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# MAIN FINDINGS, OBSTACLES AND CHALLENGES FOR IMPROVEMENTS OF THE WATER/WASTEWATER SECTOR IN MUNICIPALITY OF TEŠANJ

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## ABSTRACT

*Tešanj municipality, situated in the north of the Federation of Bosnia and Herzegovina, has an estimated 47,000 inhabitants, with some 5,000 to 6,000 people living in the town of Tešanj. It is a historic town which developed around the river Tešanjka, a tributary of the Usora River.*

*The water distribution system is in technically good condition. Over the past years the primary water networks have been reconstructed and Non Revenue Water is said to be less than 25%.*

*The main problem is in the water source. The principle source is shallow groundwater along the Usora River. There are several well fields. Because of "poor management" of the river, such as extensive sand mining and the uncontrolled discharge of pollutants, the aquifers are endangered. The sand pits cause a lowering of the groundwater table and affects the water production quantitatively. The contaminated river water is a threat to the quality of the groundwater source.*

*A search for deep groundwater as source for municipal water supply has not yielded results. The main reason for the municipality to construct and operate a wastewater treatment plant (WWTP) is the protection of the water quality of the Usora River. The riverbanks are the major source of water supply for municipalities in the area.*

*The Municipality Tesanj has set as one of the priorities that all the households in the settlements within the Municipality have a possibility to get connected to the public water supply system and public sewerage system (Strategic Objective No 2). Main purpose of the Strategic Objective is to protect the quality of the existing water resources and health of Municipality population.*

*The project preparation activities have been started in 2010 with a comprehensive "Study and Project Idea on drainage and treatment of wastewater from the area of Tesanj Municipality" which was developed by the "Institute of Hydrotechnic", "Faculty of civil engineering" of Sarajevo. Implementation phase of the project was planned to start in 2013 and completed in 2018 with the implemented a common sewerage system.*

*In this article a summary of the key factors related main findings, obstacles and chellenges for improvements water supply and wastewater management as an EU-standard Integrated Sustainable Water and Wastewater Management scheme in the Municipality of Tešanj is presented. The project concerns priority investment schemes for water and sanitation within the territory of Tešanj Municipality, the purpose of which is to improve public health and the environment.*

**Key words:** water supply, wastewater management, Municipality of Tešanj, main findings, obstacles, challenges**.**

## 1. INTRODUCTION

This article presents a guidance document on pre-appraisal of wastewater project in Municipality of Tešanj. The guide, including a simple financial analysis tool, is meant to be used by European

Investment Bank. It is a decision-support tool: it should help deciding which projects to propose to an established project preparation facility.
The pre-appraisal is a quick scan of a project proposal against a small set of main feasibility criteria. These criteria include:

- The socio-economic characteristics and development prospects of the municipality;
- The financial and operational "health" of the town's water supply services;
- The purpose of the project: what objectives does the project intend to meet?
- The proposed wastewater project: what is the intended scope and expected cost of the project? Is this the best solution for the existing wastewater problems? Have alternative options or phasing been considered?
- Key financial indicators such as wastewater tariffs needed to cover full costs, or to cover O&M costs only;
- What project documentation is already available, or is under preparation?

The results of the pre-appraisal is a set of conclusions and recommendations, such as:

- The likelihood that the project will pass a full feasibility study successfully;
- Possible modifications to the scope of the project to improve feasibility.

