

Project Design:		BILL OF QUANTITIES KURCAJ BRIDGE, KRUJË	PREVENTIV URA KURCAJ, KRUJË				
Ref to TS	Ref. to Albanian Technical Prices Manual/ Ref. Manualit te Cmimeve	WORK DESCRIPTION	PËRSHKRIMI I PUNIMIT	UNIT / NJËSIA	ESTIMATED QUANTITIES / SASIA		
		<b>SITE MOBILISATION</b>	<b>NDËRTIM KANTIERI</b>				
	analize	Installation of the office containers	Vendosje kontenier për personelin	LS	1.0		
	analize	Installation of the toilets	Vendosje kontenier WC				
	analize	Site board	Tabela e objektit				
		Preparation of the construction site (warehouse, temporary contractor office)	Pergatitja e sheshit te ndertimit				
		Identification of a public landfill where waste will be disposed of during and after construction	Identifikimi i vend-depozitimit te mbetjeve te ngurta ku do te depozitohen mbetjet gjate dhe pas ndertimit				
		Guards	Ruajtja e kantierit				
		Installation of Environment and Health and Safety warning signs	Instalimi i sinjalistikes per Mbrojtjen e Mjedisit, Shendetit dhe Sigurise ne Pune				
		Preparation and Instalation of the project information Board (3x3m)	Pergatitja dhe instalimi i tabelës informuese te projektit (3x3m)				
		Establishment of an infromation board (2x1.2m), where rules and regulations regarding environment & health and safetyat work	Vendosja e nje tabelë informuese (2X1.2m), ku vendosen rregullat dhe rregulloret e mbrojtjes se mjedisit shendetit dhe sigurise ne pune				
		Personal Protection Equipment (PPE) for all staf: (helmets, gloves, boots, etc) and other protective materials	Pajisjet Mbrojtese Personal per te gjithë stafin: helmëta, dorashka, kepuce pune etj.)				
	analize	Site fencing and safety signs	Rrethimi I kantierit dhe sinjalistika	LS	1,702.0		
		<b>Sum 01</b>	<b>Sum / SHUMA 01</b>	<b>Lekë/All</b>			
		<b>RESTORATION WORKS OF THE BRIDGE</b>	<b>PUNIME RESTAURIMI I URËS</b>				
		<b>a- EARTH WORKS</b>	<b>a - PUNIME DHEU</b>				
	R.1/1	Soil removal and transport by wheelbarrow	Heqje dherash dhe transport me karro dore	m³	5.0		
Description		This process will be applied for the excavation needed for the terrain leveling to create the walking paths that will facilitate the access to the bridge and to the river side. The area around the bridge has not been declared as a potential archaeological area, although carefull excavation is required: no heavy machines should be used for the soil excavation and transportation.					
	R.4	Leveling , backfill of soil	Hedhje, rrafshim, mbushje dheu	m³	15.0		
Description		This process will be applied for the leveling of the terrain where the walking paths will be created for bridge access facilitation. All works within this area should be performed with utmost care and while using suitable machinery					
		<b>Sum a</b>	<b>SHUMA a</b>	<b>Lekë/All</b>			
		<b>b-DEMOLITION WORKS</b>	<b>b - PUNIME PRISHJE</b>				

	An	Detailed design of the scaffolding structure and Implementation S.P. Metal scaffolding (to reinforce the structure during work)	Projektim i struktures se skelerise dhe F.V. Skele metalike (per perforcimin e struktures gjate punes)	m <sup>2</sup>	140.0		
Description		Provisionary retaining (reinforcement) scaffolding should be erected on both facades of the bridge and under the vault as well. The provisionary scaffolding should stay mounted on site during the dismantling process and during the the time of masonry reinforcement works. Once the (masonry and vault) reinforcement process is finished, the retaining scaffolding can be removed.					
