



PLAVA VODA REGIONAL WATER SUPPLY PROJECT

Addendum to ESIA prepared in June 2011



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"PLAVA VODA"
d.o.o. Travnik

ESIA ADDENDUM DRAFT REPORT

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1 Introduction

In April 2015 EBRD has commissioned the review and update of the ESIA disclosure package developed in 2011 as part of a major investment project of the Plava Voda Regional Water Supply, which is being considered for financing by a parallel loan from the European Bank for Reconstruction and Development ("EBRD") and Council of Europe Development Bank ("CEB"). The assignment also includes the development of Resettlement and Livelihood Restoration Plan (RLRP).

1.1 Study Background

Based on the Protocol on Municipal Infrastructure Finance Facility (MIFF)¹ under which the European Bank for Development and Reconstruction (EBRD) has expressed willingness to finance municipal utility infrastructure in Bosnia and Herzegovina, and the Letter of Intent signed by EBRD on May 8 2009, a series of documents were developed for the Public Utility Company "Regional Water Supply Plava Voda" (the Company) by EU IPF consultants selected by the EBRD.

The Company has entered a subsidiary loan agreement with the Federation of Bosnia and Herzegovina, which, in turn, has entered a subsidiary loan agreement with the State of Bosnia and Herzegovina which has signed the MIFF with the EBRD.

The documents were developed in accordance with EBRDs procedures and requirements and they pertained to environmental and social impact assessment of the *Plava Voda Regional Water Supply Project* (the Project).

The following documents were prepared:

- *Environmental Impact Assessment and Social Impact Assessment Report* prepared by EU IPF consultants in July 2011
- *Stakeholder Engagement Plan* prepared by EU IPF consultants in June 2011
- *Resettlement and Livelihood Restoration Framework* prepared by EU IPF consultants in July 2011
- *Non – technical Summary* prepared by EU IPF consultants in July 2011

The Company has disclosed these documents to the public via its web site and information desks in all municipalities participating in the Project. The Company has also held public consultations in 2011 regarding the environmental and social impacts of the Project in these municipalities. The documents were accepted and approved by EBRD in 2011.

During 2013 and 2014 the Company has organized and coordinated a series of meetings between mayors of municipalities, line ministries and other relevant stakeholders of the Project in order to establish a loan agreement that would be feasible to all actors in the Project.

Namely, in November 2013, the municipalities have taken the initiative to decrease the amount subject to subsidiary loan from EBRD for the implementation of the Project due to the difficult economic situation. It was proposed that this amount is secured through domestic financing sources at the Federal and cantonal levels. The Letter of Intent, containing these provisions, agreed upon with the Federal Government and signed by the Company management, supervisory Board and mayors of all five municipalities was sent to EBRD and Council of Europe Development Bank (CEB) for approval in December 2013.

¹ *Decision on approval of signing the Protocol on Municipal Infrastructure Finance Facility*", no. 432/04 brought by the Government of Federation of Bosnia and Herzegovina on August 26 2004

In September 2014, a new Letter of Intent for subsidiary loan was signed by the Company, Prime ministers of Central Bosnia Canton and Zenica Doboje Canton, Environmental Protection Fund of FBiH, mayors of Travnik Municipality, Novi Travnik Municipality, Vitez Municipality, Busovača Municipality and Zenica town, and submitted to EBRD for further procedure.

In April 2015, following a series of consultations, the draft document on the basic conditions of the subsidiary loan from EBRD, signed by the above mentioned stakeholders was submitted to EBRD for the adoption procedure.

In this light, the 2011 ESIA needs to be updated to reflect the newest findings, which will confirm that the land acquisition needs of the Project and key stakeholders remain unchanged, to ascertain or confirm the potential impacts and to elicit the Company's, potential affected people's and relevant authorities' views on the potential impacts and expected interventions to confirm no new issues have arisen.

1.2 Methodology

The review and update of the ESIA is presented in the form of an Addendum to the ESIA where all changes to the Project, baseline information and impacts identified in the previous ESIA are clearly identified and described. The Consultant has used the outline of the previous ESIA, indicating which chapters have been updated and/or changed, whilst those findings and/or conclusions that are still valid in relation to 2011 have not been included in this report and may be found in the respective chapters of the 2011 ESIA. Therefore, this ESIA Addendum should be read in conjunction with the 2011 ESIA.

When reviewing and updating the previously developed ESAP, the Consultant has used the table form proposed in the earlier ESIA, and has included new proposed actions, whilst highlighting them for better understanding of what has been added/ changed in relation to the original ESAP. Where necessary, the Consultant has also included comments/ clarifications on actions proposed in the earlier ESAP to reflect the current Project findings.

The Consultant has undertaken the following tasks under this assignment:

- **Site visit.** The Consultant has carried out site visits for consultations with the Client to ascertain the Project parameters and to obtain necessary documentation developed under the Project. The Census and Socio-economic Survey were carried out in the period 23-26 April 2015 in all five municipalities covered by the Project, by a team of 8 surveyors and 1 supervisor, on the basis of ortho-photo maps of the pipeline route and information on affected cadastral plots provided by the Public Enterprise;
- **Review of existing documentation.** This task included a detailed review of the ESIA disclosure package and other relevant documents, including the Environmental Impact Assessment Study developed for the Project according to local legislation, the Study on the protection of water source "Plava Voda" harmonized with the new Regulation on defining conditions for determining sanitary protection zones and protection measures for public water supply water sources (Official Gazette of FBiH, no. 88/12) and the Expropriation Study prepared by the Public Enterprise in 2012 which were made available to the Consultant during the site visit;
- **Interviews with relevant Project stakeholders.** Under this task, the Consultant has interviewed the public utility companies in charge of water distribution and wastewater collection from the municipalities participating in the Project using questionnaires to obtain new relevant data on the state of the public water supply and wastewater collection system in their respective territories;
- **Development of ESIA Addendum.** Based on the previous tasks, the Consultant has developed an ESIA Addendum which included an update of baseline data, Project impacts and revision of the ESAP. The Consultant has also updated the Disclosure Pack for the Project in English and local language to be disclosed to the public;

- **Update of the Stakeholder Engagement Plan (SEP)** developed initially in 2011;
- **Update of the Resettlement and Compensation Framework (RCF), and development of Resettlement Action Plan (RAP)** with the aim of setting out the principles for addressing the potential impacts of land acquisition within the Project and providing more precise details on the project affected people, the eligibility criteria and the procedures to be applied for the Project.

1.3 National Legal Requirements

The updated information in this section pertains to new legal requirements that have come into force since the 2011 ESIA was developed.

Since the ESIA was developed in 2011, three new pieces of legislation pertinent to the Project have been adopted:

- *Regulation on sanitary conditions of drinking water* (Official Gazette of BiH, no 40/10 and 30/12) which prescribes the requirements and standards to be met by drinking water, the maximum allowed values of parameters, methods laboratory tests, and measures for monitoring sanitary conditions of drinking water;
- *Regulation on defining conditions for determining sanitary protection zones and protection measures for public water supply water sources* (Official Gazette of FBiH, no. 88/12) which defines the conditions for the methods of determining sanitary protection of water sources which may be used or are being used for public water supply, protection measures in sanitary protection zones and procedures for bringing decisions on sanitary protection of water sources, and
- *Regulation on determining environmental flow* (Official Gazette of FBiH, no. 04/13) which defines the methods for determining environmental flow, monitoring and reporting on environmental flow. This Regulation applies to all water bodies in the Federation of BiH with the aim to preserve water and water-related ecosystems, regardless whether the water bodies in question are permanent or temporary.

2 4.1 Update to Description of the Proposed Project

2.1 Introduction

The updated information in this section pertains to new activities undertaken within the implementation of the Project, including permits obtained under national law, new Project documents developed, etc.

Following the development of the 2011 ESIA, a series of activities was conducted on the Plava Voda Regional Water Supply Project in line with national legislation, regarding obtainment of necessary permits and development of Project documentation.

The following permits were obtained in the period between July 2011 and now:

- Environmental Permit issued by the Federal Ministry of Environment and Tourism in October 2011;
- Urban Permit issued by the Federal Ministry of Physical Planning in May 2012;
- Water Consent issued by the Sava River Watershed Agency Sarajevo in August 2012;
- Water Consent issued by the Ministry of Agriculture, Water and Forestry of Zenica-Doboj Canton in August 2012;

- Water Consent issued by the Ministry of Forestry, Water Management and Agriculture of Central Bosnia Canton in September 2012;
- Principal Approval for Construction of complex infrastructure for regional water supply "Plava Voda" issued by the Federal Ministry of Physical Planning in April 2014.

The following Project documents were developed in 2012:

- Main Design (revised);
- Preliminary geotechnical study (Study G1)²;
- Fire Protection Main Design;
- Occupation Safety Study;
- Main Geotechnical Study (Study G21)³;
- Written report on Design Revision (Study G23)⁴;
- Study on protection of "Plava Voda" water source (developed in 2012, and updated in 2013 to reflect the changes in national legislation regarding sanitary protection of water sources).

2.2 Aboveground Objects

The updated information in this section pertains to changes proposed to aboveground objects in relation to information from the 2011 ESIA (Chapters 2.2, 2.3 and 2.4).

In November 2011, after the Main Design had passed the revision phase, the Company received a request from the Municipality of Travnik to relocate the planned position of the water tank in local community Dolac from the hill Gradina on the right side of the transport pipeline (direction Travnik - Zenica) to Gostunj location on the left side of the transport pipeline. According to Company representatives, this proposal was made in order to ensure that water supply was made available to more people in this local community than by the technical solution originally planned.

The Company will have to ensure that this new situation is included in the Main Design and that all adequate procedures under local legislation are followed upon its implementation.

In December 2012, the Municipality of Travnik ensured 6.989,58 BAM for the procurement of electrical equipment in order to improve the Kula water tank located in local community Nova Bila, and operated by the PUC "Trebišnjica".

² According to *Regulation on geotechnical investigation, survey and organization and contents of geotechnical reports* (Official Gazette of FBiH, no. 60/09)

³ According to *Regulation on geotechnical investigation, survey and organization and contents of geotechnical reports* (Official Gazette of FBiH, no. 60/09)

⁴ According to *Regulation on geotechnical investigation, survey and organization and contents of geotechnical reports* (Official Gazette of FBiH, no. 60/09)

3 Update to Baseline Data of Environmental and Social Conditions

3.1 Potable Water Source, Supply and Distribution

The updated information in this section pertains to the number of connections in each municipality, amount of water abstracted and delivered to users and the quality of water delivered, and to any changes in the water distribution and sewerage system (if applicable).

Travnik

Public Water Utility Company "Bašbunar" has served 10,336 households and 1,006 legal entities in 2014, and as of March 2015, it serves 10,404 households and 939 legal entities. Approximately 64% households have water meters and 94% of legal entities have water meters.

According to the Study on protection of "Plava Voda" water source, Public Water Utility Company "Trebišnjica" provides water to approx. 2,500 users of the Nova Bila local community and Water Utility "Vlašić" provides water to approx. 226 users at the Vlašić Plateau.

Public Water Utility Company "Trebišnjica" has undertaken activities on the increase of the water supply system of Nova Bila and surrounding settlements. This included construction of the new water tank Kula, which is significant for the supply of water to higher settlements (above 500 m a.s.l) and water tank Radićeva glavica (above 600 m a.s.l). However, these tanks have not yet been put in use. This system is planned to serve an additional 4,000 inhabitants (villages of Kula, Ričice, Čifluk, Gornji Pokrajčiči, Brankovac, Prahulje, Perići, Lovići and part of Gladnik).

The *Study on protection of "Plava Voda" water source* has defined the measures for the protection of this water source in line with the new *Regulation on defining conditions for determining sanitary protection zones and protection measures for public water supply water sources* according to which water sources are divided into four groups by the mechanism of occurrence and the manner of water abstraction. "Plava Voda" water source has been defined as typically karst water source and according to the Regulation, a special regime is required for the protection of such water sources. Therefore, in line with the Regulation four sanitary protection zones have been proposed for "Plava Voda":

- I. protection zone (zone with the strictest prohibitions and restrictions);
- II. protection zone (zone with strict prohibitions and restrictions);
- III. protection zone (zone with moderate prohibitions and restrictions); and
- IV. protection zone (zone with preventive prohibitions and restrictions).

These zones have been defined in order to prevent or mitigate impacts of certain human activities which might endanger the qualitative and quantitative characteristics of the water source.

