Note:
Unit prices of BoQ items shall include the execution of all small and unforeseen works not covered by BoQ, but that are necessary to be carried out during construction for smooth process of works on pipeline.
Unit prices shall include any cleaning, material refilling, establishment on site, removal from the site operating plant, canopies, storage of materials, equipment, surplus materials from landfills, machinery, remedy of minor defects, and the site prepared for technical acceptance

A. BILL OF QUANTITIES FOR SANITARY SEWER

No.	Description	UoM	Quantity	Unit price	Total
I	**PRELIMINARY WORKS AND SURVEYING**				
1.	ROUTE SETTING OUT				
	The item includes setting out of sewer routes on the ground prior to work commencement, establishing bench marks along the route according to the setting out protocol. Calculation per meter of sewer route setting out.				
	- main sewer	m	178.60		
2.	GROOVE CUTTING FOR UG INSTALLATIONS				
	Groove cutting enables the exact position of existing installations. Grooves shall be cut at each 50m along the route of the newly designed sewage, i.e. at position of existing UG installations, determined on the basis of information about their position by the competent institutions. The unit price shall include any work relating to hand digging of trenches, depth 1.0-2.5m, length 3-5m, and material for protection of trench excavation. Calculation per piece of section where grooves are cut.	pcs	4.00		
3.	DEMOLITION OF ASPHALT PAVEMENT, AVERAGE THICKNESS d=15cm				
	The item includes mechanical cutting of existing asphalt on both sides along the trench for laying pipes, 20cm wider than the width of the trench, on either side of the trench, mechanical and hand breaking of asphalt (AB + BNS) to pieces of average thickness d=12cm including loading and transport of asphalt to the city landfill and all necessary labour, material and costs for the execution of this item. Calculation per m2 of demolished asphalt pavement.				
	- main sewer 62.0 x 1.65= 102.3 m2	m^2	177.54		

TOTAL PRELIMINARY WORKS	

II EARTHWORKS

1.	MECHANICAL AND HAND EXCAVATION				

No.	Description	UoM	Quantity	Unit price	Total
I	**PRELIMINARY WORKS AND SURVEYING**				
	Excavation shall be carried out in accordance with grades, dimensions and elevations indicated in the design or up to the level and size approved by the Supervision. Excavation shall be done mechanically, except in sections where the route intersects with underground installations where excavation will be done manually. During excavation of trenches deeper than 1.0m, trenches shall be immediately supported by shores to enable smooth and safe excavation. During excavation works, earth shall be loaded to a truck or temporarily stored by the edge of the trench, at least 1.0m from the edge of the trench. The item includes all costs relating to trench excavation. Calculation per m3 of autochton excavated material.				
	depth 0-2 m				
	- mechanical excavation 80 %	m^3	291.81		
	- hand digging 20 %	m^3	72.95		
	depth 2-4 m				
	- mechanical excavation 95 %	m^3	24.49		
	- hand digging 5 %	m^3	1.29		
2.	HAND DIGGING IN SOIL FOR MANHOLES				
	Manual extension of trenches for constructing manholes. The item includes hand digging of trenches 40cm wider on each side in relation to manholes, plus width of metal sheeting 2x10cm, i.e. soil digging for foundation slabs of manholes. Calculation per m3 of excavated autochton material.	m^3	28.09		
3.	HAND DIGGING IN SOIL FOR SERVICE CONNECTIONS				
	Hand digging in soil for service connections. The item includes hand digging of trenches, width 80cm, and average depth 1.10 m. Calculation per m3 of excavated autochton material.	m^3	12.75		

No.	Description	UoM	Quantity	Unit price	Total
I	**PRELIMINARY WORKS AND SURVEYING**				
4.	TRENCH BOTTOM GRADING				
	The item includes any adjustments to trench bottom (excavation and backfilling) to obtain the required grade. Trench bottom shall be thoroughly graded according to elevations and grades provided in the design (+/- 1cm) and subsoil compaction by vibrating plate until achieving the required compactness, min. 15Mpa. If required compactness cannot be achieved in some areas, sandy-gravel material shall be added. Calculation per m2 of graded and compacted surface of the trench bottom.				
	- main sewer	m^2	223.25		
5.	MECHANICAL AND MANUAL SAND BACKFILLING BENEATH, AROUND AND ABOVE PIPELINE				
	The item includes sand spreading and grading for making the bedding with accuracy +/- 1cm according to the designed elevations and slopes. Bedding thickness is d=10cm. Once bedding is graded and compacted, load shall be tested. Load capacity of the bedding should be at least 95% of the maximum laboratory compaction by standard "Proctor" procedure or compressibility modulus Me> 1.5kN/cm2. Trench shall be backfilled with sand around and above the pipe to a height of 30 from the top of the pipe in layers of 10-20cm with simultaneous compaction and wetting. Load testing shall be performed after backfilling. Below road, infill compaction should be 100% of the maximum laboratory compaction by standard "Proctor" procedure or via compressibility modulus Me =2.5kN/cm2. Below pedestrian and bicycle paths, parking lots, infill capacity load should meet 98% of the maximum laboratory compaction by standard "Proctor" procedure or compressibility modulus Me=2.0kN/cm2. Calculation per m3 of placed material in a compacted sta□□□				
	- main sewer	m^3	128.34		

No.	Description	UoM	Quantity	Unit price	Total
I	**PRELIMINARY WORKS AND SURVEYING**				
6.	MECHANICAL AND MANUAL GRAVEL BACKFILLING				
	Trench is backfilled in layers compacted and simultaneous extraction of trench shoring, wherein the layer thickness during compaction must match the type of material and the used compaction machine. Backfilling is done down to lower elevation of subgrade of road, or cycling lane or walkways, parking lots. Compaction shall be performed until reaching the required compaction, and it shall be checked for each layer at a distance between two adjacent sewer manholes. Below roads compaction should be 100% of the maximum laboratory compaction by standard "Proctor" procedure or compressibility modulus Me= 2.5kN/cm2. Below pedestrian and bicycle paths, parking lots, compaction should meet 98% of the maximum laboratory compaction by standard "Proctor" - procedure or compressibility modulus Me= 2.0kN/cm2. Calculation per m3 of placed material in a compacted state.				
	- main sewer	m^3	105.79		
7.	TRENCH SOIL BACKFILLING				
	Supply, transport and placement of selected material from the excavation into the remaining portion of the trench to the ground level along the sewer route, as well as backfilling of grooves and extensions for manholes. Calculation per m3 of placed material.				
	- main sewer	m^3	90.80		
8.	EXCESS EXCAVATED MATERIAL REMOVAL				
	The item includes loading, transport, unloading and rough grading of unloaded excess material from trench excavation to the landfill at a distance up to 8 km. Calculation per m3 of earth removed in bulk, looseness coefficient Kr=1.3. **NOTE:** 52.0 m^3 of soil remain for backfilling of discharging pipeline depressed.	m^3	358.58		
TOTAL EARTHWORKS					