	An	Detailed design of the scaffolding structure and Implementation S.P. Metal scaffolding (working scaffolding)	Projektim i struktures se skelerise dhe F.V. Skele metalike (per te punuar)	m <sup>2</sup>	360.0		
Description		All scaffolding shall be designed and erected in accordance with the relevant standards. Only experienced and competent scaffolding erectors shall carry out erection. The Contractor shall ensure that any necessary modifications to the scaffolding during the course of the works shall be accepted by the scaffolding erector so that scaffolds shall remain suitable for the purpose for which they are intended throughout the works. The signed approval of the scaffolding shall be made visible at each ground level access point to the scaffolding. Working on unapproved scaffolding is strictly forbidden. Care shall be taken that the load of any debris collecting on a scaffold does not exceed the loading for the design. The maximum permissible loading of the scaffolding shall be clearly visible at all ground level access points. All measures necessary shall be taken to prevent debris from being accidentally dislodged from the platform. Steel scaffolding of trestle type, in accordance with local standards and regulations, including the supply of supports, maintenance, assembly, anchorage, dismantling etc. 15 cm toe boards shall be provided on all levels. Weatherproof sheeting or at least protective netting shall be provided on the outside of the scaffolding.					
	analyze	Dismantle of cobblestone layer	Çmontim shtrese kalldremi	m <sup>2</sup>	85.0		
Description		1- Before the dismantling process the pavement cobblestone layer should be documented in order to identify original building technique used (the way of placing the stones and the distance between the compressing rows with stones positioned vertically) and layers (under the coble stones). Voids and missing infill visible and found should be documented. 2- After documentation, the dismantling process will take place. This proces will be done manually using chisels to detach stones from their place. The dismantling process will start at the outer end.					
	R8/1	Stone wall dismantle	Çmontim mure guri	m <sup>3</sup>	40.0		
Description		This process will be done for (A) the external wall fragments of the bridge that need to be dismantled for restoration purposes and (B) for the wall fragments previously collapsed from the bridge due to structural deterioration. The exact boundaries of the areas to be dismantled on the (A) case should be decided on site in presence of the architect of the design team, the restoration supervisor from the MoC and the restoration expert from UNOPS. Before the dismantling process should be done the documentation of the construction technique of the stone wall fragments. In case of arches or vaults dismantling the documentation process should include the identification and registration of each stone to be dismantled in order to be replaced at the same position during the reconstruction of the section. After the removal of the core the sides of the structure need to be carefully examined for all traces of damage. 2- After documentation the dismantling process will take place. This process will be done manually using chisels to detach stones from their place on the walls. The dismantling will start from the highest quotes to the lowest.					
	An	Storing and cleaning of wall stones	Stivim dhe pastrim guresh	m <sup>3</sup>	40.0		
Description		After removing, each stone should be: 1- cleaned from the mortar or other residues that might have been attached to its surface; ; 2- carefully stored in the pre designated storage area. The storage areas should be designated at the site mobilisation plan. This area should be in a safe place with a certain distance from the river in order to avoid possible stone losses in case of river flooding. The cleaning can be done using metal chisels and soft metal brushes and then washed with plenty of water. This process must be done very carefully in order not to create damages on the stone.					
