Serbia Floods Rehabilitation Support

EMERGENCY WORKS ON RECONSTRUCTION - Flood Protection System „Mačva: Sava – Drina"

East zone

ITEM No.	VOLUME IV: BILL OF QUANTITIES Work description	Unit	Quantity	Unit Price	TOTAL Without VAT
	EMERGENCY RECONSTRUCTION WORKS FLOOD PROTECTION SYSTEM „MAČVA: SAVA – DRINA", EAST ZONE **Section 1: DRENOVAC - ČEVRNTIJA** **Reconstruction of the right embankment of the Sava River(km: 18+030 to km: 23+100)**				
A	**PREPARATORY WORKS**				
A-I	**PREPARATORY WORKS FOR THE RECONSTRUCTION OF EMBANKMENT (EMBANKMENT AND SURROUNDING AREA)**	**Unit**	**Quantity**	**Unit Price**	**TOTAL Without VAT**
1	**FORMATION OF BUILDING SITE:**				
1.1.	**Setting up and securing construction site - providing space for the site at an approved location on:** **- zone of PS KAL_REV: CP No. 1952, 1953, 1954 CM. Ševarice. (Connections for electricity and water supply are provided).** **- zone of PS ĆEVRNTIJA: CP No. 1952,1953,1954 CM. Ševarice. (Connections for electricity and water supply are not provided).** Item covers: - Costs of marking and securing the building site and work zone; - Costs of temporary occupation and use of locality for the building site; in case the contractor uses the area outside the boundaries of the said parcel; - Costs of using temporary infrastructure: electricity, water, sewerage, sanitary facilities, parking space for machinery, material and fuel storages; - Costs of restoration of all temporarily used surfaces. The Contractor is liable for all damages that occur as a result of violation of the prescribed measures of protection of surfaces and facilities in the area of the building site.				
	Calculation per construction site.	Pcs	2.00	0.00	0.00

1.2.	**Maintaining and providing access roads along the embankment from the river side (foreland) and from the defended side during the works.** **width B ~ 3.5 m and L ~ 5,070 m** Item covers: -Costs of maintenance and making of building site roads surrounding the embankment, during construction works - Mechanical preparation of the existing road surface in the width of 3.5 m; - Stabilization by multiple bulldozer crossings. The Contractor shall be liable for any damage due to violation of the limits of defined building plots.				
	Calculation per m^2	m^2	35,490.00	0.00	0.00
2	**GEODETICAL SURVEY TERRAIN WORKS - MARKING OF THE DESIGNED EMBANKMENT ROUTE** Marking of the embankment, facilities, service roads and surrounding embankment area (on river side, on defended side of new embankment). Item covers complete survey terrain works under the control of the Engineer: - Renewal of geodetic alignment elements of the embankment route, roads and locations of objects on the route, marking boundaries and plots of the expropriated area , marking profile in accordance with the , security profiles and renewed geodetic points; - Geodetic recording of control cross sections in the opening situation (designed route, by sections of the route with the transitional downstream and upstream sections at a length of 0.5 km, within the limits of the designed embankment with service roads and embankment area in the foreland of 50 m in width), distance of cross sections in accordance with the project at a maximum distance of 50 m, and in the zone pits at a maximum of 10 m; - Preparation of the Survey Technical Documentation of "0" terrain state, in electronic and paper form, in 3 copies; - Highlighting profiles in the field, with writing of profile numbers; - Contractor's geodetic recording of the initial situation is subject to a field control by the Engineer. **Embankment: 362,084 m2** **Roads: 35,490 m2**				
	Calculation per m^2	m^2	397,460.00	0.00	0.00

3	**FULL VEGETATION REMOVAL, IN THE ZONE OF WORK (designed area of embankment and service roads route, surrounding area on river side (width 15m) and defended side (10 m)s of the levee), depositing to a temporary landfill along the route of the floodplain.** Wood mass must be properly cut, stamped graded (firewood and technical wood) and temporarily stored at the sites outside the work zone to a temporary landfill on the river side, and finally on the landfill on CP 5931 CM Drenovac, (distance 15 km). The most favorable schedule delay will be determined by the Engineer (with the prior consent of the PWMC "Srbijavode" as the Beneficiary) - Application of fire protection measures Ignition of wood mass is not allowed. Wood mass, properly cut, branded, classified and properly stacked on the previously approved site, belong to the Contractor. The Contractor is obliged to perform the cutting by hiring licensed cutters. Cleaning is done in accordance with the regulations for cutting timber. The Contractor shall take all necessary protective measures. Price shall include proper felling - removal of felled timber completely in a defined zone and according to given description The Contractor has the obligation to pay the prescribed fee for harvested wood.				
3.1.	**Cutting shrubs and removal of trees up to 7cm in diameter from the work area on the defended side, completely:** Item covers: - Combined (manual and mechanical) cutting of shrubs and trees up to 7 cm, with disposal to the side, grinding with the use of topper for biomass; - Mechanical excavation and extraction of stumps with disposal to the side; - Removal, out of the work zone (loading and transport). The calculation per set: for fully executed works in a defined work zone, on the basis of the situation on the terrain. The estimated area of 30 ha.				
	Calculation per set	set	1.00	0.00	0.00
3.2.	**Cutting and removal of stumps over 7cm in diameter from the work zone, in full:** - machine stump extraction; - disposal aside, loading, transportation and unloading of stumps and branches to the landfill up to 15.0 km distance on CP 5931 (stumps are disposed in a controlled manner, and the branches are to be meshed. **The calculation per set**: for fully executed works in a defined work zone, on the basis of the situation on the terrain. The estimated area of 30 ha.				
	Calculation per set:	set	1.00	0.00	0.00

3.3.	**Removal of vegetation from land designated for quarries and landfill for disposal of surplus materials.** - Complete cleaning (fully) with direct disposal to a landfill up to 15,0 km of distance, on the CP. 5931. **The calculation per set:** for fully executed works in a defined work zone, on the basis of the situation on the terrain. The estimated area of 30 ha.				
	Calculation per set	set	1.00	0.00	0.00
4	**REMOVAL OF SAND BAGS FROM DEFENDED SLOPE OF EXISTING EMBANKMENT (Used during flood defense in May 2014).** Item covers: - Uncovering a layer of earth above the sacks full of sand along the whole length of the embankment L = 5,070 m; - Mechanical removal of layers of sacks from the slope (3.00 m x 0.65 m3 / m ~ 2.0 m3 / m), and tossing them aside; - Removal and depositing, loading to a vehicle; - Transport to the landfill, up to 15.00 km (CP No. 5931, CM Drenovac), unloading, moving on the landfill, backfilling and final ordination of landfill. **The calculation per set:** for fully executed works in a defined work zone, on the basis of the situation on the terrain. The estimated area of 10.20 ha				
	Calculation per set	set	1.00	0.00	0.00
SUMMARY A.I: PREPARATORY WORKS FOR THE RECONSTRUCTION OF EMBANKMENT (EMBANKMENT AND SURROUNDING AREA)					**0.00**
A-II	**PREPARATORY WORKS FOR REHABILITATION OF EXISTING ACCESS ROADS ON SECTION (km 18+030: km 23+100: L = 4,571 m) AND OF ROAD ON THE CROWN OF DOWNSTREAM SECTION OF EMBANKMENT (km 7+000: km 18,030: L=11,030 m)**	**Unit**	**Quantity**	**Unit Price**	**TOTAL Without VAT**
1	**FORMATION OF BUILDING SITE:**				
1.1	**The application of prescribed traffic safety measures in the contact zone of roads to access the building site with categorized roads (6 locations on section (km 18+030: km 23+100: total length L=4,571 m) and of road on the crown of downstream section of embankment (km 7+000: km 18,030: L=11,030 m).** Item covers: - Registration, forming, marking and maintenance of temporary horizontal and vertical signs and road markings in the contact zone with roads of higher category. **The calculation per set:** for fully executed works on the basis of the situation on the terrain.				

	Calculation per set	set	1.00	0.00	0.00
2	**SURVEY TERRAIN WORKS - MARKING OF DESIGNED ROUTE OF ACCESS ROADS** Item covers complete surveyor's work under control by the Engineer, with additional (optional) survey terrain test as needed. - Renewal of geodetic alignment elements of the embankment route, roads and locations of existing facilities on the route, marking boundaries and plots of expropriated area, marking profile in accordance with the project marking, security profiles and renewed geodetic points; - Geodetic recording of control cross sections in the opening situation (designed route, by sections of the route and number of access roads) distance of cross sections in accordance with the project at a maximum distance of 50 m; - Preparation of the Study on initial state, in electronic and written form, in 5 copies; - Contractor's geodetic recording of the initial situation is subject to a field control by the Engineer; - Highlighting profiles in the field, with writing of profile numbers. **Calculation per m2.**				
	Survey terrain works on existing access roads, partialy recovered during Flood defense activities in March 2016. The width of area of geodetic survey works is 5 m, (L=4,571 m). 1) Access roads on the Section km18+030:km 23+100 a)Access road No.1; L=592 m, b=3.5 m, CP.br.5991 CM Drenovac b) Access road No. 2; L=672 m, b=3.5 m, CP.br.5996 CM Drenovac c) Access road No. 3; L=717 m, b=3.5 m CP.br.3902 CM Ševarice d) Access road No..4; L=985 m, b=3.5 m CP.br.3768 CM Ševarice e) Access road No..5; L=940 m, b=3.5 m CP.br.3766 CM Ševarice f) Access road No..6; L=665 m, b=3.5 m, CP.br.3763 CM Ševarice	m^2	22,855.00	0.00	0.00
	2) Marking of access road on the crown of the existing embankment on downstream section, from Drenovac: km 7+000: 18+030 (L= 11,030 m). The width of area of geodetic survey works is 5 m.	m^2	55,150.00	0.00	0.00

3	**FULL VEGETATION REMOVAL, FROM THE AREA OF EXISTING ACCESS ROADS, PARTIALY RECOVERED DURING FLOOD DEFENSE ACTIVITIES IN MARCH 2016 (L=4,571 m).** Wood mass must be properly cut, stamped graded (firewood and technical wood) and temporarily stored at the sites outside the work zone, which will be provided by Engineer - a fenced area with protective measures. Ignition of wood mass is not allowed. Wood mass, properly cut, branded, classified and properly stacked on the previously approved site, belong to the Contractor. The Contractor is obliged to perform the cutting by hiring licensed cutters. The Contractor has the obligation to pay the prescribed fee for harvested wood. Cleaning is done in accordance with the regulations for cutting timber. The Contractor shall take all necessary protective measures. Price shall include proper felling - removal of felled timber completely in a defined zone and according to given description.				
3.1	**Cutting of shrubs and removal of trees up to 7cm in diameter, in whole (6 access roads) L= 4,571 m'** Item covers: - Combined (manual and mechanical) cutting of shrubs and trees up to 7 cm, with disposal to the side, grinding with the use of topper for biomass; - Mechanical excavation and extraction of stumps with disposal to the side; - Removal, out of the work zone (loading and transportation to the secured landfill up to 15.0 km); - The calculation per set: for fully executed works in defined work zone, on the basis of the situation on the terrain. Estimated area of 3,100 m2.				
	Calculation per set	set	1.00	0.00	0.00
3.2.	**Cutting and removal of trees over 7cm in diameter from the work zone, completely (6 access roads) L= 4,571 m'** Item covers: - Cutting trees, timber, shortening the length of the logs not less than L = 2.0 m; - Disposal aside, loading, transport and unloading of stumps and branches to the landfill up to 15.0 km distance (stumps are disposed in a controlled manner) - Machine stump extraction - Disposal aside, loading, transport and unloading of stumps and branches to the landfill up to 15.0 km distance (stumps are disposed in a controlled manner, and the branches are to be meshed with application of protective measures); - The calculation per set: for fully executed works in defined work zone, on the basis of the situation on the terrain. Estimated area of 3,100 m2				
	Calculation per set	set	1.00	0.00	0.00

SUMMARY A - II: PREPARATORY WORKS FOR REHABILITATION OF EXISTING ACCESS ROADS ON SECTION (km 18+030: km 23+100: L = 4,571m) AND OF ROAD ON THE CROWN OF THE DOWNSTREAM SECTION OF EMBANKMENT (km 7+000: km 18,030: L=11,030m)					**0.00**
A-III	**PREPARATORY WORKS FOR REHABILITATION OF IRRIGATION CANAL BITVA**	**Unit**	**Quantity**	**Unit Price**	**TOTAL Without VAT**
1	**TERRAIN SURVEY WORKS- MARKING OF DESIGNED CANAL BITVA ROUTE ON RIVER SIDE AND ON UPSTREAM SECTION FROM THE NEW EMBANKMENT** Item covers complete surveyor's work under the Engineer: - Renewal of geodetic alignment elements of irrigation canal, marking profile in accordance with the project marking, security profiles and renewed geodetic points; - Geodetic recording of control cross sections in the opening situation, distance of cross sections in accordance with the project at a maximum distance of 50 m, and in zone pits at a maximum of 10 m; - Preparation of appropriate studies in electronic and paper form in an appropriate number of copies; - Contractor's geodetic recording of initial situation is subject to a field control by the Engineer; - Highlighting profiles in the field, with writing of profile numbers.				
	Calculation per m^2	m^2	59,765.00	0.00	0.00
2	**FORMATION OF BUILDING SITE:**				
2.1.	**Securing of access building site roads to the route and securing the work area for machinery.** The Contractor shall be liable for any damage due to violation of the limits of defined building plot. Item covers: - Mechanical preparation of the existing road surface in the width of 3.00 m; - Stabilizing with multiple bulldozer crossing; - Maintenance during work.				
	Calculation per m^2	m^2	6,250.00	0.00	0.00

3	**FULL VEGETATION REMOVAL FROM THE ROUTE OF DESIGNED NEW EVACUATION FACILITIES AND UPSTREAM (THROUGH IRRIGATION CANAL BITVA)** Wood mass must be properly cut, branded, classified (technical wood and timber), and stacked on the temporary nearby on the temporary depo on the river side, and finally on a landfill on CP No. 5931, CM Drenovac, in the river inundation (site is up to 15 km away). The most favorable schedule of removal shall be determined by Engineer, with prior approval of PWMC "Srbijavode"). - Application of fire protection measures. Ignition of wood mass is not allowed. Wood mass, properly cut, branded, classified and properly stacked on the previously approved site, is at Contractor's disposal. The Contractor is obliged to perform the cutting by hiring licensed cutters. The Contractor has the obligation to pay the prescribed fee for harvested wood. Cleaning is done in accordance with the regulations for cutting timber. The Contractor shall take all necessary protective measures. Price shall include proper felling - removal of felled timber completely in a defined zone and according to given description				
3.1.	**Cutting of shrubs and removal of trees up to 7cm in diameter from the work zone, completely:** Item covers: - Combined (manual and mechanical) cutting of shrubs and trees up to 7 cm, with disposal to the side, grinding with the use of topper for biomass; - Mechanical excavation and extraction of stumps with disposal to the side; -Removal, out of the work zone (loading and transportation to the secured landfill - up to 15.0 km). **The calculation per set:** for fully executed works in a defined work zone, on the basis of the situation on the terrain. **Estimated area: 5,650 m2.**				
	Calculation per set	set	1.00	0.00	0.00

