| GREATER KARACHI BULK WATER SUPPLY SCHEME | | | | | | | |
|---|---|---|---|---|---|---|---|
| LOT 3: WATER TRANSMISSION MAIN FROM HASSAN SQUARE TO GULBAI | | | | | | | |
| BILL 3: WATER TRANSMISSION MAIN DN1800 | | | | | | | |
| TRANSMISSION MAIN AND APPURTENANCES | | | | | | | |
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| **S.No.** | **Description** | **Unit** | **Quantity** | **Unit Rate (Rs.)** | **Unit Rate Foreign Currency ____** | **Amount (Rs.)** | **Amount Foreign Currency ____** |
| **1** | **CLEARING AND GRUBBING** | | | | | | |
| | Clearing jungle (ordinary & dense) with a clearing width along the pipeline alignement, as per specifications, by cutting removing all shrubs, trees as per site girth & taking out their entire roots and filling the hollows with earth complete with dressing consolidating and watering the filling including stacking the serviceable materials and disposal of useless materials cost of lead, lift and include earth etc. Complete in respects as per drawings, specifications and Engineer's instruction. | Sq.m | 6,156.00 | | | | |
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| **2** | **DISMANTLING** | | | | | | |
| 2.1 | Dismantling of existing asphalt concrete road including base, sub-base and disposal of dismantled materials to designated place approved by the Engineer. | Cu.m | 15,640.00 | | | | |
| 2.2 | Dismantling cement concrete plain and disposal of dismantled materials to designated place approved by the Engineer. | Cu.m | 100.00 | | | | |
| 2.3 | Dismantling cement concrete reinforced separating reinforcement from concrete cleaning and straightening the same and disposal of dismantled materials to designated place approved by the Engineer. | Cu.m | 100.00 | | | | |
| 2.4 | Dismantling dry brick/ Block masonry and disposal of dismantled materials to designated place approved by the Engineer. | Cu.m | 100.00 | | | | |
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| **3** | **EXCAVATION** | | | | | | |
| **A-1** | **EXCAVATION - TRENCHES FOR PIPES** | | | | | | |

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|---|---|---|---|---|---|---|---|
| | Earthwork excavation in foundation of trenches for pipes in any strata upto any required depth from natural ground level including trial pits, welding pits, dismantlig of all existing, dewatering, dressing, levelling & compacting. Retain approved material for re-use in back-filling / filling. Excavated material / previous construction materials if disposed along the alignment of proposed pipelines and structures shall be disposed off away from site of work at suitable place by dumpers. (No extra payment will be made in this regard). Excess excavation done for working if any for ease of work, will be backfilled by Contractor with same excavated earth or any imported earth, no payment will be made in this regards. Complete in all respects as per drawings, specifications and Engineer's instruction. | | | | | | |
| 31.0 | Soft soil 70% | | | | | | |
| 3.1.1 | Soft soil Depth range: 0-2 m | Cu.m | 55,710.00 | | | | |
| 3.1.2 | Soft soil Depth range: 2-5 m | Cu.m | 62,273.00 | | | | |
| 3.1.3 | Soft soil Depth range: >5 m | Cu.m | 260.00 | | | | |
| 3.2 | Hard soil 20% | | | | | | |
| 3.2.1 | Hard soil Depth range: 0-2 m | Cu.m | 15,917.00 | | | | |
| 3.2.2 | Hard soil Depth range: 2-5 m | Cu.m | 17,792.00 | | | | |
| 3.2.3 | Hard soil Depth range: >5 m | Cu.m | 74.00 | | | | |
| 3.3 | Provisional quantity for Rock soil 10% | | | | | | |
| 3.3.1 | Rock soil Depth range: 0-2 m | Cu.m | 7,959.00 | | | | |
| 3.3.2 | Rock soil Depth range: 2-5 m | Cu.m | 8,896.00 | | | | |
| 3.3.3 | Rock soil Depth range: >5 m | Cu.m | 37.00 | | | | |
| | | | | | | | |
| **A-2** | **SOLDIER PILING - TRENCHES FOR PIPES** | | | | | | |