		Sum b	SHUMA b	Leke/All			
		c - MASONRY WORKS	c - PUNIME MURATURE	Lekë/All			
	R.172	Stainless Steel Brackets Installation Ø 22 + Accessories for Tie Rods	Vendosje Tirantash inoksi Ø 22 + Aksesore	ml	50.0		
Description		Iron / Steel for tie rods, profiles and accessories: Class S275, Iron and mild steel Density (kg/m3) = 7870, Brignell Hardness Number =115, Modulus of Elasticity (x103 MPa)= 200, Yielding stress (MPa)=265, Tensile strength (MPa)=410, Ultimate strain (%)= 23, Coefficient of thermal expansion (x10-6 °C)=12					
	R.172	Stainless Steel Brackets coated in PVC Installation Ø 22 + Accessories for Cable Ties	Vendosje Tirantash inoksi veshur me PVC Ø 22 + Aksesore	ml	80.0		
Description		Steel for high strength cables Highstrength stainless steel (Cold rolled) Density (kg/m3) = 7970, Brignell Hardness Number= 300, Modulus of Elasticity (x103 MPa)= 206, Yielding stress (MPa)=785, Tensile strength (MPa)=980, Ultimate strain (%)= 5, Coefficient of thermal exp7970ansion (x10-6 °C)=17					
	R.172	Stainless Steel Brackets coated in PVC Installation Ø 22 + Accessories for Cable Ties	Vendosje Tirantash inoksi veshur me PVC Ø 22 + Aksesore	ml	14.0		
	1.188/P	Production of steel anchors	Prodhim ankera me hekur Ø te zakonshem	kg	45.0		
	R.8	Stone walls, height up to 3m with lime mortar 1: 3	Mur guri ne lartesi deri 3 m me llaç gelqerë1:3	m <sup>3</sup>	26.3		
Description		This process will be applied for the construction of the missing part of the bridge. There are a lot of stones in situ (the ones from the previously collapsed wall fragments). These wall fragments will be dismantled in advance (during the dismantling process) and cleaned and stored properly. The stones acquired from these fragments will be reused for the stone walls construction. If the in situ stones will not be enough, new ones should be supplied by the contractor. The new stones supplied should have the same characteristics (materials, color and dimensions) and the same attributes as the authentic ones. NO CEMENT should be used in the proces. For the construction of the stone walls of the bridge the mortar used should be: 1 (lime) : 2(washed river sand); The joints should be secured using 1NH (3.5):2 (washed river sand)					

	An	Reinstallement works for stone walls + transport by wheelbarrow	Punim rivendosje mur guri + transport materiali me karro dore	m <sup>3</sup>	48.8		
Description		This process will be applied for the remantling process of the dismantled stone walls fragments. The stone wall construction should be done according to the documented technique of the stonewall dismantled; which was previously documented in the preparatory phase of the works (see the technical specification of the R.8/1). The reconstruction/remanteling process will be done with lime mortar: 1 portion of NHL 3.5 with 1.5-2 portion river sand previously washed several times.					
	R.16	Archway construction with carved stones up to 3 m mortar M.15	Ndertim qemeri me gure te gdhendur deri 3 m llaç M.15	m <sup>3</sup>	1.0		
Description		This process will be applied for the construction of the discharging window's vault at the collapsed part of the bridge. A wooden folding should be constructed as per the window's vault dimensions. This will serve as the provisional sustaining structure of the vault and can be removed only after the natural hydraulic lime mortar will be fully set. The binding mortar should NOT contain CEMENT. The dimensions, shapes and positions should be according to the historical documentation of the authentic window on old technical drawings.					
	An	Structural mortar injections	Injekttime struture	m <sup>3</sup>	7.0		