3.2.	**Cutting and removal of trees over 7cm in diameter from the work zone, completely:** Item covers: - Cutting trees, timber, shortening the length of the logs not less than L = 2.0 m; - Disposal of classified trees aside, loading, transportation and unloading of stumps and branches to the landfill up to 15 km distance (stumps are disposed in a controlled manner); - Machine stump extraction, - Disposal aside, loading, transport and unloading of stumps and branches to the landfill up to 15 km distance (stumps are disposed in a controlled manner, and the branches are to be meshed with application of protective measures). **The calculation per set:** for fully executed works in a defined work zone, on the basis of the situation on the terrain. **Estimated area 5,650 m2**				
	Calculation per set	set	1.00	0.00	0.00
SUMMARY A - III: PREPARATORY WORKS FOR REHABILITATION OF IRRIGATION CANAL BITVA					**0.00**
A-IV	**PREPARATORY WORKS FOR RECONSTRUCTION OF EVACUATION FACILITIES IN THE ZONE OF PS KAL.REV. AND IN THE ZONE OF ABANDONED PS CEVRNTIJA**	**Unit**	**Quantity**	**Unit Price**	**TOTAL Without VAT**
1	**SURVEY MARKING OF DESIGNED ROUTE** Item covers: complete surveyor's work under the Engineer - zero geodesic state; - renewal of geodetic alignment elements of route and objects in the gravity and pressure outflow in zone PS Kalenica Revenica; - geodetic recording of control cross sections of the opening situation at the beginning, middle and end of the filler pouring facilities, as well as in distance up to 10 m maximum; - preparation of appropriate studies in electronic and paper form in an appropriate number of copies; - Contractor's geodetic recording of initial situation is subject to a field control by the Engineer; - highlighting profiles in the field, with writing of profile numbers. **Calculation per m2.**				
	a) Gravitation Outflow Facility A=1000 m^2	m^2	1,000.00	0.00	0.00
	b) Thrust Outflow Facility A=750 m^2	m^2	750.00	0.00	0.00
2	**DEMOLITION OF EXISTING FACILITIES**				

2.1.	**Demolition of existing casting and pouring buildings in the pumping station zone** Item covers: - Demolition of the existing inlet and outflow structures in the gravity drain and outflow facility on the discharge pipe; - Mechanical and manual (80% -20%) work on removing; - Internal transportation, loading and transport up to 15 km, at an approved landfill; - Unloading and proper disposal. **The calculation per set:** for completely demolished building				
	Area of PS KAL.REV. **a) Inlet and outflow facilities in the gravitational pouring facility in PS KAL.REV area.** **N = 2 buildings (85 m3 of reinforced concrete)** **b) gravitational pouring facility on the suction line of the zone PS KAL.REV.** **N = 1 (35 m3 of reinforced concrete)**	set	3.00	0.00	0.00
	Zone of Pumping Station Čevrntija **c) the outflow facility at the discharge pipe in the zone PS Čevrntija** **N = 1 (55 m3 of reinforced concrete)**	set	1.00	0.00	0.00
2.2.	**The demolition of the existing lock chambers on the thrust pipeline of the pumping stations (after removal of the air valve in the discharge pipeline from the pumping station).** Item covers: - Demolition of existing built object of lock chamber on the embankment, with complete mechanical equipment (air valves and pipelines); - Mechanical and manual (80% -20%) work on removing; - Internal transportation, loading and transport up to 15 km, to an approved landfill; - Unloading and proper disposal. **Calculation for completely destroyed building**				
	Zone PS KAL.REV **a) existing one RC facility (4x3 m) – lock chamber on the existing embankment**	set	1.00	0.00	0.00
	Zone of PS Čevrntija **b) existing one RC facility (4x3 m) – lock chamber on the existing embankment**	set	1.00	0.00	0.00

2.3.	Pressure pipeline from the pumping station consists of three (3) steel pipes DN 1000 with three non-return valves on the discharge. The Contractor performs work with the necessary protective measures against damage on pipelines (planned repair of pipelines throughout the length for later use). Item covers: - Dismantling of the existing steel pipeline from the pumping station to the outflow of the building on undefended side; - Dismantling and removal of hydro equipment (non-return valves 3 pieces, dismantling valves, air valves and other fittings); - Loading, transport up to 15 km and unloading pipes and various dismantled pieces at the location in area of PS Koča Canal. **The calculation per set:** (dismantling, transport and disposal of pipelines and disassembled elements)				
	a) Zone of PS KAL.REV (3x50 = 150 m)	set	1.00	0.00	0.00
	b) Zone of PS Čevrntija (3x50 = 150 m)	set	1.00	0.00	0.00
2.4.	**Demolition of the existing gravity drainage (RC tunnel - 2 pieces x L = 15 m) in the body of the existing embankment in the zone of PS KALREV.** Item covers: - Mechanical demolition of the existing two (2) reinforced concrete gravity drains(AB tunnel; 2 pieces L= 15 m); - Mechanical and manual (80% -20%) work on removing; - Internal transportation, loading and transport up to 15 km, to a landfill chosen by the Beneficiary. - Unloading and proper disposal. (with control of the Engineer). **The calculation per set:** for fully demolished building (demolition dismantling, transport and disposal) to the approved landfill.				
	Gravity drainage (RC tunnel: 2 pieces L=15 m)	set	1.00	0.00	0.00
SUMMARY A - IV: PREPARATORY WORKS IN THE ZONE PS KAL.REV.					**0.00**
A-V	**PREPARATORY WORKS FOR EXECUTION OF RISKY WORK OPERATIONS**	**Unit**	**Quantity**	**Unit Price**	**TOTAL Without VAT**

	Introduction 1. The project defines technical solutions and technologies for making the embankment from coherent and incoherent materials (from the existing embankment, from quarries and river borrow pits). 2. The project defines a temporary protective structures to reduce flood risk, water discharge from melioration channel during the work; 3. The project did not define the organization, dynamics and synchronization plan of execution of risky work operations and length of work sections, except for sites in the zone of evacuation outflow on channel BITVA (Synchronization plan of works for reduction of the risk of large water - hereinafter Sync plan of works). 4. Risk work operations: ALONG THE ROUTE OF THE EMBANKMENT: 1) Partially lowering the elevation to the working sections, along the route of the embankment 2) A total collapse of the embankment at certain sites for entering materials or for wringing of water; IN THE AREA PS KAL.REV: 3) A total collapse of the embankment at a certain section (in the zone CS KAL.REV); 4) Interruption of gravity drains from irrigation canal „BITVA"; 5) Interruption of drains in PS KAL.REV (demolition of thrust pipelines).				
1	Drafting of the Organization Plan and Dynamic Plan, which define the measures and works for reducing flood risk and ensuring water drain from the canal "BITVA" (in performing risky operations which are defined by the technical documentation) - The Organization Plan, Dynamic Plan and sync work plan are key to reducing the risk of flooding – the Contractor shall prepare and submit them for approval. - The circumstances that have to be covered by the Organization plan and Dynamic Plan shall be in accordance with the Synchronization plan of works (PWMC "Srbijavode") in which risk operations are to be performed: a) regular hydrological conditions - preventive measures; b) high water levels (introduced measures of flood control - regular and extraordinary, emergency. - Organization Plan and Dynamic Plan must include measures and works which are necessary during execution of risky work operations, in case of interruption of work (temporary halt), especially in terms of interruption of work with uncertain completion deadline of risky work operations. The price includes a set of drafting of Organization plan, Dynamic Plan and their compliance with the Synchronization plan.				
	Calculation per set	set	1.00	0.00	0.00
SUMMARY A – V : PREPARATORY WORKS FOR THE EXECUTION OF RISKY WORK OPERATIONS					**0.00**

SUMMARY A; PREPARATION WORKS					**0.00**
B	**RECONSTRUCTION OF THE EMBANKMENT**				
B-I	**CONSTRUCTION OF THE EMBANKMENT BODY (SCREEN AND BALLAST)**	**Unit**	**Quantity**	**Unit Price**	**TOTAL Without VAT**
	NOTE: Length of work front depends on the technology of the Contractor, the election of machinery and the state of water levels on the Sava river. The Contractor applies work technology which provides: - Work without interruption in conditions of high and low water levels, and Safety Works in the period of implementation of flood control measures.				
1	**EXCAVATION OF HUMUS**				
1.1.	**Excavation of humus (a total amount of 75,454 m3) from the surface which includes: a body of existing embankments, service roads, work area surrounding the embankment and disposal of the temporary landfill (for making the walls of the cassette in ballast zone, for topsoiling new embankments, loading ramps and slopes of road surrounding the embankment)** Item covers: - Mechanical excavation of humus in the layer d = 30 cm; - Displacement and longitudinal transport by pushing up to 50 m to the designed construction borders on defended side (for walls of cassettes in ballast zone) and on undefended side (temporary landfill); **Calculation per m3 of removed humus.**				
	a) Temporary depositing on the defended side for making of cassette walls (total 24,643 m3): **- high quality humus will be used for ballast topsoiling**	m^3	24,643.00	0.00	0.00
	b) Temporary depositing on the river side. Humus will be used for topsoiling; **- slopes of embankment screen and lateral parts of the crown (34,961 m3);** **- slopes of loading ramps (1,753 m3),** **- slopes of roads surrounding the embankment (1,597 m3);** **- slopes of the new top layer on the crown of the existing embankment downstream section (km:7+000: km 18+300) (12,500 m3).**	m^3	50,811.00	0.00	0.00

1.2.	**Construction of the temporary "cassette" walls (covered with PVC foil on the ballast side)on the defended side for mounting incoherent material in the ballast area of the embankment (for disposal of dredging mixture of water/send/gravel).** **After completion of the embankment body, high quality humus will be used for topsoiling of the slope of the new embankment ballast.** The Contractor, on the basis of designed technology of ballast installation on the embankment with the use of incoherent material from the borrow, applies its own technology (optimal number and distribution of cassettes, and provides stability and waterproofing of wall cassettes). <u>Item covers:</u> - Cleaning humus material disposed on a temporary landfill of roots, branches and other waste materials; - Removal aside of carrots, sticks and other debris; - Removal of exquisite coherent material up to 100 m to the border of the area; - Forming of refueling cassette walls to the limits of the secured zone in the protected part, all in accordance with the graphic documentation; - Compacting the deposited pure humus by multiple mechanization crossing (forming of a cassette wall necessary to prevent leaking of water); - Purchase and transport of PVC foils, temporary coating the inside of the wall to prevent uncontrolled ingress of water on the plot in the protected area.				
	Calculation per m^3	m^3	24,643.00	0.00	0.00
2	**CONSTRUCTION OF THE EMBANKMENT SCREEN OF COHERENT MATERIAL**				
2.1.	**Excavation of coherent material for providing area for the construction of new embankment** **Total: 296,955 m3** **(good quality soil ~ 87%; substandard soil ~ 13%)** 1) For the screen of the embankment: 259,078 m3: - From the existing embankment body: 91,184 m3 - From the existing temporary small flood defense dike (on section from km 18+300: 23+100) : 10,140 m3 - From the subsoil layer – below the future ballast of the new embankment: 125,144 m3 ,of good quality soil (it is estimated that 37,877 m3 is substandard quality soil of the total 163,021 m3 material from this area which is neccessery for the new embankment ballast) - From the borrow pit 32,610 m3 of good quality soil 2) For the temporary dike on the river side, along the whole route of works : flood defense preventive measures: 37,877 m3 of substandard quality soil below the future ballast of the new embankment (note: this material will be used for upgrading of the current level of the embankment crown, with additional stabilization of the final layer – Flood defense access road on the crown on downstream section of the existing embankment (km:7+000:18+030).				

2.1.1.	**Mechanical excavation of coherent material from the existing embankment (91,184 m3) according to the technical solutions from the EmW Design, with removal to the side, or with direct loading.** Item covers: - Excavation (with removal or direct loading to trucks); - Checking the quality of materials and classification; - Material must meet the physical and mechanical characteristics specified in the project. (transport along the route which includes access roads). **Calculation per m3.**				
	a) Excavation with the removal to the side. - Moving in longitudinal and transverse direction by pushing material using the mechanization up to 50 m.	m^3	22,796.00	0.00	0.00
	b) Excavation with direct loading to trucks (for transport along the embankment route)	m^3	68,388.00	0.00	0.00
2.1.2.	**The formation of the trench under the new embankment ballast: 163,021 m3, (see TS: Chapter 7.16.)** **Excavation of soil beneath the new embankment ballast up to the angle and dimensions given in the Design, with removal to the side (50 m)** Item covers: - Mechanical excavation of cohesive materials in a wide spoil with slopes; - Checking the quality of material and classification. It is estimated that ~20% of the available amount of material under the body of existing embankment do not meet the required physical and mechanical characteristics; - Compacting the contact surface by multiple transition with tamping equipment to obtain the required density Ms = 30.0 MPa; - Compaction is carried out evenly over the entire width and length of the bedding; - Geomechanical control of subsoil compaction (for every 100 m it is mandatory and upon special request of the Engineer); - The costs of field and laboratory tests shall be borne by the Contractor **Calculation per m3.**				
	a) Excavation with removal (50 m) into the temporary landfill on the embankment route for mounting the screen embankments (good quality materials). All material will be transport along the route of embankment screen (at a distance of 100 m or 200 m, or 300 m).	m^3	125,144.00	0.00	0.00
	b) Excavation with direct loading into a vehicles, transport at a distance of 500 m, discharge and removal (50 m) on the river side for temporary flood defense measures during period of works (substandard material).	m^3	37,877.00	0.00	0.00

2.1.3	**Excavation of the good quality material from existing small dike (made on the crown during Flood defense in March 2016).** Item covers: - Mechanical excavation from the small dyke along the existing embankment (2,0 m3 / m'*5.070 m), with direct loading in the truck.				
	Calculation per m^3.	m^3	10,140.00	0.00	0.00
2.1.4.	**Excavation of additional supplies of quality coherent materials from the borrow pit (15 km away, on CP 5931 CM Drenovac). Borrow pit is provided by the Beneficiary.** Item covers: - The provision and maintenance of access roads to the borrow pits for coherent material - Testing the quality of physical and mechanical characteristics of cohesive materials (obligations of the Contractor). - Opening of the temporary landfill (vegetation clearance, temporary removal of topsoil). - Excavation of coherent material with direct loading. - Transport to the site of up to 15 km.				
	Calculation per m^3	m^3	32,610.00	0.00	0.00
2.2.	**Preparation of the subbase - contact surface of the terrain - construction of the new embankment screen in the full width of the designed route.** Item covers: - Preparation of the contact surface in the zone of the new embankment (after removing the humus); - Rutting subbase of parts of the existing embankment with the use of rippers (layer thickness of 50 cm); - Compacting the contact surface by multiple transition with funds for tamping to required density Ms = 30.0 MPa; Compaction is carried out evenly over the entire width and length of the subbase; - Geotechnical control of subsoil compaction (for every 100 m mandatory and by special request of the Engineer); - The costs of field and laboratory tests shall be borne by the Contractor.				
	Calculation per m^2	m^2	84,800.00	0.00	0.00