The measures for the protection of the "Plava Voda" water source catchment are:

- appropriate fencing of the I. protection zone;
- marking of all individual protection zones;
- development of project documentation for adequate collection and disposal of sewerage in settlements located in the II. and III. protection zones, and construction of adequate sewerage systems;
- development of monitoring programmes for groundwater;
- removal of wild dumpsites and adequate collection of municipal solid waste;

- implementation of rehabilitation and development measures in forest ecosystems; and
- implementation of special control activities in protection zones.

This Study has also defined a draft *Decision on the protection of water source "Plava Voda"*, which, upon adoption by the Municipal council of Travnik Municipality will create an adequate legal framework for the establishment of the prescribed regime of water catchment protection.

Data regarding consumer demand in 2014 is provided in Table 1 (refers to Table 3 of the 2011 ESIA).

Table 1: Water consumption in Travnik in 2014⁵

Item	Water quantity (m ³)
Annual water extraction	627,139
Water delivered to:	
Households	443,293
Legal entities	52,181
Total water delivered	495,474

In 2014 a total of 747,157.97 m³ of wastewater was discharged into watercourses of Travnik Municipality.

Novi Travnik

The Public Water Company "Vilenica Vodovod" manages the water supply system for the town Novi Travnik and 3 surrounding settlements (Trenica, Rankovići, Stojkovići), and, according to the information collected, the Company is dealing with a total number of 4,415 connections distributed as follows: households 4,069, legal entities 346.

The total number of installed water meters is 811.

Chemical and bacteriological analysis of raw water samples and samples from the tap are undertaken by the Cantonal Institute for Public Health in Travnik. According to data obtained from the Public Water Company, a total of 144 microbiological analysis and 12 physical-chemical analysis were carried out in 2014. All samples satisfied the national regulatory standards, except one.

Data regarding consumer demand in 2014 is provided in Table 2 (refers to Table 6 of the 2011 ESIA).

Table 2: Water consumption in Novi Travnik in 2014⁶

Item	Water quantity (m ³)
Annual water extraction	480,000
Water delivered to:	
Households	150,000
Legal entities	60,000
Total water delivered	210,000

According to information obtained from Water Utility Company "Vilenica Vodovod" settlements having sewer system are Kasapovići, Isakovići, Muholjići and Pribilovići.

⁵ Data from Water Utility "Bašbunar"

⁶ Data from Public Water Company "Vilenica Vodovod"

Vitez

The Consultant is still waiting for new information from the Water Utility Company "Vitkom". As of May 2015, the Consultant has not received data from this utility company.

Busovača

A total of 1,768 households or 6,500 inhabitants and 180 legal entities are served by the Water Utility "Komunalac" as of April 2015. Out of this number, 1,200 households and 170 legal entities have installed water meters.

Analysis of water quality from the water sources is performed twice per week by the Cantonal Institute for Public Health of Central Bosnia Canton. According to data obtained from the Water Utility, as of March 2015, samples taken from water sources show adequate quality. However, the Consultant did not receive information from the Water Utility according to which standard this testing was conducted and whether it is in line with provisions of the *Regulation on sanitary conditions of drinking water*.

Data regarding consumer demand in 2014 is provided in Table 3 (refers to Table 14 of the 2011 ESIA).

Table 3: Water consumption in Busovača in 2014⁷

Item	Water quantity (m ³)
Annual water extraction	480,000
Water delivered to:	
Households	150,000
Legal entities	60,000
Total water delivered	210,000

The water distribution network is summarized in Table 4 (refers to Table 17 of the 2011 ESIA).

Table 4: Water distribution network in Busovača in 2015⁸

Material	Diameter	Length (l.m.)	Age (Years)
Cast Iron	400mm	2,000	
Asbestos Cement	50 to 150mm	5,000	50
PEHD	25 (1/2") to 200mm	50,000	Up to 25
PVC	Up to 50mm or 2"	20,000	Up to 40
Galvanized Steel	Up to 50mm or 2"	15,000	Up to 40

Since 2011, three new water supply systems (pumping systems) have been constructed for 50 new households.

The Water Utility has reported that it uses 8,000 kg of chlorine for water disinfection.

A total of 480,000 m³ of wastewater was discharged in 2014.

⁷ Data from Water Utility "Komunalac"

⁸ Data from Water Utility "Komunalac"

Zenica

In Zenica, 130,000 inhabitants are connected to the public water supply system. The total number of households that are served by the Water Utility "Vodovod i Kanalizacija" amounts to 27,158 (18,274 households living in apartment buildings and 8,884 households living in individual houses), and the total number of legal entities billed by the Water Utility amounts to 1,855.

Table 5 (refers to Table 19 of the 2011 ESIA) presents data on consumers who are supplied by the Water Utility "Vodovod i Kanalizacija" Zenica, and have installed water meters. Apartment buildings have only one water-meter for the whole building.

Table 5: Number of water meters in Zenica in March 2015⁹

No.	Number of connections (water-meters)	
1	Apartment buildings	1,227
2	Private houses	8,884
3	Total households (1+2)	10,111
4	Legal entities	2,332
5	Total connections (3+4)	12,443

The annual amount of water abstracted and delivered to consumers by the Water Utility is presented in Table 6 (refers to Table 20 of the 2011 ESIA)

Table 6: Water consumption in Zenica in 2014¹⁰

Item	Water quantity (m ³)
Annual water extraction	8,188,102
Water delivered to:	
Households	4,263,630
Legal entities	1,699,989
Total water delivered	5,963,619

Losses in the water supply system of Zenica amounted to 2,224,483 m³ (27.17%) in 2014.

3.2 Socio-economic Profile

The updated information in this section pertains to new information regarding the socio-economic profile of the municipalities included in the Project, including analysis of the population, following the 2013 census, employment structure and wages in place and updated information on public health.

3.2.1 Demographic Profile

In addition to the population censuses 1948 to 1991, there was a recent census in BiH, carried out in 2013. The table below shows population numbers for the municipalities recorded for the previous four previous censuses.

⁹ Data from Water Utility "Vodovod i Kanalizacija" Zenica

¹⁰ Data from Water Utility "Vodovod i Kanalizacija" Zenica

Table 7: Population Census Results 1971 to 2013

Census Year	Travnik	Novi Travnik	Vitez	Busovača	Zenica
1971	55,822	22,847	20,628	14,428	112,447
1981	64,100	26,154	24,166	16,289	132,733
1991	70,747	30,713	27,859	18,879	145,517
2013	57,543	25,107	27,006	18,488	115,134

Source: Preliminary Results of the 2013 Census of Population, Households and Dwellings in Bosnia and Herzegovina, First Release, No. 1/2013, Agency for Statistics of B&H, 2013

There was a steady increase in population in all the municipalities throughout the 1971-1991 period. However, the latest census shows decrease in population number in 2013, especially in Travnik, Novi Travnik and Zenica.

According to last census, population for the individual municipalities totalled to 243,278 inhabitants in the project area, which is slightly less than what originally projected by the ESIA for 2009 (248,089 inhabitants) and also differs from the projections of the Federal Institute of Statistics for 2013 (247,089).

Table 8: Population estimates by the Federal Institute of Statistics

Municipality	Item	2005	2006	2007	2008	2009	2010	2011	2012	2013	2013*
Travnik	Population	55,590	55,195	55,217	55,093	55,000	54,878	54,771	54,567	54,557	57,543
	Growth %	-	-0.71	0.04	-0.22	-0.17	-0.22	-0.19	-0.37	-0.01	
Novi Travnik	Population	24,753	24,826	24,840	24,834	24,859	24,884	24,880	24,899	24,930	25,107
	Growth %	-	0.29	0.06	-0.02	0.10	-0.09	0.01	0.07	0.12	
Vitez	Population	24,906	24,982	25,010	25,070	25,052	25,109	25,137	25,214	25,230	27,006
	Growth %	-	0.31	0.11	0.24	-0.07	0.22	0.11	0.31	0.06	
Busovača	Population	16,005	16,065	16,114	16,095	16,073	16,068	16,013	16,009	16,018	18,488
	Growth %	-	0.37	0.31	-0.12	-0.14	-0.03	-0.34	-0.02	0.05	
Zenica	Population	127,646	127,307	127,334	127,113	127,105	127,103	127,202	127,296	127,162	115,134
	Growth %	-	-0.27	0.02	-0.17	-0.01	-0.001	0.07	0.07	-0.10	
Total for the region	Population	248,900	248,375	248,515	248,205	248,089	248,042	248,003	247,985	247,897	243,278
	Growth %	-	-0.21	0.06	-0.12	-0.05	-0.02	-0.02	-0.01	-0.04	
FB&H	Population	2,328,000	2,325,000	2,328,359	2,327,195	2,327,318	2,337,000	2,338,000	2,338,000	2,337,000	2,371,603
	Growth %	-	-0.13%	0.14%	-0.05	0.01	0.41	0.04	0.00	-0.04	

* Results as per preliminary results of the 2013 Census of Population, Households and Dwellings in Bosnia and Herzegovina

3.2.2 Ethnic Mix

The data on ethnic mix resulted from the latest census in BiH have not been published yet, due to sensitivity of such data. However, it is not expected that this update would significantly change the status quo portrayed in the original EIA.

3.2.3 Population projections

In July 2014, the *Draft Spatial Plan of the Federation of Bosnia and Herzegovina for the period 2008-2028* was adopted by the House of Representatives of the Parliament of the Federation of BiH; however, the full adoption procedure is still ongoing. The Draft Spatial Plan includes the projections of population for the planning period, as one of the basis for spatial planning.

Population projections for FBiH by cantons and municipalities were made based on assumptions about trends in fertility and mortality in the planning period 2008-2028. The cohort-component method was applied, which implied setting of hypotheses on fertility by age of mother, and on mortality by age and sex. Zero net migration was assumed, which means that migrations were not taken into account.

As the base population for projections, the estimated population of municipalities by age and sex (up to 80 years and over) in mid-2008 (June 30) was used.

Table 9 shows population projections for municipalities of Travnik, Novi Travnik, Vitez, Busovača and Zenica for the period 2008-2028.

Table 9: Population projections for municipalities of Travnik, Novi Travnik, Vitez, Busovača and Zenica for the period 2008-2028

Municipality	2008	2013	2018	2023	2028
Travnik	55,093	55,583	55,932	56,054	55,881
Novi Travnik	24,834	24,984	25,098	25,143	25,084
Vitez	25,070	25,257	25,434	25,586	25,675
Busovača	16,095	16,242	16,386	16,537	16,468
Zenica	127,113	127,674	127,340	126,300	124,741

Source: Draft Spatial Plan of the Federation of Bosnia and Herzegovina for the period 2008-2028

Development of this Spatial Plan started in 2008 and population projections were calculated for the period 2008-2028. It is, however, evident that projected population for 2013 (Table 9) differs from the preliminary results of 2013 Census in BiH (Table 7). Those projections will probably need to be revised, once the final results of the 2013 census of population, households and dwellings in BiH are published and the adoption procedure of the Draft Spatial Plan is complete. However, this difference of 6,462 persons in total is not expected to significantly affect the Project, as the projections are on the side of caution in relation to the Project (the actual population count is smaller than the projections) and its ability to provide potable water.

3.2.4 Population by Settlements According to Preliminary Results of the 2013 Census of Population, Households and Dwellings in Bosnia and Herzegovina

The Municipality of Travnik has 90 settlements, with the population and household numbers shown in

Table 10 below (refers to Table 36 of the 2011 ESIA). This information is updated as per latest census in BiH in 2013. The settlements marked red in table are not inhabited based on census date, which differs from the previous 2011 ESIA information, based on the Spatial Plan Plan of Travnik Municipality 2004-2020.

