Construction of **Sewage Network and Waste Water Treatment Plant (WWTP) in Berane**

Volume 3-2 Technical Specifications

Section 1 General Requirements

for Execution of Works

June 2015

Table of Contents

[1. Items of general application 5](#_Toc422486976)

[2. Introduction 5](#_Toc422486977)

[3. Objectives of the investments 7](#_Toc422486978)

[4. Scope of Work 7](#_Toc422486979)

[4.1. General 7](#_Toc422486984)

[4.2. Description of the works 8](#_Toc422486985)

[5. General requirements 10](#_Toc422486986)

[5.1. Definitions 10](#_Toc422486988)

[5.2. Interferences with other Contracts 11](#_Toc422486989)

[5.3. Submissions by the Contractor 11](#_Toc422486990)

[5.3.1. Work Programme and Method Statement 11](#_Toc422486999)

[5.3.2. Method Statements 12](#_Toc422487000)

[5.3.3. Organisation Chart and Plant, Labour Returns 13](#_Toc422487001)

[5.3.4. Health, Safety and Environmental Plan 13](#_Toc422487002)

[5.3.5. Quality Control Plan 14](#_Toc422487003)

[5.3.6. Technical documentation 15](#_Toc422487004)

[5.3.7. Working Drawings and Calculations 15](#_Toc422487005)

[5.3.8. Sub-orders 17](#_Toc422487006)

[5.3.9. As-Built Drawings 17](#_Toc422487007)

[5.4. Pre-Construction Surveys and Setting Out 18](#_Toc422487008)

[5.4.1. General 18](#_Toc422487010)

[5.4.2. Levels and Benchmarks 19](#_Toc422487011)

[5.4.3. Execution and Workmanship 19](#_Toc422487012)

[5.5. Coordination with Other Authorities 19](#_Toc422487013)

[5.5.1. Statutory Services 19](#_Toc422487015)

[5.5.2. Traffic Requirements 20](#_Toc422487016)

[5.5.3. Co–ordination with network operator 20](#_Toc422487017)

[5.5.4. Notices, Permits 21](#_Toc422487018)

[5.5.5. Precautions 21](#_Toc422487019)

[5.5.6. Witnessing and Post-Construction Clearances 22](#_Toc422487020)

[5.6. Access to and Possession of Construction Site 22](#_Toc422487021)

[5.6.1. The Site 22](#_Toc422487023)

[5.6.2. Access by Officials 23](#_Toc422487024)

[5.6.3. Temporary Way leaves, Access Costs 23](#_Toc422487025)

[5.6.4. Access to Adjoining Property 23](#_Toc422487026)

[5.6.5. Permanent Right-of-Way 24](#_Toc422487027)

[5.6.6. Measurement and Payment 24](#_Toc422487028)

[5.7. Provision and Maintenance of Contractor’s Site Installations 24](#_Toc422487029)

[5.8.1. Construction Management 24](#_Toc422487032)

[5.8.2. Contractor's Offices, Stores and Services 24](#_Toc422487033)

[5.8.3. Contractor's Construction Equipment 25](#_Toc422487034)

[5.8.4. Water Supply 25](#_Toc422487035)

[5.8.5. Sanitation 26](#_Toc422487036)

[5.8.6. Sewage and Waste Disposal 26](#_Toc422487037)

[5.8.7. Electrical power supply 26](#_Toc422487038)

[5.8.8. Lighting and Electric Power 26](#_Toc422487039)

[5.8.9. Supply of Fuel, Lubricants, etc. 26](#_Toc422487040)

[5.8.10. Temporary Telephone Connections 27](#_Toc422487041)

[5.8.11. Signboards 27](#_Toc422487042)

[5.8.12. Site Drainage 27](#_Toc422487043)

[5.8.13. Cleaning-up of Site 28](#_Toc422487044)

[5.8. Temporary Works 28](#_Toc422487045)

[5.9. Notice of Operations 28](#_Toc422487046)

[5.10. Working Hours 29](#_Toc422487047)

[5.11. Safety and Public Convenience 29](#_Toc422487048)

[5.12.1. Health and Safety 29](#_Toc422487053)

[5.12.1.1. General 29](#_Toc422487054)

[5.12.1.2. Safety Officer 30](#_Toc422487055)

[5.12.1.3. Hazard Identification and Risk Assessment 30](#_Toc422487056)

[5.12.1.4. Accident Reporting 30](#_Toc422487057)

[5.12.1.5. Site Safety 30](#_Toc422487058)

[5.12.1.6. First Aid 31](#_Toc422487059)

[5.12.1.7. Working with Sewage 31](#_Toc422487060)

[5.12.1.8. Confined Space Working 31](#_Toc422487061)

[5.12.1.9. Working near power lines 31](#_Toc422487062)

[5.12.2. Fire Prevention 31](#_Toc422487063)

[5.12.3. Prevention of Noise and Disturbance 32](#_Toc422487064)

[5.12.4. Loading and Turning Areas 32](#_Toc422487065)

[5.12.5. Storage of Equipment and Materials in Public Streets 32](#_Toc422487066)

[5.12.6. Street Clean Up During Construction 33](#_Toc422487067)

[5.12.7. Protection of Adjoining Property 33](#_Toc422487068)

[5.12.8. Procedure for Complaints and Claims for Damage 33](#_Toc422487069)

[5.12.9. Protection against Damage 33](#_Toc422487070)

[5.12.10. Damage to Access Roads 34](#_Toc422487071)

[5.12.11. Reinstatement upon Completion 34](#_Toc422487072)

[5.12. Quality Control, Sampling and Testing 34](#_Toc422487073)

[5.13.1. Responsibilities and Procedures 34](#_Toc422487075)

[5.13.2. Sampling and Testing 34](#_Toc422487076)

[5.13.3. Certification 36](#_Toc422487077)

[5.13.4. Employer Inspection 36](#_Toc422487078)

[5.13.5. Inspection and Acceptance 37](#_Toc422487079)

[5.13.6. Materials/Plant Certificates 37](#_Toc422487080)

[5.13.7. Construction Completion Reports 38](#_Toc422487081)

[5.13.8. Daily Log Book 39](#_Toc422487082)

[5.13. Protection of the Environment 39](#_Toc422487083)

[5.14.1. Mitigation measures for environmental protection during the construction period 39](#_Toc422487085)

[5.14. Progress of Works 40](#_Toc422487086)

[5.15.1. Updating, Monitoring and Reporting Progress 40](#_Toc422487088)

[5.15.2. Detailed Fortnightly Programme 40](#_Toc422487089)

[5.15.3. Record / Progress Photographs 40](#_Toc422487090)

[5.15.4. Progress Reports 40](#_Toc422487091)

[5.15. MATERIALS AND WORKMANSHIP 41](#_Toc422487092)

[5.16.1. Equipment and materials 41](#_Toc422487094)

[5.16.2. Packing and shipping 41](#_Toc422487095)

[5.16.3. Quantities 41](#_Toc422487096)

[5.16.4. Toxic Materials 42](#_Toc422487097)

[5.16.5. Country of Origin of Materials 42](#_Toc422487098)

[5.16.6. Reference Standards and Codes 42](#_Toc422487099)

[5.16.7. Metric Units 43](#_Toc422487100)

[5.16.8. Alternative designs, materials and constructional procedures 43](#_Toc422487101)

[5.16.9. Approval of Equivalent Materials 43](#_Toc422487102)

[5.16. Special requirements 43](#_Toc422487103)

[5.17.1. Cross Cutting Issues (Environment, Gender, Minorities) 44](#_Toc422487105)

[5.17.2. Communication Guidelines 44](#_Toc422487106)

[5.17.3. Persons with Special Needs 44](#_Toc422487107)

[6. List of Standards 44](#_Toc422487108)

# Items of general application

These Technical Specifications cover principles, responsibilities and requirements for items that will be applicable to all construction, pipe and road works pertinent to Contract No. [Insert contract No] under the Investment Project "Construction of the sewerage network and wastewater treatment plant in the municipality of Berane", Lot 2: Construction of the sewerage network in Berane in accordance with the detailed design prepared by the Employer/Project Beneficiary.

They shall be read in conjunction with the General Conditions of Contract (Volume 2, Section 2, Appendix to Tender (Volume 1, Section 2), Particular Conditions Volume 2, Section 3), the Specifications (Volume 3), the Bill of Quantities (BOQ, Volume 4) and the Contractual Drawings (Volume 5). The Bill of Quantities have to be completed with the contractors prices expressed in EURO. Where reference is made to any national Standard/Code or European Norm the Contractor shall adopt the highest specification.

# Introduction

The works are located in the town of Berane in the Republic of Montenegro.

The Municipality of Berane is located in the north-east part of Montenegro. The town of Berane is located close to the border with the Republic of Serbia (around 30km to the north - east), Albania (50km to the south) and Kosovo (approximately 20km to the east).

It is situated approximately 70 km north of Podgorica and 30km east of Kolašin. The Municipality, with its 5 surrounding settlements, has a population of around 35,000 inhabitants and a total size of 717km2. The population of the town of Berane is around 11.000. The town of Berane is the administrative, economic, cultural, educational and the religious centre of the municipality.

Figure 2‑1: Geographical position of the Municipality of Berane



The sewerage system in Berane is designed as a separate system, i.e. rainwater and wastewater are to be collected and discharged separately. However, at present, there are some irregularities, and wastewater and stormwater drainage systems are randomly cross-linked. There are a few direct connections of stormwater drainage to the sewerage system but the lack of stormwater sewers in a number of streets leads to surface water entering the sewers through manholes. A number of these irregularities are to be addressed through this project.

There is also considerable infiltration from springs and groundwater.

Within the overall Berane Wastewater Collection and Treatment Project it is planned to carry out extensive works on the sewerage network rehabilitation and extension, within the scope of this tender. Two main sewers are to be built up to the planned WWTP location. One of the main sewers shall serve the area along the left bank of the Lim River, while the second main sewer shall serve the areas along the right bank of the Lim River. Both main sewers are supposed to operate by gravity and transfer collected communal wastewaters to the inlet lifting pumping station at the WWTP location.

Planned wastewater treatment facility is one of major components of the wastewater system. The wastewater collection system is planned to cover almost entire urban and suburban zone, and complete municipal wastewater is to be transferred to the future WWTP site.

Being one of key wastewater system components, the WWTP should provide effluent quality in accordance with the relevant environmental national and EU regulations, reducing pollution of surface and ground waters, reducing risks to public health and significantly improving wastewater collection and treatment services in the project area.

This Tender covers rehabilitation and construction of the sewerage system (wastewater and stormwater collection) in the town of Berane and neighbouring settlements, in order to improve and extend wastewater collection services, physically separate sub-systems for collection of wastewater and stormwater, minimize/eliminate combined sewer overflows, and ensure effective transfer of communal wastewaters to the planned WWTP.

When becoming a Candidate Country, the European Commission adopted an Operational Programme to assist the country in achieving compliance with the criteria defined by the legislation of the European Union. The Operational Programme has been prepared in relation to the national strategy for compliance to the Acquis of the European Union.

Under the Operation Programme, the European Union provides financial support for investments in the transport infrastructure and the environmental sector through Pre-Accession Funds (IPA).

The construction of a wastewater treatment plant and the rehabilitation and extension of the wastewater system of Berane have been identified as priority measures in the environmental sector and will be co-financed by the European Union and the Government of the Montenegro and Municipality of Berane.

The Municipality of Berane is the Final/Project Beneficiary of the investment project and owner of the municipal wastewater collection system.

JKP Vodovod i Kanalizicija (Opearting Company), Berane, is the water supply and wastewater utility in Berane and is in charge for the operation and maintenance of the water services and facilities.

# Objectives of the investments

The overall objective of the Investment Project "Wastewater Collection and Treatment Infrastructure in Berane" is to achieve communal wastewater collection and treatment services in compliance the relevant EU Directives related to wastewater collection and treatment in Berane through:

* Rehabilitation and extension of the wastewater collection system
* Construction of a Wastewater Treatment Plant for the Town of Berane

With regard to the wastewater collection it is envisaged to achieve the following specific targets:

* Provision of centralized wastewater collection in excess of 90% of population,
* Reduced pollution of natural water bodies,
* Reduced risk of flooding through replacement of structurally defective and hydraulically under-sized sewers.

# Scope of Work



## General

The investment project "Wastewater Collection and Treatment Infrastructure in Berane" is divided into two lots:

1. Lot 1: Design and build of the wastewater treatment plant
2. Lot 2: Rehabilitation and extension of the sewerage network in accordance with the detailed design prepared by the Employer/Project Beneficiary.