2.3.	**Longitudinal transport of coherent material:** **1) from the excavation of the existing embankment (68,338 m3), and** **2) from the excavation under the new embankment ballast (125,144 m3) for installation at the screen of a new embankment.** Item covers: - Transport of cohesive material from the excavation of the existing embankment loaded directly to the site, unloading, depositing. - The material is deposited on the previously prepared and compacted sub grade into the ballast zone made of cohesive material. **Calculation per m3, set of work with transport length.**				
2.3.1.	**Longitudinal transport of coherent material from the excavation of the existing embankment (68,338 m^3)**				
	a) up to 100 m	m^3	22,796.00	0.00	0.00
	b) up to 200 m	m^3	18,237.00	0.00	0.00
	c) up to 300 m	m^3	27,335.00	0.00	0.00
2.3.2.	**Longitudinal transport of coherent material from the excavation under the new embankment ballast (125,144 m^3)**				
	a) up to 100 m	m^3	41,250.00	0.00	0.00
	b) up to 200 m	m^3	33,750.00	0.00	0.00
	c) up to 300 m	m^3	50,144.00	0.00	0.00
2.4.	**Construction of the screen of the new embankment: 259,078 m3:** - From the existing embankment body: 91,184 m3 - From the temporary small flood def. dike: 10,140 m3 - From the subsoil layer – below the future ballast of the new embankment: 125,144 m3,of good quality soil , - From the borrow pit 32,610 m3 of good quality soil Item covers: - Removal of deposited material at a distance up to 50 m, with spreading in layers of 30 cm on the alignment of the new embankment; - Compacting the contact surface by multiple transition; (the required compaction: 95% Proctor test). Compaction is carried out evenly over the entire width and length of the cant; - Geo-mechanical control of compaction layers (the thickness of each of the tested compacted layers), for every 100 m is mandatory, and by special request of the Engineer); - The costs of sampling and laboratory testing shall be borne by the Contractor; - Material for contraction of the embankment screen must meet geotechnical characteristics for this type of work (clean, without vessels, humus or other organic material); - The material is installed and compacted in accordance with the standards for this type of work.				
	Calculation per m^3	m^3	259,078.00	0.00	0.00

3	**CONSTRUCTION OF THE EMBANKMENT BALLAST**				
3.1.	**Providing incoherent material – riverbed sediment from borrow pits (on upstream and downstream sections of the Sava river) for installation in the embankment ballast, surrounding area and the channel (total amount of 389.731 m3). Characteristics of the materials are presented in Diagram of Particle Size Distribution, according to the Design and TS (Chapter 7.12.2).** Item covers: - Borrow pit of incoherent materials (sediment on the bottom of the Sava river): 1. The borrow pit from the riverbed with official permission provided by the Beneficiary (on next section of the river chainage): a) from km 113+000 to km 115+450; b) from km 119+000 to km 120+200, . c) from km 126+700 to km 129+000, or 2. Other borrow pits at a distance from the construction site - the route of embankment up to 10 km, selected by the Contractor (for which the Contractor shall provide the necessary permission according the Serbian Water Law and subordinate legislation: a) previous geological field investigation, survey. b) Technical documentation for dredging (made by licensed designer). c) obtaining permission from PWMC (the approximate period for implementation of the procedure: ~3 months) - Before the use of borrow pits (1. and 2.), the Contractor must previously carry out surveying, control testing of representative samples of sediment material from the river bottom, and provide a written consent of the Engineer and Beneficiary for nstallation in the embankment ballast; '-The installation of incoherent material of particle size distribution shall be approved in the range in accordance with the attached diagram of granulometric structure; - Particle Size Distribution Diagram (enclosed in EmW Design). - The fee for the recovered material is not an obligation of the Contractor, according the Serbian Water Law.				

3.1.1.	**Excavation of the river sediment (389,731m3) with transport to shore in the area of the embankment route:** **1) 207, 893 m3 for direct filling the ballast area from a vessel;** **2) 181, 838 m3 from temporary storage (on distance of 5 km from embankment route),** Item covers: - Excavation of incoherent material (with a test certificate of Particle Size Distribution) from borrow pits provided by the Beneficiary, or from other selected by the Contractor (up to 10 km), in the bed of the river Sava, dredge with loading the vessel - Excavation is done in accordance with the prescribed conditions for dredging - marking, zero status, date and specified technology dredging, control, recording and final study on the amount taken out, the application amount. - Waterway transport from borrow pits in the bed of the river Sava to the previously provided pier on the coast in the zone of unloading (unloading covered by a separate line); - The Contractor determined the location of the temporary pier on the river bank according to the installation location in the ballast of a new dam. - Providing temporary piers on the coast at locations designated by the Contractor, with the use of technical measures of stabilization of coast and the conditions for the prescribed mooring and operation (docking the vessel, mooring, work and exit), - Application of security measures on the fairway in accordance with the regulations of Serbian Agency "Plovput" provided by the Beneficiary; - The Contractor is obliged to comply with the technology of transport characteristics of watercourses and state courts in the concerned section. - Complete all preparatory work, refueling, finishing and auxiliary works, supplies and equipment.				
	Calculation per m^3	m^3	389,731.00	0.00	0.00

3.1.2.	**Unloading - direct filling with mixture of sand/gravel/water using a device for hydraulic transport from a vessel into the embankment ballast (previously provided reservoir with temporary longitudinal and transverse cassettes).** **After the dewatering process of the mixture, in cassetes will remain incoherent of materials in amount of 207, 893 m3 in accordance with the attached diagram of granulometric structure - Particle Size Distribution Diagram (enclosed in EmW Design).** - Procurement, transport (all trucks), assembly and disassembly of steel pipelines from the pier to the tape / temporary landfill on the coast; - Ensuring controlled discharge in the body of the embankment and drainage channels for refueled water, with the use of protection against water penetration foil; - Direct installation mixture of sand/gravel/water using a device for hydraulic transport from a vessel into the embankment ballast with measures for drain water and maintenance of the cassette walls and sewers during construction; - The Contractor, by applying installation technology of sand, defines the number and distribution of cassettes, and the arrangement of temporary piers for vessels.				
	Calculation per m^3	m^3	207,893.00	0.00	0.00
3.1.3.	**Unloading - directly from the vessel into the temporary landfill on the riverbank on the distance of 5 km (in amount of 181.838 m3 of send/gravel, in accordance with the attached diagram of granulometric structure - Particle Size Distribution Diagram (enclosed in EmW Design).** **Calculation per m3**				
	a) for body of embankment (Ballast)	m^3	138,595.00	0.00	0.00
	b) for service roads surrounding the embankment (on the river side of new embankment)	m^3	27,327.00	0.00	0.00
	c) for ramps	m^3	15,916.00	0.00	0.00
3.2.	**Loading incoherent material from temporary storage, transport of up to 5 km, unloading in the cassettes in the zone of the future ballast of embankment, depositing in the cassette in the proper amounts deployed along the route for surrounding roads and ramps.**				
	Calculation per m^3	m^3	181,838.00	0.00	0.00

3.3.	**Removal (at a avarage distance of 100 m) of dredged incoherent material (directly loaded or brought) in layers and installation of sand in the embankment, designed to elevation and dimensions.** Item includes: - Excavation in the zone of the cassettes and moving of sandy material to a coherent part of the embankment; - 50% of previously inserted incoherent material (dredged and brought from the temporary landfill) is moved. - Roughly spreading in the contact zone with a coherent part of the embankment; - Controlled drainage and evacuation of refueled water completely, by gravity or pumping; - Spreading material in layers of 30 cm; - Compacting the contact surface by multiple transition with funds for tamping to required density Ms = 20.0 MPa); - Geo-mechanical control of compaction layers (thickness of each of the tested compacted layers), for every 100 m is mandatory, and by special request of the Engineer). - The costs of sampling and laboratory testing shall be borne by the Contractor. **Calculation per m3 in the compacted state**				
	Removal (100 m) of 50% of directly loaded material in cassettes	m^3	103,945.00	0.00	0.00
	Removal (100 m) of 50% of brought material in cassettes	m^3	90,500.00	0.00	0.00
4	**FINAL PROFILING OF THE EMBANKMENT BODY (SIZE AND SLOPES ANGLE)** Items covers: - Profiling of the embankment body, embankments scarping (both sides), with an accuracy of ± 5 cm; - Leveling of the embankment crown with an accuracy of ± 5 cm; - Geodetic control of slope and embankment footprint.				
	Calculation per m^2	m^2	172,790.00	0.00	0.00
5	**TOP SOILING OF THE NEW EMBANKMENT (BODY, ACCESS RAMPS) AND OF SLOPES OF ROADS**				

5.1.	**Top soiling of the new embankment, access ramps and slopes of service roads - relocation of assorted humus (total 62.955 m3) to:** **1) embankment slopes: (in total amount of 59.604 m3: from the cassette walls: 24,643 m3, from the landfill on the river side: 34,961 m3;** **2) slopes of the access ramps (1,754 m3),** **3) slopes of the roads (1,597 m3),** Item covers: - Excavation of assorted materials from the walls of the cassette and from temporary landfill at the river side - Transport - moving up to 100 m (upstream and downstream, along the emankment route) and disposal of humus along the new embankment, ramps and service roads,in a layer thickness of d = 30 cm				
	Calculation per m^3	m^3	62,955.00	0.00	0.00
5.2.	**Top soiling of the new top layer slopes on the crown of the existing embankment downstream section (km:7+000: km 18+300) (12,500 m3).** Items covers: - Loading, transport (15 km), and installation with flattening of the humus.				
	Calculation per m^3	m^3	12,500.00	0.00	0.00
5.3.	**Flattening of the humus along the slopes and part of the crown of the embankment.** Item covers: - Mechanical and manual (80% -20%) planning of the embankment crown and slope; - The accuracy of planning of the area must be within requested ± 3 cm. **Calculation per m2**				
	1) new embankment slopes (km: 18+030:21+100)	m^2	209,847.00	0.00	0.00
	2) existing embankment crown slopes (km: 7+000:18+030)	m^2	41,700.00	0.00	0.00
6	**GRASSING OF THE SLOPES AND LATERAL PARTS OF THE EMBANKMENT CROWN**				
6.1.	**Grassing of the lateral parts of the crown and embankment with selected mixtures of grass with deep bunches** Item covers: - Purchase and transport of grass mixture (screw meadow, orchard grass, trefoil, French ryegrass, red clover); - Seeding of the surface; - Care till emergence; - The required amount of grass is between 45 kg / ha, with the addition of 200 grams of fertilizer per 1 m2 of grassy area; - The grassing is considered successful when there is 80% of the surface covered with grass.				
	Calculation per m^2	m^2	152,594.00	0.00	0.00

7	**STABILIZATION OF THE EMBANKMENT CROWN (B=4 m)**				
7.1.	**Procurement, transport and installation of CSA (crushed stone aggregate)** Item covers: - Procurement, transport of crushed stone into two factions: CSA 0/63 d = 0.2 m to the undercarriage structure and CSA 0 / 31.5 mm d = 0.1 m for superstructure; - Internal transport to 50 m and depositing material at the crown of the embankment; - Roughly spreading material, leveling, planning and compaction of the embankment crown in layers (Ms=40 MPa) installation of protective compaction of gravel surfacing with the crest of the embankment (width 4.0 m, d = 0.3 m); - The material must meet all standards in terms of quality for this type of work (Approved material); - In all according to the Design.				
	Calculation per m^3	m^3	6,040.00	0.00	0.00
SUMMARY B - I: CONSTRUCTION OF THE EMBANKMENT BODY (SCREEN AND BALLAST)					**0.00**
B-II	**REHABILITATION OF EXISTING SERVICE ROADS, PARTIALY RECOVERED DURING FLOOD DEFENSE ACTIVITIES IN MARCH 2016.**	**Unit**	**Quantity**	**Unit Price**	**TOTAL Without VAT**
1	**Forming and profiling the body of road surrounding the embankment on the defended side: Total length L = 5,200 m,**				

1.1.	Consolidation and further strengthening of sub-soil to produce the service road on the defended side Items include: - Multiple mechanization crossing with the consolidation of the field to the required compaction Ms=30 MPa. With further improvement of the soil in terms of filtration stability - Supply, transport and installation of a certified non-woven PP geo textile - Installing non-woven polypropylene geotextile on a prepared subsoil service road (before making the final layer of sand and a layer of crushed stone). Resumption of geo textiles is an overlap of min. 20 cm. The Contractor should include the necessary overlap at the surface for geo textile to be laid. Before laying the geo textile, the subsoil must be solid and leveled without great prominence and without roots, or other materials that can cause damage (perforation) of geo textile. - The Contractor is obliged, before laying of geo textile, to submit the Declaration on the properties of geo textiles, for approval to the Engineer. (Declaration of perfomance - DoP). - Geo textile must meet the following specifications: Tensile strength (tensile strength) ≥ 22 kN / m (EN ISO 10319) Elongation (Elongation at break) ≥ 55% (EN ISO 10319) Puncture resistance (CBR test) ≥ 3500 (EN ISO 12236) Test of dynamic breakthrough (Dynamic perforation) ≤ 15 mm (EN ISO 13433) **Total surface area of existing roads (21,968 m2), Total surface area of partialy built service roads during flood defense in March 2016: (10,500 m2) Calculation of surface to which geo textile is laid**				
	Calculation per m^2	m2	10,500.00	0.00	0.00
1.2.	**Making of the final road layer of crushed stone (CSA) width of 3.5 m thickness d = 30cm** Item covers: - Internal transport to 50 m and disposal of materials within the construction zone; - Installation of material in Slok CSA 0/63 d = 0.2 m, CSA 0 / 31.5 d = 0.1 m; with leveling and compacting (Ms=40 MPa) the material in layers in accordance with the designed slopes; - Material must meet all standards in terms of quality for this type of work; - In accordance with the Design. **Total surface area of existing roads (21,968 m2), Total surface area of partialy built service roads during flood defense in March 2016: (10,500 m2)**				
	Calculation per m^3	m^3	3,150.00	0.00	0.00