Table 10: Population and number of household by settlements in Travnik Municipality

No.	Settlement	Population number	No. of households	No.	Settlement	Population number	No. of households
1	Bačvice	597	166	46	Mosor	267	74
2	Bandol	204	60	47	Mudrike	556	114
3	Bijelo Bučje	739	183	48	Nova Bila	767	241
4	Bilići	311	87	49	Orahovo	421	114
5	Brajići	646	159	50	Orašac	-	-
6	Brajkovići	540	122	51	Orlice	-	-
7	Brankovac	316	84	52	Ovčarevo	513	148
8	Čifluk	118	32	53	Paklarevo	997	277
9	Čosići	451	123	54	Podkraj	575	131

No.	Settlement	Population number	No. of households	No.	Settlement	Population number	No. of households
10	Čukle	720	142	55	Podovi	1,174	286
11	Dolac	533	142	56	Podstinja	648	160
12	Dolac na Lašvi	459	150	57	Pokrajčiči	1,655	485
13	Donja Trebeuša	92	23	58	Poljanice	268	60
14	Donje Krčevine	325	85	59	P.Slavka Gavrančića	370	117
15	Donji Korićani	11	5	60	Prići	216	48
16	Dub	1,041	245	61	Pulac	424	106
17	Đelilovac	910	239	62	Putičevo	1,282	396
18	Fazlići	193	50	63	Radića Brdo	243	70
19	Gladnik	344	94	64	Radojčići	315	75
20	Gluha Bukovica	964	232	65	Radonjići	131	39
21	Goleš	437	121	66	Ričice	615	169
22	Gornja Trebeuša	110	28	67	Runjići	166	51
23	Gornje Krčevine	597	162	68	Sažiči	24	7
24	Gornji Korićani	67	12	69	Sečevo	177	46
25	Gradina	388	107	70	Seferi	432	118
26	Grahovčići	563	97	71	Selići	307	86
27	Grahovik	309	94	72	Skomorje	116	26
28	Guča Gora	582	183	73	Slimena	1,328	360
29	Hamandžiči	258	78	74	Suhi dol	513	134
30	Han Bila	715	194	75	Šešiči	192	59
31	Jezerci	398	101	76	Šipovik	252	87
32	Kljaci	672	195	77	Šišava	200	69
33	Kokošari	31	11	78	Travnik	16,534	5,524
34	Komar	-	-	79	Turbe	4,029	1,226
35	Kraljevice	178	50	80	Turići	677	196
36	Krpeljići	661	154	81	Varošluk	709	181
37	Kruševo Brdo I	-	-	82	Velika Bukovica	105	33
38	Kruševo Brdo II	-	-	83	Vidoševići	152	49
39	Kula	559	169	84	Vilenica	22	6
40	Kundići	88	25	85	Višnjevo	1,001	231
41	Lovrići	109	32	86	Vitovlje	588	159
42	Mala Bukovica	134	45	87	Vlahovići	324	93
43	Maline	1,158	294	88	Vranići	60	21
44	Miletići	118	25	89	Zagrađe	456	105
45	Miškića Brdo	96	31	90	Zaselje	-	-
Total:						57,543	16,641

The Municipality of Novi Travnik has 52 settlements, with the population and household numbers shown in the Table 11 (refers to Table 37 of the 2011 ESIA). This information is updated as per latest census in BiH in 2013.

Table 11: Population and number of household by settlements in Novi Travnik Municipality

No.	Settlement	Population number	No. of households	No.	Settlement	Population number	No. of households
1	Balići	879	230	27	Novi Travnik	9,533	3,142
2	Bistro	355	84	28	Opara	221	57
3	Božići	72	21	29	Orašac	820	220
4	Bučići	555	136	30	Pečuj	571	151
5	Budušići	205	55	31	Petačići	261	61
6	Bugojčići	150	50	32	Potočani	197	52
7	Bukvići	340	92	33	Pribilovići	381	83
8	Čakići	334	80	34	Pričani	369	93
9	Čehova	526	144	35	Rankovići	353	261
10	Dahovo	≤10	≤3	36	Rastovci	819	225
11	Donje pećine	263	53	37	Rat	288	80
12	Duboko	178	48	38	Reput	197	49
13	Đakovići	23	10	39	Ruda	236	59
14	Gornje pećine	238	65	40	Sebešić	68	19
15	Hadžići	165	49	41	Seona	75	24
16	Has	379	94	42	Sinokos	456	116
17	Isakovići	213	71	43	Stojkovići	451	133
18	Kasapovići	517	159	44	Šenkovići	459	114
19	Kopila	221	64	45	Torine	199	50
20	Kovačići	42	13	46	Trenica	409	106
21	Krnjića potok	193	49	47	Trnovac	-	-
22	Lisac	357	85	48	Turalići	41	10
23	Margetići	223	61	49	Vežzovići	156	45
24	Monjići	237	62	50	Vodovod	49	14
25	Nević polje	749	229	51	Zenepići	122	34
26	Nova Opara	221	54	52	Zubići	131	37
Total:						25,107	7,295

The Municipality of Vitez has 34 settlements, with the population and household numbers shown in the Table 12 below (refers to Table 38 of the 2011 ESIA). This information is updated as per latest census in BiH in 2013. The settlement marked red in table is not inhabited based on census date, which differs from the previous 2011 ESIA information, based on the Spatial Plan of Vitez Municipality 2006-2020.

Table 12: Population and number of household by settlements in Vitez Municipality

No.	Settlement	Population number	No. of households	No.	Settlement	Population number	No. of households
1	Ahmići	533	163	18	Nadioci	370	113
2	Bila	1,584	492	19	Pirići	171	50
3	Brdo	49	12	20	Počulica	466	130
4	Bukve	211	57	21	Preočica	1,098	313
5	Divjak	1,404	427	22	Prnjavor	293	79
6	Donja Večeriska	588	187	23	Putkovići	106	30
7	Dubravica	1,113	343	24	Rijeka	1,330	385
8	Gačice	673	196	25	Sadovače	423	126

No.	Settlement	Population number	No. of households	No.	Settlement	Population number	No. of households
9	Gornja Večeriska	380	115	26	Šantići	873	292
10	Jardol	747	230	27	Sivrino selo	382	123
11	Krtine	-	-	28	Tolovići	151	45
12	Krčevine	924	286	29	Veliki Mošunj	164	52
13	Krtine	51	18	30	Vitez	6,633	2,198
14	Kruščica	2,615	760	31	Vraniska	441	130
15	Ljubić	126	37	32	Vrhovine	499	125
16	Lupac	482	140	33	Zabilje	1,263	366
17	Mali Mošunj	792	221	34	Zaselje	71	25
Total:						27,006	8,266

The Municipality of Busovača has 47 settlements, and 18,448 inhabitants. The information is based on the latest census data from 2013. The settlement marked red in table is not inhabited based on census date, which differs from the previous 2011 ESIA information, based on the estimate of the representatives of Busovača Municipality at the time of environmental and social due diligence.

Table 13: Population and number of household by settlements in Busovača Municipality

No.	Settlement	Population number	No. of households	No.	Settlement	Population number	No. of households
1	Bare	399	121	25	Kupres	231	84
2	Bukovci	394	112	26	Lončari	378	108
3	Buselji	980	307	27	Mehurići	65	22
4	Busovača	4,072	1,328	28	Merdani	275	89
5	Carica	623	193	29	Mihaljevići	365	101
6	Dobraljevo	463	146	30	Milavice	107	30
7	Dolac	109	40	31	Nezirovići	135	41
8	Donja Rovna	275	93	32	Očehnići	≤10	≤3
9	Gornja Rovna	312	85	33	Oselište	115	36
10	Grablje	162	52	34	Podbare	139	39
11	Granice	134	47	35	Podjele	84	28
12	Gusti Grab	293	80	36	Podstijena	293	81
13	Hozanovići	356	100	37	Polje	757	246
14	Hrasno	370	96	38	Prosje	42	14
15	Javor	-	-	39	Putiš	516	150
16	Jazvine	459	128	40	Ravan	452	136
17	Jelinak	198	62	41	Skradno	625	193
18	Kačuni	1,611	462	42	Solakovići	454	142
19	Kaonik	394	106	43	Strane	277	86
20	Katići	139	37	44	Stubica	38	10
21	Kovačevac	87	30	45	Šudine	143	49
22	Krčevine	380	118	46	Turići	230	65
23	Krvavčići	99	31	47	Zarače	114	31
24	Kula	339	100				
Total:						18,488	5,657

Zenica Municipality currently has 81 settlements and there were 115,134 inhabitants (see Table 14 below). It is important to note that the information on settlements differs from the original data presented in Table 41 in the 2011 ESIA. This is most likely because the Municipality provided the information on the “local community” units that do not correspond to the “settlement” units used in other parts of this document. The list of local communities is available at the Zenica Municipality website¹¹. It is important to note that some settlements of Zenica Municipality were greatly affected by the recent flood catastrophe in Bosnia happened in 2014, after the census of 2013. Topicic Polje settlement was severely damaged and almost completely covered by excess soil in floods and consequent landslides¹². The inhabitants of Serici and Topicic Polje were covered by the plans and activities of City of Zenica to restore the homes for 37 families with approximately 110 household members whose homes were completely destroyed, as well as to repair 95 houses (340 household members) that were seriously damaged¹³

Table 14: Population and number of household by settlements in Zenica Municipality

No.	Settlement	Population number	No. of households	No.	Settlement	Population number	No. of households
1	Arnauti	1,085	294	42	Lokvine	888	283
2	Banloz	413	142	43	Loznik	-	-
3	Bijele vode	-	-	44	Ljubetovo	184	49
4	Bistrica	601	159	45	Moščanica	619	185
5	Bistrica Gornja	≤10	≤3	46	Mutnica	208	58
6	Blatnica	≤10	4	47	Nemila	2,596	815
7	Briznik	1,159	338	48	Novo selo	162	55
8	Bukovica	139	44	49	Obrenovci	543	159
9	Dobriljevo	566	178	50	Orahovica	2,498	703
10	Donja Vraca	825	293	51	Osojnica	≤10	≤3
11	Donji Čajdaraš	244	84	52	Osredak	132	37
12	Drugavci	264	82	53	Palinovići	147	37
13	Dusina	149	52	54	Pepelari	239	77
14	Gladovići	503	152	55	Peševići	274	87
15	Gorica	701	216	56	Plahovići	366	113
16	Gornja Gračanica	858	278	57	Plavčići	-	-
17	Gornja Višnjica	225	86	58	Poca	378	116
18	Gornja Vraca	222	65	59	Pojske	1,896	569
19	Gornja Zenica	1,999	645	60	Ponihovo	-	-
20	Gornji Čajdaraš	710	242	61	Ponirak	381	143
21	Gradina	85	29	62	Puhovac	448	130
22	Gradišće	3,037	955	63	Putovičko polje	362	111
23	Grm	808	265	64	Putovići	838	243
24	Gumanci	≤10	≤3	65	Radinovići	182	55
25	Janjac	111	60	66	Sebuja	47	18
26	Janjički vrh	≤10	≤3	67	Smajići	343	96
27	Janjići	1,010	317	68	Starina	800	210

¹¹ http://zenica.ba/fileadmin/user_upload/Obrasci/KONTAKT_OSLOBE_ORGANA_MJESNIH_ZAJEDNICA.pdf

¹² The information on the sanitation of Topicic Polje after floods can be found on this link:

http://www.fondzapomocnastradalimfbih.gov.ba/userfiles/file/projekti/o3_sanacija_topcic_polje_web.pdf

¹³ http://zenica.ba/fileadmin/user_upload/Doc/2015/01_ZBIRNA_INFORMACIJA_-_STAMBENO_ZBIRNJEVANJE.pdf

No.	Settlement	Population number	No. of households	No.	Settlement	Population number	No. of households
28	Jasika	71	28	69	Stranjani	1,388	406
29	Jastrebac	435	109	70	Sviće Šerići	387	115
30	Jezera	-	-	71	Tišina	702	212
31	Jurjevići	115	36	72	Topčić polje	1,221	379
32	Kasapovići	268	89	73	Trešnjeva glava	253	81
33	Klopački vrh	-	-	74	Vranduk	463	169
34	Kolići	250	66	75	Vranovići	60	21
35	Koprivna	321	110	76	Vražale	319	110
36	Kovačići	233	76	77	Vrhpolje	243	74
37	Kovanići	313	95	78	Vukotići	778	195
38	Kozarci	550	169	79	Zahići	241	70
39	Kula	95	42	80	Zenica	73,751	26,135
40	Lašva	458	148	81	Živkovići	100	28
41	Lijeske	≤10	5				
Total:						115,134	38,784

It can be noted that some of the settlements population differs from the previous 2011 ESIA information. However, according to information in the *Study on partial expropriation of Plava Voda water supply project* (2012), these settlements are not part of the Project area and this change in population number will not affect the Project.

3.2.5 Household Size

Table 15 gives an overview of the total number of enumerated persons and households in 5 municipalities in the region of the Project area, according to the preliminary results of the 2013 Census of Population, Households and Dwellings in Bosnia and Herzegovina. The average number of members per household is estimated based on this data.

Table 15: Enumerated persons and households according to preliminary results of the 2013 Census, and estimate of average household - by municipalities

Municipality	Total enumerated persons	Total number of households	Estimated average household size (No. of members)
Travnik	57,543	16,641	3.46
Novi Travnik	25,107	7,295	3.44
Vitez	27,006	8,266	3.27
Busovača	18,488	5,657	3.27
Zenica	115,134	38,784	2.97
Total for the region	243,278	76,643	3.17

3.2.6 Structure of Employment

Most important sectors in terms of employment in the project area are manufacturing, retail, education and mining, public administration, and health and welfare services.