III CARPENTRY WORKS

1.	TRENCH SHORING				

No.	Description	UoM	Quantity	Unit price	Total
I	**PRELIMINARY WORKS AND SURVEYING**				
	Shores shall be on both sides of a trench along its entire length and depth, where excavation depth exceeds 1.0m to enable smooth and safe execution of excavation, installation and testing of pipeline. Shores shall be placed in parallel with the progress of excavation. Formwork must be 20cm higher than ground level. The item includes delivery and removal of shores and any work with the necessary equipment and materials for trench shoring and bracing. Calculation per m2 of surface shored on both sides.				
	- main sewer	m^2	624.86		
TOTAL CARPENTRY WORKS					

IV CONCRETE WORKS

1.	INSTALLATION OF INSPECTION CHAMBER				
	The item includes supply, transport and unloading of watertight precast RC rings (h = 0.25m; 0.5m; 1.0m; cone h=0.6m) Ø1000mm, concrete MB40 and minimum wall thickness d=12cm, storage, transport of additional materials along the route and accessories for the required installation and connection of RC rings, all work on the installation of inspection chambers with side opening, finish of passes through inspection chamber to be watertight and treatment of joints of precast elements of inspection chambers by special cement mortar or other material so as to obtain water tightness. Calculation per meter of performed inspection	m	20.68		

No.	Description	UoM	Quantity	Unit price	Total
I	**PRELIMINARY WORKS AND SURVEYING**				
2.	CONSTRUCTION OF CONCRETE SUBBASE AND GRAVEL BASE				
	The item includes supply and transport of all required materials and accessories and labour necessary for complete and prescribed execution of the item including: setting up and dismantling of formwork, concrete mixing, pouring and curing, MB15, d=10cm. A layer of concrete shall be evenly performed on gravel base, d=10cm, with designed decline with a flat top surface. Calculation per piece of constructed concrete layer, i.e. m3 of gravel base.				
	- Vc= 1.7x1.7x0.1=0.29m3	pcs	12.00		
	- Vg= 2.0x2.0x0.1=0.40m3	m^3	4.80		
3.	CONSTRUCTION OF INSPECTION CHAMBER BOTTOM SLAB				
	The item includes supply and transport of all required materials including rebar, accessories and labour necessary for complete and prescribed execution of the item: setting up and dismantling of necessary formwork, straightening, cutting, bending and tying of rebar, mixing and pouring of concrete MB30 and all necessary for the required construction of RC bottom slab of inspection chamber. Calculation per piece of performed bottom slab of inspection				
	- Vc=1.7x1.7x0.2=0.58m3	pcs	12.00		
4.	CONSTRUCTION OF HALF-ROUND GUTTER				
	The item includes supply, transport, mixing, pouring and curing of MB20 concrete for construction of half-round gutter, plastering with cement mortar in two layers and trowel finish of the second layer. Calculation per piece of constructed half-round	pcs	12.00		

No.	Description	UoM	Quantity	Unit price	Total
I	**PRELIMINARY WORKS AND SURVEYING**				
5.	REINFORCED-CONCRETE RELIEVING RING				
	The item includes supply and transport of all required materials including rebar, accessories and labour necessary for complete and prescribed construction of RC relieving ring, internal diameter Ø625mm including: setting up and dismantling of formwork, straightening, cutting, bending and tying of rebars, mixing, pouring and curing of MB30 concrete. Before relieving ring is constructed, it is necessary to additionally check compaction around inspection chamber. Calculation per piece of constructed	pcs	12.00		

TOTAL CONCRETE WORKS					

V INSTALLATION WORKS

1.	PIPE INSTALLATION				
	Supply, loading, transport and unloading of PVC pipes on a temporary construction site landfill - local transport to the route, laying along the trench bed and installation according to the manufacturer's instructions. Before pipe laying, it is necessary to check appearance, if pipes are functional and lay them according to the designed invert level. The unit price includes all necessary fine materials and labour, and cutting. Calculation per meter of installed				
	PVC S-20 (SDR41) Ø160mm	m	12.26		
	PVC S-20 (SDR41) Ø200mm	m	178.60		
	KGF conduit bushing Ø160mm	pcs	8.00		
	KGF conduit bushing Ø200mm	pcs	24.00		
2.	CAST IRON MANHOLE COVERS				
	Supply, transport and installation of heavy, flat, cast iron manhole covers, Ø 625 mm, with holes, with frame, load of 250kN. Cast iron cover shall be installed on a provided elevation of the cover. Covers shall be stiffened by cement mortar, supports and concrete of about 0.30m3, concrete MB20. Calculation per piece of installed cover.	pcs	12.00		

No.	Description	UoM	Quantity	Unit price	Total
I	**PRELIMINARY WORKS AND SURVEYING**				
3.	STEP IRON				
	Supply, transport and installation of cast iron steps according to DIN 1211 in manholes, at each 30 cm of height, alternately in two rows at the distance of 20 cm with manual chase cutting and cement mortar finish. Calculation per piece of installed iron step.	pcs	69.00		

TOTAL INSTALLATION WORKS	

VI OTHER WORKS

1.	SEWER FLUSHING				
	Sewer flushing before sealing the pipeline with pneumatic gasket with manual removal of all types of materials due to pipeline flushing. Flushing is done using high-pressure tanks and sludge pumps to evacuate water from the pipeline. Calculation per meter of performed pipeline route.	m	178.60		
2.	HYDRAULIC TESTING				
	After certain sections of the pipeline are installed, the pipeline and inspection chambers shall be checked for waterproofing, with the obligatory presence of the Supervision, and under the terms of utility company and the applicable regulations for this type of work (pressure head). Any defects shall be remedied before trench backfilling. Calculation per meter of constructed pipeline route.	m	178.60		
3.	SITE PROTECTION				
	Setting safety fence and warning tapes around the trench. Calculation per meter.	m	178.60		

No.	Description	UoM	Quantity	Unit price	Total
I	**PRELIMINARY WORKS AND SURVEYING**				
4.	REINSTATEMENT OF THE EXISTING PAVEMENT				
	After trench is backfilled and compacted to the required compactness, it shall be reinstated, to its original thickness and composition. Layers of structure shall be performed in accordance with the relevant regulations, with the necessary tests.				
	- Crushed stone 0-32mm d=15cm	m^3	20.18		
	- Crushed stone 0-63mm d=25cm	m^3	33.62		
	- BNS 22sA d=8cm	m^2	177.54		
	- wearing course AB11s d=5cm	m^2	177.54		
5.	AS-BUILT SURVEY				
	Prior to backfilling of pipelines, and after hydraulic testing, it is necessary to perform pipeline as-built survey, and enter the data in the register of underground installations and register it to the cadastral administration. Calculation per meter of surveyed pipeline	m	178.60		
6.	AS-BUILT DESIGN				
	Develop As-built design according to the Supervision's instructions.	m	178.60		

TOTAL OTHER WORKS	

SUMMARY:

