BILL OF QUANTITIES
MAIN DESIGN OF LANDSLIDE REMEDY
ON THE STATE ROAD OF II A CLASS NO 170, SECTION: SEDLARE - DEBELO BRDO,
from km 14+960 to km 14+978, ID-3732

No	WORKS DESCRIPTION	Unit	Quantity	Unit price	Total USD
	I PRELIMINARY WORKS				
1	Forming of construction site, construction and installation of temporary structures, delivery and mounting of ancilliary facilities and equipment, etc.	lump sum	1.00		
2	Surveying - pegging of road surfaces, elementary and detailed bench marks, with marking protocol.	lump sum	1.00		
3	Felling of trees, clearing of undergrowth and small vegetation.	lump sum	1.00		
4	Demolition of pavement, transportation and excavation, damaged surface: 56.96 m2	m²	56.96		
5	Demolition of asphalt surfacing 7cm with transportation up to 3km, surface: 3*40-57=63 m2	m²	63.00		
			TOTAL:		

II EARTH AND DRAINAGE WORKS					
6	Bulk excavation of soil from second to fourth category for the purpose of replacement of deformed and waterlogged ground on the landslide. Excavation is to be done 100% mechanically, with an excavator or bulldozer. Transportation of excavated ground to adisposal, determined by the Supervisor to a distance of up to 2 km. This position covers the work in wet conditions. The disposal is to be done in layers of 40 cm and partially compacted. Calculation per m3 of excavated material.	m3	1,100.00		
7	Ecavation for the purpose of construction of drainage trenches, manhole and foundations in the soil of second to fourth category, 80% mechanically, 20% manually, with supporting of trenches with strong timber. The excavation of trenches involves work in wet and damp soil with possible pumping of water. Excavated soil is to be transported to a disposal at a distance of up to 2 km. The disposal is to be done in layers of up to 40 cm and partially compacted. Calculation per m3 of excavated material.	m3	151.79		
8	Supply, transportation and incorporation of drainage material from crushed stone with the grain size of 10-25cm of continuous granulation fully in accordance with the design. Calculation per m3 of incorporated material.	m3	7.70		
9	Construction of embankment from rock rubble, partially from excavation, without adding clay, which has the internal friction angle of $\phi \geq 30°$. Compaction is to be done in layers of 30cm - with 100% compaction by Proctor	m3	1,300.00		
10	Construction of bearing parts of the pavement according to SRPS U.E4.014.Subgrade from crushed stone aggregate of 0/63mm (35cm thickness). Levelling of layers with a grader, with manual repair and rolling with vibrating rollers. 57*1.35*0.35=	m3	26.93		

11	Construction of the bearing layer from crushed stone aggregate of 0/31mm (d=25cm). Levelling of layers with a grader, with manual frepair and rolling with vibrating rollers. 57*1.35*0.25	m3	19.24		
12	Construction of the upper bitumenous base course from BNS 32 with the thickness of 7cm according to SRPS U.E4.014	m2	57.00		
13	Construction of the wearing course of asphalt concrete from AB 11 with the thickness of 5cm according to SRPS U.E4.014.	m2	240.00		
14	Supply, transportation and incorporation of non-woven geotextile of the type 300 (300gr/m2) as a filter drainage layer in behind the retaining wall. Calculation per m2 of incorporated material.	m2	323.00		
15	Construction of a clay cap from a layer of compacted clay with the thickness of 20cm. Calculation per m3 (91.74+10.3)*0.2=	m3	18.32		
16	Topsoiling of slopes, shoulders and berms in the layer of 20cm mixed with grass seed.	m2	1,628.47		
17	Paving of earthen canals with crushed stone in a 25cm thick layer with sealing of the joints with cement mortar in the ratio 1:3. The price includes the supply and transportation of crushed stone, cement mortar and construction of paving. - 4.0*64m+3.21*(34.81+12.46+10.58) - pit - appox. 600m2	m2	856.00		
18	Making of gabions, the price includes the supply of galvanized wire, making of gabion cage from galvanized wire and filling from crushed stone - lime stone	m3	290.00		
			TOTAL:		