Table 16: Structure of Employment in the Project Areas in 2013

Section according to NACE Rev. 2 Classification	Middle-Bosnia Canton (Travnik, N.Travnik, Vitez and Busovača)		Zenica-Doboj Canton (Zenica)	
	No. of employed persons	%	No. of employed persons	%
Agriculture, forestry and fishing	1,283	3.29%	1,410	2.06%
Mining and quarrying	929	2.38%	4,837	7.06%
Manufacturing	10,110	25.94%	20,518	29.93%
Electricity, gas, steam and air conditioning supply	685	1.76%	1,691	2.47%
Water supply, sewerage, waste management and remediation activities	600	1.54%	1,091	1.59%
Construction	1,421	3.65%	3,245	4.73%
Wholesale and retail trade; repair of motor vehicles and motorcycles	8,317	21.34%	9,475	13.82%
Transportation and storage	1,260	3.23%	3,792	5.53%
Accommodation and food service activities	1,733	4.45%	2,514	3.67%
Information and communication	437	1.12%	811	1.18%
Financial and insurance activities	314	0.81%	914	1.33%
Real estate activities	41	0.11%	113	0.16%
Professional, scientific and technical activities	404	1.04%	1,316	1.92%
Administrative and support service activities	176	0.45%	403	0.59%
Public administration and defence; compulsory social security	2,931	7.52%	4,390	6.40%
Education	3,773	9.68%	6,346	9.26%
Health and social welfare	2,940	7.54%	4,131	6.03%
Arts, entertainment and recreation	482	1.24%	244	0.36%
Other service activities	335	0.86%	624	0.91%
Unclassified according to activities CEA	804	2.06%	689	1.01%
TOTAL	38,975	100%	68,554	100%

Source: Federal Institute of Statistics

3.2.7 Employment and Wages

The statistics for employment and wages is quite similar to the information provided in Table 43 in the original 2011 ESIA, with some slight modifications in order to reflect the most recent statistical data. It is important to note that the average monthly wages didn't change considerably since 2009 – there is slight increase in Travnik, Novi Travnik, Vitez and Busovaca (compensating inflation, rather than presenting a real increase in wages), while the average wages in Zenica even dropped for almost 10% which most likely have considerable socio-economic effects to the entire municipality.

Table 17: Employment and Wages by Municipalities in 2013

	Travnik	Novi Travnik	Vitez	Busovača	Zenica
Total population*	57,543	25,107	27,006	18,488	115,134
Average No. of employed	10,608	3,228	5,802	1,673	24,823
Labour participation ratio	18.43	12.86	21.48	9.05	21.56
Economically active	37,421	17,226	16,807	10,492	87,280

	Travnik	Novi Travnik	Vitez	Busovača	Zenica
population (15-64 years)					
Employment rate	28%	19%	35%	16%	28%
Average monthly wages KM	693	754	590	724	828

* Results as per preliminary results of the 2013 Census of Population, Households and Dwellings in Bosnia and Herzegovina
Source: Federal Institute of Statistics

3.2.8 Consumer Affordability

Consumer affordability is assessed in order to determine financial ability of households to pay water supply service bills. Since the financial capacity of households is changing over time as well as the prices of water supply services it is necessary to measure the current affordability levels as an indicator of projected future conditions. According to Organization of Economic Cooperation and Development (OECD) definition household is considered unable to pay for water and wastewater services if paying would require a considerable reduction of expenses for other essential goods and services (food products, health, education etc.).¹⁴ It should be noted, however, that defining "considerable" reduction and "essential" goods and services remains a challenging task, and there is no universal definition applicable for all situations.

According to general criteria used by International Financial Institutions households should not spend more than 4% of their average monthly income on water/wastewater expenses. However in order to address the income distribution disparities within average household affordability level it is also necessary to analyze different socio-demographic groups on the local level. In addition to this methodology the structure of household expenditures is also used as an indicator of consumer affordability. According to a World Bank structural criterion, households spending 60% or more of their expenditures on food are considered poor, and when this figure reaches 80% - absolutely poor. Poor and absolutely poor families will find it difficult to pay for communal services.

According to estimates by the Agency for Statistics of BiH, based on Survey of Household, which was conducted in 2011, 32.6% of the average household expenses in BiH is spent on food and drink. Therefore the figures on the national level indicate that BiH households on average are not considered poor or absolutely poor. However based on the data from the same report it is estimated that 15% of households in BiH are living below the absolute poverty line with monthly income reaching below 235.00 KM¹⁵.

The general level of economic development on the local level in the targeted municipalities is analyzed in the Table 18 below.

Table 18: Aggregate development indices for municipalities of Busovača, Novi Travnik, Travnik, Vitez and Zenica in 2013¹⁶

Municipality	Employment rate (%)	Unemployment rate (%)	Number of students per 1000 residents	GDP per capita	Index of absent population	Federation of B&H=100
						Development Index
Busovača	10.4	65.8	155	4.1	-15.2	79.1
Novi Travnik	12.9	56.6	139	4.7	-18.8	79.9
Travnik	19.4	43.4	160	6.4	-22.2	96.1

¹⁴ OECD, Key Issues And Recommendations For Consumer Protection: Affordability, Social Protection, and Public Participation in Urban Water Sector Reform in Eastern Europe, Caucasus and Central Asia, 2003.

¹⁵ Millenium Development Goals, Ministry of Finance and Treasury of Bosnia and Herzegovina, 2013.

¹⁶ Socioeconomic indicators by municipalities in Federation of Bosnia and Herzegovina, Federal Institute for Development Programming, 2013.

Municipality	Employment rate (%)	Unemployment rate (%)	Number of students per 1000 residents	GDP per capita	Index of absent population	Federation of B&H=100
						Development Index
Vitez	23	42.7	149	5.3	-9.4	112.1
Zenica	19.5	48	127	7.3	-12.6	104.3
FBiH	18.6	47.4	130	7.1	-15.3	100

The development indicators for each municipality are compared to the same indicators on the average level for Federation BiH. The presented results show that the development levels for analyzed municipalities is ranging between 79.1% and 112.3% of the Federal average. According to the used methodology municipalities that have aggregate development index higher than 75% of the Federal average could be considered as developed, therefore all five analyzed municipalities meet this criterion.

In order to assess affordability level within different socio-economic categories in considered municipalities Table 23 provides more detailed view.

Table 19: Socioeconomic structure of population in municipalities of Busovača, Novi Travnik, Travnik, Vitez and Zenica in 2013

No.	Category	Municipality				
		Busovača	Novi Travnik	Travnik	Vitez	Zenica
1	Average number of employed persons ¹⁷	1,673	3,228	10,608	5,802	24,823
2	Total number of retired persons ¹⁸	2,487	3,621	8,018	4,182	20,929
	2.1 Regular pensions	1,225	1,761	4,053	1,980	11,160
	2.2 Disability pensions	396	605	1,505	751	3,959
	2.3 Family pensions	866	1,255	2,460	1,451	5,810
3	Total number of unemployed persons ¹⁹	3,215	4,206	8,129	4,330	22,885
	3.1 Males	1,697	2,140	4,872	2,183	10,832
	3.2 Females	1,518	2,066	3,257	2,147	12,053
4	Population of age between 0 and 14 ²⁰	3,593	4,665	10,119	5,494	21,002
5	Other categories	7,520	9,387	20,669	7,198	25,495
	Total number of residents ²¹	18,488	25,107	57,543	27,006	115,134

Referring to Table 19 above, category 5 - *Other categories* include students, unregistered employed and unemployed persons, population that live abroad etc. Among the different population categories presented employed persons, retired persons and unregistered employed persons are considered to have regular monthly income. Due to lack of any kind of data monthly income of unregistered employed persons could not

¹⁷ Basic information for cantons of Federation of Bosnia and Herzegovina, Institute for Statistics of Federation of Bosnia and Herzegovina, 2014.

¹⁸ Socioeconomic indicators by municipalities in Federation of Bosnia and Herzegovina, Federal Institute for Development Programming, 2013.

¹⁹ Ibid.

²⁰ Basic information for cantons of Federation of Bosnia and Herzegovina, Institute for Statistics of Federation of Bosnia and Herzegovina, 2014.

²¹ Census of population, households and dwellings in Bosnia and Herzegovina 2013, Preliminary results by municipalities and settlements in the Federation of Bosnia and Herzegovina, Institute for Statistics of Federation of Bosnia and Herzegovina, 2013.

be estimated. Therefore only the average monthly income of employed persons and retired persons were used for estimation of average monthly income per household in considered municipalities in 2013.

Table 20 summarizes the methodology used for estimation of monthly income per household in considered municipalities in 2013. Average number of members per household is calculated based on available data on total number of residents and total number of households in each municipality. Also percent of employed persons and retired persons in total population calculated based on total numbers of employed persons and retired persons as a percent of the total number of residents in municipalities. Based on calculated percents of employed persons and retired persons in total population, the average numbers of employed members and retired members per household are estimated.

Table 20: Average monthly income per household in municipalities of Busovača, Novi Travnik, Travnik, Vitez and Zenica in 2013

No.	Category	Municipality				
		Busovača	Novi Travnik	Travnik	Vitez	Zenica
1.	Total number of residents ²²	18,488	25,107	57,543	27,006	115,134
2.	Total number of households ²³	5,657	7,295	16,641	8,266	38,784
3.	Average number of members per household	3.27	3.44	3.46	3.27	2.97
4.	Total number of employed persons ²⁴	1,673	3,228	10,608	5,802	24,823
5.	Total number of retired persons ²⁵	2,611	3,736	8,270	4,274	21,291
6.	Average monthly wage (KM) ²⁶	724	754	693	590	828
7.	Average monthly pension (KM) ²⁷	369.65	369.03	369.18	375.35	397.12
8.	Average number of employed persons per household	0.3	0.44	0.64	0.7	0.64
9.	Average number of retired persons per household	0.46	0.51	0.5	0.52	0.55
10.	Average monthly income per household (KM)	387.24	519.97	628.11	608.18	748.34

In addition it should be noted that the above calculated average monthly income per household does not include various other income including unofficial employment wages, remittances, income from grey economy sources, own production of food by households etc. Considering that calculated average income is based only on official sources of household revenues it can be expected that the actual average household income is higher than presented above.

In order to appraise the consumer affordability in considered municipalities, the average monthly income in considered municipalities is compared to monthly bills for water and wastewater services, which are

²² Census of population, households and dwellings in Bosnia and Herzegovina 2013, Preliminary results by municipalities and settlements in the Federation of Bosnia and Herzegovina, Institute for Statistics of Federation of Bosnia and Herzegovina, 2013.

²³ Ibid.

²⁴ Basic information for cantons of Federation of Bosnia and Herzegovina, Institute for Statistics of Federation of Bosnia and Herzegovina, 2014

²⁵ Socioeconomic indicators by municipalities in Federation of Bosnia and Herzegovina, Federal Institute for Development Programming, 2013.

²⁶ Basic information for cantons of Federation of Bosnia and Herzegovina, Institute for Statistics of Federation of Bosnia and Herzegovina, 2014

²⁷ Socioeconomic indicators by municipalities in Federation of Bosnia and Herzegovina, Federal Institute for Development Programming, 2013.

presented in the table below. Average monthly bills for water and wastewater services in considered municipalities are calculated according to amount of water supplied per household in m³ and price of water per m³. The price of water includes: price of water supply, wastewater fee, measuring equipment maintenance fee and the Value Added Tax of 17%.

Table 21: Estimated monthly costs for water and wastewater services in municipalities of Busovača, Novi Travnik, Travnik, Vitez and Zenica in 2013

	Average net income per household (KM)	Monthly w&ww bill per household (KM)	Monthly w&ww bill as % of households income
Busovača	387.24	15.36	3.97 %
Novi Travnik	519.97	11.70	2.25 %
Travnik	628.11	16.42	2.61 %
Vitez	608.18	10.00	1.64 %
Zenica	748.34	13.70	1.83 %

The costs for water and wastewater services per household in considered municipalities, expressed as percent of household income, range from 1.64% for the Municipality of Vitez to 3.97% for the Municipality of Busovača.

As previously mentioned, according to general criteria used by International Financial Institutions households should not spend more than 4% of their average monthly income on water/wastewater expenses. This indicates that current services appear to be within the general affordability boundaries. In addition it should be considered that estimated 15% of households in BiH have less than 235 KM of income which includes households with various socially and economically vulnerable parts of population. This part of population may have affordability issue with their current water supply services however this problem is treated within the social security system in the country. On the other hand since the calculated average income per household does not include unofficial income sources it can be expected that the average affordability level is actually higher than presented in Table 21 above.