I	**PRELIMINARY WORKS AND SURVEYING**	
II	**EARTHWORKS**	
III	**CARPENTRY WORKS**	
IV	**CONCRETE WORKS**	
V	**INSTALLATION WORKS**	
VI	**OTHER WORKS**	

SANITARY SEWER TOTAL:	

B. BILL OF QUANTITIES FOR STORM DRAIN

No.	Description	UoM	Quantity	Unit price	Total
I	**PRELIMINARY WORKS AND SURVEYING**				
1.	ROUTE SETTING OUT				
	The item includes setting out of storm drain routes on the ground prior to work commencement, establishing bench marks along the route according to the setting out protocol. Calculation per meter of storm drain route setting out.				
	- main sewer	m	59.40		
2.	GROOVE CUTTING FOR UG INSTALLATIONS				
	Groove cutting enables the exact position of existing installations. Grooves shall be cut at each 50m along the route of the newly designed drain, i.e. at position of existing UG installations, determined on the basis of information about their position by the competent institutions. The unit price shall include any work relating to hand digging of trenches, depth 1.0-2.5m, length 3-5m, and material for protection of trench excavation. Calculation per piece of section where grooves are cut.	pcs	2.00		
	TOTAL PRELIMINARY WORKS				
II	**EARTHWORKS**				
1.	MECHANICAL AND HAND EXCAVATION				
	Excavation shall be carried out in accordance with grades, dimensions and elevations indicated in the design or up to the level and size approved by the Supervision. Excavation shall be done mechanically, except in sections where the route intersects with underground installations where excavation will be done manually. During excavation of trenches deeper than 1.0m, trenches shall be immediately supported by shores to enable smooth and safe excavation. During excavation works, earth shall be loaded to a truck or temporarily stored by the edge of the trench, at least 1.0m from the edge of the trench. The item includes all costs relating to trench excavation. Calculation per m3 of autochton excavated material				
	depth 0-2 m				
	- mechanical excavation 80 %	m^3	45.14		
	- hand digging 20 %	m^3	11.29		
2.	HAND DIGGING IN SOIL FOR MANHOLES				

No.	Description	UoM	Quantity	Unit price	Total
	Manual extension of trenches for constructing manholes. The item includes hand digging of trenches 40cm wider on each side in relation to manholes, plus width of metal sheeting 2x10cm, i.e. soil digging for foundation slabs of manholes. Calculation per m3 of excavated autochton material.	m^3	3.10		
3.	TRENCH BOTTOM GRADING				
	The item includes any adjustments to trench bottom (excavation and backfilling) to obtain the required grade. Trench bottom shall be thoroughly graded according to elevations and grades provided in the design (+/- 1cm) and subsoil compaction by vibrating plate until achieving the required compactness, min. 15Mpa. If required compactness cannot be achieved in some areas, sandy-gravel material shall be added. Calculation per m2 of graded and compacted surface of the trench bottom.				
	- main sewer	m^2	80.19		
4.	MECHANICAL AND MANUAL SAND BACKFILLING BENEATH, AROUND AND ABOVE PIPELINE				
	The item includes sand spreading and grading for making the bedding with accuracy +/- 1cm according to the designed elevations and slopes. Bedding thickness is d=10cm. Once bedding is graded and compacted, load shall be tested. Load capacity of the bedding should be at least 95% of the maximum laboratory compaction by standard "Proctor" procedure or compressibility modulus Me> 1.5kN/cm2. Trench shall be backfilled with sand around and above the pipe to a height of 30 from the top of the pipe in layers of 10-20cm with simultaneous compaction and wetting. Load testing shall be performed after backfilling. Below road, infill compaction should be 100% of the maximum laboratory compaction by standard "Proctor" procedure or via compressibility modulus Me =2.5kN/cm2. Below pedestrian and bicycle paths, parking lots, infill capacity load should meet 98% of the maximum laboratory compaction by standard "Proctor" procedure or compressibility modulus Me=2.0kN/cm2. Calculation per m3 of placed material in a compacted state				
	- main sewer	m^3	46.25		

No.	Description	UoM	Quantity	Unit price	Total
5.	TRENCH SOIL BACKFILLING				
	Supply, transport and placement of selected material from the excavation into the remaining portion of the trench to the ground level along the sewer route, as well as backfilling of grooves and extensions for manholes. Calculation per m3 of placed material.				
	- main sewer	m^3	18.10		
6.	EXCESS EXCAVATED MATERIAL REMOVAL				
	The item includes loading, transport, unloading and rough grading of unloaded excess material from trench excavation to the landfill at a distance up to 8 km. Calculation per m3 of earth removed in bulk, looseness coefficient Kr=1.3.	m^3	53.86		
	TOTAL EARTHWORKS				

III CARPENTRY WORKS

1.	TRENCH SHORING				
	Shores shall be on both sides of a trench along its entire length and depth, where excavation depth exceeds 1.0m to enable smooth and safe execution of excavation, installation and testing of pipeline. Shores shall be placed in parallel with the progress of excavation. Formwork must be 20cm higher than ground level. The item includes delivery and removal of shores and any work with the necessary equipment and materials for trench shoring and bracing. Calculation per m2 of surface shored on				
	- main sewer	m^2	83.60		
	TOTAL CARPENTRY WORKS				

No.	Description	UoM	Quantity	Unit price	Total

IV CONCRETE WORKS

1.	INSTALLATION OF INSPECTION CHAMBER				
	The item includes supply, transport and unloading of watertight precast RC rings (h = 0.25m; 0.5m; 1.0m; cone h=0.6m) Ø1000mm, concrete MB40 and minimum wall thickness d=12cm, storage, transport of additional materials along the route and accessories for the required installation and connection of RC rings, all work on the installation of inspection chambers with side opening, finish of passes through inspection chamber to be watertight and treatment of joints of precast elements of inspection chambers by special cement mortar or other material so as to obtain water tightness. Calculation per meter of performed inspection	m	2.10		
2.	CONSTRUCTION OF CONCRETE SUBBASE AND GRAVEL BASE				
	The item includes supply and transport of all required materials and accessories and labour necessary for complete and prescribed execution of the item including: setting up and dismantling of formwork, concrete mixing, pouring and curing, MB15, d=10cm. A layer of concrete shall be evenly performed on gravel base, d=10cm, with designed decline with a flat top surface. Calculation per piece of constructed concrete layer, i.e. m3 of gravel base.				
	- Vc= 1.7x1.7x0.1=0.29m3	pcs	2.00		
	- Vg= 2.0x2.0x0.1=0.40m3	m^3	0.80		
3.	CONSTRUCTION OF INSPECTION CHAMBER BOTTOM SLAB				
	The item includes supply and transport of all required materials including rebar, accessories and labour necessary for complete and prescribed execution of the item: setting up and dismantling of necessary formwork, straightening, cutting, bending and tying of rebar, mixing and pouring of concrete MB30 and all necessary for the required construction of RC bottom slab of inspection chamber. Calculation per piece of performed bottom				
	'- Vc=1.7x1.7x0.2=0.58m3	pcs	1.16		