The present Works Contract covers Lot 2: Rehabilitation and extension of the sewerage network and is based on the detailed design prepared by the Employer/Project Beneficiary.

The works under the Contract include the execution and completion of the Works described in Volume 3 (Technical Specifications), Volume 4 (BoQ) and Volume 5 (Tender Drawings) and the remedying of any defects therein in conformity with the Conditions of Contract, Specifications and the Appendices of Tender Documents.

The works can be summarized as follows:

1. Wastewater collection system: construction of the sewerage network of the total length L=20.678m, of GRP sewerage pipes in accordance with EN14364
2. DN500, L=1.858m
3. DN400, L=213m
4. DN300, L=4.606m
5. DN250, L=11.005m
6. DN200, L=3.000m
7. Stormwater drainage system: construction of the stormwater drainage system of the total length L=1.400m, of profiled HDPE PE 100 in accordance with DIN 16961
8. DN1000, L=543m
9. DN800, L=312m
10. DN630, L=197m
11. DN300, L=267m
12. DN250, L=83m

The abovementioned stormwater drainage sub-system shall be equipped with a corresponding oil separator, as described in the BoQ and in the Detailed Design.

The Works shall comprise (inter alia) the mobilisation and demobilisation of staff and equipment, provision of site installations, provision of temporary facilities during construction, housing for Contractor’s staff, provision of all site offices and vehicles including running costs, purchase, receipt, storage of all material required for the Works, preparation of working drawings (construction design/shop drawings) as required, setting out, the construction in accordance with the Specification and BoQ, testing and commissioning of those Works, correction of any defects until the end of the Defects Notification Period (12 months).

According to the Procurement Plan of the Employer for the investment project for this lot, the Works are required to be completed within 18 months.

## Description of the works

The Project area generally consists of two sub-catchments, urban area and settlements along the left bank of the Lim River, and part of the town of Berane along the right bank of the Lim River.

**Wastewater collection system**

**Right-bank sub-catchment**

There shall be two new main sewers (D0 and D1), as well as four new sewers D1.1, D1.2, D1.3 and D1.3.1. within the right-bank sub-catchment.

1. Main sewer D0 is the most important sewer line for the right-bank sub-catchment. It starts close to the bridge on the regional road Berane - Rožaje and then goes along the industrial zone crosses the Lim River and ends in the WWTP inlet chamber. Upstream section of the main sewer is to be built within the existing right-bank flood protection embankment. Downstream section of the sewer is to be laid under the future flood-protection embankment, and therefore, the works on the sewer and embankment should be coordinated. Crossing of the sewer with the Lim River shall be executed in accordance with the BoQ and design drawings. The sewer is to be placed in the pre-cast concrete channel, with proper backfilling, and with pre-cast concrete slabs. Up to the river crossing the sewer is of DN300, and then the size is increased to DN400.
2. Main sewer D1 should collect wastewater from the settlement Donje Luge, Jasikovac and Harem. The sewer shall be of DN250 in the settlement of Donje Luge while downstream section from D.Luge to the inlet point to the D0 sewer the size of the sewer shall be DN300. So called secondary sewers D1.1, D1.2, D1.3 and D1.3.1 are to be connected to the main sewer D1.

**Left-bank sub-catchment**

Most of the central urban zone of Berane is situated along the left bank of the Lim River, and it has got quite developed wastewater collection system. The following sewers are to be constructed within the left-bank sub-catchment:

1. Main sewer L1 is the primary sewer within this sub-catchment. It should be of DN500 and should collect complete wastewater generated in the catchment. The route is mostly planned in parallel and close to the Lim River, while the length of the main sewer is app. 1.860m. A number of smaller sewers are connected to the L1 main sewer.
2. Sewer L2 shall collect wastewater from Pešća settlement and is planned along the bypass road. The size of the sewer is DN250 and DN300, and its total length is app. 1.900m. There are several smaller sewers to be connected to the L2 sewer.
3. Sewer L3 should serve the area between M.Mladenović Street and the bypass road. The size of the sewer is DN250 and it should be app. 70m.
4. Sewer L4 is to be laid along T.Softića St. It is of DN300 and app. 170m long.
5. Sewer L5 is planned along the Polimska Rd. It is of DN250 and app. 180m.
6. Sewer L6 should serve a part of the Lušce settlement, it is of DN250 and app. 1400m long.
7. Sewer L7 shall serve the settlement of Dolac, it is of DN250 and app. 350m long.

**Stormwater drainage**

New stormwater drainage sewer is planned for the catchment area along the right bank of the Lim River. Size of this catchment is app. 28 ha. This sewer, as well as the other sewers in the stormwater drainage system shall be constructed of corrugated HDPE sewer pipes of adequate size and class. The main new sewer for stormwater drainage is coded A1 and its basic characteristics are as follows:

1. Section 1 - DN630, L=196m
2. Section 2 - DN800, L=296m
3. Section 3 - DN1000, L=403m

Apart from the above-mentioned main sewer there are a number of smaller sewer that should drain towards it. At the downstream end of the aforesaid main sewer there shall be a oil separator which should retain and remove oils, fats and other dirt that is washed by stormwater runoff. Effluent quality after the oil separator should comply with the relevant national and EU regulations.

As far as the urban zone along the left bank of the Lim River is concerned, main scope of the works on the stormwater drainage system includes the interventions that should result in full separation of the wastewater and stormwater collection sub-system. These interventions include detachment of a number of stormwater drainage sewers from the wastewater collection system and their re-connection to the main stormwater drainage lines. The micro-locations that these interventions are to be carried out are coded A2, A3, A4 and A5.

Layout of planned extension and reconstruction of the stormwater drainage system are shown on the general and detail layout maps.

# General requirements



## Definitions

**a) General**

Agreed - Agreed in writing.

As detailed - As detailed on the drawings.

Authorized/ordered/rejected - Authorized/ordered/rejected by the Engineer in writing.

Designated - Shown on the drawings or otherwise specified by the Engineer or, in relation to an item scheduled in the Bill of Quantities, description of an item.

Indicated - Indicated in or reasonably to be inferred from the contract, or indicated in writing by the Engineer.

Instructed/directed/permitted - Instructed/directed/ permitted by the Engineer.

Satisfactory - Capable of fulfilling or having fulfilled the intended function.

Service - Any pipeline, cable, duct etc. for conveying or transmitting any fluid, power or other matter.

Submitted - Submitted to the Engineer.

Working easement – Area required by the Contractor for execution of the Works, including the permanent right of way obtained plus any temporary way leaves arranged by the Contractor.

Working strip - The working easement on the sewer line route.

**b) Tolerances**

Deviation - The difference between the actual (i.e., measured) size or position and the specified size or position.

Permissible deviation - The specified limit(s) of deviation.

Tolerance - The range between the limits within which a size or position must lie.

**c) Measurement and Payment**

Bill/schedule - The bill/schedule of quantities.

Billed/scheduled rate - The unit rate or price entered in the bill/schedule at which the Contractor undertakes to execute the particular work or to provide the required material, article or service, or to do any or all of these things, as set out in the item concerned.

Billed/scheduled - Listed in the bill/schedule of quantities.

## Interferences with other Contracts

It is the Contractor’s obligation to liaise with the other Contractor on site and to coordinate his activities with those of the other contracts to avoid any conflicts.

The Employer will not be responsible and will not bear any additional cost for any interference on site with others and for any delays resulting from it.

## Submissions by the Contractor



### Work Programme and Method Statement

In accordance with the Conditions of Contract, the Contractor shall submit a work programme to the Engineer within the period specified. The programme shall be prepared on a CPM-software of a form and version compatible with the systems operated by the Engineer and shall be submitted both in digital format and in hard copy.

The programme for the Works shall take into account the preparation of Working Drawings, obtaining permits, as required, climatic conditions, etc. to ensure the completion of the Works in accordance with the Contract. The Contractor shall allow in his Programme reasonable amount of time for work to be carried out by and with the Public Utility Services Authorities. The Employer will provide all necessary assistance in liaising with such Authorities.

The programme shall include the following:

* A detailed work programme in form of a Gantt chart which clearly indicates individual functions, actions and tasks and shows the period for preparation of working drawings, approvals, delivery of construction materials, construction period, testing, commissioning and all other such operations as may be applicable with key dates; Indicated shall be the sequence of each activity, the proposed start and completion dates of each activity, the rate of progress and the cumulative quantity or percentage of work expected to be achieved on each activity by the end of each month;
* a complete resource schedule showing the number of units and allocated times for each unit of construction plant & machinery, materials and labour allocated to each part of the Works;
* Dates by which working drawings, including Temporary Works design details, requiring the Engineer’s approval will be submitted;
* The time requirements for work by others, including those of the Employer and by the various utility companies;
* Mobilization/Demobilization Schedule;
* Schedule of Subcontractor;
* Actual progress against the programmed progress for each activity,
* A Pert chart with all task linkages and the critical path clearly indicated;

During the contract period the programme shall be updated monthly and the programme thus presented shall clearly compare actual progress with that planned. The programme shall be be attached to the monthly progress report with a clear statement on the progress. These programmes shall indicate the use of materials and deployment of plant and labour, in addition to showing anticipated constructional progress. Where the inputs of others (including the Employer and his Representative, the Engineer) are required, target dates should be shown and adequate notice should be given to those concerned.

This planning must include the implementation of all the agreements made with the authorities who are involved and responsible for traffic, transport and existing services like water supply, power, telephone, fire fighting, drainage and such like. Any consent of the Employer to this planning will not exempt the Contractor of his responsibility to complete the Works within the time as agreed and stated in the Contract.

The Contractor shall take the initiative to inform the local authorities in due time about his programme. The Contractor shall attend co-ordination meetings between the Employer and other authorities and shall supply all relevant information and data in his possession.

The possible simultaneous construction of adjacent works under separate contracts may require the Contractor to adapt his planning to that of other Contractors. The Employer will inform the Contractor in due time about the conditions to be expected during the period of interference of work. Such adaptations as far as are required in the interest of and at the request of Employer shall not entitle the Contractor to additional payments.

For any operations that may result in a safety hazard (eg deep excavation, pile driving, concrete casting of foundation etc.), the Contractor shall submit in writing the method statements for such operations for approval by the Engineer not less than 30 days prior to the planned commencement of such work.

Programmes shall allow for the 21 days review period prior to construction. Where desired, the Contractor may present the Programme (and updates) in electronic format provided the Contractor ensures, at his own cost, that the Engineer has the necessary software and hardware to be able to utilize the information as presented.

### Method Statements

The initial and monthly programmes shall be submitted with a construction and installation method statement. These shall make due allowance for all requirements and restrictions imposed by the Contract. Each method statement shall comprise a step-by-step schedule of specific operations or activities with descriptions, dates, times and duration of each step. Sketches, diagrams or other supportive detail as necessary to enable a clear understanding of the method and significance of each step of work or operation shall support the method statements. Each method statement shall be submitted to the Engineer for review at least 28 days prior to the programmed activity commencement. The method statements shall include, but not be limited to:

1. Detailed methodology for all operations (site preparation, setting out, earthworks, dewatering, construction, continuation of wastewater discharge during construction, testing, commissioning, etc.);
2. A statement giving the numbers and categories of supervisory and technical staff and skilled and unskilled workers to be employed on the Works;
3. Construction equipment to be used (Details of plant, machinery, equipment and tools, which the Contractor proposes to use in the execution of the Works);
4. A statement identifying proposed locations and sizes for the Contractor’s site installations. (Layouts of compounds, storage and welfare facilities);
5. Hours of working.
6. Risk assessment
7. Temporary works proposed;
8. Measures for controlling noise and vibration.
9. Sources of materials.
10. Methods of movements and storage of bulk materials and spoil.
11. Measures for controlling dust.
12. Temporary lighting measures.
13. Details of all disposal sites.
14. Maintaining and cleaning of roads.
15. Site safety procedures.
16. Traffic Management Plan incl. pedestrian and traffic management measures.

Method statements shall be submitted to cover the use of materials or working practices that are not covered by codes or standards mentioned elsewhere in this Specification.

### Organisation Chart and Plant, Labour Returns

The organization chart shall include details of the Contractor's Representative and other key personnel including respective job descriptions, addresses, 24-hour telephone numbers and facsimile transmission numbers. The Engineer shall be notified of any changes to addresses etc. immediately.

The Contractor shall provide a list of all staff and all plant and equipment intended to be employed on the site each week (as a forecast). This shall detail each operative's typical job description. Lists shall be submitted to the Engineer in 3 copies, of which one copy will be returned to the Contractor.