III CONSTRUCTION WORKS					
1	Construction of gutters from asphalt with the thicknes of 6cm and width of 50cm with gray prefabricated curb 18/24	m1	44.50		
2	Construction of open concrete canal from MB30, M-150. The item involves concreting, supply and incorporation of mesh reinforcement along the middle with necessary formwork.	m1	21.67		
			TOTAL:		
V TRAFFIC SIGNALIZATION AND ROAD FURNITURE					
1	**Horizontal signalization**				
	White unbroken line with the width of 0.12m	m2	5.88		
2	**Road furniture**				
	Guard rail N2W5	m	56.00		
	Oblique gurad rail endinngs N2W5 L=12m	pcs	1.00		
	Reflective studs (catadiopters)	pcs	6.00		
	Removal of the existing gurad rail	m	56.00		
3	**Temporary traffic signalization**	lump sum	1.00		
			TOTAL:		

SUMMARY:

GROUP OF WORKS	**TOTAL**	
I PRELIMINARY WORKS		
II EARTH AND DRAINAGE WORKS		
III CONCRETE WORKS		
IV TRAFFIC SIGNALIZATION AND ROAD FURNITURE		
TOTAL:		

BILL OF QUANTITIES
MAIN DESIGN OF LANDSLIDE REMEDY
ON THE STATE ROAD OF II A CLASS NO 170, SECTION: SEDLARE - DEBELO BRDO, from km 22+130 to km 22+150, ID-3733

No	WORKS DESCRIPTION	Unit	Quantity	Unit price	Total USD
	I PRELIMINARY WORKS				
1	Forming of construction site, construction and installation of temporary structures, delivery and mounting of ancilliary facilities and equipment, etc.	lump sum	1.00		
2	Surveying	lump sum	1.00		
3	Clearing of undergrowth and small vegetation.	lump sum	1.00		
4	Demolition of damaged structure due to the construction of the drainage trench A-B and construction of the road embankment.	lump sum	1.00		
5	Demolition of the existing pipe culvert of Ø1000.	lump sum	1.00		
			TOTAL:		
	II EARTH AND DRAINAGE WORKS				
1	Bulk excavation of earth of 3rd and 4th category for the purpose of replacing sladed material in the road embankment and construction of draiange trenches. Excavation to be done 100% mechanically, with an excavator or bulldozer. Transportation of excavated soil to a disposal at a distance up to 2 km. This item involves works in wet conditions. Side cut of the embankment: 8076.38m3 trench J-L: 1323.22m3 trench B-I: 3465.75m3 trench M-N: 298.96m3 trench A-B-C: 2469.74m3	m3	15,634.05		

2	Construction of fill on a side cut and backfilling of the drainage trench A-B-C from crushed stone with the size of 10-25cm with continuous granulation, with necessary compaction in layers of 50cm to compressibility module of Ms=40MPa. The stone must have the internal friction angle of $\phi \geq 35°$. Fill: 7420.76m3 trench A-B-C: 1648.69m3	m3	9,069.45		
3	Filling of drain trenches with crushed stone with the size of 10 -25cm, with continuous granulation fully in accordance with the design. Calculation per m3 of filled material. trench J-L: 693.13m3 trench B-I: 1983.54m3 trench M-N: 188.12m3	m3	2,864.79		
4	Supply, transportation, cutting, bending and installation of reinforcement for the RC retaining wall and front walls 1, 2 and 3. RA400/500 RC wall: 1055.0kg front walls 1, 2 and 3: 733.9kg Calculation per kg of incorporated steel	kg	1,788.90		
5	Filter layer from thermopressed non-woven geotextile of the type 300, (300 g/m2). Calculation per m2 of laid geotextile. Cut: 2363.41m2 trench J-L: 704.15m2 trench B-I: 1286.52m2 trench M-N: 368.32m2 trench A-B-C:1150.09m2	m2	5,872.49		
6	Backfilling of drain trenches and temporary bulk excavations for trenches with earth material from soil obtained by digging drain trenches. Calculation per m3 of filled material. trench J-L: 630.09m3 trench B-I: 2000.45m3 trench M-N: 110.84m3 trench A-B-C: 820.61m3	m3	3,561.99		
7	Construction of clay cap from a layer of compacted clay with the thickness of 30cm above the retaining RC wall.	m3	12.00		
			TOTAL:		