3.2.9 Public Health

According to the *Cantonal environmental protection plan 2015 - 2025* of Central Bosnia Canton, hygienic and sanitary conditions of water facilities and the public health control system of drinking water are not entirely satisfactory. Due to the lack of modern equipment it is not possible to determine parameters such as pesticides, phenols, mineral oil, heavy metals and other harmful substances, and the number and examined samples of water are insufficient, especially for rural water supply.

The microbiological analyses of drinking water samples in Travnik, Novi Travnik, Vitez and Busovača in 2013 have shown that out of a total of 728 analysed samples from public water supply systems, 654 or 89.8% were in line and 74 or 10.16% were not in line with the *Regulation on sanitary conditions of drinking water* (Official Gazette of BiH, no 40/10 and 30/12). Results of chemical analysis showed that of 532 analyzed samples of water, 515 or 96.8% are in line and 17 or 3.2% are not in line with this Regulation.

Microbiological analysis of water from other water supply systems (rural water supply systems, public fountains) have shown that of the 703 samples analyzed, 629 or 89.47% were in line, and 70 or 9.96% were not in line with the Regulation. Results of chemical analysis showed that of 293 analyzed samples of water, 285 or 97.27% were in line, and 8 or 2.73% were not in line with the above cited Regulation.

Table 22 shows the results of drinking water analysis for 2012 and 2013 in Travnik, Novi Travnik, Vitez, and Busovača..

Table 22: Results of microbiological and chemical analyses of drinking water samples in Travnik, Novi Travnik, Vitez and Busovača for 2012 and 2013²⁸

Municipality	Microbiological analysis								Chemical analysis							
	Public water supply				Other water supply sources				Public water supply				Other water supply sources			
	Total	Compliant	Non-compliant		Total	Compliant	Non-compliant		Total	Compliant	Non-compliant		Total	Compliant	Non-compliant	
			No.	%			No.	%			No.	%			No.	%
2012																
Travnik	339	311	28	8.2	596	542	54	9.0	340	312	28	8.2	245	217	28	11.4
Novi Travnik	143	128	15	10.4	6	6	-	-	21	20	1	4.7	3	3	-	-
Vitez	163	155	8	4.9	-	-	-	-	121	118	3	2.5	-	-	-	-
Busovača	75	71	4	5.3	3	3	-	-	17	15	2	11.7	3	3	-	-
2013																
Travnik	353	291	62	17.6	615	555	57	9.3	377	363	14	3.7	245	238	7	2.9
Novi Travnik	153	144	9	5.9	6	3	2	33.3	9	9	-	-	1	1	-	-
Vitez	151	150	1	0.7	64	57	7	11.0	133	132	1	0.8	47	46	1	2.2
Busovača	71	69	2	2.9	18	14	4	22,2	13	11	2	15.4	-	-	-	-

²⁸ *Cantonal environmental protection plan 2015 - 2025* of Central Bosnia Canton (Ministry of Spatial Planning, Construction, Environmental Protection, Return and Housing of Central Bosnia Canton, 2015)

Local water supply systems mostly show an increased number of coliform bacteria such as *Escherichia coli*, *Enterobacteria sp.*, *Streptococcus faecalis*, *Proteus sp.* and *Clostridium sp.*, which indicates that water from these water supply systems were not of adequate quality due to the presence of pathogenic microorganisms.

Table 23 provides information on the number of infected persons with Enterocolitis in Travnik, Novi Travnik, Vitez, and Busovača.

Table 23: Water borne disease Enterocolitis in Travnik, Novi Travnik, Vitez, and Busovača in 2012²⁹

Municipality	Number of sick persons	Rate per 10,000 inhabitants
Travnik	204	37.4
Novi Travnik	65	26.1
Vitez	9	3.6
Busovača	19	11.9

In Zenica-Doboj Canton, the Cantonal Public Health Institute has reported 81 cases of intestinal infectious diseases, 3,256 cases of Diarrhea and gastroenteritis and 36 cases of Hepatitis B in Zenica in 2012.

3.2.10 People and Communities Affected by the Project

For the purposes of building the water pipeline, it will be necessary to carry out:

- **complete (permanent)³⁰ expropriation** of 8 privately owned and 3 state-owned land plots positioned in the location of planned structures (such as pumping stations and water tanks) - in the Municipality of Zenica;
- **incomplete (temporary)³¹ expropriation** of 772 privately owned and 268 state-owned land plots along the pipeline route for the purpose of placement of the main transport pipeline and its branches.

The Census and Socio-economic Survey were carried out in the period 23-26 April 2015 in all five municipalities covered by the Project.

The total number of households affected by the Project is 197 (of which 161 reside in the Project area, and 36 live elsewhere). The total number of businesses affected by the Project is 16.

Detailed data and information on the directly affected people and communities are presented in the Resettlement Action Plan prepared for the needs of the Project.

²⁹ *Cantonal environmental protection plan 2015 - 2025* of Central Bosnia Canton (Ministry of Spatial Planning, Construction, Environmental Protection, Return and Housing of Central Bosnia Canton, 2015)

³⁰ According to the Law on Expropriation of FBiH, *complete expropriation* allows the expropriation beneficiary to obtain legal title over the expropriated property, while the rights of the previous owner over the real property as well as other rights over that real property cease to exist.

³¹ According to the Law on Expropriation of FBiH, *incomplete expropriation* provides the beneficiary with usufruct rights on the land and structures, as well as the lease of the land for a definite period of time. At the end of the lease, usufruct rights over land are returned to the previous owner.

4 Update to Description of the Environment

The updated information in this section pertains to new information regarding changes in the hydrological data and water quality, air quality, Project effect on the infrastructure and any other updates to data that was available in the 2011 ESIA.

4.1 Hydrological Data and Quality of Surface Waters

The *Regulation on determining environmental flow* (Official Gazette of FBiH, no. 04/13) adopted in 2013 defines the methods for determining environmental flow, monitoring and reporting on environmental flow. This Regulation applies to all water bodies in the Federation of BiH with the aim to preserve water and water-related ecosystems, regardless whether the water bodies in question are permanent or temporary. However, Article 5 states that provisions of this Regulation relating to determining of environmental flow do not apply to water abstraction intended for public water supply and in cases when conditions for determining the environmental flow set under this Regulation cannot be met. In this case, environmental flow is determined based on provision of Article 62, paragraph 3 of the *Law on Waters* (Official Gazette of FBiH, no. 70/06), which is the case for the Plava Voda project. All other provisions of the Regulation still apply for the Project.

According to measurements undertaken in the framework of the EC project "Plava Voda Regional Water Supply System", which was carried out in the period from July 2009 to October 2010, Plava Voda spring's overall minimum capacity of 20-year return period amounts to 700 l/s. It should be noted that this quantity also includes the quantity of water abstracted for Travnik which, in the average, amounts to 194 l/s.

Considering that the total estimated water quantities for abstraction from this spring amount to a total of 750 l/s (550 l/s for the regional water supply system and 200 l/s for Travnik municipality), which are larger than the minimum capacity of 20-year return period, provisions of Article 5 of the *Regulation on determining environmental flow* apply to this spring, thus the environmental flow will not be calculated according to this new regulation, but in line with Article 62, paragraph 3 of the *Law on Waters*.

The Project will have to maintain the environmental flow prescribed in the Environmental Permit.

In 2014 the Company has installed a measuring station to measure the water level of the Plava Voda watercourse in the period until construction and commissioning of the regional water supply system. This activity is undertaken in cooperation with the Hydro Engineering Institute of Sarajevo.

According to the *Cantonal Environmental Protection Plan of Central Bosnia Canton 2015 - 2025*, the total number of measuring stations for monitoring of surface water quality in Central Bosnia Canton amounted to 10 in 2011, 8 in 2012 and 5 in 2013. Monitoring of surface water quality in Central Bosnia Canton is undertaken by the Sava River Watershed Agency Sarajevo according to national legislation and recommendations of Water Framework Directive 2000/60/EC.

Table 24 shows the results of physical and chemical parameters and microbiological analysis in the Bosna River sub-catchment area.

Table 24: Overview of physical-chemical parameters and microbiological analysis in Bosna River sub-catchment area for the period 2010 - 2013³²

No.	Measuring stations - profile	Required class	Year of measurement			
			2013	2012	2011	2010
			Parameters that cause deviation from required class			
1.	Lepenica - confluence with Fojnica River	II	Increased phosphorus, COD	Increased total phosphorus and COD, MBQ does not satisfy	-	-
2.	Lepenica - upstream from Kreševka	II	-	Within class parameters, MBQ does not satisfy	-	-
3.	Kozica - confluence with Lašva River	II	Increased ammonia ion, nitrates	Increased nitrites and COD, MBQ does not satisfy	-	-
4.	Grlovnica - mouth	II	Increased nitrites, ammonia ion, COD and BOD	Increased nitrites, ammonia ion, and BOD, MBQ does not satisfy	-	-
5.	Bila - mouth	II	-	Increased COD, MBQ does not satisfy	-	-
6.	Lašva - source, Hatarić settlement	I	-	-	Increased COD, MBQ does not satisfy	-
7.	Lašva - Mali Mošunj settlement	II	Satisfies class	-	Satisfies class	-
8.	Lašva - source	I	Satisfies class	-	Increased COD, MBQ does not satisfy	Increased nitrites, MBQ does not satisfy
9.	Lašva - Donja Rovna settlement	II	-	-	Increased nitrites, MBQ does not satisfy	-
10.	Lašva - Gospino Vrilo church	II	-	-	Increased nitrites, total phosphorus, BOD and COD, MBQ does not satisfy	-

4.2 Air quality

Air quality is monitored in the area of Zenica by the Federal Hydrometeorological Institute at four locations. The network of automatic measuring stations was established in 2013. Figure 1 shows the locations of stationary automatic stations in 2014 in the territory of Zenica Municipality.

³² Cantonal environmental protection plan 2015 - 2025 of Central Bosnia Canton (Ministry of Spatial Planning, Construction, Environmental Protection, Return and Housing of Central Bosnia Canton, 2015)

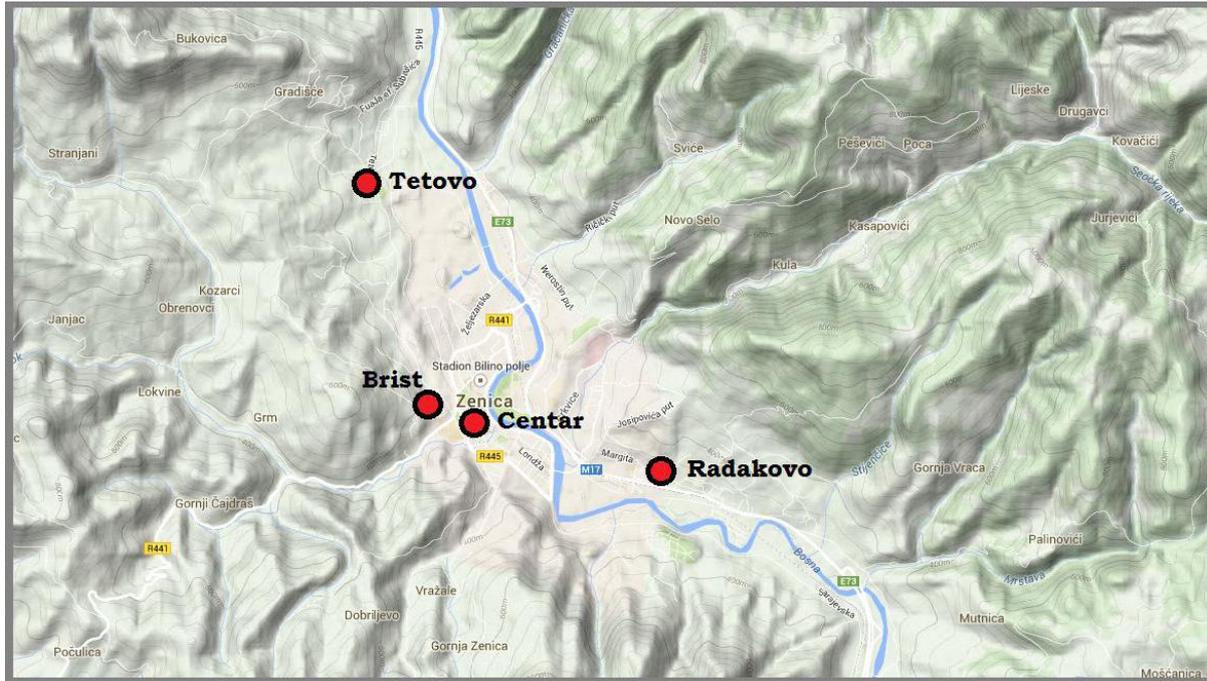


Figure 1: Locations of fixed automatic stations in Zenica in 2014 (Source: Annual Report on Air Quality in FBiH for 2014, Federal Hydrometeorological Institute)

The following parameters of air quality are monitored at these stations:

- Sulfur dioxide (at all four measuring stations);
- Nitrogen oxides (at all four measuring stations);
- Carbon monoxide (at measuring station "Centar", "Radakovo", "Tetovo");
- Benzene / toluene / ethylbenzene / xylene (at measuring station "Centar", "Radakovo", "Tetovo");
- Ozone (at all four measuring stations); and
- Particulate matter PM₁₀(at all four measuring stations).