### Health, Safety and Environmental Plan

Before starting the Works, a Health and Safety Plan shall be submitted together with the Programme and shall be approved by the Engineer. This shall contain, but not be limited to:

* Construction risk assessment and control measures.
* Organization and management arrangements for implementing the plan.
* Appropriate specified safety requirements, including all confined space entry and egress.
* Welfare arrangements for staff messing, first aid and sanitary arrangements.

The Health and Safety Plan shall demonstrate how the Contractor proposes to comply with his obligations with regard to safety during trenching, pipe laying, erection of structures, installation and commissioning of equipment. This must include provision for the continuous safety of pedestrians, private and public vehicles, existing structures, foundations and services, the Works, the Contractor’s workmen and equipment and the continuous maintenance of permanent access for all public services including fire and ambulance.

The Contractor shall prepare an Environmental Plan that shall be submitted together with the Programme, for the Works addressing (but not limited to):

1. Company’s environmental policy, including any details of certification or accreditation.
2. Management, organization and responsibilities for environmental protection including the provision of a point of contact in the case of complaints and emergency response plans in the event of damage to utilities, traffic accidents, third party claims and spill of damaging or dangerous materials.
3. Staff awareness training.
4. Proposed environmental monitoring, record keeping and reporting.
5. Implementation of specific measures to ensure compliance with relevant environmental legislation and guidance.
6. Minimizing impacts in relation to human health and the general environment. This includes minimizing noise, vibration, dust, odor and exhaust emissions.
7. The safe storage and handling of potentially hazardous liquid materials (including but not limited to fuels, oils, cementations products, chemicals, sewage).
8. Liquid waste management related to sanitary waste, potential spills and silt and turbid waters such as from ground dewatering, and the disposal of such liquid wastes in an environmentally safe manner.
9. Solid waste disposal including construction material and wastes to be removed from site in an environmentally safe manner; to include information on proposed recycling and disposal at suitable sites.
10. Plans and actions (as included in the Works Contract) for the demolition of redundant structures and removal backfilling of foundations, sewers, collectors and septic tanks.
11. The Environmental Plan shall cover all the activities that fall under the responsibility of the Contractor related to Work at all sites (work sites on public and private land, storage sites, spoil storage and disposal sites, construction material sites, roads to be used etc.).

### Quality Control Plan

As soon as reasonably practicable after the order to commence the Works the Contractor shall submit for the Engineer a detailed description of his proposed Quality Control Plan. The Plan shall include the quality control of all aspects of on-site construction.

The Contractor shall be responsible for the quality of all his purchased items as stated in the Technical Specifications and as such shall develop and submit a supplier quality inspection plan for review. The inspection plan shall cover those items intended for inspection at the supplier’s works and the procedures for carrying out the same. The Plan shall contain at least the following items and shall be supplemented with additional information from time to time as required by the Engineer:

* organization chart for quality control;
* list of the Contractor’s staff to be engaged in quality control and materials testing together with details of their relevant experience;
* Quality certificates;
* list of tests of material properties as required in the specifications or necessary for demonstrating that material properties meet the requirements of the specifications;
* list of certified test laboratories;
* methodology, frequency and other relevant details of tests;
* list of proposed ”hold points”, defined as points at which specified inspection and documentation shall be performed by the Contractor and reviewed by the Engineer prior to proceeding with the work: (for example soil testing, concrete placement, back-filling, start-up of equipment, testing sewer lines and so on).

The Contractor’s Quality Control Plan shall be subject to approval of the Engineer. Should the Engineer be dissatisfied with the Contractor’s Plan at any time, the Contractor shall alter his plan as the Engineer requires. The Quality Control Plan approved by the Engineer shall be followed throughout the performance of the Contract, unless specific approvals or instructions to the contrary are received from the Engineer. Any approval by or on behalf of the Engineer of the Contractor’s Plan shall not relieve the Contractor of his obligation to ensure that the Works comply with the specifications of the Contract.

### Technical documentation

Together with the tender, technical information is to be submitted in datasheets and in the form of brochures and other certified descriptive literature to allow for an assessment of the qualities offered.

The Engineer shall have the liberty to require further details.

### Working Drawings and Calculations

The Tender Design Drawings prepared by the Employer are presented in Volume 5 as Contract Drawings. Based on this Tender Design, the Contractor shall submit prior to any commencement of work to the Engineer for his approval Shop (Working) Drawings, as required, and, where required by the relevant Sections, shall also submit calculations indicating design criteria, parameters and results.

Within 28 days of the date of the Letter of Acceptance, the Contractor shall start with the preparation of the Work Drawings of the Project. Also the Contractor shall submit to the Engineer a “Drawing Submittal Schedule for the Working Drawings” listing the anticipated dates upon which they will be submitted for approval by the Engineer. The submission dates shall be spaced at reasonable intervals to allow at least 14 days for the Engineer to duly check and to either approve them or to request changes or modifications, as the case may be.

During the preparation of his working drawings, the Contractor shall refer to the Specifications and Schedules as outlined in these documents and shall unless otherwise stated, adopt the sizes and capacities stated and shown.

Working Drawings may include, but not be restricted to:

1. Sewer line layout plans, longitudinal sections indicating other identified services, cross sections,
2. Details regarding the jointing of sewer lines, connection to inspection manholes,
3. Working drawings and calculations for bedding of sewer lines,
4. Property connections – Layout plans, sections, details
5. Structural drawings for manholes, ground plan, sections, construction details
6. Shuttering for cast-in-situ structures;
7. Reinforcement details for cast-in-place reinforced concrete manholes,
8. Drawings for other work for which the Engineer's approval is required.

The Engineer’s approval of the Working Drawings, Contract Records etc. and of the Workshop test records etc, shall not relieve the Contractor of the obligation to meet the terms of the Specification and any of the plant which upon delivery to site is found to be incorrect or unsatisfactory, or which fails to perform its duty satisfactorily during commissioning or during the Defects Notice Period shall be replaced to the Engineer’s satisfaction.

The Drawings and calculations, which have to be produced by the Contractor shall be made and submitted in accordance with the following requirements.

* All dimensions shall be in metric units and each drawing shall be properly identified by a drawing head and a numbering code in the form prescribed by the Engineer upon commencement of the Works. ISO or DIN standard size sheets shall be used. Drawings shall not be larger than DIN A1;
* The Drawings of all parts of the construction shall be clear and complete. The scales indicated on the Contract Drawings can generally be used. A further choice of recommended metric scales are 1:100, 1:50, 1:20, 1:10,1:5 and 1:1 depending on the kind of drawing and or details to be presented;
* The Contractor shall submit a softcopy and six hardcopies of all Drawings and calculations to the Engineer when seeking his approval and the Engineer will return one copy of the Drawings and calculations to the Contractor with his comments;
* Any changes or modifications to the Working Drawings that the Engineer considers necessary shall be made by the Contractor promptly and the drawings resubmitted for approval in three copies until final approval is obtained;
* 6 copies of each set of the approved Drawings including a softcopy and calculations shall be submitted to the Engineer;

Approval of Working Drawings will be given by the Engineer in the form of a stamp "RELEASED FOR CONSTRUCTION" together with the date and the authorized signature of the Engineer. Only those Working Drawings carrying the signature of the Engineer and dated stamp shall be used for execution. Working Drawings carrying other signature than those of the Engineer shall not be used for execution. Commencement of work on any part of the Works construction will only be permitted after the approval of the Contractor’s Working Drawings and calculations by the Engineer.

All cost related to the above mentioned Drawings and calculations submitted to the Engineer shall be covered by the lump sum amounts indicated in the BoQ.

All modifications requested by the Engineer in accordance with the Technical Specification shall be carried out without any additional charge. If the Contractor disagrees with the alterations requested by the Engineer, the Contractor shall send written notice to the Engineer within seven days of receiving the altered drawing(s). In such a case the Contractor shall resubmit the particular drawing(s) and calculations if needed, in five copies to the Engineer subsequent to the Contractor’s consideration of the Engineer’s comments.

Should it be found at any time after approval has been given by the Engineer to a Working Drawing submitted by the Contractor that the said Working Drawing does not comply with the terms and conditions of the Contract or that the details do not agree with the Working Drawings previously approved, such alterations and additions as may be deemed necessary by the Engineer shall be made therein by the Contractor and the work carried out accordingly without entitling the Contractor to extra payment on account thereof, except where such alternations and additions are to be made in direct consequence of written order by the Engineer to vary the Works.

No examination by the Engineer of any document submitted by the Contractor or of the Contractor's Working Drawings, nor the approval expressed by the Engineer in regard thereto, either with or without modification, shall absolve the Contractor from any liability imposed upon him by any provision of the Contract. Notwithstanding the Engineer's approval of the Working Drawings the Contractor shall be responsible for any dimensional or other errors.

### Sub-orders

During the course of the Contract the Contractor shall furnish six copies of sub-orders for plant, materials and services to the Engineer. Except as otherwise approved by the Engineer, the Contractor shall employ only those specialist manufacturers or sub-contractors declared in the Tender and sub-orders to them shall be confined to those for materials, plant and services in respect of which the Engineer’s approval has been given. Three copies of each sub-order, (inclusive of supporting documents to which it may refer), and of any amendments thereto, shall be furnished to the Engineer when payment is requested by the Contractor. Each sub-order shall state clearly the contract title and the item or drawing reference, or other means of identification.

### As-Built Drawings

Concurrently with the progress of work on Site the Contractor shall prepare all necessary drawings and diagrams of the "As-Fitted" / "As-Built" Works. Such approved Working Drawings as have been selected by the Engineer shall be correctly modified for inclusion in the As-Built Drawings incorporating such variations to the Works as have been ordered and executed. During the course of the Works, the Contractor shall maintain a fully detailed record of all changes from the approval to facilitate easy and accurate preparation of the As-Built Drawing.

The As-Built documentation shall be prepared according to what has actually been built and it shall include all electrical, mechanical and building requirements and in sufficient detail to fully define the location, size, line, level purpose and nature of all elements. Drawings shall include all detail necessary or desirable for the long-term operation and maintenance of the system and these shall include:

* detailed drawings at appropriate scales for all structures;
* layout plans of all sewer lines showing diameter, pipe material, fittings, etc. including any manholes with coordinates of the manholes and elevation of all inlet levels and outlet levels;
* Location of benchmarks established by the Contractor;
* Longitudinal profiles of the sewer lines at 1:1.000 (horizontal scale) and 1:100 (vertical scale);
* details of all service connections installed by the Contractor, other services encountered, or crossed by the lines and any other structures constructed along the lines by the Contractor, including manholes, trench cut-offs, concrete slabs and surround etc. shall be included.;
* details of any other works constructed by the Contractor for which record drawings are required by the Engineer and which will be stored in the GIS system;

The foregoing drawings may include those submitted and approved as Working Drawings and all shall be sized and set out according to the requirements for the Working Drawings. Updated Drawings and other documents shall be available to the Engineer at any reasonable time during construction.

The As-Built drawings shall incorporate full topographical surveys of all alignments, including roads, pavements, existing services, project pipes and service connections, inspection chambers, street names, property limits, etc.

The Engineer shall approve the title block and numbering system to be used.

The Contractor shall submit 1 (one) reproducible copy and 3 (three) prints of all As-Built Drawings clearly named as such to the Engineer for approval before applying for the Taking-Over Certificate for the respective Section of the Works. After approval of the As Built Drawing the Contractor shall supply an electronic copy of the drawing that shall become the property of the Employer.

Drawings shall be prepared on computer-assisted design and drafting software of a form and version compatible with the systems which will be operated by the Final Beneficiary (ACAD or similar compatible format). Each copy shall be durably bound in a volume or volumes depending on bulk. All material except Drawings shall be A4 size. Drawings shall be on international A size sheets and shall be bound into volumes. Volume titles shall be clearly inscribed on the front cover and on the spine of the cover. Drawings shall be marked “AS-BUILT”. All design, structural, electrical and mechanical Drawings shall be filed on CD as AutoCAD Drawings in DWG format and shall be handed over to the Employer 2-fold. The operating manual shall be filed on CD as Word or Excel files.

As-Built Drawings shall be submitted before the issue of Taking-Over Certificate. Irrespective of the other contractual prerequisites no Section of the Works will be considered substantially completed until the respective As-Built Drawings have been approved by the Engineer.

## Pre-Construction Surveys and Setting Out



### General

The Works shall be set out and tied to the National Co-ordinate System.

