

Informative Bill of Quantities

PRELIMINARY COMPLETION

Item	Work Description	Unit	Quantity
	SURFACE EXCAVATION		
C71.30	Removal and disposal of topsoil and surplus and unsuitable material	m ³	4000
C10.11	Loose excavation south portal area	m ³	12000
C10.12	Loose excavation north portal area	m ³	2500
C10.14	Rock excavation south portal area	m ³	500
C10.15	Rock excavation north portal area	m ³	2500
	FILLS AND ROADWORK		
C10.17	Road filling south portal area	m ³	5100
C10.18	Road filling north portal area	m ³	103000
C10.19	Rip-rap	m ³	13500
C10.20	Road filling in tunnel	m ³	5500
C10.21	Road filling for new access road to Dariali HEP	m ³	20000
	UNDERGROUND EXCAVATION		
C10.22	Underground excavation	m ³	96000
C10.23	Removal of material from approved geological overbreak	m ³	1500
C10.24	Additional excavation	m ³	500
	PIPING		
M20.01	DN100mm perforated dual walled PEH plastic piping (tunnel+portals)	Meters	2740
M20.02	DN300mm dual walled PEH plastic collection pipe (tunnel + outfall	meters	1300
M20.03	DN400mm plastic manholes with cast iron lid	each	15
M20.04	DN200mm plastic catch basins with cast iron inlet	each	15
M20.05	DN600mm concrete culvert with 2x headwalls	meters	30
M20.06	3000 liter plastic tank with oil separator and sump for settling basin	each	1
M20.07	Filter material (clean pea gravel or equivalent) around drain pipes	m3	2740
M20.08	Bedding sand material (particle size 0-16mm, well graded)	m3	1300
	CONCRETE WORKS		
	Retaining wall		
C50.30	Blinding layer	m ³	5
C50.31	Formwork	m ²	50
C50.32	Reinforcement	kg	800
C50.33	Concrete	m ³	15
C50.34	Waterproofing	m ²	25

ROCK REINFORCEMENT AND SUPPORT

Item	Work Description	Unit	Quantity
	ROCK REINFORCEMENT AND SUPPORT		
	Rock bolts for underground excavations		
C10.40	Untensioned rock bolts (20 mm diameter), avg lengths	ea	3270
C10.41	Untensioned rock bolts (25 mm diameter) avg lengths	ea	820
C10.42	Tensioned rock bolts (20 mm diameter), avg lengths	ea	1400
C10.43	Tensioned rock bolts (25 mm diameter), avg lengths	ea	350
C10.44	Spiling rock bolts (32 mm diameter), avg lengths	ea	245
C10.45	Rock bolts uncoded (32 mm diameter), avg lengths	ea	50
	Rock bolts for surface works and portals		
C10.46	Untensioned rock bolts (20 mm diameter), avg lengths	ea	200
C10.47	Untensioned rock bolts (32mm diameter), length = 4,0 m	ea	30
C10.48	Untensioned rock bolts (32mm diameter), length = 6,0 m	ea	130
	Structural steel support		
C10.49	Rock bolts for lattice girders	ea	300
C10.50	Lattice girders	kg	8560
C10.51	Triangular washers	ea	100
C10.52	Steel ties	kg	100
	SPRAYED CONCRETE		
C10.53	Sprayed concrete in tunnel	m ³	2800
C10.54	Sprayed concrete in portal areas	m ³	50
C10.55	Steel fibres for all sprayed concrete	kg	700
C10.56	Welded wire mesh for sprayed concrete in tunnels	kg	100

TUNNEL - WATER AND FROST SUPPORT

Item	Work Description	Unit	Quantity
	SPRAYED CONCRETE		
C10.57	Sprayed concrete on insulation; 0,6mm	m ²	15 000
	INSULATION FOAM		
C10.58	Insultation under sprayed concrete	m ²	15 000
C10.59	Cover under concrete spray	m ²	300
C10.60	Water protection	m ²	80