1.3.	**Top soiling (with humus) and grassing of slopes of an area surrounding the embankment** Item covers: - Top soiling of batter service road with exquisite humus from the landfill in the layer thickness d = 20 cm; - Longitudinal displacement (up to 20 m) of the deposited material (humus); - Spreading and planning of humus along the slope				
	Calculation per m^3	m^3	1,600.00	0.00	0.00
2	**Forming and profiling service roads on the river side of the embankment in the floodplain L = 5,077 m**				
2.1	**The formation of the roadway and drainage layer of the road: Creating a substructure of roads out of incoherent material (total amount of incoherent material -river sediment 27,327 m3)** Item covers: - Excavation in the cassette zone, transport and moving of incoherent material to the zone of the service road on the defended side; - Roughly spreading material in layers of 30 cm in the area of service roads on the defended side - Even compaction over the entire width, with the application of prescribed measures for achieving compaction: Ms = 25.0 MPa.				
	Calculation per m^3	m^3	27,327.00	0.00	0.00
2.2.	**Making the final CSA layer of road in the width of 3.5 m thickness d = 30 cm** Item covers: - Procurement, transport and installation of crushed stone in two fractions CSA 0 / 31.5 mm and RCA 0/63; - Internal transport to 50 m and disposal of materials within the construction zone; - Procurement, transport and installation of compacted materials in layers CSA 0/63 d = 0.2 m, CSA 0 / 31.5 d = 0.1 m, (Ms=40 MPa); - Materials must meet all the quality standards for this type of work; - In all according to the project graphic documentation.				
	Calculation per m^3 in compact state	m^3	5,350.00	0.00	0.00
2.3.	**Top soiling and grassing of slopes of roads on the embankment area** Items covers: - Top soiling service road slopes with exquisite humus landfill in the layer thickness d = 20 cm; - Longitudinal displacement (up to 20 m) of the deposited material (humus); - Spreading and planning of humus along the slope.				
	Calculation per m^3	m^3	1,250.00	0.00	0.00
SUMMARY B - II: THE EMBANKMENT SERVICE ROADS					**0.00**

B-III	CONSTRUCTION OF LOADING RAMPS (13 pcs)	Unit	Quantity	Unit Price	TOTAL Without VAT
1	Making the body of ramps (width in the crown of 5 m, longitudinal gradient of 10% -13% and inclines 1: 3) by installing uncoherent materials. Item covers: -Excavation of sand from the cassette with moving to the site on both sides in relation to the embankment; - Internal transport up to 50 m; - Spreading material in layers of 30 cm; - Compacting by multiple machine crossings, evenly over the entire width, with the application of prescribed measures for achieving the required density(Ms=30 MPa); - Geo-mechanical control of compaction troop of ramps (at each ramp mandatory, and by special request of the Engineer); - The costs of sampling and laboratory testing shall be borne by the Contractor.				
	Calculation per m^3	m3	9,400.00	0.00	0.00
2	**Final profiling of loading ramps in the designed size and angle of the levee slope** Item covers: - Profiling body of ramps, scarping of slopes (both sides), with an accuracy of ± 5 cm; - Leveling the crown of ramp with an accuracy of ± 5cm; - Geodetic control of the slope and dimensions of ramps.				
	Calculation per m^2	m^2	13,150.00	0.00	0.00
3	**Top soiling of ramp slope with quality humus compost from the landfill.** Item covers: - Longitudinal displacement (up to 20 m) of the deposited material (humus); - Spreading and planning in the layer d = 30 cm.				
	Calculation per m^3	m^3	1,760.00	0.00	0.00
4	**Making the final layer of crashed stone on the crown of reconstructed ramp 5 m wide and 30 cm thick.** Item covers: - Procurement, transport and installation of crushed stone in two fractions CSA 0 / 31.5 mm and RCA 0/63; - Internal transport to 50 m and disposal of materials within the construction zone; - Installation of material in slok CSA 0/63 d = 0.2 m, CSA 0 / 31.5 d = 0.1 m; with leveling and compacting the material in layers (Ms=30 MPa) in accordance with the designed slopes; - Material must meet in terms of quality all standards for this type of work; - In accordance with the graphic documentation of the project.				
	Calculation per m^3 in compact state	m^3	2,178.00	0.00	0.00

5	**Grassing slope of the ramp with selected mixtures of grass bunches that have deep roots.** Items covers: - Purchase ad transportation of grass mixture (black fescue 60%, 20% grass meadow grass, white clover 20%); - Seeding of the surface; Care to emergence. The required amount of the grass is between 5 to 10 grams per m2 floor area, with the addition of 200 grams of fertilizer per 1 m2 of the surface of the grass: - It is estimated that cover cropping has failed when it receives 80% of grasslands Set - work and material.				
	Calculation per m2	m2	5,850.00	0.00	0.00
SUMMARY B - III: CONSTRUCTION OF LOADING RAMPS					**0,00**
B-IV	**EMBANKMENT CHAINAGE BENCHMARKS AND CONSTRUCTION OF EMBANKMENT GATES**	**Unit**	**Quantity**	**Unit Price**	**TOTAL Without VAT**
1	**Producing and installation of embankment gates:** Item covers: - Making of reinforced concrete foundation pillars of embankment gates, complete marking of the site, earthwork, supply and installation of concrete MB 30 in the plating; - Purchase and installation of poles for the gate (with an assembly for handling and non-standard locking mechanism) and embankment gates cantilever with a bowsprit (of steel pipes varying in diameter), with the proper multiple anti corrosion protection and final visible color; the gates fully in accordance with the graphic details in the design; - Set of work and materials, auxiliary and finishing work on the formation of the finished ramp.				
	Calculation per set	set	15.00	0.00	0.00
2	**Proper labeling of internal of geodetic points of state network along the embankment** Item covers: - Re-creation surveying works, documentation on marking the entry of data in the cadaster. - Set of work and materials, auxiliary and finishing work on the formation of the finished ramp.				
	Calculation per set.	set	1.00	0.00	0.00
3	**Labeling of chainage of embankment and border of the service road in the protected part, with installation of AB pillars of prescribed dimensions, painted in white.** Item covers: - Set of surveying, preparation, earthmoving work, procurement, transport and installation of pillars. **Calculation per piece**				
	a) half-kilometer poles 15x15x100 cm	psc	10.00	0.00	0.00

	b) kilometric poles 20x20x100 cm	psc	5.00	0.00	0.00
	c) poles for delimitation of land 10x10x80 cm	psc	220.00	0.00	0.00
SUMMARY B – IV: EMBANKMENT CHAINAGE BENCHMARKS AND CONSTRUCTION OF EMBANKMENT GATES					**0.00**

B- V	TEMPORARY LONGITUDINAL FLOOD DEFENSE DIKE	Unit	Quantity	Unit Price	TOTAL Without VAT
1	**(related to BoQ Item: B-I: 2. 1.2. b)).** **Making the temporary flood defense dike – along the new embankment route during works period, using the substandard material from excavation below the future ballast of the new embankment.** Note: this material will be used for for upgrading of the current level of the embankment crown, with additional stabilization of the final layer -- Flood defense access road on the crown on downstream section of the existing embankment (km:7+000:18+030). Item covers: - Displacement and longitudinal transport by pushing up to 50 m to the limits of the route on the river side, with compaction works (Ms=15 MPa);				
	Calculation per m^3	m^3	37,877.00	0.00	0.00
SUMMARY B-V: TEMPORARY LONGITUDINAL FLOOD DEFENSE DIKE					**0.00**
TOTAL B: RECONSTRUCTION OF THE EMBANKMENT:					**0.00**

C	REHABILTATION OF EXISTING FLOOD DEFENSE ACCESS ROADS Section km:18+030:23+100, Downstream Section km: 7+000:18+030)	Unit	Quantity	Unit Price	TOTAL Without VAT
1	**Preparation for construction of access roads** Item covers: - Multiple mechanization crossing with the consolidation of the field to the required compaction (Ms=40 MPa). - In accordance with the Drawings and standards for this type of work **Calculation per m^2**				

1.1	**1. Preparation for rehabilitation of access roads on the Section 18+030:23+100 (built during Flood Defense activities in March 2016).** NOTE: It is estimated that on average 50% of surface of the roads (30% of total amount of 22,855 m2) on this Section will be rehabilitated) a) Access road No.1; L=592.0 m, b=3.5 m, CP.br.5991 CM Drenovac b) Access road No. 2; L=672.0 m, b=3.5 m, CP.br.5996 CM Drenovac c) Access road No. 3; L=717.0 m, b=3.5 m CP.br.3902 CM Ševarice d) Access road No..4; L=985.0 m, b=3.5 m CP.br.3768 CM Ševarice e) Access road No..5; L=940.0 m, b=3.5 m CP.br.3766 CM Ševarice f) Access road No..6; L=665.0 m, b=3.5 m, CP.br.3763 CM Ševarice **Calculation per m2**	m^2	11,430.00	0.00	0.00
1.2	**2) Preparation for rehabilitation and upgrading of the level of access road on the crown of existing embankment on downstream section, from Drenovac : km: 7+000:18+030.** - Mechanical removal of existing embankment layer, with disposal on service road for defended sides of embankment, spreading and compaction until reaching compaction of Ms=25 MPa. **Calculation per m2**	m^2	45,400.00	0.00	0.00
2	**Rehabilitation works**				
2.1.	**Rehabilitation of access roads on Section 18+030:23+100** (built during Flood Defense activities in March 2016). NOTE: It is estimated that on average 50% of surface of the roads (50% of total amount of 22.855 m2) on this Section will be rehabilitated) Item covers: - Procurement, transport and installation of crushed stone in two fractions CSA 0 / 31.5 mm and RCA 0/63. - Internal transport to 50 m and disposal of materials within the construction zone - Installation of materials in Slok CSA 0/63 d = 0.2 m, CSA 0 / 31.5 d = 0.1 m - Even compaction over the entire width, with the application of prescribed measures for achieving compaction; (97% SPD) - Material must meet all standards in terms of quality for this type of work Set of work, equipment and material. 11430 m2*0,3				
	Calculation per m^3	m^3	3,429.00	0.00	0.00

2.2.	**Access road on the crown of the existing embankment on downstream section, from Drenovac : km: 7+000:18+030**				
2.2.1.	**Excavation and longitudinal transport (length of transport 10 km) of substandard quality coherent material (37,877 m3) from the temporary flood defense dike during work period on the river side.** **This material will be used for upgrading of the current level of the embankment crown, with additional stabilization of the final layer – Flood defense access road on the crown.** Item covers: -Excavation of the material from temporary flood dike on the river side of the new embankment route, loading into the trucs -Transport (10 km), loaded directly on the crown of the embankment, unloading, depositing in layer average thickness d=40 cm; - Compacting filled layers (thickness of d = 30 cm) , on whole crown width, Ms=20 MPa,				
	Calculation per m^3	m^3	37,877.00	0.00	0.00
2.2.2.	**Formation of final layers of embankment crown and ramps by implementation of existing low quality material (10,030*0.4*3.5~=14,050 m^3 of stabilized top layer on the crown, compacted at min Ms=55 MPa)** - Stabilization of top layer 3,5 m wide, d=0.40 m thickness with preparation and quality control in accordance with prescribed parameters which confirm homogeneity of the final layer. Item includes: 1) laboratory testing of samples of low-quality material for defining optimum recipes of mixture of attested binder and water. 2) Presentation of reports to Supervision (Report of Contractor's Laboratory is recognized), with possibility of additional control made by accredited laboratory), 3) mobilization, positioning and work of multifunctional self-propelled machine for stabilization and homogenization of soil layers, and cisterns for uniform dosing of attested binder in the quantity which is determined in Laboratory Report, 4) test of stabilization, homogenization and compaction on test field (2 characteristic sites ordered by Engineer, area 500 m^2) 5) stabilization and homogenization at test field, and after that on the route of embankment superelevation, by implementation of synchronous work of self-propelled multifunctional machine, cistern for control of dosing of binder and vibro rollers: - synchronous operation of multifunctional machine. Mechanical grinding and mixing of new and already treated layer with minimum two transfers (after first transfer, soil particles larger than 60 mm are removed).				

	Work of cistern with integrated unit for uniformly controlled dosing of attested binder with binder spreading machine in full layer width, in accordance with laboratory recipe of the mixture, Compaction and final flatenning layer. 6) control of achieved compaction and homogenization, in every layer (thickness 0.4 m), in accordance with Technical conditions of testing points at every 500 m2 of placed layer, at edges and in central part of the layer. Testing parameters (required results after 7 days: compressive strength minimum: 0.4. MPa, compaction degree in relation to standard Proctor test - 98%. Costs of sampling and laboratory testing by accredited laboratory are borne by the Contractor. Additional control will be performed upon order of the Engineer and Investor, by hiring an independent accredited laboratory, and costs of control will be borne by the Contractor in case of unacceptable deviation in relation to the requested quality parameters. 7) maintenance of layer – in accordance with technical conditions, especially in case of slowdown and low temperatures.				
	Calculation per m^3	m^3	14,050.00	0.00	0.00
2.2.3.	**Upgrading and stabilization of the embankment crown from section 7+000-km 18+030,** Making of final layers on the embankment crown and on access ramps. Item covers: - Procurement, transport and installation of crushed stone - installation of materials CSA 0 / 31.5 d = 0.1 m; - Even compaction over the entire width, with the application of prescribed measures for achieving compaction; (Ms=45 MPa); - Material must meet all standards in terms of quality for this type of work; - Set of work, equipment and material.				
	Calculation per m3	m^3	3,510.00	0.00	0.00
3	**Construction of the new access asphalt road from the road Šabac - S. Mitrovica, to PS KAL.REV** **C) Access road No.3 L=717.0 m, b=3.5 m** **CP.No.3902** **Planning and rolling of road subbase.** Item covers: -Planning the surface of road subbase to the prescribed angle and accuracy of +/- 2 cm; -Compaction of sub soil with the use of vibrating resources up to the prescribed compaction Ms=40 MPa; - Control of compaction.				
	Calculation per m^2	m^2	2,950.00	0.00	0.00

3.1.	**Construction of base layer of gravel material in size of 0/63 mm below the road surface in a layer of 20 cm.** Item covers: - Supply of gravel material 0/63, transportation, installation spreading (70% of the machine-30% by hand); - Compactivity control at 40MPa - Compactivity control				
	Calculation per m^3	m^3	800.00	0.00	0.00
3.2.	**Construction of bearing layer of crushed stone, granulation 0 / 31 mm.** Item covers: - Supply of crushed aggregates 0/31, transportation, installation, spreading of a layer of 15 cm (70% of machine-30% by hand); - Planning and vibro compaction means; - Compactivity control at 40 MPa				
	Calculation per m^3	m^3	400.00	0.00	0.00
4	**Construction of the upper substrate layer of bituminous crushed aggregate BNS 22 d=12 cm** Item covers: -Procurement, transport and installation of materials for making upper bituminous support layer (BNS) of a mixture of terrain stone, stone aggregate and bitumen as a binder; - The work includes the purchase of necessary materials and embedding in layers of 12 cm according to the project.				
	Calculation per m^2	m^2	2,950.00	0.00	0.00
5	**Production of wearing layer of AB d=4 cm** Item covers: - Procurement, transportation and installation of materials for making the wearing layer (AB) of asphalt concrete mixtures of stone materials and bitumen; - The work includes the procurement of materials and embedding in layers 4 cm per project.				
	Calculation per m^2	m^2	2,950.00	0.00	0.00
SUMMARY C: REHABILTATION OF EXISTING FLOOD DEFENSE ACCESS ROADS Section km:18+030:23+100, Downstream Section km: 8+950:18+030)					**0.00**
D	**REHABILITATION OF IRRIGATION CANAL BITVA (KM 0+000:1+036)**				
D-1	**EARTHWORKS**	**Unit**	**Quantity**	**Unit Price**	**TOTAL Without VAT**