No.	Description	UoM	Quantity	Unit price	Total
4.	CONSTRUCTION OF HALF-ROUND GUTTER				
	The item includes supply, transport, mixing, pouring and curing of MB20 concrete for construction of half-round gutter, plastering with cement mortar in two layers and trowel finish of the second layer. Calculation per piece of constructed half-round	pcs	2.00		
5.	REINFORCED-CONCRETE RELIEVING RING				
	The item includes supply and transport of all required materials including rebar, accessories and labour necessary for complete and prescribed construction of RC relieving ring, internal diameter Ø625mm including: setting up and dismantling of formwork, straightening, cutting, bending and tying of rebars, mixing, pouring and curing of MB30 concrete. Before relieving ring is constructed, it is necessary to additionally check compaction around inspection chamber. Calculation per piece of constructed relieving ring.	pcs	2.00		
	TOTAL CONCRETE WORKS				

V INSTALLATION WORKS

1.	PIPE INSTALLATION				
	Supply, loading, transport and unloading of PVC pipes on a temporary construction site landfill - local transport to the route, laying along the trench bed and installation according to the manufacturer's instructions. Before pipe laying, it is necessary to check appearance, if pipes are functional and lay them according to the designed invert level. The unit price includes all necessary fine materials and labour, and cutting. Calculation per meter of				
	PVC S-20 (SDR41) Ø300mm	m	59.40		
	KGF conduit bushing Ø200mm	pcs	1.00		
	KGF conduit bushing Ø300mm	pcs	6.00		
2.	CAST IRON MANHOLE COVERS				
	Supply, transport and installation of heavy, flat, cast iron manhole covers, Ø 625 mm, with holes, with frame, load of 250kN. Cast iron cover shall be installed on a provided elevation of the cover. Covers shall be stiffened by cement mortar, supports and concrete of about 0.30m3, concrete MB20. Calculation per piece of installed cover.	pcs	2.00		

No.	Description	UoM	Quantity	Unit price	Total
3.	STEP IRON				
	Supply, transport and installation of cast iron steps according to DIN 1211 in manholes, at each 30 cm of height, alternately in two rows at the distance of 20 cm with manual chase cutting and cement mortar finish. Calculation per piece of installed iron step.	pcs	7.00		
	TOTAL INSTALLATION WORKS				

VI OTHER WORKS

1.	SEWER FLUSHING				
	Sewer flushing before sealing the pipeline with pneumatic gasket with manual removal of all types of materials due to pipeline flushing. Flushing is done using high-pressure tanks and sludge pumps to evacuate water from the pipeline. Calculation per meter of performed pipeline route.	m	59.40		
2.	HYDRAULIC TESTING				
	After certain sections of the pipeline are installed, the pipeline and inspection chambers shall be checked for waterproofing, with the obligatory presence of the Supervision, and under the terms of utility company and the applicable regulations for this type of work (pressure head). Any defects shall be remedied before trench backfilling. Calculation per meter of constructed pipeline route.	m	59.40		
3.	SITE PROTECTION				
	Setting safety fence and warning tapes around the trench. Calculation per meter.	m	59.40		
5.	AS-BUILT SURVEY				
	Prior to backfilling of pipelines, and after hydraulic testing, it is necessary to perform pipeline as-built survey, and enter the data in the register of underground installations and register it to the cadastral administration. Calculation per meter of surveyed pipeline	m	59.40		
6.	AS-BUILT DESIGN				
	Develop As-built design according to the Supervision's instructions.	m	59.40		
	TOTAL OTHER WORKS				

No.	Description	UoM	Quantity	Unit price	Total

SUMMARY:

I	**PRELIMINARY WORKS AND SURVEYING**	
II	**EARTHWORKS**	
III	**CARPENTRY WORKS**	
IV	**CONCRETE WORKS**	
V	**INSTALLATION WORKS**	
VI	**OTHER WORKS**	

STORM DRAIN TOTAL:	

C. BILL OF QUANTITIES FOR MANHOLE

No.	Description	UoM	Quantity	Unit price	Total
I	**PRELIMINARY WORKS AND SURVEYING**				
1.	ROUTE SETTING OUT				
	The item includes setting out of facility and relating sewage route on the ground prior to work commencement, establishing bench marks along the route according to the setting out protocol. Calculation per meter of facility and sewage route				
	- manhole	m	7.60		
	- drain pipe	m	7.00		
	TOTAL PRELIMINARY WORKS				
II	**EARTHWORKS**				
1.	MECHANICAL AND HAND EXCAVATION				
	Excavation shall be carried out in accordance with grades, dimensions and elevations indicated in the design or up to the level and size approved by the Supervision. Excavation shall be done mechanically, except in sections where the route intersects with underground installations where excavation will be done manually. During excavation of trenches deeper than 1.0m, trenches shall be immediately supported by shores to enable smooth and safe excavation. During excavation works, earth shall be loaded to a truck or temporarily stored by the edge of the trench, at least 1.0m from the edge of the trench. The item includes all costs relating to trench excavation. Calculation per m3 of autochton excavated material				
	- manhole				
	- mechanical excavation 80 %	m^3	11.56		
	- hand digging 20 %	m^3	2.89		
	- drain pipe				
	- mechanical excavation 80 %	m^3	20.80		
	- hand digging 20 %	m^3	5.20		

No.	Description	UoM	Quantity	Unit price	Total
2.	TRENCH BOTTOM GRADING				
	The item includes any adjustments to trench bottom (excavation and backfilling) to obtain the required grade. Trench bottom shall be thoroughly graded according to elevations and grades provided in the design (+/- 1cm) and subsoil compaction by vibrating plate until achieving the required compactness, min. 15Mpa. If required compactness cannot be achieved in some areas, sandy-gravel material shall be added. Calculation per m2 of graded and compacted surface of the trench bottom.				
	- manhole	m^2	3.36		
	- drain pipe	m^2	8.75		
3.	MECHANICAL AND MANUAL SAND BACKFILLING BENEATH, AROUND AND ABOVE PIPELINE				
	The item includes sand spreading and grading for making the bedding with accuracy +/- 1cm according to the designed elevations and slopes. Bedding thickness is d=10cm. Once bedding is graded and compacted, load shall be tested. Load capacity of the bedding should be at least 95% of the maximum laboratory compaction by standard "Proctor" procedure or compressibility modulus Me> 1.5kN/cm2. Trench shall be backfilled with sand around and above the pipe to a height of 30 from the top of the pipe in layers of 10-20cm with simultaneous compaction and wetting. Load testing shall be performed after backfilling. Below road, infill compaction should be 100% of the maximum laboratory compaction by standard "Proctor" procedure or via compressibility modulus Me =2.5kN/cm2. Below pedestrian and bicycle paths, parking lots, infill capacity load should meet 98% of the maximum laboratory compaction by standard "Proctor" procedure or compressibility modulus				
	- drain pipe	m^3	4.00		
4.	TRENCH SOIL BACKFILLING				
	Supply, transport and placement of selected material from the excavation into the remaining portion of the trench to the ground level along the sewer route, as well as backfilling of trial grooves and extensions for manholes. Calculation per m3 of placed material.				
	- manhole	m^3	0.90		
	- drain pipe	m^3	22.00		