## 2. PROJECT CONTEXT

Tešanj municipality, situated in the north of the Federation of Bosnia and Herzegovina, has an estimated 47,000 inhabitants, with some 5,000 to 6,000 people living in the town of Tešanj. It is a historic town which developed around the river Tešanjka, a tributary of the Usora River.
Jelah is the municipality's commercial zone along the national road No.4 (Banja Luka – Doboj), some 7km north of the old town. Jelah is also the original industrial area with important textile and car parts industries. Although production has declined drastically since the war, most factories still operate. The area is now accommodating trading establishments (large markets). Population numbers in Jelah are similar to that in the old town. The water distribution system is in technically good condition. Over the past years the primary water networks have been reconstructed and Non Revenue Water is said to be less than 25%.
The main problem is in the water source. The principle source is shallow groundwater along the Usora River. There are several well fields. Because of "poor management" of the river, such as extensive sand mining and the uncontrolled discharge of pollutants, the aquifers are endangered. The sand pits cause a lowering of the groundwater table and affects the water production quantitatively. The contaminated river water is a threat to the quality of the groundwater source.
A search for deep groundwater as source for municipal water supply has not yielded results. From before the war there are plans for a regional water supply system with the main source in Teslić municipality (now situated in Republika Srpska) and supplying neighbouring municipalities, most of them in the Federation. These plans remain shelved. Water supply is part of the municipal communal utility company RAD which also handles solid waste management, wastewater and road maintenance during winters. There is no separate management and accounting of the water supply services. All assets are owned by the municipality.
Recent annual reports have not yet been received and firm financial information is not yet available. It is not confirmed whether the income from water sales do cover operation expenses. Current base tariffs for water are 0.81 and 1.84 KM/$m^3$ for domestic and industrial clients respectively. VAT (17%) and other charges (ranging from 1.15 to 19.75 KM/month) are to be added as costs to the customer.
RAD is optimistic about customers accepting higher tariffs to cover the forthcoming cost of wastewater facilities.

## 3. PROJECT OBJECTIVES

The main reason for the municipality to construct and operate a wastewater treatment plant (WWTP) is the protection of the water quality of the Usora River. The riverbanks are the major source of water supply for municipalities in the area. Tešanj municipality has two important well fields along the river (Jelah), the neighbouring municipality of Usora has one well field there. See map on figure 1.
Wastewater from Tešanj town is discharged at one point into Tešanjka river. This is a small stream and the impact of the untreated wastewater discharge of about 5000 people may be of concern.

Wastewater originating from Jelah is discharged into the Usora River directly. This is a larger river and under threat from other sources of pollution such as Telić town and its industries (textile). Treatment of wastewater from the two largest settlements Tešanj town and Jelah has the highest priority. Over time the municipality also wants to provide sewerage and sewage treatment services in the smaller settlements and hamlets which are dispersed over the territory.
The Usora River, and indirectly the adjacent groundwater sources, appears to be under threat from pollution. Treatment of municipal wastewater will contribute to mitigate this threat. However, there seem to be more factors that endanger the river, such as (industrial) wastewater from upstream sources and poorly controlled sand quarrying in and along its river bed. The rural population in Tešanj is very dispersed. There seems a lack of spatial management. This affects to cost of utility services such as access roads, electricity, water supply and sewerage.