1	**Sludge removal (work in the water) in all according to drawings from Design** Item covers: The excavation material from the bottom and slopes of the channel - Mechanical excavation of cohesive material on the bottom of the slope (work in water), removal aside for draining; - Longitudinal leveling of the channel profile bottom +/- 5 cm; - Geodetic control of the channel alignment; - Loading of dried material; - Transport to the landfill up to 15 km on the CP 5931 CM Drenovac).				
	Calculation per m^3	m^3	2,540.00	0.00	0.00
2	**Preparation of canal slope for making of stone protection: Scarping of slopes in accordance with the designed incline.** Item covers: - Excavation of cohesive material on the slopes in the zone of the foot channel with direct loading; - Transport of material to landfill up to 10 km, which is defined by the Beneficiary; - In all according to the graphics documentation and standards for this kind of works. **Calculation per m3.**				
	Gravity canal K1	m^3	10,050.00	0.00	0.00
	Diversion canal on the discharge outflow	m^3	1,300.00	0.00	0.00
3	**Installation of material along the slope for forming of designed profiles: Preparation of canal slope for creation of protection in the designed cross slope.** Item covers: - Excavation of material from the landfill in the area of the embankment, transportation and installation of cohesive material on the slopes of the embankment - Depositing material along the edges of the canal - Spreading and profiling of incoherent material (gravel) on the slopes - In all according to graphic documentation and standards for this type of work **Calculation per m3**				
	Gravity canal BITVA	m^3	5,720.00	0.00	0.00
	Diversion canal on the discharge outflow	m^3	800.00	0.00	0.00
SUMMARY D - I: EARTHWORKS					**0.00**
D-II	**PROTECTION OF CANAL BITVA SLOPES**	**Unit**	**Quantity**	**Unit Price**	**TOTAL Without VAT**

1	**Installing non-woven polypropylene geo textile on the prepared slope of the canal, „Bitva – PS KAL.REV" (before making a layer of gravel and stone landfill - rolled stone)** Item covers: - Supply and installation of PP nonwoven geo textiles of certified production. - Resumption of geo textile is done in an overlap of min. 20 cm. The Contractor should include the necessary overlap in the total surface on which the geo textile is laid. - Before laying the geo textile, the slope must be thoroughly profiled, without great prominence and without any root, or other materials that can cause damage (perforation) to geo textile. Production of geo textile is certified. The Contractor is obliged, before laying geo textile, to provide the Engineer with the Declaration on the properties of geo textiles, in order to get the approval. (Declaration of Performance - DoP). The geo textile must meet the following specifications: - Tensile strength (tensile strength) ≥ 22 kN / m (EN ISO 10319) - Elongation (Elongation at break) ≥ 55% (EN ISO 10319) - Resistance to puncture (CBR test) ≥ 3500 (EN ISO 12236) - Elongation (Elongation at break) ≥ 55% (EN ISO 10319) - Test the dynamic breakthrough (Dynamic perforation) ≤ 15 mm (EN ISO 13433)				
2	**Making of protective embankments of crushed stone.** Item covers: - Procurement, transport and installation of rolled stone on profiled slopes. - Procurement of quarry stone grit of 20-400 cm - Transportation of materials from the landfill at distances up to 10 km - Internal transport and mechanical installation of stone on profiled slopes - Exquisite stone of larger dimensions should be placed in a controlled manner along the leg, in order not to cause damage to geo textile - The Contractor is required to provide certificates for the quality of the built-in material - In accordance with the Drawings and standards for this type of work **Calculation per m3.**				
	a) Gravity canal BITVA	m^3	13,118.00	0.00	0.00
	b) Diversion canal on the discharge outflow	m^3	3,490.00	0.00	0.00
SUMMARY D – II: PROTECTION OF CANAL SLOPES					**0.00**

SUMMARY D: REHABILITATION OF IRRIGATION CANAL BITVA (KM 0+000:1+036)					**0.00**
E	**RECONSTRUCTION OF EVACUATION FACILITIES OF CANAL BITVA (KM 0 + 000) - GRAVITY DRAINAGE OF CANAL BITVA AND PRESURE PIPELINE PS KAL.REV**				
	Works in the zone CS KAL.REV. in accordance with the Design are risky work operations which can cause flooding: - A total collapse of the embankment for reconstruction of evacuation facilities; - Interruption of drains from the irrigation canal "BITVA"; - The Contractor applies its own technology of works which ensures uninterrupted operation in conditions of high water levels and security during the implementation of flood control measures; - Due to the evident risk on the location of PS KAL.REV, the Project defines temporary protective structures to reduce flood risk, for draining water from the canal during the works and the hiring of additional mobile unit of great capacity; - The Contractor shall establish temporary protective structures and provide auxiliary mobile aggregate in accordance with the approved Organization Plan, Dynamic Plan and synchronization plan of the works.				
E-I	**TEMPORARY FACILITIES: FLOOD PROTECTION AND DRAINAGE OF BITVA CANAL DURING WORK**	**Unit**	**Quantity**	**Unit Price**	**TOTAL Without VAT**
1	**Hiring of mobile high-capacity pumps** - Because of the attendant risk of flooding of coastal canal "BITVA" during work on the reconstruction of evacuation facilities, the Contractor is obliged to provide on-site 2 mobile aggregation pumps with diesel and electric drive of capacity minimum 300 l / sec. - The work of this auxiliary equipment is particularly recorded, and is paid by the hour.				
	Calculation per hour	h	1,000.00	0.00	0.00
1.2.	**Hiring of pumps PS KAL.REV** Prior to the demolition of pressure pipeline, the Contractor can also use, with the approval Srbijavode, the capacities of PS KAL.REV (2x2 m3 / sec). The work of pumping stations (operating costs, human workforce CS) are also recorded and paid to PWC limited with the pricelist of "Srbijavode" (planned prices stated in the Program of operations with the approval of the Government of the Republic of Serbia).				
	Calculation per hour	h	1,000.00	0.00	0.00

2	**MAKING OF TEMPORARY CIRCUMFERENTIAL EMBANKMENT IN THE ZONE PS KAL.REV (FLOOD PROTECTION DURING THE WORK)** Removal of temporary facilities covered, the Contractor is obliged to: 1. flange the protective embankment - the downstream embankment formed before the opening of the embankment in the area of facilities; 2. maintain the designed height of the temporary protective embankment and bulkheads (80,90 m.a.s.l.).				
2.1.	**Creating temporary circumferential flood defense embankment (cofferdam) in the floodplain of the Sava River in PS KalRev area. The embankment crest: min 3.5 m width, level embankment (80.90 m.a.s.l.).** **(Section of embankment which separates the drainage channel has the function of the downstream cofferdam for security work in the dry during the reconstruction of facilities in the zone of PS - special Item).** **Material for this temporary embankment will be used from existing amankment (3,877 m3) with additional material from excavation from subbase of the new ballast (12,300 m3 of total 37,877 m3).** **Material from this temporary embankment, after reconstruction of the evacuation facilities of PS will be used for reconstruction of embankment on this section and for upgrading level of existing embankment (7+000:18+030)- excavation and transport is covered by separate item.** Item covers: - Marking of geodetic route and cross sections of the temporary circumferential embankment; - Preparation of the terrain along the route of the designed technological schemes (within the drain trunking by cutting into the slope): - Cleaning the route of vegetation, excavation of the surface layer, ripping and compaction of the contact surface by multiple bulldozer crossings; - Depositing, spreading with compacting layers, providing materials for the formation of the embankment. - Excavation, loading and transport of cohesive materials. '- Unloading; **Calculation per m3 -** creating and maintaining earthen cofferdam with the application of security measures overflow and water penetration (use foil).				
	Calculation per m^3	m^3	16,177.00	0.00	0.00
3	**TEMPORARY DRAINAGE PIPES, AND PREPARATION FOR DRY WORK IN THE CANAL BITVA ZONE**				
3.1.	**Development and maintenance of downstream cofferdam in ducts within the circumferential temporary dikes. Cofferdam must include a temporary gravity drainage of water from the canal with controlled outflow (non-return valve).**				

3.1.1.	**Preparation for the development of downstream cofferdam (a mound of cohesive materials)** Item covers: - Working in the water; - Excavation sludge from the bottom and the banks of the canal, removal aside and spreading after draining - Installation of geo textile at the bottom of the slopes, preparation for filling; - Quality and technology of geo textile is in accordance with the Technical Specifications				
	Calculation per m^3	m^3	95.00	0.00	0.00
3.1.2.	**Making of cofferdam body (embankment of coherent material) with integrated non-return valve and drain.** Item covers: - Working in the water; - Installation of a coherent material in the trough channel, spreading and compacting in layers, forming the body of cofferdam up to elevation 80.40 mnm, (298 m3); - Purchase and installation of corrugated pipes DN 1000 (segment length 15m) with downstream AB head (front wall in the double-sided plate 2x2x0,3 m, double reinforced Q335, 358 kg) and preparing for the installation of non-return valves (steel frame, all in accordance with the technical documentation); - Purchase and installation of irreversible 2 pieces of HDPE type damper DN 1000 in all according to the technical requirements - specifications; - Compaction of material around pipes; - Maintenance of slopes, the use of PVC film (300 m2) on the bottom of the slope; - Maintenance of earth cofferdam with the application of security measures of leakage and infiltration of water (use foil); - Making the protection of stone in the zone of the discharge, at the bottom of the slopes (total 120 m3, big stone min D 30).				
	Calculation per set. (works, materials, auxiliary materials, transportation) in accordance with the description and the given quantity	set	1.00	0.00	0.00
3.2.	**Preparation for the formation of a temporary drain - demolition of the embankment in the zone of gravitational drain (discharge pipe within the CS remains in operation) after the demolition of reinforced concrete structures in the body of the embankment** This Item has the character of risky work operations and is performed after cofferdam is formed and the written consent of the Engineer is obtained. Item covers: - Mechanical excavation of the embankment in the area of gravity drainage (discharge pipe within the CS remains in operation) until the completion of the new gravity sewers 2 DN1500 installed with HDPE dams; - Removal aside, move to the body of circumferential temporary embankment, depositing; - Material is subsequently used for reconstruction of the embankment.				

	Calculation per m^3	m^3	1,868.00	0.00	0.00
3.3.	**Preparation for making of temporary pipeline - digging a trench on the right bank of the canal, preparation for installation of pipelines** **Calculation per m3**				
	Mechanical excavation of longitudinal trench depth up to 3 m, with slope incline of 1: 1, leveling of trench bottom	m^3	1,870.00	0.00	0.00
	Purchase and installation of sandy material in the surface for laying of pipes (incoherent material from the river borrow pit) to the substrate tube; 260 mx1,5x0,5 m	m^3	195.00	0.00	0.00
3.4.	**The formation of new bed of the main canal in the floodgate zone. Temporary drain piping for draining of water from the canal "BITVA" DN1000 L = 260 m for the purpose of controlling the water drain during reconstruction** Item covers: - Installation of 2 PP corrugated pipes DN 1000 mm, connection of an integral socket, all in accordance with graphic details. - Purchase of PP corrugated pipes Quality CN 8 with integrated socket, transport to the construction site, temporary proper storage; Pipe properties: Pipe PP corrugated pipes for wastewater DN 1500 CN 8 in accordance with DIN 16961, USA 8 (according to ISO 9969), the connected socket integrated in the tube. The inner wall of the pipe must be designed for high-pressure cleaning (120 bars at the nozzle), the minimum wall thickness according to EN 13476th Material properties of pipes and fittings must meet the requirements of EN 13476th - Internal transport, installation in trenches in accordance with DIN EN 1610 and the manufacturer's instructions, to a preformed substrate, the designed decline, with geodetic control; - Geodetic control and reception by the Engineer - Application of protective measures for workers in the basic trench. - The Contractor shall obtain appropriate certificates for quality of building material - In accordance with the graphic documentation and standards for this type of work Length of temporary pipeline L = 260 m. **(The price includes materials, labor and additional material).** **The price includes materials, labor and additional material.**				
	Calculation of m ' of embedded pipes.	m'	260.00	0.00	0.00
3.5.	**Forming and maintenance of upstream cofferdam in the canal with capture to divert water from the canal** **Removing of cofferdam is covered by Item BoQ:**				

3.5.1.	**Preparation for the making of the upstream cofferdam (a mound of cohesive materials)** Item covers: - Working in the water - Excavation of sludge from the bottom and the banks of the canal, removal aside, spreading after draining - Installation of geo textile at the bottom of the slopes, preparation for filling.				
	Calculation per m^3	m^3	95.00	0.00	0.00
3.5.2.	**Making the body of upstream cofferdam (embankment of coherent material)** Item covers: - Working in the water, - Installation of a coherent material in the trough canal, spreading and compacting in layers, forming the body of cofferdam up to shore elevation (298 m3) - Purchase and installation of corrugated pipes DN 1000 (segment length 15m) for the project from the channel upstream of the cofferdam, - Maintenance of slopes, the use of PVC film (300 m2) on the bottom of the slope - Maintenance of earth cofferdam with the application of security measures of leakage and infiltration of water (use foil); - Making the protection of stone in the zone of the discharge, at the bottom of the slopes (total 120m3, big stone min D 30) **Calculation per set. (works, materials, auxiliary materials, transportation) in accordance with the description and the given quantity**				
	Calculation per set	set	1.00	0.00	0.00
SUMMARY E – I: TEMPORARY FACILITIES: FLOOD PROTECTION AND DRAINAGE OF BITVA CANAL DURING WORK					**0.00**

E-II	**PREPARING FOR MAKING OF NEW GRAVITY DRAIN**	**Unit**	**Quantity**	**Unit Price**	**TOTAL Without VAT**
	Security conditions in the dry zone in the future AB facilities of gravity drain **The Contractor shall adopt its own technology of maintenance of work in the dry (gravity and pumping), which is included in the price.**				
1	**Geodetic marking of the route and profile of the trench for installation of gravity drain pipes.** Item covers a set of work on marking, maintenance profile, geodetic control, built drawing				
	Calculation per set	set	1.00	0.00	0.00