| 3.4 | Provide, design, install, maintain, and remove a soldier piling system or other equivalent trench support system, subject to the approval and satisfaction of the Engineer for the support of trench and excavation sides, measured per running meter on each side, complete in all respects in accordance with the approved drawings, specifications, and applicable safety regulations. Including all materials, design following soil conditions, excavation depth, groundwater, surcharge loads, and construction sequence, installation of structural steel soldier piles at the specified size, spacing and embedment as required by the design, progressive installation of lagging during excavation, monitoring, adjustment, and protection of adjacent structures, utilities, and personnel, until the excavation is safely backfilled or the shoring system is removed. | Ru.m | 14,904.00 | | | | |
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| **B.1** | **EXCAVATION - TRENCHES FOR CHAMBERS** | | | | | | |

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|---|---|---|---|---|---|---|---|
| | Earthwork excavation in foundation of trenches for pipes in any strata upto any required depth from natural ground level including trial pits, welding pits, dismantlig of all existing, dewatering, dressing, levelling & compacting. Retain approved material for re-use in back-filling / filling. Excavated material / previous construction materials if disposed along the alignment of proposed pipelines and structures shall be disposed off away from site of work at suitable place by dumpers. (No extra payment will be made in this regard). Excess excavation done for working if any for ease of work, will be backfilled by Contractor with same excavated earth or any imported earth, no payment will be made in this regards. Complete in all respects as per drawings, specifications and Engineer's instruction. | | | | | | |
| 3.5 | Soft soil 70% | | | | | | |
| 3.5.1 | Soft soil Depth range: 0-2 m | Cu.m | 2,346.00 | | | | |
| 3.5.2 | Soft soil Depth range: 2-5 m | Cu.m | 2,496.00 | | | | |
| 3.5.3 | Soft soil Depth range: >5 m | Cu.m | 150.00 | | | | |
| 3.6 | Hard soil 20% | | | | | | |
| 3.6.1 | Hard soil Depth range: 0-2 m | Cu.m | 670.00 | | | | |
| 3.6.2 | Hard soil Depth range: 2-5 m | Cu.m | 713.00 | | | | |
| 3.6.3 | Hard soil Depth range: >5 m | Cu.m | 43.00 | | | | |
| 3.7 | Provisional quantity for Rock soil 10% | | | | | | |
| 3.7.1 | Rock soil Depth range: 0-2 m | Cu.m | 335.00 | | | | |
| 3.7.2 | Rock soil Depth range: 2-5 m | Cu.m | 357.00 | | | | |
| 3.7.3 | Rock soil Depth range: >5 m | Cu.m | 21.00 | | | | |
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| **B-2** | **EXCAVATION WITH SOLDIER PILING - TRENCHES FOR CHAMBERS** | | | | | | |
| 3.4 | Provide, design, install, maintain, and remove a soldier piling system or other equivalent trench support system, subject to the approval and satisfaction of the Engineer for the support of trench and excavation sides, measured per running meter on each side, complete in all respects in accordance with the approved drawings, specifications, and applicable safety regulations. Including all materials, design following soil conditions, excavation depth, groundwater, surcharge loads, and construction sequence, installation of structural steel soldier piles at the specified size, spacing and embedment as required by the design, progressive installation of lagging during excavation, monitoring, adjustment, and protection of adjacent structures, utilities, and personnel, until the excavation is safely backfilled or the shoring system is removed. | Ru.m | 85 | | | | |
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| **4** | **LOWERING OF SUB SOIL WATER TABLE** | | | | | | |

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|---|---|---|---|---|---|---|---|
| | Provisional quantity for lowering of sub-soil water table, by installation of tubewells along pipe line and pumping out water, for excavation in open cutting below sub-soil water level, concreting, curing, laying and jointing pipes, filling haunches, etc. till the completion of pipe line, including disposal of pumped out water:- | | | | | | |
| 4.1 | 0-1 ft. (0 to 310 mm) below SSWL | R.m | 500.00 | | | | |
| 4.2 | 0-2 ft. (0 to 610 mm) below SSWL | R.m | 500.00 | | | | |
| 4.3 | 0-3 ft. (0 to 910 mm) below SSWL | R.m | 500.00 | | | | |
| 4.4 | 0-4 ft. (0 to 1220 mm) below SSWL | R.m | 500.00 | | | | |
| 4.5 | 0-5 ft. (0 to 1520 mm) below SSWL | R.m | 500.00 | | | | |
| 4.6 | 0-6 ft. (0 to 1830 mm) below SSWL | R.m | 1,000.00 | | | | |
| 4.7 | 0-7 ft. (0 to 2170 mm) below SSWL | R.m | 1,000.00 | | | | |