The Contractor shall establish temporary benchmarks and survey stations at suitable locations on the Site of the Works. The original points, lines and level of reference will be given by the Engineer. Temporary benchmarks and survey stations shall, unless otherwise approved, be located clear of the construction works.

The Contractor shall submit to the Engineer for approval Drawings in duplicate showing the locations and levels or co-ordinates as appropriate of each and every temporary benchmark and survey station used for the setting out of the Works.

The Contractor shall before commencing execution of any given section of the Works submit to the Engineer complete setting out details with supporting calculations and Drawings (including Drawings showing the locations and co-ordinates of the reference points used) in duplicate for approval.

The Contractor shall identify setting out dimensions for all structures by relating them to existing works and by interpretation of the Drawings.

The locations of structures to be constructed as part of the Works shall be identified by reference to steel pins set in concrete or other approved markers set up by the Contractor, who shall also determine the co-ordinates of the markers and their distances from adjacent existing structures.

The Contractor shall establish reference co-ordinate points at intervals of not more than 500m along all sewer lines and major pipelines and these points shall be located and clearly marked at approved locations either on existing building or by means of steel pins fixed in concrete.

The Contractor shall set out sections of the Works at such times as may be directed by the Engineer to enable Service Authorities to carry out temporary or payment alterations to their equipment or buried services.

### Levels and Benchmarks

Except where otherwise specified all levels shall be in meters above sea level with accuracy of millimetres. The data for all levels shall be based on bench marks approved by the Engineer. No bench mark shall be used which was set out by the Employer during project preparation.

The Contractor shall establish, construct and project during the period of construction of the Works necessary additional bench marks which shall be checked periodically.

The Contractor shall be responsible for constructing the Works in accordance with the data on levels, benchmarks and other points of reference in the vicinity of the site(s) if they are not shown on the Drawings. The appropriate data thereof will be supplied to the Contractor by the Engineer before execution of the Works.

The Contractor shall maintain a record of the levels of all the benchmarks and shall submit of the records to the Engineer. The Datum for all levelling on the site shall be the Datum used by the Employer. It shall be related to the level bench marks and shall be approved by the Engineer.

### Execution and Workmanship

The Contractor shall employ well qualified and experienced surveyors approved by the Engineer for the execution of the survey work and setting out as described in the Contract. The survey instruments to be used by the Contractor shall be of the modern type, suitable for the work to be executed and shall be maintained in a first class condition.

For all survey instruments used in the Works the Contractor shall submit recent calibration certificates issued by competent Authorities. Further calibration of the instruments shall be carried out every six months.

The Engineer will check and approve the levels and setting out of the alignments and positions of structures in accordance with the Beneficiary’s Requirements and the approved Contractor’s drawings before, while and after construction.

## Coordination with Other Authorities



### Statutory Services

The Authorities are public institutions responsible for the public utility services of electricity, gas, water, sewerage, drainage, telephone and roads.

The Contractor shall acquaint himself with the actual location of all existing public utilities such as sewers, water, gas, drains, cables for electricity, telephone lines, pipelines from central heating system, etc., before commencing any activities likely to affect the existing utilities.

The Contractor shall use Ground Penetration Radar or other pipe/cable locator along the proposed alignment of the sewer lines in order to get reliable information of other utilities so as not to damage the utilities and to explore all existing services in advance of his general excavation. If necessary excavation (trial pits) shall be dug by the Contractor after written approval by the Engineer. Such exploratory excavations shall be carried out in consultation with the Authorities concerned and either be protected until backfill during construction or be backfilled according to the Engineer’s instructions immediately after recording of the service.

Some of the existing infrastructures are shown on the Drawings as basic information.

The Contractor however shall at his own costs but with the assistance of the Employer obtain such information directly from the responsible authorities as early as possible and shall execute his own investigations on site.

### Traffic Requirements

Throughout the Contract Period, the Contractor shall co-operate with the Roads and Police Authorities concerning works in, or access to, any regional and local road. The Contractor shall inform the Engineer of any requirements of, or arrangements made with, the Roads and Police Authorities.

The Contractor will provide skilled personnel for traffic control at the adjacent magisterial road as directed by the responsible Authorities.

The Contractor shall if needed, provide all barriers and traffic signs approved by the Engineer.

Traffic diversions, if necessary, shall be planned and arranged with the responsible Authorities by the Contractor and harmonized with the Engineer. No diversion shall be implemented without the written consent of the responsible Authority and after given information to the Engineer. Access to the site shall be available to vehicles of emergency services and residents in the areas.

The Contractor shall provide, erect and maintain on the sites and at locations on the access to the sites all traffic signs and traffic control signals, as necessary and/or may be required by the Police Authority for the safe direction and control of the traffic. The location and size of all such signs and the lettering thereon shall be approved by the Engineer before erection of the signs.

The Contractor shall reposition, cover or remove signs as required during the progress of the works.

The Contractor shall take all reasonable steps to prevent vehicles entering and leaving the Site depositing mud or other debris on the surface of adjacent roads or footways, and shall remove expeditiously any materials so deposited.

### Co–ordination with network operator

As for much of the Contract duration the existing sewer network needs to be kept operational it is important that there is close co-ordination between the Contractor and the Network Operator.

All operational matters must first be addressed to the Network Operator prior to any work proceeding.

It is envisaged that once a month a co-ordination meeting will be held at the site between the Networks Operator, the Engineer and the representative of the Contractor. At these meetings the Contractor will inform the Operator of likely disturbance to the operation of the network.

In turn the Network Operator, in co-operation with the Engineer, will advise the Contractor on sequencing of shut downs and procedures to be followed. Network Operator will have the final responsibility regarding if or not a section of the plant can be closed down.

### Notices, Permits

The Contractor shall obtain through the Municipality of Berane or other relevant statutory body all permits necessary for the construction, occupation and use of the Works. Acquisition of all relevant permits is the responsibility of the Employer.

The Contractor shall allow a realistic timescale for dealing with the third parties responsible, for permits etc., in his planning and programming of the work.

The Contractor shall comply with all conditions stipulated in any permits granted by third parties, including conditions stipulated in those permits obtained by the Employer.

Well in advance of the programmed start of any work which may affect the traffic or any existing utilities the Contractor shall give advance notice to the respective authority indicating the type, the exact location, the programmed commencing time and the expected duration of the activities and shall provide whatever particulars may be required by the authorities to issue any required permits and make all necessary arrangements. The Employer will provide whatever assistance possible to the Contractor to facilitate the permit procedure which, however, will remain the sole responsibility of the Contractor.

Further information and instructions on measures to be taken before and during the execution of the Works will, to the extent known to the Authorities, be submitted to the Contractor by the Employer or the Engineer in co-operation with the relevant Authorities. Any type of permits and or authorisations required for the implementation of the measure will be provided by the competent authorities of the Beneficiary in accordance with national law.

As soon as any infrastructure (cable, gas, etc.) is encountered whether previously located or discovered during the course of the excavation for the works, the Contractor shall immediately inform the Engineer who will inform the Authorities concerned.

The Contractor shall follow any instructions requested by the Employer, the Engineer or the relevant Authorities. If necessary, precautions shall be taken by the Contractor to protect the systems during the execution of the Works.

### Precautions

No excavating machines shall be used in the immediate surroundings of cables, gas lines and/or other pipelines. Special care shall be taken to ensure that the existing facilities are accessible in the case of an emergency.

Temporary Works which have to be made in the vicinity of the existing facilities during the execution of the Works shall be maintained by the Contractor and shall be removed as soon as practicable.

The Contractor shall be responsible for maintaining all such utilities encountered by him in the construction of the Works and shall bear the cost of making good any damage caused directly by his activities.

### Witnessing and Post-Construction Clearances

It is expected that the issue of any permits will be linked to the requirement that the work may only be carried out in the presence of authorized inspectors from the authorities concerned. Their job will be to witness and assess any damage or interference with their respective utility. Should such disturbances occur it will be at their discretion to authorize either the Contractor to correct them or to arrange for specialized repairs through their own personnel. No work shall be done without written approval/permit issued by the respective authority.

The Contractor shall be fully responsible for all costs whatever resulting from damages of or interference with other utilities.

As proof that the activities in question have been completed to the satisfaction of the authorities concerned the Contractor shall submit to the Engineer upon request official post-construction clearances issued by the respective authorities.

## Access to and Possession of Construction Site



### The Site

Most of the construction sites are public land or land owned by the Beneficiary or for which a right of way has been acquired by the Beneficiary. Details of particular site areas are indicated on the Drawings in Volume 5 and no extensions beyond these limits are allowed.

The Contractor shall obtain temporary way leaves on whatever additional lands or working easements are required by him to carry out the Works. The Contractor is informed that the sites for the construction works are under the jurisdiction of the Municipality of Berane.

The Contractor is deemed to be familiar with the conditions imposed by the Municipality for the works to be carried out within the limits of the public roads, walkways and green area.

The sites will be made available to the Contractor one week ahead of the start of physical work on site according to the Contractor’s programme. In addition, the Contractor shall have permanent access to identified roads or paths required to reach the Site. The Contractor and the Engineer at the outset of Works shall agree upon the access roads or paths. The Contractor shall keep all access roads and paths sufficiently clear to permit normal flow of pedestrian and vehicular traffic. The Contractor shall at his own cost provide any improvement of tracks to the sites if required for access by his equipment.

The Contractor has the obligation to comply with the deadlines specified in the Excavation Authorisation issued by the Municipality. In case that the Local Authorities apply fines to the Employer and to the Final Beneficiary, the Contractor shall have to bear the respective penalties.

Immediately after completion of works on each site, the Contractor shall at his own cost remove all equipment, plant and unused materials fill in and level pits and reinstate the site to its original condition.

If any damage to services results from the execution of the Works, the Contractor shall immediately:

* notify the Engineer, Final Beneficiary and appropriate utility company;
* make arrangements for the damage to be made good without delay to the satisfaction of the utility company including damages to the access roads. The Contractor shall be liable for all costs for making good such damage.

The Engineer may issue instructions or make other such arrangements, as he seems necessary; to repair rapidly any essential services damaged during the execution of the Contract. Such arrangements shall not affect any liability to pay for making good the damage.

No work shall be covered up or put out of view without the prior approval of the Engineer. The Contractor shall provide full access to the Engineer to enable him to examine work, which will subsequently be covered up. The Contractor shall give reasonable prior notice to the Engineer whenever any such work is ready for examination and the Engineer shall within a reasonable time examine the work.

### Access by Officials

Authorised government and municipal officials and of the EU Delegation in Montenegro shall at all times have access to the work wherever it is in preparation or progress, and the Contractor shall provide proper facilities for such access and for inspection.

### Temporary Way leaves, Access Costs

The Contractor shall be responsible for obtaining temporary way leaves.

The cost of obtaining way leaves, including crop compensation, for temporary working areas, additional working easement and for any additional areas, required by the Contractor in connection with the Works as well as for the access to all of these shall be borne by the Contractor himself.

The Contractor shall arrange for the serving of any Statutory Notices in connection with any temporary working area and shall give to the occupier of each such area seven days notice of his intention to enter and shall ensure that his methods of working cause the minimum of disturbance to the land and to its owners and occupiers.

The Contractor shall at all times provide proper facilities for access and inspection of the Works by the Employer, Beneficiary and Engineer, their assistants, inspectors, agents and other representatives of public agencies having jurisdiction.

The extent of each temporary working area and the period of time for its occupation shall be such as the Engineer considers necessary having regard to the Contractor's reasonable requirements which shall be submitted together with the Work Programme to the Engineer.

The Contractor shall reinstate any temporary working areas to the condition prevailing prior to his initial entry as soon as possible after the work in those areas has been completed so as to keep the period of occupation to a minimum. The Contractor shall in any event restore the areas to a tidy and workmanlike condition. Walls, fences and other structures that have been damaged, removed or otherwise interfered with by the Contractor shall be restored to a condition at least equivalent to their original condition.

### Access to Adjoining Property

If the Contractor's work will cause unavoidable interference with access to adjoining property, the Contractor shall first give 7 days notice to the occupier of such property and shall provide temporary means of access for vehicles, pedestrians and livestock.

Convenient access to driveways, houses and buildings adjoining the work shall be maintained and temporary approaches to intersecting streets and alleys shall be provided and kept in good condition by the Contractor.

As soon as a section of surfacing, pavement, or a structure has been completed, it shall be opened for use by traffic at the request of the Beneficiary.

The Contractor shall not prevent the free access to public water valves, water hydrants, or other utility valves.

### Permanent Right-of-Way

The Employer will make all statutory arrangements necessary for obtaining the final possession of the Site and the permanent right-of-way in the shortest possible time.