2	**Trench excavation for the installation of a new gravity sewers - 2 corrugated pipes DN 1500** Item covers: - Mechanical - manual (70-30%) excavation of material, III and IV Categories for forming the trench in width 5.0 m, in defined boundaries, with removal aside for draining; - Support work; - Work in the wet environment (30%); - Loading and transport to the landfill, transport of up to 1.0 km.				
	Calculation per m^3	m^3	1,500.00	0.00	0.00
3	**Earthworks for the formation of the foundation pit for the installation of the RC (reinforced-concrete) filling facility in the gravity drain.** Item covers: - Mechanical manual (70-30%) excavation of material, III and IV categories on the banks and the riverbed canal for the base of the object to the designed depth, removal aside for draining; - Proper shoring of foundation trenches, with the use of protective measures; - Working in wet environment; - Loading and transport of dredged material to the landfill away up to 1 km after draining; - Unloading and moving up to 20 m on the side of the river; - Spreading material at the landfill with a final arrangement.				
	Calculation per m^3	m^3	250.00	0.00	0.00
4	**Earthworks for the formation of the foundation pit for the installation of the RC building parallel slide gate valve on the gravity drain.** Item covers: - mechanical manual (70-30%) excavation of material, III and IV categories on the banks and the riverbed canal for base of the object to the designed depth, removal aside for draining; - proper shoring of foundation trenches, with the use of protective measures, after written approval of Engineer - working in wet environment; - loading and transport of dredged material to the landfill away up to 1 km after draining - unloading, moving up to 20 m; - spreading material at the landfill with a final arrangement.				
	Calculation per m^3	m^3	550.00	0.00	0.00
SUMMARY E – II: PREPARING FOR MAKING OF NEW GRAVITY DRAIN					**0.00**
E-III	**PREPARING FOR THE CONSTRUCTION OF THE NEW PRESSURE PIPELINES PS KAL.REV**	**Unit**	**Quantity**	**Unit Price**	**TOTAL Without VAT**

1	**Earthworks for the formation of the foundation pit for the installation of the pouring object to thrust pipelines from the pumping station.** Item covers: - preparatory work in the riverbed to work on the protective revetments with minimal presence of water (temporary cofferdam, diversion of water); - mechanical manual (70-30%) excavation of material, III and IV categories on the banks and the riverbed canal for the base of the object to the designed depth, removal aside for draining; - proper shoring of foundation trenches, with the use of protective measures, after written approval of the Engineer - work in wet environment - loading and transport of dredged material to the landfill away up to 15 km after draining; - unloading, moving up to 20 m; - spreading material at the landfill with a final arrangement;				
	Calculation per m^3	m^3	550.00	0.00	0.00
SUMMARY E-III: PREPARING FOR THE CONSTRUCTION OF THE NEW PRESSURE PIPELINES PS KAL.REV					**0.00**

E-IV	FINAL WORKS IN THE ZONE OF NEW EVACUATION FACILITIES AT PS KAL.REV	Unit	Quantity	Unit Price	TOTAL Without VAT
1	**Backfill of constructed buildings around and above, and in front of the front wall of the facility to the designed elevation, excavation material, and filling channels above the elevation of the building carried out, the designed slope to terrain level in the protected area and foreland, all in accordance with the Design details.** Item covers: - Unloading of dredged material, internal transport to a depth of 3.0 m; - Mechanical and manual installation (80% vs. 20%), in the zone and through the embedded facility; - Filling is done in layers up to 30 cm and around the facilities. Ms=30 MPa.				
	Calculation per m^3	m^3	350.00	0.00	0.00

2	**Formation of the new embankment on the section of evacuation facilities.** Item covers: - Removal of deposited material at a distance up to 50 m, with spreading in layers of 30 cm along the route of the new embankment; - Compaction of built material by multiple crossing of transition mechanization tamping with the use of prescribed technical measures to achieve compaction (Ms = 30.0 MPa); - Incorporating must achieve the required compaction (Ms = 30 MPa). Compaction is carried out evenly over the entire width and length of the cant; - Geo mechanical control of layer compaction (thickness of each of the tested compacted layer), mandatory for every 100 m, and by special request of the Engineer). The costs of sampling and laboratory testing shall be borne by the Contractor. Material that is built into the embankment must satisfy the geotechnical characteristics of this type of work (clean, without vessels, humus or other organic material). The material is installed and compacted in accordance with the standards for this type of work Material is provided: from the existing embankment, deposited with temporary circumferential embankment from temporary circumferential dam, from borrow pits.				
	Calculation per m^3	m^3	19,100.00	0.00	0.00
SUMMARYE-IV: FINAL WORKS IN THE ZONE OF NEW EVACUATION FACILITIES AT PS KAL.REV					**0.00**
E-V	**REINFORCED CONCRETE WORKS WITHIN THE NEW EVACUATION FACILITIES**	**Unit**	**Quantity**	**Unit Price**	**TOTAL Without VAT**
1	Woven filler - pouring AB facility in the gravity outflow (base plate, frontal wing walls) Item covers: - Supply, transport and assembly and the subsequent dismantling of bilateral formwork with holes for the installation of pipelines in all, according to the given formwork plans; - Preparation for installation of standard mounting and a removable HDPE system; - Inspection and acceptance in the shell stage and after the construction is done by the Engineer.				
1.1.	**Concrete works on the installation of the filler-pouring facility**				
1.1.1.	**Creating a buffer layer** - Making a buffer layer of unreinforced concrete MB15 (thin concrete) thickness of 0.15 m below the lower slab (6.32 m3 / item).				
	Calculation per m^3 (6.32m3 x 2)	m^3	13.00	0.00	0.00

1.1.2.	**Creating AB inflow outflow facilities in the double-sided plate, according to the Design** Item covers: - Procurement, transportation to the site, internal transport and casting of concrete MB 30 (72 m3 / item); - Installation of concrete with the obligatory use of the additive for quality characteristics (plasticity without segregation, effectively achieving the required strength depending on weather conditions installation); - Topcoat visible surfaces of concrete hardener penetrator-equivalent to quality of "Evercrete" or better out features; - Proof of the quality of concrete, applied additives and coatings; - Curing all in accordance with the given formwork plans and standards for this type of work; The volume of concrete per object: a) lower plate MB30-filler outflow AB building V = 1 x 43.6 m3 b) side walls MB30-filler outflow AB building V = 2 x 8.6 m3 c) the front wall MB30-filler outflow AB building V = 1 x 11.2 m3				
	Calculation per m^3 (72.5 m^3x2)	m^3	145.00	0.00	0.00
1.2.	**Reinforcing works on the installation of the filler-pouring facility** - Procurement of reinforcement RA 400/500, processed according to the given specification, transport and installation of the formwork, all in accordance with the plan of reinforcement (3250.3 kg /object x 2); - Testing quality of embedded reinforcement - Cutting and welding of reinforced concrete - The Contractor is required to provide certificates for the quality of the built-in fittings - All according to planned reinforcement and under standards for this type of work (reinforcement bent cut and fitted V = 3250.3 kg x 2) Calculation per fully constructed building (materials, auxiliary materials, transportation, work)				
	Calculation per kg	kg	6,500.00	0.00	0.00
2	**Access AB staircase of outflow facilitiies (2 pcs)**				
2.1.	**Concrete work on the installation of the access stairway**				
2.1.1.	**Creating a buffer layer** Item covers -Making a buffer layer of unreinforced concrete MB15 (thin concrete) thickness of 0.15 m below the lower slab (1.31 m3 / item)				
	Calculation per m^3	m^3	3.00	0.00	0.00

2.1.2.	**Creating AB staircase, double-sided formwork everything to detail, the formwork plan and standards for this type of work** Item covers: - Reinforced concrete works on the installation of a set of accession stairs, as provided under the project; - Procurement, trucking and construction of a buffer layer of gravel thickness of 10 cm below the landing of the staircase; - Supply, transport and assembly and the subsequent dismantling of bilateral formwork; - Inspection and acceptance of shell performs Engineer during construction and after installation; - Procurement, transport to the site, internal transport and casting of concrete MB 30 (3.57 m3 / item); - Installation of concrete with the obligatory use of the additive for quality characteristics (plasticity without segregation, effectively achieving the required strength depending on weather conditions installation); - Proof of the quality of concrete, applied additives and coatings; - Curing.				
	Calculation per m^3 (2x4 m^3)	m^3	8.00	0.00	0.00
2.2.	**Reinforcement work on the installation of the access stairway** - Procurement of reinforcement RA 400/500 and 500/600 MA, processed according to the given specification, transport and installation of the formwork, all in accordance with the plan of reinforcement and graphic attachments (112.5 kg / facility); - Testing of quality of embedded reinforcement a) reinforcement RA 400/500 and 500/600 V MA = 112.5 kg / facility x 2 **Calculation per fully-built object (materials, auxiliary materials, transportation, work)**				
	Calculation per kg	kg	300.00	0.00	0.00
3	**Outlet AB object to thrust pipelines from pump stations (base plate, frontal and lateral wing walls)**				
3.1.	**Concrete works in the outflow AB facilities of pressure pipeline**				
3.1.1.	**Creating a tampon concrete layer** Item covers: - Making a buffer layer of unreinforced concrete MB15 (thin concrete) thickness of 0.15m below the lower slab (6.32 m3 / item)				
	Calculation per m^3	m^3	12.00	0.00	0.00

3.1.2.	**Concrete work on he installation of the pouring object to discharge pipe. Creating AB inflow outflow facilities, double-sided plating, in everything according to detail, planned formwork and standards for this type of work.** **Reinforced concrete work on the outflow facility for installation of 3 sets of steel pipes with a diameter according to the project, with the base plate, frontal and wing walls, as set in the project.** Item covers: - Procurement, transportation, installation and subsequent removal of double-sided formwork for frontal and side walls with holes for the installation of pipelines, all in accordance with this plan and details of the casing; - Inspection and acceptance of formwork is done by the Engineer in the drafting phase and after installation; - Procurement, transportation to the site, internal transport and casting of concrete MB 30 (86.9 m3 / item); - Installation of concrete with the obligatory use of the additive for quality characteristics (plasticity without segregation, effectively achieving the required strength dep - Topcoat visible surfaces of concrete with hardener penetrator; - Proof of the quality of concrete, applied additives and coatings; - Care of concrete surface, all in accordance with the given formwork plan and standards for this type of work; a) lower plate MB30-filler outflow AB building V = 1 x 43.6 m3 b) side walls MB30-filler outflow AB building V = 2 x 8.6 m3 c) the front wall MB30-filler outflow AB building V = 1 x 11.2 m3 b) side walls MB30-filler outflow AB building V = 2 x 8.6 m3 c) the front wall MB30-filler outflow AB building V = 1 x 11.2 m3 .				
	Calculation per m^3	m^3	87.00	0.00	0.00
3.2.	**Reinforcement work on the installation of the pouring object to discharge pipe** Procurement of reinforcement RA 400/500 and 500/600 MA, processed according to the given specification, transport and installation of the formwork, all in accordance with the plan of reinforcement; - Procurement of reinforcement RA 400/500 and 500/600 MA, processed according to the given specification, transport and installation of the formwork, all in accordance with the plan of reinforcement; - procurement of reinforcement RA 400/500, processed according to the given specification, transport and installation of the formwork, all in accordance with the plan of reinforcement and graphic attachments (5236.1 kg/object); - testing of quality of the embedded reinforcement reinforcement RA 400/500 and 500/600 V MA = 5236 kg. Calculation per fully - built object (materials, auxiliary materials, transportation, work)				
	Calculation per kg	kg	5,300.00	0.00	0.00

4	**Manipulative AB shaft of air valve at the crossing over the embankment pinch pipeline from PS.**				
4.1.	Concrete work on the installation of manipulative shaft air vent Item covers: - Purchase, transport, installation and subsequent removal of the formwork, in all according to the plan of formwork, with defined elevations of planned interruptions of concrete - Prior to placing concrete formwork, the Contractor shall provide reception; - Inspection and acceptance shall be performed by the Engineer during construction and after installation; - Procurement, transport to the site, internal transport and casting of concrete MB30; (34.5 m3 / piece) - Installation of concrete with the obligatory use of the additive for quality characteristics (plasticity without segregation, effectively achieving the required strength depending on weather conditions installation); During the installation of concrete, measures must be applied to control the placement connection Pressure mains 3 x DN1000. Duly interruption of fine concrete with control measures of angle interruption. - Proof of the quality of concrete and applied additives; - Curing all in accordance with the given plans of formwork and standards for this type of work a) lower plate AB manhole V = 16.5 m3 b) side walls AB manhole V = 8.5 m3 c) frontal walls AB manhole V = 7.9 m3 d) the upper plate AB manhole V = 1.6 m3 In total ~35m3				
	Calculation per m^3	m^3	35.00	0.00	0.00
4.2.	**Reinforcement work on the installation of manipulative shaft of air vent** - Procurement of reinforcement RA 400/500 and 500/600 MA, processed according to the given specification, transport and installation of the formwork, all in accordance with the plan of reinforcement; - procurement of reinforcement RA 400/500, processed according to the given specification, (1007.9) - testing of quality of the embedded reinforcement (reinforcement RA 400/500 and 500/600 V=1007.9 kg~1050 kg)				
	Calculation per kg	kg	1,050.00	0.00	0.00

5	**Sealing holes in buildingwalls on the part of the compound pipelines and the building of the wall** Item covers: - Procurement, transportation and installation of seals, according to the Project details, at the exit pinch piping from the outflow facility 3 X DN 1000 ; -Procurement, transportation and installation of seals, according to the Project details, the inlet and outflow piping from the actuating shaft air valve 3 X DN 1000 was performed; - Procurement, transportation and installation of seals, according to the Project details, the inlet and outflow of gravity pipelines 2 x DN 1500 PLUS - Inlet buildings in the gravity pipeline N = 2 x Ø1500 - Pouring buildings in the gravity pipeline N = 2 x Ø1500 - Pouring buildings in the suction line of N = 3 x Ø 1000 - Schacht air valve on suction line N = 6 x Ø 1000 **Calculation per complete** (materials, auxiliary materials, transportation, work)				
	Calculation per set	set	4.00	0.00	0.00
SUMMARY E – V: REINFORCED CONCRETE WORKS WITHIN THE EVACUATION FACILITIES					**0.00**
E-VI	**INSTALLATION WORKS WITHIN THE NEW EVACUATION FACILITIES**	**Unit**	**Quantity**	**Unit Price**	**TOTAL Without VAT**
1	**INSTALLATION WORKS ON CONSTRUCTION OF GRAVITY DRAINAGE OF BITVA CANAL**				