No.	Description	UoM	Quantity	Unit price	Total
5.	EXCESS EXCAVATED MATERIAL REMOVAL				
	The item includes loading, transport, unloading and rough grading of unloaded excess material from trench excavation to the landfill at a distance up to 8 km. Calculation per m3 of earth removed in bulk, looseness coefficient Kr=1.3.	m^3	22.82		
	TOTAL EARTHWORKS				

III CARPENTRY WORKS

1.	TRENCH SHORING				
	Shores shall be on both sides of a trench along its entire length and depth, where excavation depth exceeds 1.0m to enable smooth and safe execution of excavation, installation and testing of pipeline. Shores shall be placed in parallel with the progress of excavation. Formwork must be 20cm higher than ground level. The item includes delivery and removal of shores and any work with the necessary equipment and materials for trench shoring and bracing. Calculation per m2 of surface shored on both sides				
	- drain pipe	m^2	45.00		
	TOTAL CARPENTRY WORKS				

IV CONCRETE WORKS

1.	CONSTRUCTION OF BOTTOM CONCRETE SLAB, BEDDING COURSE AND GRAVEL BASE				
	The item includes supply and transport of all required materials and accessories and labour necessary for complete and prescribed execution of the item: setting up and dismantling of formwork, mixing, pouring and curing of MB20 concrete, d=20cm, bottom slab, straightening, bending, cutting and tying of rebars, Q335 rebar in the upper zone, i.e. Q188 rebar in the lower zone. Construction of bedding course of MB15 concrete, d=10cm. A layer of concrete shall be evenly performed on gravel base, thickness d=10cm. Calculation per m3 of constructed bottom slab, m3 of constructed bedding course, i.e.				
	- Vc= 2.4x1.4x0.2=0.68m3	m^3	0.68		
	- Vbc= 2.4x1.4x0.1=0.34m3	m^3	0.34		
	- Vg= 1.4x2.4x0.1=0.34m3	m^3	0.34		

No.	Description	UoM	Quantity	Unit price	Total
2.	CONSTRUCTION OF CONCRETE WALLS AROUND WWTP UP TO GROUNDWATER TABLE				
	The item includes supply and transport of all required materials and accessories and labour necessary for complete and prescribed execution of the item: setting up and dismantling of formwork, mixing, pouring and curing of MB20 concrete, d=20cm, straightening, bending, cutting and tying of rebars, +/- Q188. Calculation per m3 of constructed concrete				
	Vc=1.4x2.9x0.2x2+2.0x2.9x0.2x2=4.00m3	m^3	4.00		
	TOTAL CONCRETE WORKS				

V INSTALLATION WORKS

1.	PIPE INSTALLATION				
	Supply, loading, transport and unloading of PVC pipes on a temporary construction site landfill - local transport to the route, laying along the trench bed and installation according to the manufacturer's instructions. Before pipe laying, it is necessary to check appearance, if pipes are functional and lay them according to the designed invert level. The unit price includes all necessary fine materials and labour, and cutting. Calculation per meter of installed				
	PVC S-20 (SDR41) Ø200mm	m	7.00		
	KGF conduit bushing Ø200mm	pcs	1.00		
2.	INSTALLATION OF MANHOLE				
	Supply, transport and installation of manhole made of structural PP, for all labor and materials. The item includes construction of manhole with all associated equipment, pumps, fittings, pipes, control electrical cabinet. Calculation per piece of built-in manhole. NOTE: If previously approved by the Supervision, it is possible to build a standard waterproof RC manhole of the following characteristics.				
	- Features of pumps Q= 2.0 l/s H= 3.50 m				
	- Features of manhole Vmin= 1.6 m3				
	manhole	pcs	1.00		
3.	FEEDING CABLE OF MANHOLE				
	The item includes excavation of a trench for laying feeding cable, and trench backfilling. Feeding cable is routed from the nearest distribution cabinet located inside the school. Calculation per meter of installed feeding cable.				
	PP00-Y 5x2,5mm2	m	35.00		
	TOTAL INSTALLATION WORKS				

No.	Description	UoM	Quantity	Unit price	Total

VI OTHER WORKS

1.	SITE PROTECTION				
	Setting safety fence and warning tapes around the trench. Calculation per meter.	m	14.60		

	TOTAL OTHER WORKS	

SUMMARY:

I	**PRELIMINARY WORKS AND SURVEYING**	
II	**EARTHWORKS**	
III	**CARPENTRY WORKS**	
IV	**CONCRETE WORKS**	
V	**INSTALLATION WORKS**	
VI	**OTHER WORKS**	

MANHOLE TOTAL:	

D. BILL OF QUANTITIES FOR WASTEWATER TREATMENT PLANT

No.	Description	UoM	Quantity	Unit Price	Total
I	**PRELIMINARY WORKS AND SURVEYING**				
1.	ROUTE SETTING OUT				
	The item includes setting out of facility and relating sewage route on the ground prior to work commencement, establishing bench marks along the route according to the setting out protocol. Calculation per meter of facility and sewage route setting out.				
	- WWTP	m	18.00		
	- drain pipe	m	8.50		
	TOTAL PRELIMINARY WORKS				
II	**EARTHWORKS**				
1.	MECHANICAL AND HAND EXCAVATION				
	Excavation shall be carried out in accordance with grades, dimensions and elevations indicated in the design or up to the level and size approved by the Supervision. Excavation shall be done mechanically, except in sections where the route intersects with underground installations where excavation will be done manually. During excavation of trenches deeper than 1.0m, trenches shall be immediately supported by shores to enable smooth and safe excavation. During excavation works, earth shall be loaded to a truck or temporarily stored by the edge of the trench, at least 1.0m from the edge of the trench. The item includes all costs relating to trench excavation. Calculation				
	- WWTP				
	- mechanical excavation 80 %	m^3	49.28		
	- hand digging 20 %	m^3	12.32		
	- drain pipe				
	- mechanical excavation 80 %	m^3	8.40		
	- hand digging 20 %	m^3	2.10		