III CONCRETE WORKS					
1	Construction of the open concrete canal 1 and 2 from MB30, M-100. The item covers concreting, supply and incorporation of mesh reinforcement along the middle with necessary formwork. RC canal 1: L=32.1m, 283.7kg RC canal 2: L=15.2m, 115.1kg Calculation per m1 of constructed canal.	m'	47.30		
2	Supply, transportation and incorporation of MB30 concrete, M-150, for the construction of retaining wall, into preprepared formwork in layers with the thickness of 30cm with mechanical compaction of each layer according to applicable regulations for this kind of works. This item covers necessary carpentry works on the preparation of formwork and scaffolding and concrete curing after concreting. This item also includes the construction of weep holes in the wall.	m3	40.80		
3	Construction of concrete front walls at the outlet of the drain trenches. The item covers necessary planing of the groud, with necessary formwork, fully in accordance with the details from the design. Calculation per m³ of incorporated concrete. front walls 1 and 2: 25.2m3	m3	39.60		
4	Supply and laying of PVC pipes with Ø300 below the access road for the drainage of water from the prefabricated pipe shaft to the RC canal 1.	m'	5.50		
5	Construction of the prefabricated pipe manhole from prefabricated concrete pipes of Ø1000.	m'	2.50		
			TOTAL:		
IV PAVEMENT					
1	Construction of the lower bearing course of the pavement from a layer of crushed stone, with grain size up to 0-63mm, of continuous granulometric composition, 25cm thick in compacted state, in the length of 88.1m. 1.14*88.1=100.4m3	m3	100.40		

2	Construction of the lower bearing course of the pavement structure from a layer of crushed stone, with grain size up to 0-31mm, of continuous granulometric composition, 20cm thick in compacted state, in the length of 88.1m. 0.8*88.1=70.48m3	m3	70.48		
3	Demolition of the asphalt surfacing of the road in the section planned by the desing for the construction of new asphalt surfacing in the length of 88.1m. The item includes: demolition, loading and transportation of demolished material to a disposal at a distance of up to 2km. Calculation per m2 of demolished pavement.	m2	519.80		
4	Construction of the upper bitumenous base course from BNS 22, with a thickness of 7cm on the entire width of the road according to SRPS U.E4.014. in the length of 88.1m. 5.9*88.1=519.8m2	m2	519.80		
5	Construction of the wearing course from asphalt concrete AB 11 with a thickness of 5cm on the entire eidth of the road according to SRPS U.E4.014. in the length of 88.1m. 5.9*88.1=519.8m2	m2	519.80		
6	Construction of concrete gutter on the left and right side of the road and concrete channel in the zone of the RC wall from MB40.	m'	155.00		
7	Topsoiling of the slopes of the new embankment, shoulders and berms in a layer of 20cm mixed with grass seed.	m2	1,635.61		
8	Excavation of earth in front of the spandrel wall in bulk excavation for controlled drainage of water, according to the details from the design. front wall 1: 3.23m3 front wall 2: 81.74m3 front wall 3: 84.15m3	m3	169.12		
			TOTAL:		

V TRAFFIC SIGNALIZATION AND ROAD FURNITURE					
1	**Horizontal signalization**				
	White unbroken line with the width of 0.12m	m2	5.52		
2	**Road furniture**				
	Guardrail H1W5	m	56.00		
	Reflective studs (catadiopters)	pcs	5.00		
	Removal of the existing safety fence	m	56.00		
3	**Temporary traffic signalization**	lump sum	1.00		
			TOTAL:		

SUMMARY:

GROUP OF WORKS	TOTAL	
I PRELIMINARY WORKS		
II EARTH AND DRAINAGE WORKS		
III CONCRETE WORKS		
IV PAVEMENT		
V TRAFFIC SIGNALIZATION AND ROAD FURNITURE		
TOTAL:		

BILL OF QUANTITIES
MAIN DESIGN OF LANDSLIDE REMEDY
ON THE STATE ROAD OF II A CLASS NO 170, SECTION: SEDLARE - DEBELO BRDO, from km 22+190 to km 22+208, ID-3734

No	WORKS DESCRIPTION	Unit	Quantity	Unit price	Total USD
	I PRELIMINARY WORKS				
1	Forming of construction site, construction and installation of temporary structures, delivery and mounting of ancilliary facilities and equipment, etc.	lump sum	1.00		
2	Surveying	lump sum	1.00		
3	Clearing of undergrowth and small vegetation.	lump sum	1.00		
			TOTAL:		
	II EARTH AND DRAINAGE WORKS				
1	Bulk excavation of earth of 3rd and 4th category for the purpose of replacing sladed material in the embankmnet and construction of draiange trenches. Excavation to be done 100% mechanically, with an excavator or bulldozer. Transportation of excavated soil to a disposal at a distance up to 2 km. This item involves works in wet conditions. side cut of the embankment: 3875.89m3 trench D-G-H: 1323.22m3 trench F-G: 3465.75m3 trench C-D-E: 298.96m3	m3	7,185.12		
2	Construction of embankment on a side cut and backfilling of the drainage trench A-B-C from crushed stone with the size of 10-25cm with continuous granulation, with necessary compaction in layers of 50cm to compressibility module of Ms=40MPa. The stone must have the internal friction angle of $\phi \geq 35°$. Embankment: 3177.91m3 trench C-D-E: 367.09m3	m3	3,545.00		
3	Filling of drain trenches with crushed stone with the size of 10 -25cm, with continuous granulation fully in accordance with the design. Calculation per m3 of filled material. trench D-G-H: 724.27m3 trench F-G: 713.45m3	m3	1,437.72		