Figure 2 to Figure 6 provide data about air quality in Zenica in 2014.

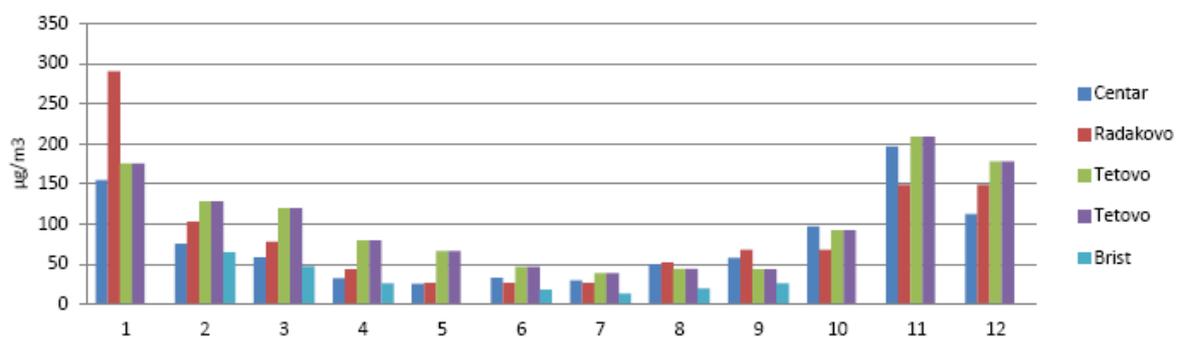


Figure 2: Mean monthly SO₂ concentrations in Zenica in 2014

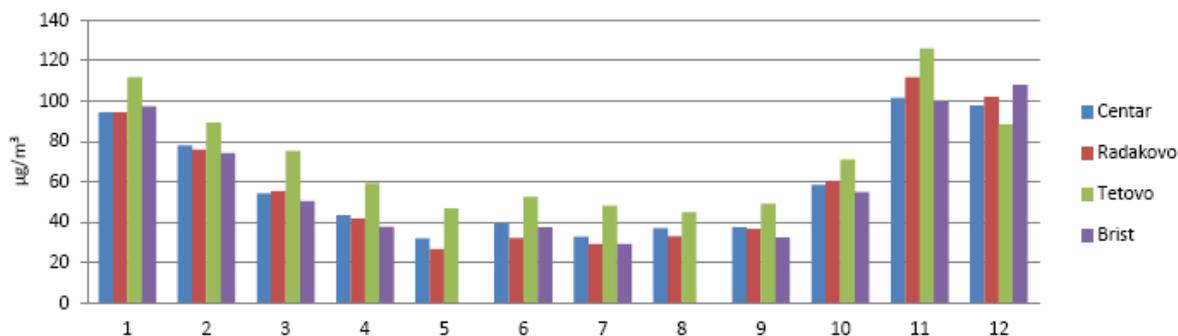


Figure 3: Mean monthly PM₁₀ concentrations in Zenica in 2014 (Source: Annual Report on Air Quality in FBiH for 2014, Federal Hydrometeorological Institute)

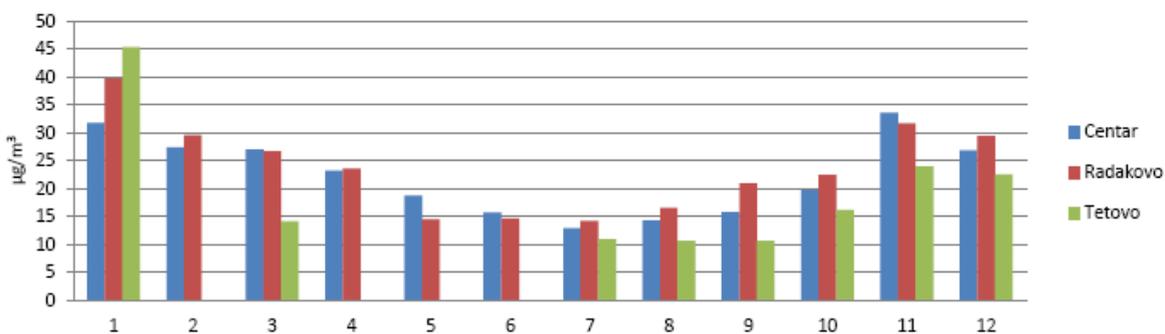


Figure 4: Mean monthly NO₂ concentrations in Zenica in 2014 (Source: Annual Report on Air Quality in FBiH for 2014, Federal Hydrometeorological Institute)

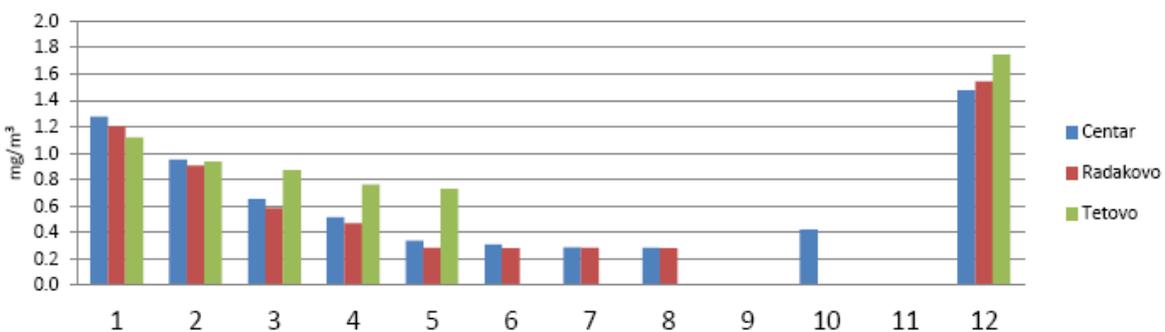


Figure 5: Mean monthly CO concentrations in Zenica in 2014 (Source: Annual Report on Air Quality in FBiH for 2014, Federal Hydrometeorological Institute)

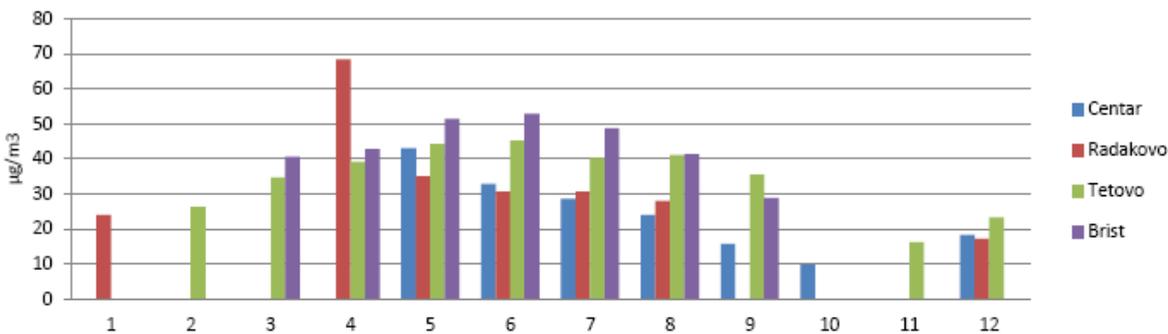


Figure 6: Mean monthly O₃ concentrations in Zenica in 2014 (Source: Annual Report on Air Quality in FBiH for 2014, Federal Hydrometeorological Institute)

Systematic monitoring of air quality is not performed in the territory of Central Bosnia Canton.

4.3 Infrastructure

The Company has obtained the following consents from utility companies whose infrastructure is located in the same area as the planned regional water supply infrastructure:

Type of consent	Obtained from
Principal consent for issuance of Urban Consent	- "BH-Gas" d.o.o. Sarajevo
Consent for issuance of Urban Consent	- Water Utility "Vilenica-Vodovod" d.o.o. Novi Travnik; - "HE Grablje" d.o.o. Busovača; - Public Utility "Elektroprivreda HZ HB" d.d. Mostar, branch office Novi Travnik; - Public Utility "Elektroprivreda HZ HB" d.d. Mostar, branch office Busovača; - Public Utility "Elektroprivreda HZ HB" d.d. Mostar, branch office Nova Bila; - Public Utility "Elektroprivreda HZ HB" d.d. Mostar, branch office Vitez; - "Elektroprenos BiH" a.d. Banja Luka, operational branch Sarajevo; - "BH Telecom" d.d. Sarajevo, directorate Travnik; - "BH Telecom" d.d. Sarajevo, directorate Zenica; - Public Utility "HT-Hrvatske telekomunikacije" d.d. Mostar, location Vitez; - Public Utility "HT-Hrvatske telekomunikacije" d.d. Mostar, location Busovača; - Public Utility "HT-Hrvatske telekomunikacije" d.d. Mostar, location Novi Travnik; - Public Utility "Bašbunar" d.o.o. Travnik; - Public Utility "Vodovod i kanalizacija" d.o.o. Zenica; - Public Utility "Komunalac" d.o.o. Busovača; - Public Utility "Vitkom" d.o.o. Vitez; - Public Utility "Željeznice" FBiH d.o.o. Sarajevo; - Federal Ministry of Culture and Sport; - Public Utility "Autoceste FBiH" d.o.o. Mostar.
Consent for issuance of Construction Permit	- "BH-Gas" d.o.o. Sarajevo; - Water Utility "Vilenica-Vodovod" d.o.o. Novi Travnik; - "HE Grablje" d.o.o. Busovača; - Public Utility "Elektroprivreda HZ HB" d.d. Mostar, branch office Novi Travnik; - Public Utility "Elektroprivreda HZ HB" d.d. Mostar, branch office Busovača; - Public Utility "Elektroprivreda HZ HB" d.d. Mostar, branch office Nova Bila; - Public Utility "Elektroprivreda HZ HB" d.d. Mostar, branch office Vitez; - "Elektroprenos BiH" a.d. Banja Luka, operational branch Sarajevo; - "BH Telecom" d.d. Sarajevo, directorate Travnik; - "BH Telecom" d.d. Sarajevo, directorate Zenica; - Public Utility "HT-Hrvatske telekomunikacije" d.d. Mostar, location Vitez; - Public Utility "HT-Hrvatske telekomunikacije" d.d. Mostar, location Busovača; - Public Utility "Bašbunar" d.o.o. Travnik; - Public Utility "Vodovod i kanalizacija" d.o.o. Zenica;

Type of consent	Obtained from
	<ul style="list-style-type: none"> - Public Utility "Komunalac" d.o.o. Busovača; - Public Utility "Vitkom" d.o.o. Vitez; - Federal Ministry of Culture and Sport; - Public Utility "Autoceste FBiH" d.o.o. Mostar.

5 Update to Analysis of Environmental and Socio-economic Impacts of the Project

The updated information in this section pertains to newly identified Project impacts during all phases of Project implementation. This includes a reassessment of the environmental and social impacts of the Project.

5.1 Environmental Impact Assessment

5.1.1 Impacts on Flora and Fauna

Operation phase

The 2011 ESIA has calculated the flow of Plava Voda after the abstraction for regional water supply (550 l/s) as:

- average 1.78 m³/s;
- autumn 1.48 m³/s;
- winter 1.35 m³/s; and
- spring 2.46 m³/s.

The 2011 ESIA has also stated that the prescribed environmental flow for "Plava Voda" downstream from the intake is 200 l/sec and that it may be assumed that most of the time the environmental flow will not be endangered and will be sufficient to maintain natural balance and ecosystems in "Plava Voda" waters.

In addition to the already proposed mitigation measures in the 2011 ESIA, the measures regarding environmental flow defined in the Environmental Permit and Water Consents have to be taken into consideration as well.

5.1.2 Impact on Soil Quality

Transport pipeline

The laying of the main transport route will enable gravity water supply from spring "Plava Voda" to the water tank Putovići. The construction of the regional system on this route will enable avoiding urbanized and inhabited parts of municipalities, paved surfaces, as well as private properties. Configuration of the terrain in some parts of the route along the Lašva River in Busovača municipality is such that the belt along which the pipeline is to be laid is very narrow (route of the old railroad), which will cause difficulties in the operation of mechanization and lack of disposal locations for excavated materials. This issue has been identified in the *Study on protection of "Plava Voda" water source* (2013).