No.	Description	UoM	Quantity	Unit Price	Total
2.	TRENCH BOTTOM GRADING				
	The item includes any adjustments to trench bottom (excavation and backfilling) to obtain the required grade. Trench bottom shall be thoroughly graded according to elevations and grades provided in the design (+/- 1cm) and subsoil compaction by vibrating plate until achieving the required compactness, min. 15Mpa. If required compactness cannot be achieved in some areas, sandy-gravel material shall be added. Calculation per m2 of graded and compacted surface of the trench bottom.				
	- WWTP	m^2	16.64		
	- drain pipe	m^2	10.62		
3.	MECHANICAL AND MANUAL SAND BACKFILLING BENEATH, AROUND AND ABOVE PIPELINE				
	The item includes sand spreading and grading for making the bedding with accuracy +/- 1cm according to the designed elevations and slopes. Bedding thickness is d=10cm. Once bedding is graded and compacted, load shall be tested. Load capacity of the bedding should be at least 95% of the maximum laboratory compaction by standard "Proctor" procedure or compressibility modulus Me> 1.5kN/cm2. Trench shall be backfilled with sand around and above the pipe to a height of 30 from the top of the pipe in layers of 10-20cm with simultaneous compaction and wetting. Load testing shall be performed after backfilling. Below road, infill compaction should be 100% of the maximum laboratory compaction by standard "Proctor" procedure or via compressibility modulus Me =2.5kN/cm2. Below pedestrian and bicycle paths, parking lots, infill capacity load should meet 98% of the maximum laboratory compaction by standard "Proctor" procedure or compressibility modulus Me=2.0kN/cm2. Calculation per m3 of placed material in a compacted state				
	- drain pipe	m^3	6.10		

No.	Description	UoM	Quantity	Unit Price	Total
4.	TRENCH SOIL BACKFILLING				
	Supply, transport and placement of selected material from the excavation into the remaining portion of the trench to the ground level along the sewer route, as well as backfilling of trial grooves and extensions for manholes. Calculation per m3 of placed material.				
	- WWTP	m^3	3.64		
	- drain pipe	m^3	4.52		
5.	EXCESS EXCAVATED MATERIAL REMOVAL				
	The item includes loading, transport, unloading and rough grading of unloaded excess material from trench excavation to the landfill at a distance up to 8 km. Calculation per m3 of earth removed in bulk, looseness coefficient Kr=1.3.	m^3	83.12		
	TOTAL EARTHWORKS				

III CARPENTRY WORKS

1.	TRENCH SHORING				
	Shores shall be on both sides of a trench along its entire length and depth, where excavation depth exceeds 1.0m to enable smooth and safe execution of excavation, installation and testing of pipeline. Shores shall be placed in parallel with the progress of excavation. Formwork must be 20cm higher than ground level. The item includes delivery and removal of shores and any work with the necessary equipment and materials for trench shoring and bracing. Calculation per m2 of surface shored on both sides.				
	- drain pipe	m^2	20.40		
	TOTAL CARPENTRY WORKS				

IV CONCRETE WORKS

1.	CONSTRUCTION OF BOTTOM CONCRETE SLAB, BEDDING COURSE AND GRAVEL BASE				

No.	Description	UoM	Quantity	Unit Price	Total
	The item includes supply and transport of all required materials and accessories and labour necessary for complete and prescribed execution of the item: setting up and dismantling of formwork, mixing, pouring and curing of MB20 concrete, d=20cm, bottom slab, straightening, bending, cutting and tying of rebars, Q335 rebar in the upper zone, i.e. Q188 rebar in the lower zone. Construction of bedding course of MB15 concrete, d=10cm. A layer of concrete shall be evenly performed on gravel base, thickness d=10cm. Calculation per m3 of constructed bottom slab, m3 of constructed bedding course, i.e. m3 of gravel				
	- Vc= 6.4x2.6x0.2=3.34m3	m^3	3.34		
	- Vbc= 6.4x2.6x0.1=1.67m3	m^3	1.67		
	- Vg= 6.4x2.6x0.1=1.67m3	m^3	1.67		
2.	CONSTRUCTION OF CONCRETE WALLS AROUND WWTP UP TO GROUNDWATER TABLE				
	The item includes supply and transport of all required materials and accessories and labour necessary for complete and prescribed execution of the item: setting up and dismantling of formwork, mixing, pouring and curing of MB20 concrete, d=20cm, straightening, bending, cutting and tying of rebars, +/-Q188. Calculation per m3 of constructed concrete wall				
	Vc=2.25x2.6*0.2*2+6.0x2.25*0.2*2=7.74m3	m^3	7.74		
	TOTAL CONCRETE WORKS				

V INSTALLATION WORKS

1.	PIPE INSTALLATION				
	Supply, loading, transport and unloading of PVC pipes on a temporary construction site landfill - local transport to the route, laying along the trench bed and installation according to the manufacturer's instructions. Before pipe laying, it is necessary to check appearance, if pipes are functional and lay them according to the designed invert level. The unit price includes all necessary fine materials and labour, and cutting. Calculation per meter of installed pipeline.				
	PVC S-20 (SDR41) Ø200mm	m	8.35		
	KGF conduit bushing Ø200mm	pcs	1.00		
2.	INSTALLATION OF BIOLOGICAL FILTER				

No.	Description	UoM	Quantity	Unit Price	Total
	Supply, transport and installation of a biological wastewater filter made of structural PP, for all labor and materials. The item includes construction of WWTP with all associated equipment, compressors, aerator, control electrical cabinets. Calculation per piece of installed biological filter.				
	Capacity WWTP 90-110 ES				
	Capacity WWTP Q= 15 m3/day				
	WWTP	pcs	1.00		
3.	FEEDING CABLE OF BIOLOGICAL FILTER				
	The item includes excavation of a trench for laying feeding cable, and trench backfilling. Feeding cable is routed from the nearest distribution cabinet located inside the school. Calculation per meter of installed feeding cable.				
	PP00-Y 5x2,5mm2	m	35.00		
	TOTAL INSTALLATION WORKS				

VI OTHER WORKS

1.	SITE PROTECTION				
	Setting safety fence and warning tapes around the trench. Calculation per meter.	m	26.50		
	TOTAL OTHER WORKS				

SUMMARY:

I	**PRELIMINARY WORKS AND SURVEYING**	
II	**EARTHWORKS**	
III	**CARPENTRY WORKS**	
IV	**CONCRETE WORKS**	
V	**INSTALLATION WORKS**	
VI	**OTHER WORKS**	

WASTEWATER TREATMENT PLANT TOTAL:	

E. BILL OF QUANTITIES FOR OUTLET HEAD

No.	Description	UoM	Quantity	Unit price	Total
I	**PRELIMINARY WORKS AND SURVEYING**				
1.	ROUTE SETTING OUT				
	The item includes setting out of facility on the ground prior to work commencement, establishing bench marks according to the setting out protocol. Lump sum calculation.	LS	1		
	TOTAL PRELIMINARY WORKS				
II	**EARTHWORKS**				
1.	MECHANICAL AND HAND EXCAVATION				
	Excavation shall be carried out in accordance with grades, dimensions and elevations indicated in the design or up to the level and size approved by the Supervision. Excavation shall be done mechanically, except in sections where the route intersects with underground installations where excavation will be done manually. During excavation of trenches deeper than 1.0m, trenches shall be immediately supported by shores to enable smooth and safe excavation. During excavation works, earth shall be loaded to a truck or temporarily stored by the edge of the trench, at least 1.0m from the edge of the trench. The item includes all costs relating to trench excavation. Calculation per m3 of autochton				
	- outlet head				
	- mechanical excavation 80 %	m^3	5.00		
	- hand digging 20 %	m^3	2.00		
2.	TRENCH BOTTOM GRADING				
	The item includes any adjustments to trench bottom (excavation and backfilling) to obtain the required grade. Trench bottom shall be thoroughly graded according to elevations and grades provided in the design (+/- 1cm) and subsoil compaction by vibrating plate until achieving the required compactness, min. 15Mpa. If required compactness cannot be achieved in some areas, sandy-gravel material shall be added. Calculation per m2 of graded and compacted surface of the trench bottom.				
	- outlet head	m^2	4.05		