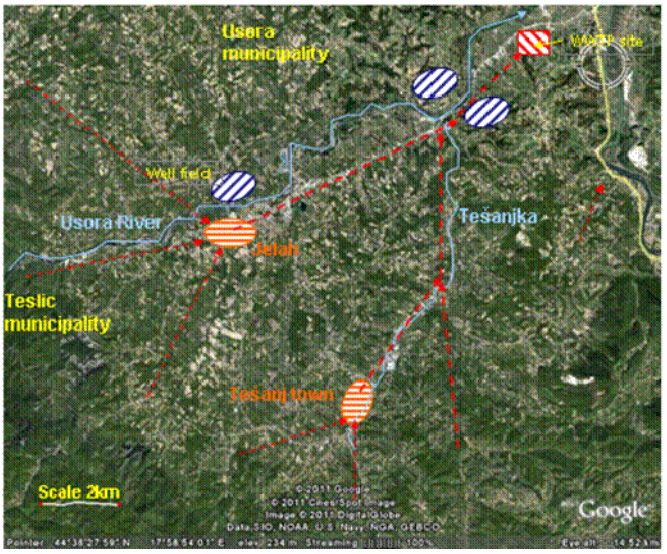


*Figure 1. Variant No.2 of the Tešanj wastewater plants.*

## 4. PROJECT IDENTIFICATION

Tešanj town has a wastewater collection network serving most of the population. Coverage in Jelah is somewhat less. There are about 30km of (combined) sewers in the municipality, 10km in Tešanj, 10km in Jelah and 10km spread out over smaller settlements. In total about 18% of the municipal population (or 8,500 people) is said to be connected to a public sewer. This may cover 5000 people in the old town, 2500 in Jelah and 1000 people elsewhere.
The majority of the inhabitants in the municipality use on-site wastewater disposal facilities. Officially these should be septic tanks with overflows into cess pits or open drains. Apparently wastewater of many houses is disposed into ditches and streams directly.
Both the municipality and private companies provide desludging facilities. Collected material is disposed into the river because no treatment facility is available. If properly operated, the monthly cost of desludging is said to amount to 100 - 150 KM per month for a family. This high cost and the fact that the sludge ends up untreated in the environment is a main reason for the municipality to aim at also covering the smaller settlements with piped sewerage.
The municipality has studied various options for the collection and treatment of wastewater in the municipality. It aims to collect most wastewater, also that from smaller settlements. Six variants have been examined, ranging from one central WWTP to be shared with all neighbouring municipalities (Teslić, Usora, Doboj South) to separate smaller WWTP's for clusters of settlements. The latter foresees in separate WWTPs for Tešanj town and Jelah. The first variant is preferred by the municipality, but because of expected administrative hurdles in the cooperation with the neighbours

(including Teslić in Republika Srpska) a middle variant is now being considered as leading. This variant "number 2" foresees in one central WWTP for Tešanj municipality to be located on the Usora River near to the border with Doboj South. Figure 1 illustrates the chosen variant of the plans. There are sub-variants where smaller WWTPs may serve upstream settlements and the area outside the Usora catchment (i.e. in the Bosna basin).
The municipality is aware of the size of the project. It intends implementing the project in three phases. The first two phases, each including some 100km of sewer pipes, would cost BAM 50- 56 million. Implementation may last till the year 2030. The municipality has proposed a first stage project covering the largest settlements Tešanj town and Jelah, the main collectors to the site of the central WWTP and the WWTP proper. Investment costs are expected to be BAM 20 million (€ 10 million) of which € 4.5 million would be an EIB loan and € 4.5 million a BiH government grant. Of the latter 40% would be ensured through IPA, 60% from municipal and cantonal sources.

## 5. CONCLUSIONS

Treatment of municipal wastewater, one of the aims of the project, will contribute to the protection of the Usora River, and indirectly the adjacent groundwater sources, from pollution. However, there are more factors that endanger the river, such as (industrial) wastewater from upstream sources and poorly controlled sand quarrying in and along its river bed. It is advisable to examine the relative impact of discharges of untreated wastewater from Tešanj on the river's ecology as compared to other potential threats. Such an integrated study would be the basis for a decision on the need and urgency of wastewater treatment. Tešanj is a very rural municipality. The two largest settlements count about 5000 to 6000 inhabitants each. Some 36,000 people live in smaller and rather dispersed settlements. Provision of piped sewerage in such areas is very expensive. Although commendable as a long term goal, it seems appropriate to examine the impact of the dispersed sources of pollution on the environment (i.e. groundwater and open water courses) to support a decision about the urgency of mitigating measures. Moreover, it is then advisable to explore alternative measures such as on-site treatment (e.g. in traditional septic tanks with overflows into cess pits) and regulatory instruments before a decision is taken to expand sewerage into rural settlements.
The municipality prefers a comprehensive solution of piped sewerage with one central WWTP for the entire municipality, and a phased implementation of this plan. The first construction stage of this variant is expensive because of the long main sewage collectors and, as indicated in the financial analysis, is likely to be unaffordable. Considering the probably very low priority of sewerage in rural areas it seems advisable to plan for a more modest setup, with small clusters of settlements and small individual WWTPs. Feasibility of phased implementation of such plan is more likely.
Expansion of the sewerage network and provision of wastewater treatment at Jelah seems a first priority for two reasons:

i. The proximity to the Usora River ;
ii. The growth in commercial and manufacturing activities the area is experiencing.

Recommendations are as follows:

- Carry out an Integrated River Basin Study for the Usora River, with the aim to identify main threats to the ecological condition of the river and groundwater resources and to formulate and prioritize measures to mitigate these threats.
- The results of the study shall place the need for and urgency of wastewater treatment in perspective. The results can also be used to examine alternative options of on-site wastewater facilities in rural areas.

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