5.1.3 Impact on Infrastructure

Construction phase

As defined in Chapter 4.3, the Company has obtained the necessary consents from relevant institutions and utilities operating roads, telecommunication cables, and existing water distribution pipelines on the pipeline route. The Main Design has been developed and revised in line with national legislation, and therefore, no additional impacts on infrastructure are expected in the construction phase, provided the Contractor adheres to provisions of the Principal Approval for Construction and good working practices.

5.2 Social Impacts Assessment

In addition to the directly affected people (PAP) that will be targeted by complete or incomplete expropriation (as described above), the affected PAP also include the people living in the old part of the City of Travnik, where construction works will take place in relatively narrow streets. However, most of the impacts on the latter group are temporary, and require proper communication and consultation activities.

The population of Travnik will be impacted in the long-term, however, through decreased availability of water resources in their municipality which, for the most part, does not have practical implications with regards to Travnik water needs. However, there is a strong perception of giving away a valuable resource, and a loss of identity built around Plava Voda in Travnik (the Plava Voda spring is the "brand" of the old part of Travnik) among the Travnik population. It is, therefore, crucial to properly carry out public consultations and address the concerns of this group.

The Socio-economic survey showed that the PAP and other stakeholders in Travnik and Zenica are better informed about the Project, than the population in Novi Travnik, Busovaca and Vitez. PAP from several project areas highlighted that beside adequate compensation for the loss of property or its functions, it would be very important for them to restore their properties temporarily affected by the project into their original state (e.g., fixing fences after construction works). They were concerned about it due to negative experiences in the past with similar projects. This is especially important for vulnerable groups and elderly population. Vulnerable groups, in addition to those identified in the original ESIA as those living below or close to poverty line, are also the elderly and disabled, as well as single parent households.

5.2.1 Gender Considerations

Women are not considered as a vulnerable for the purpose of the ESIA for Plava Voda, while at the same time single parent households and households where women are breadwinners might experience more stress adjusting to the project impacts, therefore these households should be specially considered in the mitigation and consultation activities.

It has been demonstrated in research that the addition of chlorine to drinking water eventually creates unwanted disinfectant byproducts when the chlorine reacts with residual organic matter. One of the main byproducts created are total trihalomethanes (THMs) like chloroform. Moderate evidence from studies of THMs and adverse birth outcomes indicates an association of THMs with small for gestational age, neural tube defects, and spontaneous abortions. The guidelines for maximum allowed level for chlorine disinfectants and their by-products in water public surprised should be carefully implemented to mitigate such potential risks, especially for pregnant women.

During recent project survey, women were consulted about preferred means of communication. Women didn't express too much interest in participating at the meetings in local community offices, and prefer to receive the information about the project in writing. The project should pay special attention at engaging with this part of population in an adequate manner, that make women belonging to PAPs feel comfortable.

5.2.2 Impact on Public Amenities

As stated in Chapter 5.1.1 the 2011 ESIA has calculated the flow of Plava Voda after the abstraction for regional water supply (550 l/s) and stated that requirement for 550 l/s for regional water supply might not be satisfied in all hydrological conditions although the probability of having minimum capacities in the period of maximum demand is very low.

The new *Regulation on determining environmental flow* (Official Gazette of FBiH, no. 04/13) was adopted in 2013; however, according to Article 5, the provisions of this Regulation relating to determination of environmental flow do not apply to water abstraction intended for public water supply and when conditions for determining the environmental flow set under this Regulation cannot be met. In this case, environmental flow is determined based on provision of Article 62, paragraph 3 of the *Law on Waters*. The Project will have to maintain the environmental flow prescribed in the Environmental Permit.

In order to sustain the amenity value, the 2011 ESIA proposed mitigation measures which should be strictly implemented. Those measures relate to changes in the stream bed which include decrease of bed slope, construction of cascades that will decrease the flow velocity and produce desirable visual effect of flow richness. In addition, a special condition needs to be included in Water Buying Contract between Public Regional Company Plava Voda and individual water utilities according to which concession users should modify (i.e. lower) the abstracted quantities of water in accordance with hydrological situation in order to satisfy environmental flow prescribed in the Environmental Permit.

6 Update to Environmental and Social Action Plan

The updated information in this section pertains to an update of the Environmental and Social Action Plan, which includes measures defined in the 2011 ESIA and new measures in light of the newly identified impacts of the Project.

The revised ESAP includes measures to minimize potential negative impacts which will be applied during Project implementation, including responsibilities for their implementation, an implementation timeframe and cost estimates, and a monitoring plan. It has taken into consideration the measures proposed in the 2011 ESIA, with comments on the validity of the proposed measures where necessary, comments which additionally clarify the necessary measures to be undertaken, that have been defined in the 2011 ESIA and new measures to reflect the new findings described in the previous chapters.

6.1 Environmental Impacts Mitigation Measures

The 2011 ESIA has defined mitigation measures according to three main phases of Project implementation:

- Mitigation measures prior to construction,
- Mitigation measures in the phase of construction,
- Mitigation measures in the phase of operation.

It has also included a list of good working practices and Waste Management Plan that are to be included in the Contract for Execution of Works is given after the ESAP table.

Table 25: Environmental mitigation measures

Phase	Issue	Action to be taken/ Mitigation measure	Comments	Responsibility	Timeframe	Cost
PR 1: Environmental and Social Appraisal and Management						
Following Main Design Development	Permits and agreements	Obtain Construction Permit and a Water Permit	Federal Ministry of Physical Planning issues construction permit and Water Agency issues water permit.	Public Regional Company Plava Voda	Request are to be submitted prior to construction	2,500 €
Following completion of Preliminary Design	The detailed design of river regulation of the Plava Voda from the source to the (river) mouth in Lašva	Agreement on ToR and carrying out this study according to the agreed ToR.	The detailed design will be carried out to assess the adequacy of the pre-defined flow rate value of 200l/s and to make necessary adjustment to that flow. The detailed design should be verified by an engineering bureau authorised by the relevant Ministry. The design of this section is an extra input for the water approval request, the step required in the water permit obtaining procedure.	Public Regional Company Plava Voda	The estimated implementation costs are to be available together with the detailed design of Plava Voda project. The detailed design to be finished before the tendering procedure.	50,000 €
Pre-construction/ Construction	Provisions of Environmental Permit and Water Consents	Ensuring all provisions of the Environmental Permit and Water Consents are implemented.	The Company needs to ensure all provisions of the Environmental Permit and Water Consents are met in order to proceed with implementation of the Project	The Company	During Project implementation	-
Pre-construction		Organization of construction works with least impact on environment Additionally, the Company will ensure that provisions of the <i>Principal Approval for Construction</i> are included in the Contract for Execution of Works.	Public Regional Company Plava Voda should include these mitigation measures in the Contract for Execution of Works	Contractor	Prior to construction works	Usually, these measures are not implemented at extra cost and are included in construction cost
Construction/Operation	EHS training	All workers shall be given ESHS training and be informed of their obligations	The ESHS management system applied by Contractors should require compliance with relevant	Contractor/ Plava Voda	During the construction and operation	

Phase	Issue	Action to be taken/ Mitigation measure	Comments	Responsibility	Timeframe	Cost
		described in this ESAP, as appropriate, as part of a training plan. As a minimum all workers on site must attend an EHS site induction and records of training must be maintained.	regulatory requirements and operational controls to be defined within the Construction and Environmental Management Plan (C&EMP) for the following as a minimum: <ul style="list-style-type: none"> - Excavation activities and appropriate pipe laying techniques - Air quality and noise management - Waste management - Hazardous Materials Management - Reinstatement; - Spill/Incident/Accident response - OHS Risk assessment - Trench safety Public Regional Company Plava Voda should include these mitigation measures in the Contract for Execution of Works and develop their own training programmes for operation.			
Operation	Environmental, Health and Safety Management System	Develop, implement and maintain an Environmental Management System (EHSMS) in line with International good practice. Develop corporate EHS management structure. This should include clear designation of responsibilities at every management level and for every site. Develop EHS corporate manual available for all employees.	The Company needs to develop procedures for actions to be taken in case of unsatisfactory water quality results from water sources intended for water supply. These procedures will be included in the comprehensive EHS corporate manual. Implementation of a formal EHS management system at the corporate level will reduce environmental risks and improve overall management.	Public Regional Company Plava Voda with help of Consultants	Prior to putting Regional Water Supply System in use	15,000 €

Phase	Issue	Action to be taken/ Mitigation measure	Comments	Responsibility	Timeframe	Cost
PR 3: Pollution Prevention and Abatement						
Construction	Prevention of water, soil and air pollution, impact on flora and fauna, and increased noise level	Implement mitigation measures related to execution of construction works	As a minimum this requires compliance with the relevant regulatory requirements and operational controls to be defined within the Construction and Environmental Management Plan (C&EMP) as stated PR1 of this ESAP. Contractors need to develop and implement required management plans; The Company needs approve management plans developed by the contractors and monitor their implementation. Mitigation measures listed in 2011 ESIA following Table 71. Environmental mitigation measures Public Regional Company Plava Voda should include these mitigation measures in the Contract for Execution of Works	Contractor	During the construction	Usually, these measures are not implemented at extra cost and are included in construction cost
ROW Reinstatement	Prevention of negative impact on habitat deterioration and soil erosion	Implement mitigation measures related to organization of construction site after completion of works	Mitigation measures listed in 2011 ESIA following Table 71. Environmental mitigation measures Public Regional Company Plava Voda should include these mitigation in the Contract for Execution of Works	Contractor	Immediately after competition of works on concerned sections	To be included in decommissioning costs
PR 4: Community Health, Safety and Security						
Prior and during project implementation	Risk assessment with regard to community exposure	The Company needs to carefully assess all the H&S risks associated with the Project, in a special Risk Assessment Study.	The Company needs to include written procedures on management of hazardous substances and materials in its Emergency Response Plan	The Company	During project implementation	10,000 €

Phase	Issue	Action to be taken/ Mitigation measure	Comments	Responsibility	Timeframe	Cost
		The Company needs to keep track record of diseases caused by the Project. This includes risks associated with the use of hazardous materials (chlorine, oils and lubricants) and risks associated with unsatisfactory quality of water provided by the Company in case of accidents or system malfunctions.				
Operation	Reduction of losses in water supply network in all concerned municipalities	Develop a Leak Detection Study and reconstruct the network according to recommendations from the study	The project of detection of losses in concerned municipalities has already started. Grant for networks reconstruction is pending development of Studies	Public Regional Company Plava Voda	Prior to putting Regional Water Supply System in use	To be determined by a Leak Detection Study
Pre-construction	Establish water protection areas in line with national legislation	The Municipal Assembly of Travnik Municipality needs to adopt the <i>Decision on the protection of water source "Plava Voda"</i> Given the fact that the Company is partially owned (51%) by the Municipality, the Company management needs to internally resolve this issue with the Municipality.	Adoption of the Decision will create a legal framework for protection of the water source in line with the Study on protection of "Plava Voda" water source	Travnik Municipality	During project implementation	-
Pre-construction / Construction / Operation	Organisation of monitoring activities related to the environmental flow	Organisation of continuous monitoring of flow rates and seasonal monitoring of selected upstream and downstream representative species of the ecosystem. This action/mitigation measure has been partially undertaken by the Company.	Public Regional Company Plava Voda should on the basis of this report and according to the Water Law of FBiH organise monitoring program. This mitigation measure aim not only to ensure the minimum ecological flow but to mitigate possible risk from future changes	Public Regional Company Plava Voda	Prior to construction works and during construction and operation	5,000 € per year.