### Measurement and Payment

No separate measurement and payment will be made. The costs shall be deemed to be included in the rates of the BoQ.

## Provision and Maintenance of Contractor’s Site Installations



### Construction Management

The Contractor shall appoint construction management team of competent and experience engineers and managers, fluent in the (written and oral) English Language. The appointment of the management team shall be with the prior approval of the Engineer. Permanent presence on site is required for the duration of the construction of the Works and for the initial operation of the Works.

### Contractor's Offices, Stores and Services

The Contractor shall provide, erect, construct, maintain and subsequently remove proper offices (head office and site office if required), stores, workshops, laboratories, storage and parking areas for his own use. Such facilities shall be sufficiently sized and equipped to enable him to manage his operations and those of his Subcontractors in a professional manner and to enable him to carry out all his obligations under the Contract.

Sheds for storage of materials that may deteriorate or corrode if exposed to the weather shall be weatherproof, adequately ventilated and provided with raised floors.

Within his offices a separated room for members of the PIU and in addition a meeting room of sufficient space shall be available for site meetings with the Engineer and the Employer or Beneficiary.

These Contractor's facilities shall be subject to the same stipulations regarding interference with amenities and environmental protection as the Contractor's housing facilities.

For the complete works specified under this contract the Contractor shall:

* Provide appliances, tools and materials, which are required for the implementation of the works as specified in the contract, including transport to the site and operational set up,
* Transport, erect and furnish site offices, accommodations, workshops, storage sheds and such as required,
* Provide electricity, water and telephone connection as well as disposal facilities and such for the construction site,
* Provide access roads to the construction site, storage sites, other pavements and traffic routes at the location of the construction site as required,
* Carry out earthworks, including removal of existing vegetation as required for the site facilities,
* Find appropriate locations for the site facilities,
* Furnish, install and maintain construction sign with inscription agreed by the Engineer (dimensions: 2.00/1.00 m).

Costs for the maintenance and operation of the appliances and the facilities, including renting and leasing, fees and such should be included in the price.

The Contractor shall maintain the site facilities for the complete construction period, including possible interruptions, which are not caused by the Employer, and supply electricity, water and all other materials required for the execution of the works.

The Contractor shall remove all appliances, facilities and such and reinstate all used surfaces and roads to the original state under observation of landscape management matters. Rubble shall be removed.

The Contractor should install, maintain and afterwards dismount temporary power and water supply connections for the Contractors use with the necessary earthworks, pipes, cables and manifolds in agreement with the respective utilities for the complete construction period.

### Contractor's Construction Equipment

Details of all Contractor's Equipment to be used by the Contractor in the execution of the Works shall be submitted to the Engineer prior to its use together with in detail elaborated method statement.

The Engineer’s consent to use the Contractor's Equipment will not be unreasonably withheld, but if in the Engineer’s opinion circumstances arise which make it desirable that the use of the Contractor's Equipment should be suspended either temporarily or permanently, the Contractor shall change the method of performing the work affected and he shall be deemed to have no cause for claims against the Employer on account of having to carry out the work by another method, nor shall he be deemed to have cause for claim if any order issued by the Engineer results in the Contractor's Equipment having to stand idle for a period of any duration whatsoever or having to be removed.

When working in built-up areas, the Contractor shall provide and use suitable and effective silencing devices for pneumatic tools and other Equipment that would otherwise cause a noise level exceeding 85 dB (A) during excavation and other work. Alternatively, he shall, by means of barriers, effectively isolate the source of any such noise in order to comply with above requirement.

### Water Supply

The Contractor shall make his own arrangements for the supply of potable water for his office and other temporary buildings as well as for the execution of the Works including the testing of sewers.

### Sanitation

The Contractor shall maintain the Site and all working areas in a hygienic condition. In all matters of health and sanitation he shall comply with the requirements of the local Medical Officer of Health or other competent authorities.

### Sewage and Waste Disposal

The Contractor shall make all required provision for the discharge or disposal from his offices and the Works of all water as well as of all liquid and solid waste products however arising. The methods of disposal shall be to the satisfaction of the Engineer and of any authority or person having an interest in any land or watercourse over or in which water and waste products may be discharged.

### Electrical power supply

The Contractor shall install, operate, maintain and subsequently remove temporary supplies of electricity for power at the sites, heating, cooling, lighting and ventilation of offices, stores, laboratories and other temporary buildings used by the Contractor in addition to all electricity requirements in connection with the construction, testing and Defects Correction of the Works.

The Contractor shall ensure that all proposed electrical installations comply with the national standards and shall be responsible for and shall bear all costs associated with obtaining the written approval of that authority for such installations and their operations.

Prior to placing orders for transformers, conductors, cables and associated equipment, the Contractor shall ensure that his proposed equipment is suitable for use with the existing or proposed medium/high tension electricity supply lines.

### Lighting and Electric Power

The Contractor shall provide and maintain efficient temporary lighting and power supplies for all parts of the Works as may be necessary and shall, in connection with such supplies, adopt precautions to ensure the safety of all personnel.

The Contractor shall provide adequate lighting for the proper execution and inspection of the Works. If the Engineer considers the intensity of lighting to be inadequate for the proper execution and inspection of the work being undertaken the Contractor shall install such additional lighting as the Engineer may be require.

Such lighting shall be maintained throughout the Contract until the end of the Contract Period or until such alternative date as may be agreed with the Engineer.

### Supply of Fuel, Lubricants, etc.

The Contractor shall be responsible for arranging and ensuring that adequate supplies of petrol, diesel oil, motor oil, kerosene, natural gas, lubricants and other petroleum products are available at all times to meet his requirements for the purpose of or in connection with the Contract. With regard to the transportation, storage and handling of all his fuel requirements, including all gas connections and electrical connections, he must strictly comply with all relevant safety codes and local regulations. Particular care is to be taken to avoid pollution due to spillage of fuel and oils. They shall be stored within a bounded area, all equipment drive by diesel, gas or petrol engines shall be installed on a drip tray, waste oils shall be disposed of in a proper manner.

### Temporary Telephone Connections

The Contractor shall arrange at his own cost for temporary telephone and internet connections and other communication links if required or installations to his offices. He shall be responsible for all installations, connection and disconnection and running charges for his and his Representative's offices.

### Signboards

In order to visualize the project co-financed by the European Union, the Contractor shall erect at each work place placards containing information about the project and the role of IPA and the European Union in completing this project. The placards will be thus elaborated in order to be very visible for everyone. The placards will have the sign of the European Union and shall comply with the EU visibility guidelines.

Beside this above mentioned placards, the Contractor shall post signboards at all sites with the following further information:

* name of the Project;
* sign and name of the Employer;
* sign and name of the Beneficiary;
* flag of European Union and Montenegro;
* sign and name of the Engineer(s);
* sign and name of the Contractor;
* duration of work;
* cost of work.

The format, size and material of the signboards shall comply with the provisions of the Montenegrin Law on Construction and the EU Visibility Guidelines. The details shall be agreed upon with the Employer and the Engineer prior to posting.

Signboards shall be of durable construction capable of withstanding exposure to the weather conditions until the end of the Defects Liability Period. The Contractor shall keep the signboards in good repair for the duration of the contract and shall remove them on final completion of the Contract.

Besides these signboards the Contractor shall not, except with the written authority of the Engineer, exhibit or permit to be exhibited on the Site any other form of advertisement.

### Site Drainage

The Contractor shall keep each Section of the Works well drained until the Engineer certifies that it is substantially complete and shall ensure that, so far as is practicable, all work is carried out in the dry. Site areas shall be kept well drained and free from standing water.

The Contractor shall provide, operate and maintain in sufficient quantity such pumping equipment including power supply by generator, well points, pipes and other equipment as may be necessary to minimize damage, inconvenience and interference and shall construct, operate and maintain all temporary coffer-dams, sumps, ditches, drains and other temporary works as may be necessary to remove water from the Site while construction is in progress. Such Temporary Works and construction equipment shall not be installed and removed without the approval of the Engineer.

Notwithstanding any approval by the Engineer of the Contractor's arrangements for the removal of water, the Contractor shall be responsible for the sufficiency thereof and for keeping the Works safe at all times and for making good at his own expense any damage to the Works.

The Contractor shall be responsible to keep the Site clear of water at whatever pump rate is found necessary. The noise level of the generator shall be less than 85dB(A) in order to minimise nuisance to the population. The Contractor’s site drainage facilities shall not cause pollution in any local watercourses. He shall be responsible for any legal action resulting from pollution events.

### Cleaning-up of Site

Before application is made for the Employer to accept any substantially completed Section of the Works, all items shall be complete, ready to operate and in a clean condition. All trash, debris, unused building materials and temporary facilities shall have been removed from the Site. Tools and construction equipment not needed during the subsequent Defects Liability Period for repair and adjustment shall not remain on the Site. The temporary walkways, parking areas and roadways shall be completely swept and cleaned.

A Performance Certificate will not be issued before the Contractor has removed all his machinery, equipment, plant, waste material from the site and the site reinstated to the satisfaction of the Engineer.

## Temporary Works

The Contractor shall make such provision at his expense in the way of temporary works, and other works as may be necessary and required for the safe and efficient performance and construction of the Works and all works incidental thereto and in an expedient manner.

The Contractor shall design at his own expense all Temporary Works he may require for the execution of the Works. He shall submit six (6) weeks in advance of any scheduled temporary work, detailed drawings and supporting calculations considered essential by the Engineer. Within four weeks after submission of the aforementioned drawings and calculations the Engineer shall comment or approve the relevant Temporary Works.

Notwithstanding the approval by the Engineer of any design of Temporary Works, the Contractor shall remain responsible for their efficiency, safety and maintenance, and for all obligations in regard to such works specified or implied in the Contract until the removal of such works.

Unless provided for in the Bill of Quantities expenditures whatsoever dealing with any Temporary Works shall be deemed to be covered by the other rates and prices in the Bill of Quantities and shall not be measured for payment nor be paid for under a separate item.

## Notice of Operations

Further to the General Conditions of Contract, the Contractor shall not carry out any important operation without the consent in writing of the Engineer. The Contractor shall give full and complete notice in writing to the Engineer sufficiently in advance of the time of the operation, but not less than 48 hours, so as to enable the Engineer to make such arrangements as he may deem necessary for inspection.

## Working Hours

Subject to any provision to the contrary contained in the Contract, none of the Works shall, save as hereinafter provided, be carried out during the night or on locally recognised day of rest without the consent of the Engineer, except when work is unavoidable or absolutely necessary for the saving of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Engineer. Provided that the provisions of this Clause shall not be applicable in the case of any work which it is customary to carry out by multiple shifts.

## Safety and Public Convenience



### Health and Safety

### General

The Contractor shall pay careful attention to safety procedures. In addition to the requirements of the General Conditions of Contract, the Contractor shall comply with all statutory and other regulations concerning the safety of all persons on the site or in the vicinity of any of the Contractor’s operations. He shall obtain copies of all the relevant regulations and shall make them available for inspection on site. The Contractor's Safety Officer shall have the qualification and the authority to issue instructions to the Contractor's personnel regarding protection measures to prevent accidents. The Contractor shall at all times in the conduct of his work and that of his Subcontractors adhere to the established rules and regulations concerning all safety matters at Site to the extent that such provisions do not conflict with the applicable laws. This is especially important wherever it is necessary to enable the free passage of the public through the Site.

The Contractor shall appoint a “Safety Officer” whose role shall be to promote, monitor and enforce safe working practices on the Site. The Safety Officer shall be a senior member of the Contractor’s staff and shall be approved by the Engineer prior to taking up the role.

Health and Safety shall be an agenda heading at the regular monthly site progress meeting. The Contractor shall carry out a safety audit of the Site at intervals not exceeding six months.

The Contractor shall ensure that all persons entering the working sites have received the appropriate safety briefing and have signed the record of briefing declaration.

The Contractor shall be responsible for the safe conduct of the Works. He shall ensure that all operations are carried out safely and that any person made responsible for the safe conduct of any part of the operations is properly trained and carries out their duties in a proper manner.

Where any part of the Works is not already covered by the Contractor’s Safety Policy, or there is a high risk activity, the Contractor shall, before commencing work on that part of the Works or activity, submit to the Engineer a safe system of working statement. He shall immediately submit to the Engineer any subsequent additions to, or amendments of, this statement. No work covered by any safe system of working statement shall be commenced unless the Engineer has indicated that he has no objection to the methods proposed. The Contractor is warned that any failure on his part to observe the requirements of the agreed safety plan will be grounds for the Engineer or his authorised representative, to issue a Stop Notice on that part of the Works where the safety breech has occurred. Such notice shall be effective immediately and will only be lifted when the Contractor has put in place the necessary safety measures. The Contractor will not be entitled to any compensation or extension of time as a result of the issue of a Stop Notice resulting from his failure to provide agreed safety measures.