No.	Description	UoM	Quantity	Unit price	Total
3.	TRENCH SOIL BACKFILLING				
	Supply, transport and placement of selected material from the excavation into the remaining portion of the trench to the ground level along the sewer route, as well as backfilling of trial grooves and extensions for manholes. The item includes soil backfilling up to 0.8m over pipe, since outlet head is in depression. Calculation per m3 of placed material.				
	- outlet head	m^3	5.00		
4.	EXCESS EXCAVATED MATERIAL REMOVAL				
	The item includes loading, transport, unloading and rough grading of unloaded excess material from trench excavation to the landfill at a distance up to 8 km. Calculation per m3 of earth removed in bulk, looseness coefficient Kr=1.3.	m^3	2.60		
	TOTAL EARTHWORKS				

III CARPENTRY WORKS

1.	TRENCH SHORING				
	Shores shall be on both sides of a trench along its entire length and depth, where excavation depth exceeds 1.0m to enable smooth and safe execution of excavation, installation and testing of pipeline. Shores shall be placed in parallel with the progress of excavation. Formwork must be 20cm higher than ground level. The item includes delivery and removal of shores and any work with the necessary equipment and materials for trench shoring and bracing. Calculation per m2 of surface shored on				
	- outlet head	m^2	8.40		
	TOTAL CARPENTRY WORKS				

IV CONCRETE WORKS

1.	CONSTRUCTION OF BOTTOM CONCRETE SLAB, OUTLET HEAD, BEDDING COURSE AND GRAVEL BASE				

No.	Description	UoM	Quantity	Unit price	Total
	The item includes supply and transport of all required materials and accessories and labour necessary for complete and prescribed execution of the item: setting up and dismantling of formwork, mixing, pouring and curing of MB20 concrete, d=20cm, bottom slab, straightening, bending, cutting and tying of rebars, Q335 rebar in the upper zone, i.e. Q188 rebar in the lower zone. Construction of bedding course of MB15 concrete, d=5cm. A layer of concrete shall be evenly performed on gravel base, thickness d=20cm. During construction of bottom slab or riverbed reconstruction, it is necessary to perform channel drain finish. Calculation per m3 of constructed bottom slab, m3				
	- Vc= 6.4x2.6x0.2=3.34m3	m^3	3.34		
	- Vg= 1.6 m2x1.35m=2.16m3	m^3	2.16		
2.	CONSTRUCTION OF WING WALL				
	The item includes supply and transport of all required materials and accessories and labour necessary for complete and prescribed execution of the item: setting up and dismantling of formwork, mixing, pouring and curing of MB20 concrete, d=20cm, straightening, bending, cutting and tying of rebars, +/-Q188. Calculation per m3 of constructed				
	- Vc=1.2x1.4x0.2+1.2x1.2x0.2=m3	m^3	0.70		
3.	CONSTRUCTION OF PLAIN CONCRETE ANCHOR BLOCK FOR OUTLET HEAD				
	The item includes supply and transport of all required materials and accessories and labour necessary for complete and prescribed execution of the item: setting up and dismantling of formwork, mixing, pouring and curing of plain concrete for anchor block that shall protect outlet head.				
	- Vc= 1.0m2x0.7m + 0.15x3.0x0.7= 1.05 m3	m^3	1.05		
	TOTAL CONCRETE WORKS				

V INSTALLATION WORKS

1.	STEEL PIPE INSTALLATION				
	Supply, loading, transport and installation of cast iron and stainless steel for NP 10 bar according to the design details. The price includes supply of connecting materials: bolts, nuts, washers, gaskets, and sealing rings with metal inserts. Fittings must be anti-rust protected in factory. Calculation per piece of mounted fitting.				
	Cast iron DN300mm L= 1.0m	pcs	4.00		

No.	Description	UoM	Quantity	Unit price	Total
2.	INSTALLATION OF CAST IRON FITTINGS				
	Supply, transport and installation of fittings made of cast iron and stainless steel for NP 10 bars according to design details. The price includes supply of connecting materials: bolts, nuts, washers, gaskets, and sealing rings with metal inserts. Fittings must be anti-rust protected in factory.				
	E-ks fitting DN300	pcs	1.00		
	Mica flap DN300	pcs	1.00		
	TOTAL INSTALLATION WORKS				

SUMMARY:

I	**PRELIMINARY WORKS AND SURVEYING**	
II	**EARTHWORKS**	
III	**CARPENTRY WORKS**	
IV	**CONCRETE WORKS**	
V	**INSTALLATION WORKS**	

OUTLET HEAD TOTAL:	

F. BILL OF QUANTITIES FOR RECONSTRUCTION OF THE RIVER BARIČ REGULATED RIVERBED

No.	Description	UoM	Quantity	Unit price	Total
I	**PRELIMINARY WORKS AND SURVEYING**				
1.	ROUTE SETTING OUT				
	The item includes setting out of facility on the ground prior to work commencement, establishing bench marks according to the setting out protocol. Lump sum calculation.	LS	1		
2.	DEMOLITION AND REMOVAL OF EXISTING CONCRETE LINING				
	The item includes demolition, crushing, loading and transport to the landfill to 8km of distance, of the existing concrete lining of the regulated riverbed on the stretch where the works are performed. Calculation per m2 of demolished, crushed and transported concrete lining.	m^2	96.00		
TOTAL PRELIMINARY WORKS					
II	**EARTHWORKS**				
1.	MECHANICAL AND HAND EXCAVATION				
	Excavation shall be carried out in accordance with grades, dimensions and elevations approved by the Supervision. Excavation shall be done mechanically. During excavation soil shall be loaded to truck or temporarily store it. The item includes all costs relating to trench excavation. Calculation per m3 of autochton excavated material.				
	- mechanical excavation	m^3	36.10		

No.	Description	UoM	Quantity	Unit price	Total
2.	RIVERBED BOTTOM AND SLOPES GRADING				
	The item includes any adjustments to channel slopes (excavation and backfilling) to obtain the required designed grade. Channel slopes shall be thoroughly graded according to elevations and grades provided in the design (+/- 1cm) and subsoil compaction by vibrating plate until achieving the required compactness, min. 15Mpa. If required compactness cannot be achieved in some areas, sandy-gravel material shall be added. Calculation per m2 of graded and compacted surface of the regulated riverbed bottom and slopes.	m^2	103.50		
TOTAL EARTHWORKS					