| 4.8 | 0-8 ft. (0 to 2480 mm) below SSWL | R.m | 1,000.00 | | | | |
| 4.9 | 0-9 ft. (0 to 2790 mm) below SSWL | R.m | 1,000.00 | | | | |
| 4.10 | 0-10 ft. (0 to 3100 mm) below SSWL | R.m | 1,000.00 | | | | |
| 4.11 | 0-11 ft. (0 to 3410 mm) below SSWL | R.m | 1,000.00 | | | | |
| 4.12 | 0-12 ft. (0 to 3720 mm) below SSWL | R.m | 1,500.00 | | | | |
| | | | | | | | |
| **5** | **SAND BEDDING AND PADDING/SURROUNDING** | | | | | | |
| | Providing, placing and compacting an imported 200 mm thick sand bedding beneath pipes, including surrounding and backfilling up to 300 mm above the crown of the pipe, including dressing, watering, levelling, consolidation etc. The imported material shall comply with a maximum AASHTO Class A-3 as determined by AASHTO soil classification tests and shall be subject to the Engineer's approval. The method of compaction shall achieve not less than 95% Modified Proctor density. Complete in all respects as per drawings, specifications and Engineer's instruction. | Cu.m | 53,761.00 | | | | |
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| **6** | **M.S.PIPE** | | | | | | |
| | Providing, laying and jointing of Spiral Welded Mild Steel Pipes as per API 5L – PSL2 , grade X42 for various diameters and thicknesses, end-beveled, externally 3LPE coating (shop applied), internally fusion bonded epoxy (FBE) coating with a minimum 400 – 500 microns Dry Film Thickness (DFT) as per AWWA Standard, joint coating with epoxy and heat shrinkable sleeves, the rate included, cutting, welding, and jointing in trenches, including all fittings, tees, any degree of bends and yees, expander/reducer, flanges, gasket, steel nut bolts and washers, ultrasonic or radiographic inspection of welded joints, , hydrostatic testing (sectional and complete testing), disinfection with chlorine, level and grade, warning tape 300mm wide, 100 micron thick, blue in color, complete in all respect as per drawing, technical specification and Engineer's instruction. | | | | | | |

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| 6.1 | 72 inch (1828.8 mm OD) x 12.7 mm wall thickness | R.m | 12,320.00 | | | | |
| 6.2 | 56 inch (1422.4 mm OD) x 14mm wall thickness | R.m | 100.00 | | | | |
| | | | | | | | |
| **7** | **BACKFILLING** | | | | | | |
| 7.1 | **SELECTED MATERIAL BACKFILLING** | | | | | | |
| | Structural backfilling using selected imported material borrowed from approved quarries around structures, placed in layers not exceeding 150 mm thickness. The material shall comply with AASHTO Classification and shall meet at least Class A-2-4 or A-4 (or a better class), as approved by the Engineer.Including watering, compacting upto required level with suitable excavated material as approved by the Engineer. The method of compaction shall achieve not less than 95% Modified Proctor density. Complete in respects as per drawings, specifications and Engineer's instruction. | Cu.m | 44,302.00 | | | | |
| 7.2 | **COMMON MATERIAL BACKFILLING** | | | | | | |
| | Structural backfilling around structures using common excavated material, placed in layers not exceeding 150 mm thickness. The material shall meet at least AASHTO Class A-4 (or a better class) and be subject to the Engineer’s approval. Including watering, compacting upto required level with suitable excavated material as approved by the Engineer. The method of compaction shall achieve not less than 95% Modified Proctor density. Complete in respects as per drawings, specifications and Engineer's instruction. | Cu.m | 44,302.00 | | | | |
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| **8** | **RCC CHAMBERS** | | | | | | |
| 8.1 | **PLAIN AND REINFORCED CONCRETE** | | | | | | |
| | Providing and laying cement concrete using Ordinary Portland Cement / Sulphate resistant cement / Slag cement (separate or blended as per geo technical recomendations) including mixing, transporting, hosting, placing, form work, scaffolding, vibrating and curing etc., including the cost of form work and its removal complete in all respect as per drawings, specifications and Engineer's instructions (but excluding the cost of the reinforcement). | | | | | | |