### Safety Officer

The Contractor shall appoint a Safety Officer who shall be responsible for co-coordinating and controlling the health and safety on Site. The Safety Officer shall be suitably qualified for this work and shall have the authority to issue required instructions and take protective measures to prevent accidents. The safety officer shall maintain the Accident Register of any accidents occurring on any part of the site that require any form of medical attention.

All employees shall be briefed before starting work on site safety procedures and the need to report and record any accidents and verify the entry in the register. The register shall be available for inspection by the Employer, Engineer and any statutory authority at any time. All Employees shall sign a declaration that they have received the site safety briefing and safety instruction for the areas of the site that they will enter and the work that they will undertake. The Contractor is warned that the signature of the safety briefing acknowledgement by anyone will not relieve the Contractor of possible liability in the case of any subsequent accident to that person.

### Hazard Identification and Risk Assessment

The Contractor shall undertake and present a Hazard Analysis and Risk Assessments comprising, but not limited to, a Hazardous Operations Analysis study, design risk assessments, method statements for safe construction, operation and maintenance of the pumping stations at the appropriate stage in the project. This will require the Contractor to carry out soil investigations (e.g. by means of trial pits) ahead of any excavation to ensure that buried hazardous substances are identified and that appropriate working methods area greed and approved in advance of the main works being carried out.

### Accident Reporting

The Contractor shall notify the Engineer immediately of any accident that occurs in which the Contractor is directly involved, whether on or off site, which result in any injury to any person whether directly concerned with the site or a third party. Such initial notification may be verbal and shall be followed by a written comprehensive report in English and Montenegrin within 24 hours of the accident. The Contractor shall also report any such incident to any such authority as may be required by law. Further its required to maintain a Register of Accidents.

### Site Safety

The Contractor shall at all times in the conduct of his work and that of his Subcontractors adhere to the established rules and regulations concerning all safety matters on Site such as the recommendations contained in the "Manual of Accident Prevention in Construction", published by the Associated General Contractors of America, Inc., or other internationally recognized recommendations to the extent that such provisions do not conflict with the applicable laws. The Contractor's Safety Officer shall have the qualification and the authority to issue instructions to the Contractor's personnel regarding protection measures to prevent accidents.

During construction the Contractor shall erect, maintain and subsequently remove sufficient barricades, guards, lighting, sheeting, shoring, temporary sidewalks and bridges, danger signals as well as temporary covering of potential accident areas. If and where required the Contractor shall erect and maintain suitable and approved temporary fencing to enclose such areas of construction and areas of land occupied by the Contractor within the Site as may be necessary to implement his obligations under the Contract. Where temporary fencing has to be erected alongside a public road, foot-path, etc., it shall be of the type required by and shall be erected to the satisfaction of the authority concerned.

All open excavations along pipe lines shall be protected sufficiently to ensure the safety of workmen and members of the public and be in accordance with the directives of the police and the other local regulations.

To ensure safety on the Site all building pits and trenches shall be enclosed with a mobile site fence during construction of the sewer until backfilling is completed. Mobile site fence (height: 2,00 m) shall be assembled of mobile steel frame elements with round steel filling bars, concrete column bases, including all mounting materials. Doors and gates are deemed to be included in the price.

### First Aid

On site suitable number of First-Aid kits in accordance with European Standard, the national occupational health standards and to the satisfaction of the Engineer has to be provided by the Contractor.

### Working with Sewage

The Contractor shall make all his personnel aware of, and comply with, the requirements of the Specification with regard to hygiene, training and medical monitoring when working in the proximity of, or in undertaking the Works in contact with sewage.

The Contractor shall note that there is a possible risk of contracting Leptospirosis, or Weil’s disease, when working in contact with sewage. The Contractor shall ensure that all employees are aware of the precautions to be taken when working in such situations. All employees must be issued with a card informing other medical specialists inspecting the employee of the fact that they may have been exposed to Leptospirosis.

### Confined Space Working

The Contractor’s attention is drawn to the hazards of working within chambers, shafts, channels or tanks and poorly ventilated areas. The Contractor shall supply the necessary safety equipment, which shall be available on the Site, before such work is commenced.

### Working near power lines

The Contractor shall be responsible for ensuring that all persons working in the vicinity of power lines are aware of the relatively large distance that high voltage electricity can "short" to earth when cranes or other large masses of steel are in the vicinity of power lines.

### Fire Prevention

During the performance of the Contract, the Contractor shall make arrangements to the satisfaction of the Engineer for the protection of the Permanent Works and any Temporary Works and any adjacent property from fire and, if required, he shall give the Fire Authority admittance to all facilities periodically to inspect the fire prevention arrangements.

The Contractor shall perform all work in a fire-safe manner. He shall supply and maintain on the site adequate fire-fighting equipment. The Contractor shall comply with all current applicable fire regulations as well as the hygienic and technical working conditions.

Special arrangements will be necessary for the storage of highly flammable liquids on the site. The Contractor shall remove all rubbish and material of a flammable nature and take such other steps as the Engineer may require but this shall not relieve the Contractor of any of his obligations under the Contract.

### Prevention of Noise and Disturbance

The Contractor shall in general comply with the requirements contained in the following paragraphs.

Noise and disturbance shall be kept to the reasonable minimum. The Contractor’s attention is drawn to the close proximity of some Working Sites to buildings in continuous use. All plant and tools used at such sites above or near ground level shall be silenced or of a silent type.

The Contractor shall take all necessary steps to ensure that his workmen carry out their duties in a quiet manner particularly when working at night or close to sensitive areas and buildings. No work is allowed at Sundays and public holidays or any religious festival.

The Contractor shall obtain the Engineer’s consent to the details and arrangement of all plant before installation. All plant shall be kept in good condition and safe working order.

Operation of any particular item of plant shall be stopped whenever, in the opinion of the Engineer, it is causing unreasonable noise or disturbance. The Contractor shall immediately take steps to eliminate such noise or disturbance or replace the plant.

Where compressors or generators are to be used for less than one month suitable baffles or other provisions to reduce noise emission shall be provided with suitable acoustic baffles to reduce the emission of noise. Acoustic screening shall be provided for outside plant equipment to the satisfaction of the Engineer.

If instructed by the Engineer, the Contractor shall take noise intensity readings and shall submit the results to the Engineer. The Contractor shall comply with any additional measures required by the Engineer to keep noise and disturbance to the minimum.

### Loading and Turning Areas

The Contractor shall provide and maintain such access to the various sections of the Works as he requires for the proper execution of the work. Loading and turning areas shall be so arranged as to minimize inconvenience to adjoining landowners or occupants and to the general public. Temporary roads, loading and turning areas shall be removed when they are no longer required and the location reinstated to the satisfaction of the Engineer, and damage to existing roads or bridges shall be repaired and reinstated to the satisfaction of the Engineer.

### Storage of Equipment and Materials in Public Streets

Construction materials shall not be stored in streets, roads, or highways for more than one day after unloading. All materials or equipment not installed or used in the construction shall be stored in a particular stockyard provided and maintained by the Contractor at his expense. Excavated material shall not be stored in public streets, roads or highways unless otherwise permitted by the Engineer. Such permissions may be granted only in case of excavated materials to be used as back-fill in the adjacent trench, provided that ample space is available for the storage and after obtaining permission of the Highway Authority, Police and Municipality. After placing of the back-fill, all excess material shall be removed immediately from the site.

### Street Clean Up During Construction

The Contractor shall clean all spilled dirt, gravel, or other foreign material caused by the construction operations from all streets and roads at the conclusion of each day's operation. Cleaning shall include washing with water, power brushing, and use of manual labour as necessary to achieve the necessary standard comparable with adjacent streets unaffected by the works. All such spillage or droppings shall be cleared to the satisfaction of the Engineer and appropriate Public Authority. The Contractor shall indemnify the Employer against all claims by the third parties, which may arise out of the Contractor’s failure to comply with this Section.

### Protection of Adjoining Property

The Contractor shall control the movement of his crews and equipment on the working easement including access routes approved by the Engineer so as to minimize damage to crops and property and shall endeavour to avoid marring the lands. Scars shall be obliterated and damage to land shall be corrected and the land shall be restored as closely as possible to its original conditions before final taking-over of the Works. The Contractor shall be responsible directly to the tenant / land owner for any excessive or avoidable damage to crops or lands resulting from his operations whether on lands adjacent to right-of-way or on approved access road and deductions will be made from payment due to the Contractor to cover the amount of such excessive or avoidable damage if adequate compensation is not paid by the Contractor, in the opinion of the Engineer.

The Contractor shall be responsible and take all measures in order to protect adjoining property including buildings and other structures. Prior to the commencement of the activities, the Contractor shall assess the probability and extent of unavoidable damages, if any, to the building and properties and submit his assessment to the Engineer. The Engineer may make his own opinion and if required may order arrangements for protection or repair of such likely unavoidable damage in which event the Contractor shall complete the activities.

The measurement for payment of the repair of the damages to the building, if ordered, shall be made at actual quantities of activities carried out. All costs related to the assessment, protection, etc. are deemed to be included in the unit rates of other items.

### Procedure for Complaints and Claims for Damage

Details of all claims or warnings of intended claims which the Contractor may receive in respect of matters against which he is required by the Contract to indemnify the Employer shall be notified without delay to the Engineer, who shall likewise pass to the Contractor any such claims or warnings which may be submitted directly to the Engineer or Employer.

A similar exchange of information shall also be made in relation to all complaints which may be received.

The Contractor shall notify the Engineer in writing immediately following any damage or injury arising out of the execution of the Works.

### Protection against Damage

The Contractor shall take all necessary precautions to avoid causing any unwarranted damage to roads, lands, properties, trees and other features and, during the currency of the Contract, shall deal promptly with any complaints by owners or occupiers.

### Damage to Access Roads

The Contractor shall ensure that damage to any public or private roads, footpaths and tracks used by any vehicles or equipment proceeding to or from the Site is kept to a minimum and he shall be responsible for the cost of all repairs necessary to restore such roads, tracks or footpaths to the satisfaction of the Engineer and the owner and/or controlling authorities.

### Reinstatement upon Completion

The place of use shall be cleared and reinstated immediately to at least the condition existing before the temporary facilities were provided, and to the satisfaction of the Engineer.

## Quality Control, Sampling and Testing



### Responsibilities and Procedures

The Contractor shall employ a quality assurance system for all phases of the project including design, procurement, construction, testing, defects liability etc.. The QA system shall be in accordance with the general requirements of ISO 9001 or similar.

All manufactures and sub-contractors shall also employ quality assurance systems in accordance with the general requirements of ISO 9001 or similar.

In addition to any specific obligations for sampling and testing the Contractor shall be responsible for routine inspection sampling and testing of all materials, workmanship, plant and measuring devices, in order to control the quality of work and to ensure compliance with the Specifications and with approved samples.

The Contractor shall be responsible for establishing and maintaining procedures for quality control, which will ensure that all aspects of the Works comply with the specifications of the Contract.

The Contractor shall appoint a suitably qualified member of his staff to be responsible for all aspects of quality control and to maintain effective liaison with the Engineer. Such person or persons shall be vested with the authority to reject work already carried out when such work does not meet the specified standards. The Contractor’s quality control personnel shall maintain close liaison with the Engineer at all times. The Contractor shall establish an efficient, comprehensive records facility and library. Books, Drawings, publications and manuals shall be indexed and their distribution controlled.

### Sampling and Testing

Sampling and testing of materials includes the provision of samples of materials and workmanship as well as the testing and quality control for pipes, manholes, fittings, soils, concrete, asphalt, and other building materials.

The Contractor shall provide for the approval of the Engineer, samples of all construction materials and manufactured items required for the Permanent Works. All samples rejected by the Engineer shall be removed from Site. All approved samples shall be stored by the Contractor in a sample room, at a location approved by the Engineer, for the duration of the Contract, and any materials or manufactured items subsequently delivered to Site for incorporation in the Permanent Works shall be of a quality at least equal to the approved sample. The approved samples may only be disposed of with the Engineers approval.

Samples shall be submitted and tests carried out sufficiently early to enable further samples to be submitted and tested if required by the Engineer. Samples for testing will generally be selected by the Engineer from materials to be utilized in the project and all tests will be under the supervision of the Engineer.