CONCRETE STRUCTURES

Item	Work Description	Unit	Quantity
	CONCRETE WORKS		
	Tunnel Portals		
C50.10	Membranes at tunnel entrance end	m ²	150
C50.11	Filling up to concrete casted structures	m ³	1000
C50.12	Preparing bed rock after excavation/blasting	m ²	300
C50.13	Formwork for foundation	m ²	170
C50.14	Formwork for tunnel entrance structures	m ²	3200
C50.15	Reinforcement in foundation	kg	16300
C50.16	Reinforcement in tunnel entrance structures	kg	57000
C50.17	Concrete in foundations	m ³	200
C50.18	Concrete in tunnel entrance structures	m ³	650
C50.19	Concrete surface finish work	m ²	1500
	Technical room		
C50.20	Preparing bed rock after excavation/blasting	m ²	50
C50.21	Concrete formwork	m ²	240
C50.22	Reinforcement	kg	3700
C50.23	Concrete	m ³	70
C50.24	Foundation for equipment	stk	2
C50.25	Flooring inside technical room	m ²	45

TUNNEL - PAVEMENT

Item	Work Description	Unit	Quantity
	FILLS AND ROADWORK		
C71.11	Concrete leveling layer	m ³	1200
C71.12	Concrete pavement	m ³	2150
C71.20	Concrete curb	m	2400
C71.21	Asphalt Concrete sidewalk	m ²	2400

ROAD - PAVEMENT

Item	Work Description	Unit	Quantity
	FILLS AND ROADWORK		
C71.40	Granular sub-base	m ³	2000
C71.41	Base Leveling course	m ³	1300
C71.42	Hot-mix asphalt concrete	m ²	6400

FURNISHING OF TUNNEL AND ROAD

Item	Work Description	Unit	Quantity
ROAD AND TUNNEL FURNISTURE			
C71.50	Traffic safety guardrails	m	860
C71.51	Emergency closing booms	ea	2
C71.52	Guideposts w/ delineators	ea	40
C71.53	Road signs	ea	30
C71.54	Height booms	ea	2
C71.55	Permanent pavement markings	m ²	210
ELECTRICAL INSTALLATION			
E20.01	Power and control voltages	ls	1
E20.02	Technical data and ratings	ls	1
E20.03	General electrical eq. In technical room	ls	1
E20.04	Electrical equipment enclosures	ls	1
E20.05	Indication LED lamps	ls	1
E20.06	Nameplates	ls	1
E20.07	Grounding rod with GEM	ls	1
E20.08	stainless steel Cable ladder 300mm	m	1070
E20.09	stainless steel Cable ladder 400mm	m	40
E20.10	multi pipe for fiberglass	m	1400
E20.11	blowpipe for fiberglass	m	250
E20.12	Polyvinyl chloride pipe 32mm	m	20
E20.13	Polyvinyl chloride pipe 50 mm	m	2500
E20.14	Polyvinyl chloride pipe 160 mm	m	1370
E20.15	Polyvinyl chloride pipe 75 mm	m	4000
E20.16	stainless steel pipe on walls 32 mm	m	35
E20.17	stainless steel pipe on walls 50 mm	m	50
E20.18	stainless steel pipe on walls 75 mm	m	25
E20.19	burried extention connection boxes IP68 in ground	ea	20
E20.20	Blow -tubes for fiber	m	1000
E20.21	High power cable XLPE xxkV, cable	m	850
E20.22	High power transformer xxkW according to design	ea	1
E20.23	Cable class 1, 3-5x1.5-2.5mm ²	m	180
E20.24	Cable class 1, 3-5x4mm ²	m	30
E20.25	Cable class 1, 3-5x6mm ²	m	1300
E20.26	Cable class 2, hal.free., 3-5x1.5-2.5mm ²	m	30
E20.27	Cable class 2, hal.free., 3-5x10mm ²	m	1300
E20.28	Cable class 3, fire res., 3-5x1.5-2.5mm ²	m	50
E20.29	Cable class 3, fire res., 3-5x10mm ²	m	1300
E20.30	Control cables class 1, 3x1-1,5mm ²	m	30
E20.31	Control cables class 1, 5x1-1,5mm ²	m	30
E20.32	Control cables class 1, 18x1-1,5mm ²	m	15
E20.33	Control cables class 1, 5x1-1,5/1-1,5mm ²	m	450
E20.34	Control cables class 3, 3x1-1,5/1-1,5mm ²	m	20
E20.35	Control cables class 3, 5x1-1,5/1-1,5mm ²	m	50
E20.36	Leakage Coax cable	m	1200