4	Supply, transportation, cutting, bending and installation of reinforcement for the RC shaft and head wall 4. RA400/500 and MA500/560 RC shaft: 1055.0kg head wall 4: 733.9kg Calculation per kg of incorporated steel.	kg	803.70		
5	Filter layer from thermopressed non-woven geotextile of the type 300, (300 g/m2). Calculation per m2 of laid geotextile. Cut: 1278.73m2 trench C-D-E: 536.38m2 trench D-G-H: 894.66m2 trench F-G: 884.04m2	m2	3,593.81		
6	Backfilling of drain trenches and temporary bulk excavations for trenches with earth material from soil obtained by digging drain trenches. Calculation per m3 of filled material. trench C-D-E: 167.51m3 trench D-G-H: 246.52m3 trench F-G: 646.33m3	m3	1,060.36		
			TOTAL:		
III CONCRETE WORKS					
1	Construction of the open concrete canal 3 and 4 from MB30, M-100. The item covers concreting, supply and incorporation of mesh reinforcement along the middle with necessary formwork. RC canal 3: L=47.2m, 470.1kg Rc canal 4: L=74.11m, 760.3kg Calculation per m1 of constructed canal.	m'	121.30		
2	Supply, transportation and installation of separators for the purification of light petrolium products without bypass of the type Oleopator with the capacity of 100l/s (according to EN858-1) and connecting with the RC 'bathtub' and RC manhole with Æ300 pipes.	pcs	1.00		
3	Construction of the RC 'bathtub' befind the RC canal 3 at the inlet to the separator, with MB30 concrete, M-150. The item covers concreting, supply and incorporation of mesh reinforcement with necessary formwork.	m3	0.96		

4	Complete construction of the RC manhole with cover, from MB30 concrete, M-150, under the protection of supporting timbering and pumping of any groundwater. The concrete filling is to be done from the inner formwork to the excavation with pulling out of the timber, fully in accordance with the detail from the design. Calculation per m³ of incorporated concrete.	m3	7.40		
5	Construction of concrete head wall at the outlet of the drain trench. The item covers necessary planing of the ground, with necessary formwork, fully in accordance with the detail from the design. Calculation per m³ of incorporated concrete. head wall 4: 14.05m3	m3	14.05		
6	Supply and laying of RC pipes for the construction of culvert inlet of Ø1000, MB40, reinforced with Q785. Around the pipe culvert make a concrete lining from MB30 concrete, according to SRPS U.S4.034. The price includes the construction of the outlet head of the culvert. Calculation per m' of laid pipe.	m'	11.00		
7	Filling of the trench after the construction of the concrete culvert with gravel-sand material, wih the grain size of 0-63 mm. The soil from sand-gravel material should be of continuous granulometric composition, with the coefficient of uniformity of Cu>15, coefficient of curvature of Cc=1-3; percentage of particles smaller than 0.06mm up to 5%, CBR >30%; sand equivalent Es>60, compressibility module of Ms=60MPa	m3	77.33		
			TOTAL:		
	IV PAVEMENT				
1	Construction of the lower bearing course of the pavement from a layer of crushed stone, with grain size up to 0-63mm, of continuous granulometric composition, 25cm thick in compacted state, in the length of 42.57m. 1.14*42.57+0.92*8.65=56.49m3	m3	56.49		

