ecologically and socially disadvantaged area better and more sustainable. Studies carried out within the project addressed not only the issues of remediation, the currently contaminated area, but also the social aspects of the area.

14. Media coverage

All of the activities mainly events have been announced to the media