Description		<p>The grouting is assumed not to be needed. However and in case those are needed following steps shall be undertaken: Take samples from the inner core of the wall; Only after understanding the segregation of the original mortar, one can define the ratio of the mortar to be used for the injection.</p> <p>After defining the mortar compound mix and ratio will start the process of grouting This process should be implemented in the following steps:</p> <ol style="list-style-type: none"> <li>1. Setting the grouting net. The frequency of the grouting points (net) need to be decided according to the level of deterioration and to the wall thickness. The perforation process of the walls can now start: 2-4 perforation for 1 sqm (positioned like in equilateral triangles net) and the diameters of the perforation holes need to be <math>\phi 1.5-2.5</math> cm.</li> <li>2. The grouting elastic plastic tubes (<math>\phi 1-2</math> cm) positioning should be done until. The tubes go 25-30 cm deep in the inner side of the masonry and 20 cm at the outer side of the masonry.</li> <li>3. Washing and wetting of the masonry process which aims: washing through the grouting tubes in order to remove the dust and the debris' particles created during the perforation process; inspection of the grouting lines; reduction of the absorption of the grouting mixture's moisture in order not to reduce the hydration and the fluidity of the grouting mixture.</li> <li>4. The grouting process using low pressure to the grouting mixture. the mortar mixture of the grouting should be of traditional materials and its final strength should not be higher than the strength of the authentic not deteriorated mortar of the masonry. In order to avoid the formation of the rigid nucleus of mortar within the masonry the grouting should be done relying on gravity, free fall leakage in one direction only, starting from the lowest level of the injection tubes.</li> <li>5. Tubes removal and the plastering of the perforation holes.</li> </ol>					
		<b>Sum c</b>	<b>SHUMA c</b>	<b>Lekë/All</b>			
		<b>d- LAYER WORKS</b>	<b>d - PUNIME SHTRESASH</b>				
	R.63	Gravel substrate for the bridge	Neneshtrese zhavorri per uren	m <sup>3</sup>	60.0		
	R.63	Gravel substrate for the landscape works	Neneshtrese zhavorri per punime sistemimi	m <sup>3</sup>	25.0		
	R.64	Sand layer for the bridge	Shtrese rere per uren	m <sup>3</sup>	25.0		
	R.64	Sand layer for the landscape works	Shtrese rere per punime sistemimi	m <sup>3</sup>	60.0		
	analize	Cleaning and Reinstatement of existing cobblestone	Pastrim e rivendosje kalldremit ekzistues	m <sup>2</sup>	34.0		
Description		This process will be applied for the remanteling of the cobblestone authentic layer, documented and dismantled at the beginning of the restoration works. The paving technique of the cobblestone reinstatement should be exactly the same to the authentic one (previously documented and dismantled). The stones need to be placed horizontally and a row of vertically placed stones needs to be every X meters. (the distance X meters has to be verified on site during the documentation phase). The cobblestone layer will be layered over a 15-20 cm thick layer of sand. No binder (mortar) should be used for the cobblestone reinstatement.					
	R.65	Cobblestone layer 15 - 20 cm above the sand layer for the bridge	Shtrese kalldremit 15 -20 cm mbi shtrese rere per uren	m <sup>2</sup>	21.0		
Description		This process will be applied for the cobblestone layer that will be layered over the reconstructed part of the bridge (the one that actually is collapsed). The stones for the layering should be very similar to the authentic cobblestone layer. The technique should be exactly the same as the authentic part. The stones need to be placed horizontally and a row of vertically placed every X meters. (the distance X meters has to be verified on site during the authentic cobblestone documentation phase). The cobblestone layer will be layered over a 15-20 cm thick layer of sand. No binder (mortar) should be used for the cobblestone reinstatement.					
	R.65	Cobblestone layer 15 - 20 cm above the sand layer for the landscape works	Shtrese kalldremit 15 -20 cm mbi shtrese rere per punime sistemimi	m <sup>2</sup>	30.0		
Description		This process will be applied for the new walking paths that will be created at the terrain near the bridge. The layering technique can be decided on site; it should not recreate the exact cobblestone layer as the one on the bridge's deck, so not to look as an old walking path. They should be paved with local stones. The cobble layer should be 20cm thick layered over a 15-20cm thick layer of sand.					