2	Construction of the lower bearing course of the pavement from a layer of crushed stone, with grain size up to 0-31mm, of continuous granulometric composition, 20cm thick in compacted state, in the length of 88.1m. 0.8*42.57+0.65*8.65=39.7m3	m3	39.70		
3	Demolition of the existing pavemnet of the road in the section planned by the desing for the construction of new pavement in the length of 42.57m. The item includes: demolition, loading and transportation of demolished material to a disposal at a distance of up to 2km. Calculation per m2 of demolished pavement.	m2	251.16		
4	Construction of the upper bitumenous base course from BNS 22, with a thickness of 7cm on the entire width of the road according to SRPS U.E4.014. in the length of 42.57m. 5.9*42.57=251.16m2	m2	251.16		
5	Construction of the wearing course from asphalt concrete AB 11 with a thickness of 5cm on the entire width of the road according to SRPS U.E4.014. in the length of 42.57m. 5.9*42.57=251.16m2	m2	251.16		
6	Construction of concrete gutter on the left and right side of the road from MB40.	m'	68.57		
7	Topsoiling of the slopes of the new embankment, shoulders and berms in a layer of 20cm mixed with grass seed.	m2	907.05		
8	Excavation of earth in front of the head wall in bulk excavation for controlled drainage of water, according to the details from the design.	m3	48.70		
9	Paving in front of the head wall 4 with crushed stone with the thickness of 25cm with sealing of joints with cement mortar in the ratio 1:3. The price covers the supply and transportation of crushed stone, cement mortar and paving.	m2	48.95		
			TOTAL:		

V TRAFFIC SIGNALIZATION AND ROAD FURNITURE					
1	**Horizontal signalization**				
	White unbroken line with the width of 0.12m	m2	10.56		
2	**Road furniture**				
	Guard rail H1W5	m	88.00		
	Reflective studs (catadiopters)	pcs	7.00		
3	**Temporary traffic signalization**	lump sum	1.00		
			TOTAL:		

SUMMARY:

GROUP OF WORKS	TOTAL	
I PRELIMINARY WORKS		
II EARTH AND DRAINAGE WORKS		
III CONCRETE WORKS		
IV PAVEMENT		
V TRAFFIC SIGNALIZATION AND ROAD FURNITURE		
TOTAL:		

PRICED BILL OF QUANTITIES - MONTAGE OF THE SIGNBOARDS

Scetch of signboard and method statement for montage
attached

No	DESCRIPTION	UoM	Quantity	Unit Price	TOTAL USD
I	**PREPARATORY WORKS**				
1	Mounting and dismounting of the metal pipe scaffold, fully according to standing regulations and PP measures. The scaffold shall be structurally stable, and properly grounded. Working platforms made of 5cm boards shall be placed at 2.00m of height. From the exterior, 5cm boards shall be placed vertically as guards. The scaffold shall be used throughout the montage of the signboard and untill concrete foundation reaches70% of its load bearing capacity.Same scaffold is to be used for mantage of all signboards. Calculated per m2 of vertical projection of the assembled scaffold.	m2	3.00		
	TOTAL				
II	**EARTH WORKS**				
	Manual excavation of 3rd category soil for signboard foundations. The excavation shall be executed and levelled according to the design and provided elevation points. The sides shall be clean and verticaly cut and the bottom levelled. Excavated soil shall be wheelbarrowed, poured and the terrain levelled or loaded onto a lorry and transported to the town landfill. Calculated per m3 of soil, measured in autochthonous state.	m3	1.10		
	TOTAL				
III	**CONCRETE WORKS**				
	Manufacture of the unreinforced concrete foundation mark MB20;Hight of fuondation is 60cm and other two dimensions 90x40cm. Concrete should be poured over the gravel layer thickness 10cm The top surface shall be floated and the concrete shall be cured according the regulations. Unit price shall consider gravel layr and all neccessary formwork Calculated per m3 of foundation.	m3	1.00		
	TOTAL				
IV	**MONTAGE WORKS**				
	Installation of steel plates for marking of donor.Table is rectangular in shape, dimensions and materialization according to the sketch , mounted on a steel substructure consisting of steel profiles 80x80x4mm , and metal sheet d = 1mm . The total height of the table is 3m, of which 60cm is anchored into the concrete, and the lower angle of table is at a height of 1.4m above ground level. Calculated per peace of installed signboard	kom	3.00		
	TOTAL				

	TOTAL MONTAGE OF SIGNBOARDS WORK				

TOTAL SUMMARY
FOR REMEDY OF THREE LANDSLIDES
ON THE STATE ROAD OF IIA 170

In municipality Valjevo

I	29 Sedlare - Debelo Brdo, from 14+978 to km 14+960, ID 3732	
II	30 Sedlare - Debelo Brdo, from km 22+130 to km 22+150, ID 3733	
III	31 Sedlare - Debelo Brdo, from km 22+190 to km 22+208, ID 3734	
IV	MONTAGE OF THE SIGNBOARDS	
	TOTAL	