III CONCRETE WORKS

1.	CONSTRUCTION OF RIVERBED RC BOTTOM AND SLOPES				
	The item includes supply and transport of all required materials and accessories and labour necessary for complete and prescribed execution of the item: setting up and dismantling of formwork, mixing, pouring and curing of MB20 concrete, thickness according to design details, straightening, bending, cutting and tying of rebars, Q335 rebar in the upper zone, i.e. Q188 rebar in the lower zone. Construction of bedding course of MB15 concrete, d=5cm. A layer of concrete shall be evenly performed on gravel base, thickness d=15cm. During construction of bottom slab, i.e. reconstruction of riverbed, it is necessary to perform concrete channel drain finish of outlet head. Calculation per m3 of constructed RC bottom and slopes of regulated riverbed, i.e. m3 of lean concrete and m3 of gravel				
	- Vrc= 2.5 m2 x 6.5 m= 16.25 m3	m^3	16.25		
	- Vpc= 1.5 m2	m^2	78.00		
	- Vg= 2.0 m2 x 6.5 m= 13.0 m3	m^3	13.00		

No.	Description	UoM	Quantity	Unit price	Total
2.	CONSTRUCTION OF CUT OFF WALL MADE OF PLAIN CONCRETE				
	The item includes supply and transport of all required materials and accessories and labour necessary for complete and prescribed execution of the item: setting up and dismantling of formwork, mixing, pouring and curing of MB20 concrete, thickness according to design details. A layer of concrete shall be performed on gravel base, thickness d=15cm. Calculation per m3 of constructed plain concrete cut off wall, or m3 of gravel base				
	- Vpc= 15.4 m2 x 1.5 m= 23.1 m3	m^3	23.10		
	- Vg= 1.4 m2 x 1.5 m= 2.1 m3	m^3	2.10		
TOTAL CONCRETE WORKS					

IV INSTALLATION WORKS

1.	INSTALLATION OF GEOTEXTILE				
	Supply, transport and laying of geotextile TIP 250 according to the manufacturer's specifications or for all labour and material necessary for the proper performance of this item. Calculation per m2 of installed geotextile.				
	- bottom and slopes of regulated riverbed	m^2	78.00		
	- concrete cut off wall	m^2	25.50		
TOTAL INSTALLATION WORKS					

SUMMARY:

I	**PRELIMINARY WORKS AND SURVEYING**	
II	**EARTHWORKS**	
III	**CONCRETE WORKS**	
IV	**INSTALLATION WORKS**	

RIVERBED RECONSTRUCTION TOTAL:	

G. BILL OF QUANTITIES
INTERNAL INSTALLATIONS

No.	Description	UoM	Quantity	Unit price	Total
I	**INSTALLATION WORKS**				
1.	Cutting, dismantling and blinding of existing sewerage cast iron pipes on locations specified in the design.	LS	1		
2.	Supply, transport and erection of steel galvanized water supply pipes with fittings and sealants. Pipes must meet SRPS.C.B5.225, and fittings must meet SRPS.M.B6.500-595. For vertical and horizontal lines in the garage. Calculation per meter of pipe.				
	DN32	m	20		
	DN80	m	4		
3.	Supply, transport and installation of cores for the passage of sanitary sewage pipe through the garage wall. Cores are made of steel galvanized water supply pipes. Pipes must meet SRPS.C.B5.225. Calculation per piece. Cores are 50cm long. Diameter of cores is:				
	DN200	pcs	1		
4.	Supply, transport and installation of three-layer polypropylene drainage pipes that are installed in the building (quality system ISO 9001 - 2008). Any recess cutting and penetrating of walls are not charged separately, but are calculated through meter of pipe. Calculation per meter of mounted network, measured at pipes and fittings axis.				
	Ø125mm	m	4		
	Ø110mm	m	12		
	Ø75mm	m	2		
5.	Supply, transport and installation of PVC drainage pipes with the necessary number of fittings and sealant.				
	Ø160mm for pipes to manhole	m	5		
6.	Supply, transport and installation of submersible monoblock pumping unit for vertical installation in wet area, for pumping wastewater with large free ball passage of 35 mm for plant safety. Pump version for the single-phase current, complete with float switch and connecting cable 5m with plug. Pump characteristics are: Qmax=1l/s, discharge is 5m, liquid temperature 20°C. For installation in manhole for collecting wastewater from the boiler room.	pcs	1		

No.	Description	UoM	Quantity	Unit price	Total
7.	Supply, transport and installation of fully submersible wastewater pump for stationary and portable wet well installation, for pumping dirty water and foul water (within the scope of EN 12050). Hydraulic housing and rotor made of cast iron, motor casing in stainless steel. Motor with dry-rotor, run by AC and three-phase current with the oil chamber, thermal monitoring of motor and connection cable 10 m long. Single-phase motor with integrated drive capacitor. Sealing of oil chamber is performed by two independent mechanical seals. Together with: - Float switch and connecting cable 10 m long. - Device for suspension unit DN50/2RK - Microprocessor control unit (depending on level) of submersible pump with digital signal encoder. Pump features are: Qmax =1l/s, discharge is 3m. For installation in	set	1		
8.	Supply, transport and installation of backflow valves to be installed on discharge pipes for draining water from the cooling pit and light liquid separators.				
	DN32	pcs	1		
	DN80	pcs	1		
9.	Supply, transport and installation of the transitional pieces made of cast iron on polypropylene drainage pipes of following diameters				
	Ø125/125	pcs	1		
	Ø75/75	pcs	2		
10.	Supply, transport and installation of mica flaps to be mounted on sewer pipes entering manholes.				
	Ø160	pcs	4		

	INSTALLATION WORKS TOTAL:	

No.	Description	UoM	Quantity	Unit price	Total
III	**TESTING**				
1.	Hydraulic testing of the wastewater network water tightness.	m	23.00		
	TESTING TOTAL:				
IV	**PREPARATION FOR FINISHING WORKS**				
1.	Preparation work: getting familiar with the building, surveying and setting out, transport of materials and tools, small construction works, site organization and getting familiar with the technical documentation.	LS	1		
2.	Opening drilling and chase cutting of walls for passage of sewage installations and their patching after they are installed.	LS	1		
3.	Development of As-built design.	pcs.	1		
	PREPARATION FOR FINISHING WORKS TOTAL:				

S U M M A R Y

I	**INSTALLATION WORKS**				
II	**TESTING**				
III	**PREPARATION FOR FINISHING WORKS**				
	TOTAL INTERNAL INSTALLATIONS:				

GRAND SUMMARY:

A	**SANITARY SEWER**	
B	**STORM DRAIN**	
C	**MANHOLE**	
D	**WASTEWATER TREATMENT PLANT**	
E	**OUTLET HEAD**	
F	**RECONSTRUCTION OF THE RIVER BARIČ REGULATED RIVERBED**	
G	**SANITARY SEWER - INTERNAL INSTALLATIONS**	

GRAND SUMMARY (RSD):	