		<b>Sum d</b>	<b>SHUMA d</b>	<b>Lekë/All</b>			
		<b>Sum 02</b>	<b>SHUMA 02</b>	<b>Lekë/All</b>			
		<b>STRUCTURAL REINFORCEMENT WORKS</b>	<b>PUNIME PËRFORCIMI STRUKTURE</b>				

		<b>RIVER PROTECTION WORKS</b>	<b>PUNIME MBROJTJE LUMORE</b>				
	3.184/b	Gravel filling (Zalle)	Mbushje me zhavorr (Zalle)	m³	150.0		
	3.161/1	Systematization of existing slopes (on both sides of the bridge at a distance of up to 50 m)	Sistemim i skarpatave ekzistuese (ne te dyja anet e ures ne nje distance deri 50 m)	m²	560.0		
	3.352	Filling with kave stone (in order to allow work for the protection with gabion walls from water)	Mbushje me gur kave (ne menyre qe te lejohet puna per mbrojtjen me mure gabioni nga ujrat)	m³	270.0		
	3.12	Soft rock excavation (in the ground prepared for the placement of the gabionand under the foundation)	Germim shkemb i bute (ne terrenin e pergatitur per vendosjen e murit te gabionit si dhe nen themel)	m³	180.0		
	3.331	Gabion walls (with wire mesh and river shingles with a diameter of 20 cm)	Mure gabioni (me rrjete teli dhe zall lumi me diameter 20 cm)	m³	300.0		
Description		Gabion baskets will be built with skeletons with ribbed steel ø12 mm and with galvanized nets ø3.5 mm, also steel spacers will be placed according to the shape of the baskets. For filling the gabions, boulder stones with a diameter of ≥30 cm in all three dimensions (x, y, z) will be used.					
	An	Excavation of the river bed (systematization after finishing work + filling with clay and plant of vegetation)	Germim i shtratit te lumit (sistemimi pas mbarimit te punes+ mbushje me argjil dhe mbjellje me bimesi)	m³	180.0		
	3.158/2a	Transport of materials	Transport materiali	m³	305.0		
		<b>Sum 03</b>	<b>SHUMA 03</b>	<b>Lekë/All</b>			
		<b>SITE WORKS</b>	<b>PUNIME SISTEMIMI</b>				
		<b>CONSTRUCTION OF PANDUS AND SQUARE</b>	<b>NDËRTIMI I PANDUSIT DHE SHESHE</b>				
	3.2	Cut small plants ø-10cm	Prerje bime te vogla ø-10cm	m²	220.0		
	3.7	Trim the roots of small plants	Shkulje rrenjeve bimeve te vogla	m²	220.0		
	3.46/1	Excavation in hard ground manually	Germim ne toke te forte, me krahe	m³	119.0		
	2.37/1a	Transport of construction material , soil by vehicle up to 1.0 km	Transport materiale ndertim, dheu me auto deri 1.0 km	m³	119.0		
	2.52/1	Foundation stone wall of plinth with mortar mixed M 15	Mur guri themel e xokol me llaç perzier M 15	m³	92.0		
	3.211	Gravel layer of waste kave t = 20cm	Shtrese çakelli mbeturine kave t=20cm	m²	157.0		
	3.206	River gravel layer t = 30cm	Shtrese zhavori lumi t=30cm	m²	157.0		
	2.261	Sand layer 4 cm	Shtrese rere 4 cm	m³	7.0		
	An nr. 1	Cobblestone layer (cleft stone tmin = 15-20 cm)	Shtrese Kalldremit (gur këllic tmin= 15-20 cm)	m²	157.0		
	analize	Low greenery system	Sistemim gjelberimi i ulet	m²	182.0		
	3.An165	Planting ornamental shrubs	Mbjellje shkurre dekorative	cope	35.0		
		<b>INFORMING TABLES</b>	<b>TABELA INFORMUESE</b>				
	oferte	Installation of Tourist signs Type A_40 x 120 cm, h=2.1 m ( Galvanized metalic construction, covering with corten sheet t=5mm, 2 corten plates t=10mm, print of text, symbols and images).	F.V. Tabela orjentuese turistike Tipi A_40 x 120 cm, h=2.1 meter (realizuar : Konstruksione metalike te galvanizuar; Veshje me flete Kortenit t=5 mm; Dy pllaka Kortenit t= 10 mm; Printim teks, simbole dhe imazhe)	cope	1.0		
		<b>Sum 04</b>	<b>SHUMA 04</b>	<b>Lekë/All</b>			
		<b>TOTAL 01 + 02 +03 + 04</b>	<b>SHUMA 01 + 02 +03 + 04</b>	<b>Lekë/All</b>			

		TOTAL AMOUNT	SHUMA TOTALE	Lekë/All			
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