| 8.1.1 | Lean/Blinding cement concrete Min. Cylinder Strength of 10 MPa at 28 days under foundations/ footings etc. | Cu.m | 110 | | | | |
| 8.1.2 | Reinforced cement concrete Min. Cylinder Strength 28 MPa at 28 days sub/super structural elements etc. | Cu.m | 1,540 | | | | |
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| 8.2 | **REINFORCEMENT STEEL BAR** | | | | | | |
| | Providing and laying reinforcement bars using hot rolled deformed billet steel bars "Grade 60" conforming to ASTM A-615 including the cost of straightening, cutting, bending, binding, wastage and such overlaps as are not shown over the drawings, placing in position on chairs, tying with binding wires, etc., in all kinds of RCC work complete in all respects. | Ton. | 50 | | | | |
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| 8.3 | **Bitumen Coating** | | | | | | |
| | Providing and applying water proofing with two coats (0.5 Kg per Sq.m each) of hot bitumen on concrete surfaces in contact with earth complete in all respects as per drawings, specifications and Engineer's instruction. | Sq.m | 3,570 | | | | |
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| 8.4 | **Steel Rungs** | | | | | | |
| | Providing and fixing 25mm dia. hot dip Galvanized/ epoxy coated Steel Rungs. Each of 400 mm width, 200 mm projected outside the wall and 100 mm embeded in Reinforced Cement Concrete on both ends. Rungss shall be spaced at 300 mm c/c vertically, complete in all respects as per drawings, specifications and Engineer's instruction. | Each | 1,230 | | | | |
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| 8.5 | **Water Stopper** | | | | | | |
| | Providing and embedding PVC water stopper in construction and expansion joints of RCC structures, complete in all respects in accordance with the approved drawings, specifications, and as directed by the Engineer. | R.m | 600 | | | | |
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| 8.6 | **Chambers Cover** | | | | | | |
| | Providing and fixing Precast chambers covers slab Min. Cylinder Strength of 28 MPa concrete with appropriate lifting keys . All cover slabs shall be reinforced as shown in drawing including where chambers project above ground level, covers when in position shall be flush with the adjacent cover slab top surface. For chambers under roads and verges, frames shall be solidly bedded in cement mortar so that the covers when in position are fair and even with the adjacent surfaces. Complete in all respects as per drawings, specifications and Engineer's instruction. | | | | | | |
| 8.6.1 | Size 1.20m x 1.20m | No. | 70 | | | | |
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| **9** | **FITTINGS AND VALVES** | | | | | | |
| 9.1 | **BUTTERFLY VALVE** | | | | | | |
| | Providing, installation, testing, and commissioning of PN16 double flanged butterfly valves made of ductile iron EN-GJS-450 material, designed to BS 5155, with a polyurethane coating (thickness 80 µm, color: RAL 5002), standard epoxy coating , allowing for Operating Pressures of 16 bar with options for higher velocities and various actuator/valve combinations. Manual actuation is available via manual gearboxes key & Labour. Complete as per drawings, specifications, and Engineer's instructions. | | | | | | |
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| a- | **DI Double Flanged Dismantling Joint PN16** | | | | | | |
| | DN1800mm | No. | 3 | | | | |
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| b- | **MS Straight Specials PN16** | | | | | | |
| | DN1800mm Flanged Spigot with puddle flange (L=2000mm) | No. | 6 | | | | |
| | | | | | | | |
| e- | **DI Butterfly Valve PN16** | | | | | | |
| | DN1800mm | No. | 3 | | | | |
| | | | | | | | |
| f- | **Roadside Ventilation** | | | | | | |
| | OD 200mm, uPVC Class E PN16 Air vent pipe with stainless steel mesh as per the drawings | R.m | 18 | | | | |
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| 9.2 | **AIR RELEASE VALVE (With Isolation Valve)** | | | | | | |
| | Providing, installation, testing, and commissioning of a PN16 float consisting double body, double orifce air release valves with isolation valves made ductile iron EN-GJS-450 material, designed to AWWA C512 (14), with nominal pressures and a maximum permissible pressure of 16 bar. Includes packing, key, and labor. Complete in all respects as per drawings, specifications, and Engineer's instructions. | | | | | | |