Material requiring testing shall be furnished in sufficient time before intended use so as to allow for testing. No materials represented by tests may be used prior to receipt of written approval of said materials.

The Contractor shall give the Engineer at least 14 days notice in writing of the date on which any of the materials will be ready for testing or inspection at a certified laboratory.

The Contractor shall in any case submit to the Engineer within 7 (seven) days after every test such number of certified copies of the test readings as the Engineer may require.

Approval by the Engineer as to the placing of orders for materials or as to samples or tests shall not prejudice any of the Engineer's powers under the Contract.

The provisions of this Clause shall also apply to materials supplied under any nominated subcontract.

After all construction at each Section is completed and before applying for taking-over, the Contractor shall perform field tests as called for in the Specifications. The Contractor shall demonstrate to the Engineer the proper operation of the facilities and the satisfactory performance of the individual components. Any improper operation of the system or any improper or faulty construction shall be repaired or corrected to the satisfaction of the Engineer. The Contractor shall make such changes, adjustments or replacement of equipment as may be required to make the same comply with the Specifications, or replace any defective parts or materials.

In addition to any special provision made herein as to sampling and testing materials by particular methods, samples of materials and workmanship proposed to be employed in the execution of the Works may be called for at any time by the Engineer and these shall be furnished without delay by the Contractor at his own cost. Approved samples will be retained. The Engineer will be at liberty to reject all materials and workmanship that are not equal or better in quality and character than such approved samples. The tests required for quality control shall include but not be limited to:

1. tests conducted at the premises of the Contractor, Subcontractor, manufacturer or supplier which are normally or customarily carried out at such premises for the items or materials being supplied for the Works;
2. tests which are normally or customarily conducted on the items or materials being supplied for the Works by the Contractor, Subcontractor, supplier or manufacturer but which have to be conducted at an approved laboratory because the necessary testing facilities are not available on the premises of the Contractor, Sub-Contractor, supplier and manufacturer;
3. tests on locally obtained materials or items either on the Site or at an approved laboratory for the purpose of obtaining the approval of the Engineer to the classification, use and compliance with the Specifications of such items or materials;
4. routine quality control tests conducted by the Contractor to ensure compliance with the Specifications;
5. regular testing of concrete and other materials as specified in the relevant Chapters of the Technical Specifications;
6. standard shop and Site acceptance tests, including trial assemblies, of Plant.

### Certification

All pipes and assembling parts selected under this Contract must be of first quality, truly circular, and of uniform thickness, free from scale, lamination, honeycombs and other defects, and shall be designed and suitable for the stated pressures and temperatures. The Contractor shall provide certification fulfilling the requirements indicated in these Specifications.

* Manufacturer's certificate;
* Laboratory testing certificate;

All pipes, coating, and lining materials shall be certified for waste water use and shall contain no ingredients that may migrate into water in amounts that are considered to be toxic or otherwise dangerous for health.

Pipes shall be factory tested and shall be subjected to hydraulic and mechanical tests. The number and selection of samples for testing, the test procedure and the requirements shall all be as specified in the referred relevant standards.

All imported goods shall have relevant approval certificates prior to their use in the Beneficiaries’ country. The cost of samples, their transportation to the laboratory and their testing shall be deemed to be included in the unit rates and shall not be paid for separately.

### Employer Inspection

The Employer or the Engineer or his authorised representative shall be entitled to inspect pipes or witness pipe manufacturing and quality control tests. Such inspections shall in no way relieve the Contractor of the responsibility to provide products that comply with the applicable standards within this Specification.

Alternatively, the Contractor may submit to the Engineer, certificates from approved laboratories certifying that the materials have been subjected to and have satisfactorily undergone the required tests according to the specified standards. In that case the Engineer shall be entitled (but shall not be bound) to renounce any further testing.

Should the Employer elect not to inspect the manufacturing, testing or finished pipes, it does not mean in any way that he has approved the product.

The cost of transportation of the Employer and/or Engineer to the factory and testing sites shall be deemed to be included in the unit rates and shall not be paid for separately.

Before incorporation into the pipeline each pipe shall be brushed out and carefully examined for soundness. Damaged pipes, which in the opinion of the Engineer cannot be satisfactorily repaired, shall be rejected and removed from the Site.

If the Engineer considers that an unacceptable proportion of the pipes length within a test length has failed, the Contractor may be required to test hydraulically, to the site test pressure each pipe and joint before pipe laying. In this event, test results shall be submitted to and approved by the Engineer before any further pipes are laid. The cost of individual pipe testing shall be borne by the Contractor.

The Employer reserves the right to employ an independent testing institute to carry out acceptance tests. Failures discovered during this inspection have to be corrected by the Contractor free of charge. In case of disagreement an independent testing institute will be called in as a mediator. These costs are to be paid by the losing party.

### Inspection and Acceptance

The Contractor shall be responsible for ensuring that all inspections and tests in connection with quality control or otherwise are properly carried out whether on site or elsewhere, and that where necessary the appropriate remedial measures are taken.

The Engineer will require to inspect work being prepared and to witness tests. The Contractor shall give the Engineer adequate notice of the programs of work and testing to enable the Engineer to arrange such inspections.

Manufactured items and materials delivered to the site shall be inspected by the Contractor on arrival. Any defects shall be notified to the Engineer. Minor defects to surface finishes and the like in manufactured items shall be made good in an approved manner to the satisfaction of the Engineer. Items with more serious defects shall be returned to the suppliers for correction or replacement as appropriate.

Furthermore the Engineer reserves to himself the fabric inspections of materials at the production works. The contractor shall provide unrestricted access at any time to any production plant.

Inspections and tests carried out by or on behalf of the Engineer shall not relieve the Contractor of his responsibilities in connection with quality control.

The Engineer will not inspect any item of fabricated or finished work until such time as the Contractor shall have forwarded to the Engineer the approved Working Drawings covering the items to be inspected, together with four copies of the respective orders.

### Materials/Plant Certificates

Quality Control records, test certificates, reports and daily records of on-site testing and inspection shall be kept on forms approved by the Engineer.

Test result shall be certified by the appropriate responsible member of the Contractor’s staff. All test certificates and inspection records (including any from suppliers or other outside testing agencies) shall be clearly identified with the appropriate part of the Works to which they refer, and shall include information required by the relevant Reference Standard or Specifications Section, and they shall be submitted to the Engineer.

The timing for submission of certificates shall be as follows:

* Manufacturer’s and supplier’s test certificates shall be submitted as soon as the tests have been completed and in any case not less than seven days prior to the time that the materials represented by such certificates are needed for incorporation into the Permanent Works;
* Certificates of tests carried out during the construction or on completion of parts of the Permanent Works shall be submitted within 7 days of completion of the test.

Where certificates are required by the Specifications or relevant Reference Standard, the original and two copies of each such certificate shall be provided by the Contractor.

Certificates shall be clearly identified by serial or reference number and shall include information required by the relevant Reference Standard or Specification clause.

The timing for submittal of certificates shall be as follows:

1. manufacturer's and supplier's test certificates shall be submitted as soon as the tests have been completed and in any case not less than 7 calendar days prior to the time that the materials represented by such certificates are needed for incorporation into the Permanent Works;
2. certificates of tests carried out during the construction or on completion of parts of the Permanent Works shall be submitted within 7 days of the completion of the test.

No materials, articles or items of fabricated or finished work to be supplied by the Contractor or Subcontractors which have been inspected and tested by the Engineer shall be dispatched unless a Passing Certificate has been requested by the Contractor from the Engineer and subsequently been issued by the Engineer to the effect that the same are approved. Neither the Contractor nor Sub-Contractors shall make use of any materials or articles ordered by them for the purpose of fabrication until a Passing Certificate covering the said materials and articles has been issued by the Engineer.

### Construction Completion Reports

The Contractor shall submit construction completion reports, which shall be structured to incorporate test records for both site and factory tests and inspections. The structure and format shall be agreed with the Engineer.

Quality Control records, test certificates, reports and daily records of on-site testing and inspection shall be kept on forms approved by the Engineer. Test results shall be certified by the responsible member of the Contractor's staff. All test certificates and inspection records (including any from suppliers or other outside testing agencies) shall be clearly identified with the appropriate part of the Works to which they refer, and they shall be submitted to the Engineer together with the respective Passing Certificate.

Once each month, or at such other intervals as the Engineer may require, the Contractor shall submit in an approved form a summary of all quality control inspections and tests performed at Site and elsewhere in the intervening period.

Test results shall be summarized in tabular form or graphically or both in a way that best illustrates the trends, specific results and specification requirements. Where the tests show that the specified requirements were not achieved, the report shall describe the action that was taken.

Each report shall also contain a forecast of quality control work likely to be carried out during the period to be covered by the succeeding report.

The Contractor shall keep detailed and up-to-date inventories in an approved form of goods and materials already approved by the Engineer for which Passing Certificates have been issued as well as of all other goods and materials subject to quality control which are on order, delivered, found faulty, lost during the work or found to be surplus to requirements. The Engineer shall have access to these records at all times.

### Daily Log Book

The Contractor shall keep a Daily Log Book at each location where major construction activities are taking place. This Daily Log Book shall be in a form approved by the Engineer and shall contain, but not be limited to, the following major items of information:

1. name of Contractor and Package No.
2. date;
3. weather conditions (max./min., temperature, hours and intensity of rainfall);
4. work carried out during the day per Section (description, quantities);
5. major equipment used per section (on contractual work, on extra work ordered, approximate operating time on either);
6. strength of labour force per Section (on contractual work, on extra work ordered, hours worked on either);
7. delays (cause, effects such as idle time etc.);
8. unusual events (floods, fires, storms, accidents, etc.);
9. visitors at Site.

Each daily log shall be signed by the responsible Site Manager of the Contractor and "noted" by the Engineer.

## Protection of the Environment

The Contractor shall familiarise himself with and observe the relevant environmental regulations in the Beneficiaries’ country.

In the case of conflict between Contractor’s proposal and the national regulations, the Engineer shall be contacted to ascertain the appropriate approach and the Engineer will decide which measures shall be taken.

The Contractor shall be responsible for minimising the negative environmental impact during construction and operation.



### Mitigation measures for environmental protection during the construction period

The Contractor shall implement effectively the Environmental Plan and comply with all applicable environmental documentation, which for example applies to any operation licensing and shall observe in full and immediately the directions of the responsible environmental authority.

The following mitigation measures are the responsibility of the Contractor:

1. Control of surface and ground water during construction;
2. Organise all site work so as to keep any nuisance due to noise, dust, odours, contamination of roads, rivers, water bodies soils to a minimum;
3. Respecting the requirements for labour safety during the construction works with view to decreasing the health risk;
4. Restoration of sewer and collector trenches, grassing, landscape forming and keeping sites clean;
5. Preparing and respecting the action plan in emergency situations and in the case of pollution incidents.

## Progress of Works



### Updating, Monitoring and Reporting Progress

The Contractor shall monitor the progress of the Works including information provided by his Sub-contractors and suppliers and shall confirm the actual progress on each current activity in the form of CPM networks.

The CPM networks shall form part of the Monthly Progress Report and shall indicate changes of schedule, if any in network activity duration and start/finish imposed dates. It shall also be provided in electronic form.

The Contractor shall prepare written explanatory notes on the particular activities which are overrunning or going to overrun against the Master Schedule. If any such overrunning work is on the critical path, the Contractor shall state what corrective actions will be taken by him to bring it back on the schedule.

### Detailed Fortnightly Programme

The contractor shall submit at the end of each working week a detailed bar chart programme for the next fortnight. The programme shall identify where further drawings or instructions are to be issued by the Engineer to avoid disruption to the progress of the Works.

### Record / Progress Photographs

The Contractor shall arrange each month suitable numbers of photographs as Record Photographs in digital jpg-form (digital images) and printed out on an A4 paper. Each print shall contain upon the date and description of the view taken. The Contractor shall ensure that no use is made of any print without permission from the Employer. Out of these Record Photographs the Contractor shall select characteristic as Progress Photographs to be attached to the Progress Reports.

Before, during and after implementation of the works, colour photos should be made as evidence of the existing state of the respective pipeline location routes and plants, which could be damaged during the construction. All obvious damages should be photographed, in order to turn away eventual unjustified claims from owners. The pictures should be made in the presence of the Employer’s Site Engineer. The complete documentation shall be submitted to the Employer.