1.1.	**Making of gravity pipe discharge through the embankment on the location of the PS KAL.REV** Item covers: - Installation of 2 PP corrugated pipes DN 1500 mm, connection of an integral socket, all in accordance with graphic details; - Purchase of PP corrugated pipes Quality CN 8 with integrated socket, transport to the construction site, temporary proper storage; - Pipe characteristics: Pipe PP corrugated pipes for wastewater DN 1500 CN 8 in accordance with DIN 16961, USA 8 (according to ISO 9969), connected socket integrated in the tube; The inner wall of the pipe must be designed for high-pressure cleaning (120 bars at the nozzle), the minimum wall thickness according to EN 13476th. Material properties of pipes and fittings must meet the requirements of EN 13476th - Internal transport, installation in trenches in accordance with DIN EN 1610 and the manufacturer's instructions, to a preformed substrate, the designed decline, with geodetic control; - Geodetic control and reception by the Engineer; - Application of protective measures for workers in the basic trench; - The Contractor shall obtain appropriate certificates for quality building material; - In accordance with the graphic documentation and standards for this type of work Pipeline length L = 2 x 46 m **Calculation per m' of embedded pipes.** **(The price includes materials, labor and additional material).**				
	Calculation per m'	m'	92.00	0.00	0.00
1.2.	**Production of welded metal structures - frames for prefabricated system tablets HDPE constitution DN1500 on the filler outflow facility of gravity drainage canal „Bitva – PS KAL.REV"** Item covers: - Making of the steel frame of a square tube with dimensions according to the draft; - Proper corrosion protection frame (epoxy surface protection: basic and final tar epoxy, or others of the same or better quality) - Installation (welding) of anchor bolts - Anchors with nuts and washers, and optimization of the specifications of the floodgate supplier - Delivery and precise installation of the frame into the lining of the front wall of the pouring of the object (before concreting) for mounting of standard HDPE systems: parallel slide gate valves DN 1500 PLUS. - The Contractor shall obtain appropriate certificates for quality building material - In accordance with the graphic documentation and standards for this type of work				
	Calculation per piece	pcs	4.00	0.00	0.00

1.3.	**Supply and installation of prefabricated HDPE systems: table HDPE floodgate DN 1500, all in accordance with the detailed description, drawings and specifications of the floodgate supplier** Item covers: - Procurement of standard HDPE assembly-parallel slide gate valves DN 1500; -Bearing panel of floodgate PE-300. The drive unit of stainless steel (coil control without stall wedge with a handle); Sealing with double EPDM gasket. -The delivery has to be followed with a certificate of factory testing in accordance with DIN EN 10204 - 2.3 (including the confirmation of the raw materials used, the degree of 2.2, a certificate of completion of the inspection of safe compounds according to DVS 2206 - 3.3.1.4 and certificate of competence of employees welders DVS 2212); - Installation - installation on previously prepared anchors embedded within the frame of the front wall of the pouring facilities. **Calculation per piece (a set of materials, work and additional material).**				
	Calculation per piece	pcs	4.00	0.00	0.00
2	**INSTALLATION WORKS ON THE PRESSURE PIPELINE PS KAL.REV**				
2.1.	**Making of thrust pipeline from CS, with the transition over the embankment.** Item covers: - Procurement of steel pipes DN 1000 mm externally coated with polyethylene and with epoxy resin on the inside coating, according to the designed scheme, description, technical requirements and specification - Trial filling, placing under pressure, test and discharge of pipelines; - Drafting minutes of its accuracy; - Test on the internal installation; - In accordance with the graphic documentation and standards for this type of work (Set of work, materials and auxiliary materials). **Calculation per kg** (total 44.536,07)				
	ITEM No. 1: Steel reduced piece L= 1000 mm DN 1016 /914,4 mm s 11,0 mm, Pieces	kg	3,822.00	0.00	0.00
	ITEM No. 11: Steel segment arch R 1,5 d DN 1016 mm ά=45 s 11,0 mm , Pieces 4,	kg	1,755.00	0.00	0.00
	ITEM No. 3: Steel connecting piece (tube) L= 664 mm DN 1016 mm, s 11,0 mm, Pieces 2,	kg	365.00	0.00	0.00
	ITEM No. 2: Steel connecting piece (tube) L= 4682 mm DN 1016 mm s 11,0 mm, Piece 1,	kg	1,310.00	0.00	0.00

	ITEM No. 4: Steel connecting piece L= 1481 mm DN 1016 mm s 11,0 mm,	kg	2,850.00	0.00	0.00
	ITEM No. 10: Steel segment arch R 1,5 d DN 1016 mm s 11,0 mm, Pieces 12,	kg	4,670.00	0.00	0.00
	ITEM No. 5: Steel connecting piece (tube) L= 19545 mm DN 1016 mm s 11,0 mm, Pieces 3,	kg	16,310.00	0.00	0.00
	ITEM No. 8: Steel connecting piece (tube) L=2500 mm DN 1016 mm s 11,0 mm flanged NP 6, Pieces 3,	kg	2,100.00	0.00	0.00
	ITEM No. 6: Steel connecting piece (tube) L= 2684 mm DN 1016 mm s 11,0 mm, Pieces 3,	kg	2,270.00	0.00	0.00
	ITEM No. 7: Steel connecting piece (tube) L= 13095 mm DN 1016 mm s 11,0 mm, Pieces 3,	kg	10,950.00	0.00	0.00
	ITEM No. 9: Steel connecting piece (tube) with welded flange, L= 3346 mm DN 1016 mm, s 11,0 mm, Pieces 3,	kg	3,220.00	0.00	0.00
2.2.	**Making of welded metal assemblies-frames for prefabricated system HDPE damper DN 1000, the outflow end of the pressure pipeline, all in accordance with the graphic details of the project.** Item covers: - Production of steel frame of a square tube 100 x 40 x 4 mm, external dimensions of 1,250 x 1,250 mm; including diagonal angle steel filling, weighing 52 kg. - Proper corrosion protection epoxy resin base layer final layer; - Assembling (welding); - Anchors M16, quality 8.8 (pcs 20, L = 250 mm, with nuts and washers); - Delivery and precise installation of the formwork of the front wall of the pouring of the object (before concreting) for mounting of standard HDPE; - System non-return valves DN1000; - The Contractor shall obtain appropriate certificates for quality building material; - In accordance with the graphic documentation and standards for this type of work. **Calculation per set: mounted kit - pieces (kit materials, work and auxiliary materials, anti-corrosion coatings).**				
	Calculation per set	set	3.00	0.00	0.00

2.3.	**Supply and installation of prefabricated HDPE systems: the grants HDPE damper DN 1000 all in accordance with the detailed description.** Item covers: - Procurement of prefabricated flap, non-return valves DN1000 The body flap of HDPE pipe bends a solid wall, in accordance with DIN 16961, diameter at least 1.200 mm. Platens, together with all necessary mounting brackets, reinforcements of PE-300 with ≥ 30 mm, with inserted and replaceable seal of EPDM. Weight tare and prefabricated stainless steel shaft, fully insulated jacket made of PE-HD. Sealing double EPDM gasket. - Certificate of testing in accordance with DIN EN 10204 - 2.3 (including the confirmation of the raw materials used, the degree of 2.2, a certificate of completion of the inspection of safe compounds according to DVS 2206 - 3.3.1.4 and certificate of competence of employees welders DVS 2212). - Installation - installation on previously prepared anchors embedded within the frame under the front walls of outflow facilities. **Calculation per set: mounted kit - pieces (kit materials, work and auxiliary materials, anti-corrosion coatings).**				
	Calculation per set	set	3.00	0.00	0.00
3	**INSTALLATION WORKS ON SHAFTS AIR VENT**				
3.1.	**Installation of cast iron ladders in AB shaft wall of air valves** Item covers: - Procurement, transport and installation of standard cast iron ladders; - Preparation for installation; - The Contractor shall obtain appropriate certificates for quality of building material; - In accordance with the graphic documentation and standards for this type of work.				
	Calculation per piece.	pcs	27.00	0.00	0.00
3.2.	**Installation of standard cover DN 600 on the revision of air valve shaft.** Item covers: - Procurement and transportation of cast iron frames with lids - assembling the cast iron frame and cover, proper AK protection; - The Contractor shall obtain appropriate certificates for quality of building material - In accordance with the graphic documentation and standards for this type of work (a set of materials, labor and additional material).				
	Calculation per piece.	pcs	3.00	0.00	0.00

3.3.	**Supply, transport and installation of cast - iron reinforcement in the shaft air valve, according to the designed schedule and according to specification.** Item covers: - Procurement and installation of the intake / exhaust air valves pcs.3 DN 150, according to the designed schedule and specification; - Installation test; - Set of work, materials and auxiliary materials, according to the Items and the specification.				
	Calculation per piece.	pcs	3.00	0.00	0.00
SUMMARY E –VI: INSTALLATION WORKS ON PRESSURE PIPELINE PS KAL.REV					**0.00**
E-VII	**FINAL WORK - REMOVAL OF TEMPORARY FACILITIES FOR FLOOD PROTECTION AND DRAINAGE OF WATER FROM THE CANAL BITVA**	**Unit**	**Quantity**	**Unit Price**	**TOTAL Without VAT**
1	**Removing temporary circumferential protective embankments. Some of the material shall be used to build a new embankment in the zone CS KAL.REV. and one part shall be disposed on a landfill.** - Mechanical excavation of material from the upstream cofferdam in the canal with direct loading and transportation to the landfill 15 km, unloading.				
	Calculation per m^3	m^3	298.00	0.00	0.00
2	**Removing the temporary pipeline PEHD- corrugated DN1000, dismantling of non-return valves.** - Loading and transportation up to 15 km, unloading and proper disposal at the site PS Kočin Kanal. Trench backfill with material from the circumferential temporary embankment, compaction in layers.				
	Calculation per m	m	290.00	0.00	0.00
3	**Final landscaping after the removal of temporary facilities. Flattening with leveling.**				
	Calculation per m^2	m^2	1,500.00	0.00	0.00
SUMMARY E – VII: FINAL WORK - REMOVAL OF TEMPORARY FACILITIES FOR FLOOD PROTECTION AND DRAINAGE OF WATER FROM THE CANAL BITVA					**0.00**
SUMMARY E : RECONSTRUCTION OF EVACUATION FACILITIES OF CANAL BITVA (KM 0 + 000) - GRAVITY DRAINAGE OF CANAL BITVA AND PRESURE PIPELINE PS KAL.REV					**0.00**
F	**CONSTRUCTION OF THE FILTRATION PROTECTION** CRITICAL SECTION 1 (km 18 + 600 : 19 + 087) , CRITICAL SECTION 2. (zone CS KAL.REV)				
F-I	**PRELIMINARY WORKS FOR MAKING FILTRATION PROTECTION**	**Unit**	**Quantity**	**Unit Price**	**TOTAL Without VAT**
1	**Preparation of the route for the installation of underterrain vinyl diaphragm (PVD)**				

1.1.	Geodetic marking of the designed route and share the trench PVD and area necessary for the operation of specialized machinery (earthen platform), alignment crown PVD, control recording baseline control during the preparation of PVD. Item covers a complete geodetic work with the Engineer: - Renewal of geodetic alignment elements PVD, marking the boundaries of work zone (platforms), highlighting profiles in the field of printing numbers profiles, security profiles and renewed geodetic points; - Geodetic survey initial state share of the trench and a platform for the installation of PVD is subject to a field control by the Engineer; - Geodetic monitoring of level crown PVD; - Recording the opening situation of share trench and a platform for the installation of PVD is subject to a field control by the Engineer. **Calculation per m'.**				
	1) CRITICAL SECTION 1. (km 18+600 : 19+087, 487m):	m'	487.00	0.00	0.00
	2) CRITICAL SECTION 2. (zone PS KAL.REV)	m'	195.00	0.00	0.00
1.2.	**Geodetic marking of the designed route and share the trench PVD and area necessary for the operation of specialized machinery (earthen platform), alignment crown PVD, control recording baseline control during the preparation of PVD.** Item covers: - Renewal of geodetic alignment elements PVD, marking the boundaries of work zone (platforms), highlighting profiles in the field of printing numbers profiles, security profiles and renewed geodetic points; - Developing a working platform for specialized machinery, compacting the existing subsoil and the buried material from the underlying trench PVD, in layers, with control testing (requested compactness of Ms=30 Mpa) - Maintaining alignment, size and form of the share of the trench and working platform. Security conditions in the dry. - Price should cover a set of work, control works in all things according to the description. **Calculation per m3**				
	1) CRITICAL SECTION 1. (km 18+600 km 19+087, 487 m):	m^3	3,900.00	0.00	0.00
	2) CRITICAL SECTION 2. (zone PS KAL.REV)	m^3	1,350.00	0.00	0.00

1.3.	**Geological profiling of underterrain vinyl diaphragm, control of geological cross-sections (a total of 12 wells, 12 m depth) along the route PVD, distribution, and Item in accordance with the technical documentation.** Item covers: - Geodetic marking of locations along the route of the share of the trench PVD; - Mobilization of equipment, preparation for drilling, drilling, sampling all layers; - Laboratory testing of all samples with the report of a specialized laboratory (grain size distribution, cohesion, internal friction angle, compressibility, coefficient of filtration). Report to define the depth of the layer with low filtration coefficient. Decision on changing the alignment of the crown and the bottom PVD brings the Employer, the Contractor upon request and with the consent of the Engineer; - Set of work, all in accordance with the description - Calculation per piece of constructed and tested wells (h = 12 m)				
	1) CRITICAL SECTION 1. (km 18+600 km 19+087, 487 m):	pcs	12.00	0.00	0.00
	2) CRITICAL SECTION 2. (zone PS KAL.REV)	pcs	5.00	0.00	0.00
1.4.	**Final earthwork in PVD Zone, after PVD installation.** Items covers: - Mechanical backfilling of the trench share PVD, excavation of cohesive material from an existing dam, spreading by hand around the built-in vinyl diaphragm - Mechanical compaction of material around and above the built-in vinyl diaphragm, in layers, with control testing at every 0.5 m of the compacted layer. (The Contractor must apply only lightweight equipment for compaction with the aim to protect the diaphragm from damage). - Final control of compaction of the superficial layer of foundation pit and aerial platforms - subsoil screen dikes and working platforms. **Calculation per m3**				
	1) CRITICAL SECTION 1. (km 18+600 km 19+087, 487 m):	m^3	3,900.00	0.00	0.00
	2) CRITICAL SECTION 2. (zone PS KAL.REV)	m^3	1,560.00	0.00	0.00
SUMMARY F – I: PRELIMINARY WORKS FOR MAKING FILTRATION PROTECTION					**0.00**

F-II	CONSTRUCTION OF THE FILTRATION PROTECTION	Unit	Quantity	Unit Price	TOTAL Without VAT
1	**Construction of the Vinyl Underterrain Diaphragm (H = 7.7 m): compression of certified vinyl planks on the designed route to the designed depth**				