| a- | **AIR RELEASE DN 200mm** | No. | 21 | | | | |
| | | | | | | | |
| b- | **MS Straight Specials PN16** | | | | | | |
| | DN1800mm Double Spigot with puddle flange (L=2000mm) | No. | 42 | | | | |
| | DN200 Flanged Spigot Pipe With Puddle Flange (L=400mm) | No. | 21 | | | | |
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| c- | **DI Gate Valves PN16** | | | | | | |
| | DN200mm FLANGED Gate Valve | No. | 21 | | | | |
| | | | | | | | |
| d- | **AIR RELEASE VALVE Roadside Ventilation Assembly** | | | | | | |
| | OD 200mm, uPVC Class E PN16 Air vent pipe to the ventilation chamber as per the drawings | R.m | 126 | | | | |
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| 9.3 | **AIR INLET CHECK VALVE (With Isolation Valve)** | | | | | | |
| | Supply and installation of air inlet check valve in swan neck arrangement, conical body and disc type, flanged to EN 1092-2, suitable for PN 16 working pressure. Body, inlet cone, connection cone and disc in Steel S235, internally and externally epoxy coated (min. 250 µm) in accordance with DIN 30677. The item includes packing, all necessary bends and fittings for the swan-neck installation, and all labor required. Complete in all respects as per drawings, specifications, and the Engineer's instructions. | | | | | | |
| a- | **AIR INLET CHECK VALVE DN 300mm** | No. | 21 | | | | |
| | | | | | | | |
| b- | **MS Straight Specials PN16** | | | | | | |
| | DN300 Flanged Spigot Pipe With Puddle Flange (L=400mm) | No. | 21 | | | | |
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| c- | **DI Gate Valves PN16** | | | | | | |
| | DN300mm FLANGED Gate Valve | No. | 21 | | | | |
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| 9.4 | **WASHOUT VALVE** | | | | | | |
| | Providing, installation, jointing, and fixing of a PN16 washout valve made of ductile iron EN-GJS-450 material with stainless steel 410 seat rings & stem, designed to BS 5150 / EN558 (3) complete with flanges, gaskets, nuts, bolts, pipes, key, and labor with nominal pressures of PN 16 bar. This includes all necessary pipes and fittings for draining the lines as per standards. Complete in all respects as per drawings, specifications, and Engineer's instructions. | | | | | | |
| | | | | | | | |
| a- | **DI Double Flanged Dismantling Joint PN16** | | | | | | |
| | DN300mm | No. | 11 | | | | |
| | | | | | | | |
| b- | **PE Pipe** | | | | | | |
| | OD300mm PE PN16 Pipe, L= 6m | R.m | 66.00 | | | | |
| | OD500mm PE PN16 Pipe, L= 10m | R.m | 110.00 | | | | |
| | | | | | | | |
| c- | **MS Junctions and Branches PN16** | | | | | | |
| | DN300 Flanged Spigot MS Pipe Piece (L=200mm) | No. | 11 | | | | |
| | | | | | | | |
| d- | **DI Gate Valves PN16** | | | | | | |
| | DN300mm Flanged Gate Valve | No. | 11 | | | | |
| | | | | | | | |
| e- | **Surface Box for Buried Gate Valve** | | | | | | |
| | Surface Box | No. | 11 | | | | |
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| **10** | **THRUST / Anchor Blocks** | | | | | | |
| | Providing and fixing of Thrust / Anchor blocks under pipe lines at horizontal, vertical bends, Tees, Reducers and blank ends constructed with concrete Minimum cylindrical strength Class C (21 MPa) . Including Complete design to be approved by the Engineer and complete construction in all respects as specifications and Engineer's instruction. | Cu.m | 350 | | | | |
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| **11** | **REINSTATEMENT** | | | | | | |
| | Reinstatement of Road Surface i/c excavation of unsuitable material, sub grade preparation, granular sub base, aggregate base, cut back asphalt for bituminous prime and tack coat and asphaltic concrete for base & wearing course complete in all respect as per drawing and as directed by the Engineer/Incharge. | | | | | | |
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| 11.1 | Formation, dressing and preparing sub-grade as per drawings, sepecification and as directed by the Engineer. | Sq.m | 74,476.00 | | | | |