### Progress Reports

The Contractor shall furnish the Engineer with one (1) original and six (6) copies of Progress Reports in English and Montenegrin at regular monthly intervals in a form determined by the Engineer, containing the following information:

1. physical progress for the report month and estimated progress for the next month;
2. CPM networks and explanatory notices;
3. updated S-curves for physical progress at different sections of the Works;
4. Budget used and budget remaining and its brief analysis;
5. images showing the progress attached as Annex with short explanation of location and date;
6. any report which may be specifically requested by the Employer and/or the Engineer.

These monthly progress reports shall be submitted not later than 7 days after the end of the report month.

## MATERIALS AND WORKMANSHIP



### Equipment and materials

All equipment and materials to be incorporated in the Works shall be new, unused products of reputable, experienced manufacturers and shall be in accordance with this Specification.. Similar items in the project shall be the products of the same manufacturer. All materials, equipment and executed works shall conform to the requirements of the "International Standard Organization" (ISO). Other codes, like IEC, BS (British Standards), DIN, DVGW; ASME; etc. may be applicable if they fulfil the requirements of ISO-Standards.

All component parts of manufactured plant and equipment shall be new, unused, in current production and shall comply with the latest relevant Standard. In the case of items already imported into the Country of the Works, the date of importation shall be no more than one year before the date of inclusion in the Works. All component parts shall be manufactured to strict systems of limits and complete interchangeability of similar parts shall be achieved. Where there is no recognised International Standard Specification the materials and workmanship used shall be entirely adequate for the purpose and shall not be installed without the written approval of the Engineer. Uniformity and interchangeability of mechanical and electrical components and accessories which are common to different parts of the Works shall also be achieved as far as practicable.

The Contractor shall ensure that all equipment for which he is responsible are safe. Nothing in the Specification shall remove the Contractor's obligation from drawing the attention of the Engineer to any feature of the Works which is not consistent with safety, or to prevent making proposals for incorporating equipment or designs which would increase the safety.

No materials to be incorporated in the Permanent Works shall have previously been used in the Temporary Works unless otherwise specified or agreed by the Engineer in writing.

### Packing and shipping

The Contractor shall make his own arrangements for packing and shipping of all equipment and materials from the manufacturers site to the site in Berane and all costs including clearance and transport therefore to be made shall be included in the Contract sum.

### Quantities

Before ordering the pipes, the Contractor shall make sure of the necessary lengths of each kind of pipes, adapters, fittings, valves, and specials necessary to complete the works and in accordance with the approved design. The Contractor shall have no claims for extra or deficit amounts that he orders based on BoQ.

### Toxic Materials

The Contractor is prohibited to import or to use any of the “Acrylamide and N-Methylolarcylamide Grouts” or any other toxic or poisonous materials or sub materials used in piping, kinds of concrete or in soil in any kind of usage. Any Contractor required to be licensed in writing by the Employer, otherwise, the Contractor shall be subject to legal pursuance.

### Country of Origin of Materials

The Contractor shall be specific as to the country of origin and manufacturing firm of the materials he intends to supply under the Contract, and shall submit all relevant catalogues to the Engineer. Prior to confirming the import of any materials, the contractor shall obtain the written approval of the Engineer.

### Reference Standards and Codes

It is a basic requirement of the Contractor that all materials and articles are manufactured/tested/supplied in accordance with recognised, approved, national or international Standards.

The Contractor may be required to supply any of the Standards or publications listed in this section for the use of the Engineer’s Representative (with English language translations where appropriate).

The construction of the Works shall be in accordance with the Specification and good modern practice, and shall be such as will facilitate operation, inspection, cleaning, lubrication and repair of the various components of the Plant.

Montenegrin regulations for construction of the works should be followed, especially regarding Consent to work, Building Permits, Safety regulations, existing services, regional and local road authorities permits etc.

Wherever reference is made in the Contract to specific standards and codes to be met by the goods and materials to be furnished, and work performed or tested, the provisions of the edition or revision of the relevant standards and codes in effect 28 days prior to the latest date for submission of tenders shall apply, unless otherwise expressly stated in the Contract. Where such standards and codes are national, or relate to a particular country or region, other authoritative standards which ensure an equal or higher quality than the standards and codes specified will be accepted subject to the Engineer's prior review and written approval. Differences between the standards specified and the proposed alternative standards must be fully described in writing by the Contractor and submitted to the Engineer’s, in the English language, at least 28 calendar days prior to the date when the Contractor desires the Engineer’s approval. In the event the Engineer determines that such proposed deviations do not ensure equal or higher quality, the Contractor shall comply with the standards specified in the documents.

In general, the requirements for the fabrication, construction, inspection and testing of the Works have been specified to meet the applicable standards and codes of the Republic of Montenegro, Germany (DIN), the UK (British Standards), or the EC equivalent (EN). However, the Contractor shall be permitted to use other international standards and codes provided the product, design and installation meets or exceeds the minimum specified requirements of the standard and codes of the Republic of Montenegro, Germany (DIN), British Standards or EC equivalent.

Notwithstanding the above sub-clause, the design or execution and completion of the Works shall comply with Montenegrin standards in the cases where they are obligatory.

The names of the manufacturers of Materials and Plant proposed for incorporation in the Works together with performance characteristics, capacities, certified test reports and similar information of proposed Plant, shall be furnished at the specified times or when requested by the Employer. If in the Employer’s judgement, the provision of such Materials and Plant is unsatisfactory because they are not in compliance with the standards and codes listed in the Specification, then the Employer shall have the right to reject such proposed manufacturers.

Any materials and workmanship not fully specified herein or covered by the Standards, Codes or Manuals shall be of such type and quality so as to produce a first class work. In such circumstance the Engineer shall determine whether all or any of the materials offered or delivered to the site are suitable for use in the Works and the Engineer’s decision in this respect shall be final and conclusive.

### Metric Units

All dimensions distances and levels on the Drawings are shown in the SI-system.

### Alternative designs, materials and constructional procedures

Where tenderers wish to offer alternative designs, materials and constructional procedures they should first tender on the basis of full compliance with the tender requirements. They may submit full details, complete with comprehensive supporting data of any alternatives.

### Approval of Equivalent Materials

For any materials specified as equivalent to the required materials on the drawings or specification, whenever the Contractor desires to use the equivalent material he shall submit his request in writing to the Employer for approval in all cases. The Contractor shall use the equivalent materials only upon receipt of the approval. Using the materials without approval shall not be allowed. If the substituted material costs less than the specified materials the Contract Price shall be deducted at the amount equal to the price difference. If the substituted material costs higher than the specified materials no addition to Contract Price is allowed. If the quality of the substituted material is not lower than the quality of the specified material, the substituted material shall be considered as equivalent. If testing is required, the test shall be carried out by a reliable institute approved by the Employer. The Contractor shall be responsible for arrangement and all expenses for the test.

## Special requirements

For the sewer network rehabilitation and extension, the Contractor shall have to take into account the following special requirements:



### Cross Cutting Issues (Environment, Gender, Minorities)

Cross cutting issues have to be systematically addressed during the project lifetime. Project actions must be screened in order to ensure they won’t impact negatively on gender, the environment and minorities.

The project will ensure that minority and gender equality modules are included in the activities.

Project reports need to contain quantified data on:

* Minorities and gender involved in project activities;
* Minorities and women benefiting from project activities;
* Environmental impact.

In addition, good governance improvements are expected to be an effect of increased service delivery, transparency and performances of the public sector, achieved through the EU project.

### Communication Guidelines

EU-funded projects should achieve a high and consistent level of visibility. A sufficient level of awareness can only be achieved through coherent branding of all EU projects. The role of Contractors and implementing authorities in raising public awareness is thereby crucial. The Contractor shall comply with the provisions of the 'Communications Guidelines: visual and written identity for Contractors and implementing partners', which is available at http://www.ear.eu.int/contacts/contacts.htm. The EUD will use reasonable efforts to assist the Contractor in complying with this obligation, but without incurring expenditure by the EUD. Therefore, the cost of visibility activities has to be included in the incidental budget.

The Contractor, in cooperation with the Beneficiary, shall ensure that adequate publicity is given to the project, namely by making the general public aware of the role played by the Community in this process.

### Persons with Special Needs

The Contractor shall design the facilities and buildings on the way to be accessible for persons with special needs, such as those using wheelchairs, etc.

# List of Standards

Where the following standards and codes are national, or relate to a particular country or region, other authoritative standards which ensure an equal or higher quality than the standards and codes specified will be accepted subject to the Engineer's prior review and written approval:

* EN 1610 Construction and testing of drains and sewers
* EN 16961 Thermoplastics pipes and fittings with profiled outer and smooth inner surfaces
* EN 295 Vitrified clay pipes and fittings and pipe joints for drains and sewers - Performance requirements
* DIN EN 12666 Plastics piping systems for non-pressure underground drainage and sewerage
* DIN EN 681 Elastomeric seals - Material requirements for pipe joint seals used in water and drainage applications
* EN 1446 Plastics piping and ducting systems. Thermoplastics pipes - Determination of ring flexibility
* EN 13508 Condition of drain and sewer systems outside buildings
* DIN EN 476 General requirements for components used in discharge pipes, drains and sewers for gravity systems
* DIN EN 752 Drain and sewer systems outside buildings
* DIN EN 13476 Plastics piping systems for non-pressure underground drainage and sewerage - Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE)
* EN 124 Gully tops and manhole tops for vehicular and pedestrian areas. Design requirements, type testing, marking, quality control
* DIN EN 13101 Steps for underground man entry chambers - Requirements, marking, testing and evaluation of conformity
* DIN EN 13108 Bituminous mixtures - Material specifications
* DIN EN 1338 Concrete paving blocks - Requirements and test methods
* DIN EN 1340 - Concrete kerb units - Requirements and test methods
* EN 598 Ductile iron pipes, fittings, accessories and their joints for sewerage applications. Requirements and test methods
* EN 681- Elastomeric seals - Material requirements for pipe joint seals used in water and drainage applications - Vulcanized rubber
* ISO 9001 Quality management systems
* EN ISO 9969 Thermoplastics pipes -- Determination of ring stiffness
* ISO 1083 Spheroidal graphite cast irons - Classification
* DIN 4124 Excavations and trenches - Slopes, planking and strutting, breadths of working spaces
* DIN 18134 Determining the deformation and strength characteristics of soil by the plate loading test
* DIN V 54841 Plastic Warning Devices For Buried Cables And Pipelines
* DIN 18920 “Protection of trees, plants and vegetation during construction”
* DIN 4095 Planning, design and installation of drainage systems protecting structures against water in the ground
* DIN 19537 High-density polyethylene (HDPE) pipes and fittings for drains and sewers;
* DIN 8061 Unplasticized polyvinyl chloride pipes - General quality requirements and testing
* DIN 1986 Drainage systems on private ground
* DIN 601 Hexagon head bolt with nut
* DIN 4034 Precast unreinforced and reinforced concrete manholes and inspection chambers
* DIN 1164 Special cement
* DIN 4030 Assessment of water, soil and gases for their aggressiveness to concrete; principles and limiting values
* DIN 488 Concrete steel
* DIN 4060 Pipe joint assemblies with elastomeric seals for use in drains and sewers
* DIN1045 Concrete, reinforced and prestressed concrete structures
* DIN 1048 Testing concrete; testing of hardened concrete (specimens taken in situ)
* DIN 18014 Foundation earth electrode - General planning criteria
* DIN 18015 Electrical installations in residential buildings
* DIN 19537 prefabricated high density polyethylene (pe-hd) manholes for use in sewerage systems
* DIN 19584 Manhole covers
* DIN 1221 Dirt trap for manhole covers
* DIN V 1264 Steps for underground man entry chambers - Application in construction works for wastewater disposal
* DIN 19555 Step irons for straight manhole steps in in-situ concrete manholes
* CEN/TR 14920 Jetting resistance of drain and sewer pipes - Moving jet test method
* Worksheet ATV-DVWK-A 127 - Directive for the statistical calculation of sewage pipes and pipelines
* Worksheet ATV-DVWK-A 139 - Installation and inspection of waste water pipelines and canals
* Advisory Leaflet ATV - M 143-6E - Inspection, Repair, Rehabilitation and Replacement of Sewers and Drains, Part 6: Leak Testing of Existing, Earth Covered Sewers and Drains and Shafts Using Water, Air Overpressure and Vacuum
* Worksheet ATV-DVWK\_A 157 - Sewer System Structures
* German Standard ZTVE-StB 94 “Additional technical contractual conditions and guidelines for earthworks in road construction”
* German Standard ZTVT-StB 95 “Additional technical contractual conditions and guidelines for substrata in road construction”
* German Standard ZTV-Asphalt-StB “Additional technical specifications and guide lines for asphalt in road construction“