1.1.	- Getting Vinyl planks PVD (H = 7.7 m) designed technical characteristics, delivery to site, proper disposal; '- Vinyl planks must be certified, with technical characteristics in accordance with ISO 9001: 2008 id 9,105,076,957 (Density: min1400 kg / m3; tensile strength: ≥ 40 MPa Bending strength of: ≥ 65 MPa (before / after thermal aging at required temperature 0C and time duration); '- Tensile / elasticity bending modulus: ≥ 2,500 MPa; Resistance of climatic aging at required parameters, proven by tests required methods); - The designed area of PVD: CRITICAL SECTION 1. (H=7,7 m, 487 m; in total 3896 m2 x 1,1 ~ 4125 m2); CRITICAL SECTION 2. (zone CS KAL.REV) (H=7,7 m, 195 m; in total 1501 m2 x 1,1 ~ 1651 m2 ; **Calculation per m2** of built-PVD to depths ordered Engineer - In accordance with the report on control of geological profiles (item DI 1.4.)				
1.1.1.	**CRITICAL SECTION 1. (km 18+600 km 19+087, 487m):**	m^2	4,130.00	0.00	0.00
1.1.2.	**CRITICAL SECTION2. (zone PS KAL.REV)**	m^2	1,655.00	0.00	0.00
1.2.	**Installing Vinyl planks. Extra manpower, specialized equipment, equipment installation and auxiliary equipment and materials at Contractor's choice.** Item covers: - Insurance of line installation VINYL planks - making guides, geodetic control leveling and alignment; - Internal transport (delivered to the site, temporary storage); - Mechanical installation of Vinyl planks per prescribed technology, hiring specialized machinery and adequate equipment for installation. **Calculation per m2 performed PVD**				
1.2.1.	**CRITICAL SECTION 1. (km 18+600 km 19+087, 487 m):**	m^2	4,125.00	0.00	0.00
1.2.2.	**CRITICAL SECTION 2. (zone CS KAL.REV)**	m^2	1,655.00	0.00	0.00
2	**CRITICAL SECTION 2. (zone CS KAL.REV) Waterproof (VDP) connection with PVD circulation tunnel (2 x DN1500) and discharge pipelines (3 x DN1000)**				
2.1.	**Making of holes in the body underterrain Vinyl diaphragm in zone of penetration of circulating tunnel** (Corrugated pipes 2DN1500) and pressure pipeline (steel pipe 3 DN 1000). - Dimensions of openings must allow the installation of pipelines and VDP compounds with PVD. **Calculation per set** of complete finished job.				
	Calculation per set	set	1.00	0.00	0.00

2.2.	**Making holes in the body of underterrain Vinyl diaphragm zone penetration circulating tunnel** (Corrugated pipes 2DN1500) and pressure pipeline (steel pipe 3 DN 1000). - Slot size must allow the installation of pipelines and VDP compounds with PVD. **Calculation per set of complete finished job**				
	Calculation per complete finished job	set	1.00	0.00	0.00
SUMMARY F-II: MAKING OF FILTRATION PROTECTION					**0.00**
SUMMARY F.: CONSTRUCTION OF THE FILTRATION PROTECTION					**0.00**

G	RECONSTRUCTION OF HYDROLOGICAL STATION ŠABAC	Unit	Quantity	Unit Price	TOTAL Without VAT
1	**Construction of a new hydrological monitoring stations with equipment for continuous measurement, digital recording and transmission of data on changing water levels in the rivers that runs on a pneumatic principle ("bubble system"), all in accordance with the standards of RHMSS (approval and surveillance RHMS Serbia)**				
1.1.	**Creating AB staircase width 2.00 m and accessories hydrological measuring stations.** Item covers: - Preparatory earthworks-manual excavation for the foundation and slab stairs (5.80 m3 / site); - Installation of buffer layer of gravel d=15 cm (1.9 m3); - Preparation of double-sided formwork for the foundation and dimensions and panel staircase d=20 cm in all according to the formwork plan; - Procurement of reinforcement GA 240/360 for foundations and Q335; - Procurement, transport to the site, trucks MB30 5,80 m3; - Installation of concrete with the obligatory use of the additive for quality characteristics (plasticity without segregation, effectively achieving the required strength depending on weather conditions installation); - Making the final layer of concrete stair treads paths from three fraction grained concrete MB30, d=10 cm reinforced with steel mesh Q131, with the use of additives, fibrin, air entraining admixtures, Peel; - Finishing visible surface decorative pressed customers choice double protective coating; - Preparation of AB block anchor 80x80x100 cm (MB30) to set the metal cover and the stairs to the solar panel;				

	- Procurement, transport and installation of PVC hose Ø50 mm, L=15 m, to accommodate the cable and / or inlet hose; - Procurement, transport and installation of U16 steel profiles; - Procurement, transport and installation of the water meter strips of hair that are placed on the U16 steel profile; - Procurement, transport and installation of metal stairs of length L=6 m diameter which ensures the stability of the solar panel mounted on the top of the stairs; - Procurement, transport and installation of metal shelter for devices with protection from weather conditions and unscrupulous citizens; - Final work and protection against corrosion of all metal parts; - Manual assembly work with geodetic control; - Proof of the quality of concrete, applied additives and coatings; - Curing Unit price includes all necessary materials, labor, machinery and auxiliary materials for high-quality execution of work.				
	Calculation per set of completed work.	set	1.00	0.00	0.00
1.2.	**Supply, transport and installation of equipment for continuous measurement, digital recording and transmission of data on changing water levels on the river that runs on a pneumatic principle ("bubble system"), all in accordance with the standards of the Hydrological Meteorological Institute of Serbia.** Item covers: - procurement, transportation and installation of equipment in accordance with technical requirements and according to the following specifications: - A sensor that responds to the hydrostatic pressure; - Small pump / air compressor power min. 1.5 W and a flow rate of min. 2 l / s, with a system for dehumidification and air filtration; - Integrated 16 bit data logger; - Equipment for the transfer of registered data and on-line communication with the sensor and data logger - GSM / GPRS modem for installation in the field; - Equipment for power supply with solar panels, a charging controller for solar panels; - Housing for storing components with IP66 protection for mounting on the wall. Unit price includes: all hardware, all necessary materials, labor, machinery and auxiliary materials for high-quality performance, with compulsory presence of the RHMSS during installation.				
	Calculation per completely performed work.	set	1.00	0.00	0.00
SUMMARY G: RECONSTRUCTION OF HYDROLOGICAL STATION ŠABAC					**0.00**
II	**MAKING "AS BUILT" DESIGN OF COMPLETED FACILITIES**	**Unit**	**Quantity**	**Unit Price**	**TOTAL Without VAT**

1	**DESIGN OF BUILT RIGHT SHORE EMBANKMENT ON THE RIVER SAVA (km 18 + 030 : km 23 + 100; km 7+000:km 18+030)** Item covers: - Field geodetic control works - Creating a Design of built embankments, service roads surrounding the embankment, ramps and irrigation canal Kalenića Revenica				
	Calculation of complete made documentation	set	1.00	0.00	0.00
2	**DESIGN OF BUILT ACCESS ROADS** Item covers: - Field geodetic control works - Creating a design of built access roads and traffic signs				
	Calculation of complete made documentation	set	1.00	0.00	0.00
	SUMMARY H: MAKING "AS BUILT" DESIGN OF COMPLETED FACILITIES				**0.00**

1	**WORKS, MEASURES AND RESOURCES FOR THE PERIOD OF HIGH WATER**	**Unit**	**Quantity**	**Unit Price**	**TOTAL Without VAT**
1	**PREPARATION: FORMING OF TEMPORARY OBSERVATION POSTS FOR THE NEEDS OF FLOOD CONTROL** Item covers: - Supply, transportation and installation of certified water measuring laths, height H: 8 m, VL				
	Calculation per piece	psc	2.00	0.00	0.00
2	**Temporary emergency closing of the holes in the embankment in case of a declaration of extraordinary defense.**				
2.1.	**Earthworks. Closing of holes along the embankment (10 cassettes along the route, 2 holes per cassette, 100 m3 per opening, a total of 2,000 m3)** Item covers: - Preparation of openings for the proper installation of new substances, incising batter; - Excavation of material from temporary landfills along the route, removal aside, moving up to 50 m; installation, layered with multiple crossings, to the crown of the embankment				
	Calculation per m^3	m^3	2,000.00	0.00	0.00
2.2.	**Deployment of mechanization during emergencies, by special order of the Engineer, in accordance with the command of General manager of flood control (PWMC "Srbijavode").** Calculated by the hour of engagement, recorded by the Engineer. Price covers work per hour of mechanization and the person who operates it (1 earthmover, 3 shifts)				

	1. Hydraulic excavator with classic boom (140 hp)	h	100.00	0.00	0.00
	2. Tracked excavator with classic boom (100 hp)	h	100.00	0.00	0.00
	3. Long reach excavators	h	100.00	0.00	0.00
	4. Bulldozer (150 hp)	h	100.00	0.00	0.00
	5. Bulldozer (100 hp)	h	100.00	0.00	0.00
	6. Dump Truck (210 hp)	h	100.00	0.00	0.00
	7. Loader (200 hp)	h	100.00	0.00	0.00
2.3.	**Material for flood defense** Price covers: Procurement, transport and temporary storage in the warehouse (CS Kočin Kanal), security. Installation is paid separately. The material is installed by order of the the Engineer, at critical locations where flood protection is conducted. If not used, the material is submitted using minutes to PWC "Srbijavode" **Calculation per pieces and m2**				
	Jute bags	pcs	5,000.00	0.00	0.00
	PE bags	pcs	10,000.00	0.00	0.00
	PVC foil	m^2	10,000.00	0.00	0.00
	Geo textile (specifications in accordance with technical requirements)	m^2	2,000.00	0.00	0.00
SUMMARY I: WORKS, MEASURES AND RESOURCES FOR THE TIME OF HIGH WATER					**0,00**
	TOTAL: Without VAT: EMERGENCY RECONSTRUCTION WORKS FLOOD PROTECTION SYSTEM „MAČVA: SAVA – DRINA", EAST ZONE Section 1: DRENOVAC - ČEVRNTIJA Reconstruction of the right embankment of the Sava River(km: 18+030 to km: 23+100) A+B+C+D+E+F+G+H+I				**0.00**

	RECAPITULATION	
	EMERGENCY RECONSTRUCTION WORKS PROTECTION SYSTEM „MAČVA: SAVA – DRINA", EAST ZONE DRENOVAC - ČEVRNTIJA right embankment of the Sava River(km: 18+030 to km: 23+100)	**FLOOD Section 1: Reconstruction of the**
A	**PREPARATORY WORKS**	
A-I	PREPARATORY WORKS FOR THE RECONSTRUCTION OF EMBANKMENT (EMBANKMENT AND SURROUNDING AREA)	0.00
A-II	PREPARATORY WORKS FOR REHABILITATION OF EXISTING ACCESS ROADS ON SECTION (km 18+030: km 23+100: L = 4,571 m) AND OF ROAD ON THE CROWN OF DOWNSTREAM SECTION OF EMBANKMENT (km 7+000: km 18,030: L=11,030 m)	0.00
A-III	PREPARATORY WORKS FOR REHABILITATION OF IRRIGATION CANAL BITVA	0.00
A-IV	PREPARATORY WORKS FOR RECONSTRUCTION OF EVACUATION FACILITIES IN THE ZONE OF PS KAL.REV. AND IN THE ZONE OF ABANDONED PS CEVRNTIJA	0.00

A-V	PREPARATORY WORKS FOR EXECUTION OF RISKY WORK OPERATIONS	0.00
	TOTAL A:	**0.00**
B	**RECONSTRUCTION OF THE EMBANKMENT**	
B-I	CONSTRUCTION OF THE EMBANKMENT BODY (SCREEN AND BALLAST)	0.00
B-II	REHABILITATION OF EXISTING SERVICE ROADS, PARTIALY RECOVERED DURING FLOOD DEFENSE ACTIVITIES IN MARCH 2016.	0.00
B-III	CONSTRUCTION OF LOADING RAMPS (13 pcs)	0.00
B-IV	EMBANKMENT CHAINAGE BENCHMARKS AND CONSTRUCTION OF EMBANKMENT GATES	0.00
B- V	TEMPORARY LONGITUDINAL FLOOD DEFENSE DIKE	0.00
	TOTAL B:	**0.00**
C	**REHABILTATION OF EXISTING FLOOD DEFENSE ACCESS ROADS Section km:18+030;23+100, Downstream Section km: 8+950;18+030)**	
	TOTAL C:	**0.00**
D	**REHABILITATION OF IRRIGATION CANAL BITVA (KM 0+000:1+036)**	
D-I	EARTHWORKS	0.00
D-II	PROTECTION OF CANAL BITVA SLOPES	0.00
	TOTAL D:	**0.00**
E	**RECONSTRUCTION OF EVACUATION FACILITIES OF CANAL BITVA (km 0 + 000) - GRAVITY DRAINAGE OF CANAL BITVA AND PRESURE PIPELINE PS KAL.REV**	
E-I	TEMPORARY FACILITIES: FLOOD PROTECTION AND DRAINAGE OF BITVA CANAL DURING WORK	0.00
E-II	PREPARING FOR MAKING OF NEW GRAVITY DRAIN	0.00
E-III	PREPARING FOR THE CONSTRUCTION OF THE NEW PRESSURE PIPELINES PS KAL.REV	0.00
E-IV	FINAL WORKS IN THE ZONE OF NEW EVACUATION FACILITIES AT PS KAL.REV	0.00
E-V	REINFORCED CONCRETE WORKS WITHIN THE NEW EVACUATION FACILITIES	0.00
E-VI	INSTALLATION WORKS WITHIN THE NEW EVACUATION FACILITIES	0.00
E-VII	FINAL WORK - REMOVAL OF TEMPORARY FACILITIES FOR FLOOD PROTECTION AND DRAINAGE OF WATER FROM THE CANAL BITVA	0.00
	TOTAL E:	**0.00**
F	**CONSTRUCTION OF THE FILTRATION PROTECTION CRITICAL SECTION 1 (18 + 600 19 + 087) , CRITICAL SECTION 2. (zone CS KAL.REV)**	
F-I	PRELIMINARY WORKS FOR MAKING FILTRATION PROTECTION	0.00
F-II	MAKING OF FILTRATION PROTECTION	0.00
	TOTAL F:	**0.00**
G	**RECONSTRUCTION OF HYDROLOGICAL STATION ŠABAC TOTAL G:**	**0.00**
H	**MAKING "AS BUILT" DESIGN OF COMPLETED FACILITIES TOTAL H:**	**0.00**

I	WORKS, MEASURES AND RESOURCES FOR THE PERIOD OF HIGH WATER TOTAL I:	0.00
	TOTAL Without VAT: EMERGENCY RECONSTRUCTION WORKS FLOOD PROTECTION SYSTEM „MAČVA: SAVA – DRINA", EAST ZONE Section 1: DRENOVAC - ČEVRNTIJA Reconstruction of the right embankment of the Sava River(km: 18+030 to km: 23+100) A+B+C+D+E+F+G+H+I	0.00
	VAT (20%)	0.00
	TOTAL including VAT:	0.00