| 11.2 | Providing and laying sub-base course of crushed stone aggregate of approved quality and grade, including placing, mixing, spreading and compaction of sub-base material to required depth, camber, grade to achieve 100% maximum modified AASHO dry density, including carriage of all material to site of work . | Cu.m | 11,171.00 | | | | |
| 11.3 | Providing and laying base course of crushed stone aggregate of approved quality and grade, and supply and spreading of stone screening, including placing, mixing, spreading and compaction of base course material to required depth, camber and grade to achieve 100% maximum modified AASHO dry density, including carriage of all materials to site of work. | Cu.m | 11,171.00 | | | | |
| 11.4 | Providing and laying bituminous priming coat, using 10 lbs. kerosene oil and 10 lbs. binder per 100 Sft. or 0.5 Kg kerosene and 0.5 Kg binder per square metre. | Sq.m | 74,476.00 | | | | |
| 11.5 | Providing and laying plant premixed bituminous base course (4% Bitumen), including compaction and finishing to required camber, grade and density, and carriage of all material to site of work. Provisional Quantity will used after the approval of Engineer. | Cu.m | 3,724.00 | | | | |
| 11.6 | Providing and laying bituminous tack coat, using 10 lbs. of bitumen per 100 Sft (0.49 Kg of bitumen per sq.m.) | Sq.m | 74,476.00 | | | | |
| 11.7 | Providing and laying plant premixed bituminous carpet, including compaction and finishing to required camber, grade and density, and carriage of all material to site of work. | Cu.m | 3,724.00 | | | | |
| | | | | | | | |
| **12** | **THRUST BORING** | | | | | | |
| | Full design and construction by Pipe Jacking for identified crossings as per the specifications and typical drawings including Detailed design finalization of the project works to be approved by the Engineer, hydraulic and hydrological analysis, alignment design, structural design, Temporary access shaft design, Permanent exit shaft design, geotechnical investigation and design, utility designs, etc. Construction of the micro-tunnel with all associated activities / requirements including: Preparation and general installation, approvals and permits, Thrust and reception shafts, pipe sleeves (84" MS sleeve for 72" pipe), innecessary fittings, cement and sand slurry grouting (1:2) in the annular space including supply of pipe as stated in pipe specificationsTransport and installation, and subsequent removal of the Pipe Jacking equipments, Shored trench at the inlet and outlet side. Complete in all respects as per drawings, specifications and Engineer's instruction. | R.m | 1,100.00 | | | | |
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| **13** | **CONNECTION FROM TRANSMISSION MAIN** | | | | | | |

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| | Providing connections for future conveyance and connection with existing system including the cost of fabrication, fixing, jointing, all fittings, Tees etc. Complete in all respects as per drawings, specifications and Engineer's instruction. | | | | | | |
| 13.1 | **Interconnection - at Gulbai** | | | | | | |
| | Interconnection to existing pipeline to Gulbai from proposed 72 inch MS pipe including civil works / chambers, all fitting / specials, Tee / Y, flanges, gaskets, nuts, bolts, pipes, key, and labor with nominal pressures of PN 16 bar etc. for regular operational purpose complete in all respects as per drawing KWSSIP_K-IV_R2B-W302, specifications and as per the direction of the Engineer in charge. | | | | | | |
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| a- | **MS Reducer PN16** | | | | | | |
| | DN 1800mm/1400mm | No. | 1 | | | | |
| | | | | | | | |
| b- | **DI Double Flanged Dismantling Joint PN16** | | | | | | |
| | DN1400mm | No. | 4 | | | | |
| | DN300mm | No. | 1 | | | | |
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| c- | **MS Straight Specials PN16** | | | | | | |
| | DN1400mm Flanged Spigot with puddle flange (L=2000mm) | No. | 9 | | | | |
| | | | | | | | |
| d- | **DI T-Strainer PN16** | | | | | | |
| | DN1400mm | No. | 1 | | | | |
| | | | | | | | |
| f- | **DI Butterfly Valve PN16** | | | | | | |
| | 1400mm | No. | 2 | | | | |
| | | | | | | | |
| g- | **MS Junctions and Branches PN16** | | | | | | |