Phase	Issue	Action to be taken/ Mitigation measure	Comments	Responsibility	Timeframe	Cost
		The Company has installed a measuring station in 2014 to enable monitoring of Plava Voda flow.	in the water flow due to the climate changes.			
Operation	Establishing of environmental flow	Develop and implement an adaptive management approach to establish biological minimum flow.	The monitoring results of continues monitoring of flow rates will be used to adjust available/requested rates.	Public Regional Company Plava Voda	After the completion of data series of five years monitoring	1,500 €
Operation	Preservation of environmental flow	Include special condition in the Water Buying Contract according to which water buyers (municipal water utilities) should modify (i.e.) lower the abstracted quantity of water.	The variation in abstracted quantity of water will be based on results of the adaptive management approach to establish biological minimum flow.	Public Regional Company Plava Voda	During Project Implementation	-
Operation	Preservation of fish species in Lašva River	Fish planting	In case fish loss is observed compensation in form of fish juveniles should be ensured	Public Regional Company Plava Voda in cooperation with fisherman associations	In the years when fish decreased is observed	20,000 €

6.2 Social Impacts Mitigation Measures

Table 26: Social mitigation measures

Relevant PR based on EBRD E&S Policy	Phase	Issue	Affected group	Action to be taken/ Mitigation measure	Responsibility	Cost (€)
PR 2	Construction and Operation	Working conditions and employment/ Grievance mechanism	Employees of Plava Voda, municipal water distribution companies and subcontractors	The Company and Contractor will provide a grievance mechanism for workers to raise reasonable workplace concerns and a process for their resolution. This shall be monitored by Company at least quarterly during construction. The grievance mechanism will be a part of legal covenants between Plava Voda, municipalities and construction companies.	Public Regional Company Plava Voda Contractor/construction	-
PR2	Construction and Operation	Workers health and safety	Workers of municipal water distribution companies and subcontractors for construction operations	All workers will have adequate health and safety equipment in accordance to occupational risk. Define operational control procedures and implement a training program for operators who work with chlorine/hazardous materials regarding safe handling practices and emergency response procedures.	Public Regional Company Plava Voda, municipal water distribution companies Contractor/construction	2000 €
PR4	Pre-construction Construction and Operation	Preservation of amenity values	Citizens of Travnik and tourists	Implement project "Restoration and urban planning of Plava Voda greater area" related to reconstruction of cultural historical areas in location of Plava Voda which includes measure to construct cascades, decrease of bed slope to decrease flow velocity downstream from "Plava Voda" spring. Implement other environmental mitigation measures serving to preserve environmental flow. Implement other measures defined in consultation with inhabitants of the old part of Travnik to preserve Plava Voda brand and obtain added value through tourism promotion.	Public Regional Company Plava Voda	Will be available when ToR gets prepared
PR4	Operation	Emergency Response	Public Regional Company Plava Voda	Develop and implement Emergency Preparedness and Response Plan/ procedures to deal with emergencies on	Public Regional Company Plava Voda	10,000

Relevant PR based on EBRD E&S Policy	Phase	Issue	Affected group	Action to be taken/ Mitigation measure	Responsibility	Cost (€)
			and Contractor	and off site, major incidents contamination issues and health concerns. The procedures shall include measures of how the public are informed of incidents with a potential public health impact and the requirement for at least one exercise to test the effectiveness of the procedures on an annual basis.	Municipal water distribution companies	
PR 5	Pre-construction	Land acquisition and economic displacement	Private land owners (households and business) identified through the Expropriation Study prepared in 2012, and the Census and Socio-economic Survey undertaken in April 2015	<p>The Resettlement and Compensation Framework (RCF) and the Resettlement Action Plan (RAP) prepared for the needs of the Project will be implemented. Resettlement activities will be implemented with appropriate disclosure of information, consultation and informed participation in line with RCF and RAP and prepared in accordance with EBRD requirements.</p> <p>Identified vulnerable individuals will be assisted by social workers and legal advisers to represent them and their best interests, as necessary.</p> <p>The Public Enterprise will carry out adequate dissemination of information and provide opportunities to all stakeholders to express their opinions or concerns and accordingly and timely respond to such demands (according to SEP).</p> <p>The Company will, in collaboration with other responsible authorities for on the FBiH level, and municipalities implement RAP. It will inform and engage municipalities in particular on the content of RCF and RAP.</p> <p>Adverse impacts on land-use to be compensated in cash, as defined by the FBiH Expropriation Law. Compensation for occupation of land is determined in the amount and in the manner prescribed by the Law on Expropriation for established lease, i.e. determined to equal the amount of market rent. Also the construction site after completion of</p>	Public Regional Company Plava Voda Municipalities	Preliminary assessment: app. 4.6 mil. KM

Relevant PR based on EBRD E&S Policy	Phase	Issue	Affected group	Action to be taken/ Mitigation measure	Responsibility	Cost (€)
				<p>works is to be reinstated to the original condition in accordance with good working practices listed under Environmental Mitigation Measures.</p> <p>Adverse impacts on land-use to be compensated in cash, as defined by the FBiH Expropriation Law. Compensation for occupation of land is determined in the amount and in the manner prescribed by the Law on Expropriation for established lease, i.e. determined to equal the amount of market rent. Also the construction site after completion of works is to be reinstated to the original condition in accordance with good working practices listed under Environmental Mitigation Measures.</p> <p>Each affected household and/or business shall be shown the final designs and how their land shall be affected so as to allow for micro re-alignments so as to reduce impacts on future use of land</p> <p>In case of disruptions and impacts on income of local businesses during construction by limiting access to business objects (especially in Vitez), the Company will in consultation with the PAPs design alternatives for such access. In case it is not possible to maintain adequate access, the business will be compensated for their loss of income.</p>		
PR4 and PR5, PR10	Construction	Restoration of affected public and private properties and streets into its original state	PAPs and affected communities	<p>Inform and consult with the inhabitants of the old part of Travnik about the neighbourhood street access during construction, and return the neighbourhood streets in its original state as soon as possible.</p> <p>The Company will ensure adequate monitoring and regular monitoring of contractors to ensure that all public and private properties are restored into its original state for the shortest time possible after the end of construction works,</p>	Public Regional Company Plava Voda Contractors	

Relevant PR based on EBRD E&S Policy	Phase	Issue	Affected group	Action to be taken/ Mitigation measure	Responsibility	Cost (€)
				in order to restore normal way of living to affected communities. Special attention will be given to the vulnerable groups and their needs to restore the sites after construction.		
PR10	Pre-construction, Construction	Implementation of SEP	All affected groups/persons defined in SEP	SEP is provided as part of disclosure package. The Company and contractors are responsible for SEP implementation, with the support of municipalities.	Public Regional Company Plava Voda	5,000
	Operation	Potential increase of water tariffs	Recipients of the social welfare benefits, retired, and Roma people, as well as people who will not be willing to pay	Monitor affordability and implement mechanisms for stakeholder engagement. Develop a mechanism to alert the responsible organisations once there is a risk of non-affordability.	Public Regional Company Plava Voda	Estimate not available

6.3 Monitoring Plan

The updated information in this section pertains to an update of the Monitoring Plan, which includes changes to monitoring provisions defined in the 2011 ESIA.

Monitoring plan relates to:

- monitoring of emissions from the site during construction – changes to the original monitoring plan defined in the 2011 ESIA are marked with red letters;
- monitoring of implementation of mitigation measures – no updates are identified;
- monitoring of environmental and social conditions after the project is put in use - changes to the original monitoring plan defined in the 2011 ESIA are marked with red letters.

Table 27: Programme of monitoring emissions from construction site

Potential impact	Which parameter is to be monitored?	Where will the monitoring of parameters are performed?	How will the monitoring be performed?	When will the monitoring be performed?	Cost	Who will monitor?
Elevated levels of noise that cause disturbance for nearby residents	Noise level	Near the nearby house in affected settlements, especially in Nova Bila, Stara Bila, Kremenik and Krčevine, Katići, Janjići, Putovići, Pribilovići, Hrastova Glavica. Monitoring is to be extended to other settlements in case of complains as well as to any other sites prescribed by environmental permit.	In accordance with the ISO 17025: 2005 and based on the Law on Protection from Noise (O.G. of FB&H, no.110/12)	Dynamic of monitoring is to be adjusted to the dynamics of construction - conduct monitoring at the time when the work is performed in specific section. Monitoring is to be performed once in the period of intense works at corresponding sections	100€/ measurement	Authorised laboratory/ company
Impact on ecosystem in Lašva river	Continuous measurement of flow rate in Plava Voda stream and seasonal measurement of selected species in Lašva	Flow rate in Plava Voda stream is to be continued on the location already used for hydrological measurements within the project. The measurements of the ecosystem according to the rules prescribed in secondary legislation related to the biological monitoring.	Monitoring should be done according to the secondary legislation related to the monitoring of mentioned parameters.	The frequency of monitoring is defined in the secondary legislation related to monitoring of mentioned parameters.	5000 € per year	Authorised company (defined in secondary legislation)
Impact on water course downstream from Plava Voda intake up to the confluence with Lasva river	Turbidity, total suspended matter, mineral oils, dissolved oxygen, temperature, pH, conductivity, nutrient (ammonia, nitrites, nitrates, total N, total P) and hydrobiological analyses of quantity and quality of zoobenthos and phytobenthos	100 m downstream from water intake construction site	Hydro-biological and standard physical-chemical methods used by authorised laboratories	Hydrobiological analyses should be carried out at least once in three months and other analyses at least once a month in the period of construction works	250 €/sample	Authorised laboratory/ company

Potential impact	Which parameter is to be monitored?	Where will the monitoring of parameters be performed?	How will the monitoring be performed?	When will the monitoring be performed?	Cost	Who will monitor?
Pollution of water and land with oils and fats, increase of suspended solids in a watercourse, etc. due to inadequate storage of materials, disposal of waste, construction near or inside the river bed, and the like	Turbidity, total and volatile suspended solids, mineral oils	Upstream and downstream of sections where the works are performed at watercourses of interest (Plava Voda downstream of the intake, Lašva, Bila, Kozica and Bosna rivers) as well as any other site prescribed by environmental permit.	Standard physical and chemical methods used by authorised laboratories	Dynamic of monitoring is to be adjusted to the dynamics of construction - conduct monitoring at the time when the work is performed in specific section. Monitoring is to be performed soon after the beginning of construction in specific section and after a complaint has been submitted	250€/ sample	Authorised laboratory/ company
Pollution from transport and earthworks dust	Control of vehicle coverage during the transport, control of the application of prevention measures to reduce dust-splash	Along the construction zone, especially in residential areas and near agricultural land	Visual monitoring	Daily	N/A	Supervising Engineer for environmental, health and social issues
Waste management	Waste type and quantity	Along the construction zone, especially in residential, at agricultural land and in forest areas	Visual and by measurement	Daily		Supervising Engineer for environmental, health and social issues

Table 28: Monitoring of environmental and social conditions after the project is put in use

Potential impact	Which parameter is to be monitored?	Where will the monitoring of parameters are performed?	How will the monitoring be performed?	When will the monitoring be performed?	Cost	Who will monitor?
Decrease in drinking water quality at Plava Voda source	All parameters in accordance with <i>Regulation on sanitary conditions of drinking water</i> (O.G. of BiH, no 40/10 and 30/12)	Sampling is carried out at places defined in Article 6 of the <i>Regulation on sanitary conditions of drinking water</i> (O.G. of BiH, no 40/10 and 30/12). Number of sample to be determined in accordance with Annex II of the Regulation	Using methods for analysis defined in Annex III of the <i>Regulation on sanitary conditions of drinking water</i> (O.G. of BiH, no 40/10 and 30/12)	Plava voda spring: at least once per month. Water discharge points: At least once per month in each municipality. The final number of samples per month in each municipality should be determined respecting the total number of samples per year as indicated in column 3.	500 €/sample	Laboratory authorised in line with BAS EN ISO/IEC 17025
Impact on ecosystem and amenity values due to the decrease in environmental flow	Flow in order to regulate abstracted water quality	Upstream and downstream from "Plava Voda" intake ³³	In accordance with provisions of Section III of the Regulation on determining environmental flow (O.G of FBiH, no. 04/13)	In accordance with provisions of Section III of the Regulation on determining environmental flow (O.G of FBiH, no. 04/13)	Included in the monthly salary	Engineer Responsible for managing water intake structure
Decrease in fish population in the Lašva River	Fish population	Along Lašva river downstream from convulsion with "Plava Voda"	Observation	During fishing season	N/A	Fisherman associations
Decreased affordability to pay for water	Affordability	Tracking data and trends on accounts receivable of municipal water utilities and	Tracking data and trends	Continuous	Included in the monthly salary of water utility	Municipal water utilities in cooperation with

³³At the same time, monitoring at Merdani gauging station should be continued by Water Agency for Sava river Watershed Area and data exchanged between two institutions.

Potential impact	Which parameter is to be monitored?	Where will the monitoring of parameters be performed?	How will the monitoring be performed?	When will the monitoring be performed?	Cost	Who will monitor?
		monitoring of local economic data as proposed in the ESIA			employees	Regional Company Plava Voda.

7 Update to Alternatives

The updated information in this section pertains to newly identified alternatives that may occur during Project implementation.

7.1 Alternative routes

As previously described in Chapter 2.2, the Company received a request from Travnik Municipality to relocate one of the water tanks to a different location. Whilst this is still only a request, it is one of the forthcoming activities of the Company to address this request in line with national requirements.