E20.37	Leakage Coax cable 1/2"	m	50
E20.38	Leakage Coax cable 7/8"	m	180
E20.39	Duct cable Cat. 5e F/UTP	m	70
E20.40	Duct cable Cat. 5e U/UTP	m	170
E20.41	Patch cable Cat-5e	m	10
E20.42	grounding wire, 25mm ²	m	1050
E20.43	grounding wire, 50mm ²	m	1200
E20.44	cable 4x185mm ² Cu betw.transf+main cabinet	m	10
E20.45	400 V Distribution Cubicles	ea	1
E20.46	400 V AC distribution cubicles	ea	1
E20.47	Main cabinet in technical building complet	ea	1
E20.48	UPS power cabinet, according to specifications	ls	1
E20.49	Cabinet for reserve power placed in technical buld.	ea	1
E20.50	Lighting control system	ls	1
E20.51	Lighting fixtures complet for tunnel 1,2km	ls	1
E20.52	Emergency lighting complet for tunnel 1,2km	ls	1
E20.53	Aircondition unit in technical room	ls	1
E20.54	Cooling element in technical room	ls	1
E20.55	Fire sealing	ls	1
E20.56	Receptacles and switches	ls	1
E20.57	Connecting boxes	ls	1
E20.58	Emergency cabinet with fire extinguisher and/or telephone "E" "F"	ea	9
E20.59	Emergency telephone booth at end of tunnels outside	ea	1
E20.60	Mobile distribution system	ls	1
E20.61	Temperaturesensor inside tunnels	ea	1
E20.62	temperaturesensor outside tunnels	ea	1
E20.63	temperaturesensor inside technical bulding	ea	1
E20.64	Temperaturesensor on the road	ea	1
E20.65	Humidity sensor in tunnel	ea	1
E20.66	Telecommunication wiring system	ls	1
E20.67	Cubicle, 19" rack cabinet 2100x800x800, 40 U with lockable door and bottom plate (for security systems)	ea	3
E20.68	Fiber optic connection points	ea	50
E20.69	Patch panel 12 pair (24 fibres), SFF(SC.LC) duplex conectors, 19"	ea	3
E20.70	Cabinets for fiber optic connections	ea	1
E20.71	Patch panel 24 F-UTP RJ-45, Cat-6, 19"	ea	1
E20.72	Cable organizer, 19"	ea	6
E20.73	Fiber optic., 8 pairs	m	1100
E20.74	Fiber optic patch	ea	44
E20.75	Combined intrusion alarm system and access control system	ls	1
E20.76	Closed Circuit TeleVision system (CCTV)	ls	1
E20.77	Firedetection system complet	ls	1
E20.78	Equipment testing	ls	1
E20.79	Component testing	ls	1
E20.80	Operational tests	ls	1
E20.81	Equipment fastening plates	ls	1
E20.82	Blinking RED light on a pedestole at tunnel entrance	ea	2
E20.83	Blinking light and sign	ea	2

E20.84	CO sensor	ea	2
E20.85	NO2 sensor	ea	2
E20.86	Lighting control system	ls	1
E20.87	Ventilation control system	ls	1
E20.88	GSM distribution system	ls	1
E20.89	Telecommunication system	ls	1
E20.90	Intrusion alarm- and Access control system	ls	1
E20.91	Fire alarm system	ls	1
E20.92	Installation markings	ls	1
E20.93	Luminating road signs (installed and operational)	ls	1
E20.94	Ventilation system for road tunnel	ls	1
E20.95	Oil seperator	ls	1