| | DN1800/1400mm Flanged Reducing Tee | No. | 1 | | | | |
| | 200mm Flanged Spigot MS Pipe Piece (L=400mm) | No. | 1 | | | | |
| | 300mm Flanged Spigot MS Pipe Piece (L=200mm) | No. | 1 | | | | |
| | DN300 Flanged Spigot MS Pipe Piece (L=200mm) | No. | 1 | | | | |
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| i- | **Air Release Valve PN16** | | | | | | |
| | DN200mm | No. | 1 | | | | |
| | | | | | | | |
| j- | **DI Air Inlet Check Valve PN16** | | | | | | |
| | DN300mm, Air Inlet Check Valve | No. | 1 | | | | |
| | | | | | | | |
| k- | **DI Gate Valves PN16** | | | | | | |
| | DN300mm FLANGED Gate Valve | No. | 2 | | | | |
| | DN200mm FLANGED Gate Valve | No. | 1 | | | | |

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| m- | **PE Pipe** | | | | | | |
| | OD300mm PE PN16 Pipe, L= 6m | R.m | 6 | | | | |
| | OD500mm PE PN16 Pipe, L= 10m | R.m | 10 | | | | |
| | | | | | | | |
| n- | **Surface Box for Buried Gate Valve** | | | | | | |
| | Surface Box | No. | 1 | | | | |
| | | | | | | | |
| o- | **EM Flowmeter PN16** | | | | | | |
| | DN1400 mm | No. | 1 | | | | |
| | | | | | | | |
| p- | **Plunger Valve PN16** | | | | | | |
| | DN1400 mm - Diameter to be verified and adapted by the supplier as per specifications | No. | 1 | | | | |
| | | | | | | | |
| r- | **MS BLANK FLANGE PN16** | | | | | | |
| | DN1800 mm | No. | 1 | | | | |
| | | | | | | | |
| s- | **Roadside Ventilation** | | | | | | |
| | OD 200mm, uPVC Class E PN16 Air vent pipe with stainless steel mesh as per the drawings | R.m | 18 | | | | |
| | OD 200mm, uPVC Class E PN16 Air vent pipe to the ventilation chamber as per the drawings | R.m | 6 | | | | |
| | | | | | | | |
| 13.2 | **Emergency connections - Emergency Connection** | | | | | | |
| | General connection of 1000mm from proposed 72 inch MS pipe including civil works / valve chamber, all fitting / specials, Tee / Y, flanges, gaskets, nuts, bolts, pipes, key, and labor with nominal pressures of PN 16 bar etc. for regular operational purpose complete in all respects as per drawings, specifications and as per the direction of the Engineer in charge. | | | | | | |
| | | | | | | | |
| a- | **DI Dismantling Joint PN16** | | | | | | |
| | DN 1000mm | No. | 1 | | | | |
| | | | | | | | |
| b- | **MS Straight Specials PN16** | | | | | | |
| | DN1000mm Double Flanged Pipe With Puddle Flange (L=2000mm) | No. | 1 | | | | |
| | DN1800mm Flanged Spigot Pipe With Puddle Flange (L=2000mm) | No. | 2 | | | | |
| | | | | | | | |
| c- | **MS Junctions and Branches PN16** | | | | | | |
| | DN1800 x1000mm flanged Reducing Tee | No. | 1 | | | | |
| | | | | | | | |
| d- | **DI Butterfly Valves PN16** | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | DN1000 mm | No. | 1 | | | | |
| | | | | | | | |
| e- | **DI Non Return Valve PN16** | | | | | | |
| | DN1000 mm | No. | 1 | | | | |
| | | | | | | | |
| f- | **MS Blank Flange PN16** | | | | | | |
| | DN1000 mm | No. | 1 | | | | |
| | | | | | | | |
| h- | **Roadside Ventilation** | | | | | | |
| | OD 200mm, uPVC Class E PN16 Air vent pipe with stainless steel mesh as per the drawings | R.m | 6 | | | | |
| | | | | | | | |
| 13.3 | **Connection with the existing 72" at CH 1+800** | | | | | | |
| | General connection with the existing 72 inch MS pipe including civil works, all fitting / specials, gaskets, nuts, bolts,, key, and labor with nominal pressures of PN 16 bar etc. for regular operational purpose complete in all respects as per drawings, specifications and as per the direction of the Engineer in charge. | No. | 1 | | | | |
| **14** | **Automation and Control of Plunger Valve** | | | | | | |
| | Providing and installing of automation and control for the plunger valves including Supply and installation of an analog pressure sensor 0-6 bar, IP65, PLC with dual PID loop, Installation and configuration of a multi-turn electric actuator 4-20 mA for the plunger valve, Integration of an HMI with the PLC (communication, testing, alarms) , the supply and installation of the electrical power supply with power and control cables, and the complete verification and functional testing in coordination with the plunger valve supplier as per specifications. | No. | 1 | | | | |
| | | | | | **Total Bill 3** | | |