



SALE PROPOSAL HITACHI ZOSEN TBM WITH ITS ACCESSORIES



INDEX

SI No	Description	Remarks
1	Index	
2	Specification of TBM- Hitachi Zosen	
3	BOQ - Bill of Quantity Hitachi Zosen TBM	
4	BOQ- Bill of Quantity TBM related Equipment (ancillary asset)	
5	BOQ- Bill of Quantity TBM Spares (Available)	
6	BOQ- Bill of Quantity STP Spares (Available)	
7	BOQ- Bill of Quantity STS Spares (Available)	
8	List of Rolling Stock attached to TBM	



SPECIFICATION OF TBM

HITACHI ZOSEN

1 DESIGN CONDITION

1.1 General Condition

Project Name	Bengaluru Metro Rail Corporation Phase I (East-West Corridor)
Site Location	Majestic, Central College, Vidhana Soudha, Cricket Stadium & City Railway Station
Number of TBMs	Two
Total distance bored by TBM	4.8 Kms. [West : (227 + 954) x 2 Line= 2362 m and East : (727 + 479) x2 Line= 2412 m / two TBM]

1.2 Geotechnical Condition

Type of ground	Clay, Silt, Sand, Weathered Rock and Hard Rock
Overburden	Min.3mtr. - Max.16 mtr.(from Tunnel top)
Max. Water Level	Min.2mtr. - Max.10 mtr.(from Tunnel top)
Soil Condition	Soil 20~more than 100
Max. Boulder Size	> 300 mm (Allowable 250mm with Slit /Limit plates)
UCS Value	Avg.100MPa ~ Max.300MPa

1.3 Alignment Condition

Tunnel Length	Approx. 4810m(2 TBM's)
Max. Length to continuously bore	982 m
Up	3.42%
Down	3.42%
Minimum Curve Radius	
a) Horizontal	272.480 mR
b) Vertical	1500 mR

1.4 Tunnel Segment Lining Condition

Type	RC Segments
Number of Segments	5+1
Segment Inner Diameter	5600 mm
Segment Outer Diameter	6160 mm
Segment Width	1500 mm
Key Insertion Stroke	650mm
Max. Segment Weight	36kN

2 Technical Specification

2.1 TBM Salient Features

TBM Type	Pressurized Slurry type Shield
Design Standards	Japanese Industrial Standards (JIS) Japanese Standards for Shield tunnelling (JIS) standard of Japan Electrical Manufacturer Association (JEM) Japanese Electro-Technical Committee Standards (JEC)
Working Earth Pressure	3.0 Bar
Back-Up Type	Gantry Type
Total Length (Shield + Back-Up)	(approx.) 115 m
Min. Horizontal Curve Radius	250 m
Min. Vertical Curve Radius	1000 m
Max. Slope	±2.8%
Muck Evacuation Method	Slurry system

2.2 Shield

Outer Diameter	6440 mm
Tail Inner Diameter	6,220 mm
Tail Thickness	80 mm
Tail Clearance	30 mm
Length (Shield Body + Cutter Head)	9935 mm
Overall length	115 m
Earth Pressure Sensors	2 Nos.
Injection Ports	4 Nos.
Shield Body (Peripheral)	10No. x Ø65 mm
Bulkhead	4No. x Ø65 mm
Articulation	Active Type
Probe Drilling Ports	Common with Injection Ports
Tail Sealing	Wire Brush Type, 3 rows & Spring Plates
Tail Grease Injection Lines	6
Tail Grout Injection Lines	4
Shield Griper Number x Stroke	4 x 150 mm

2.3 Cutter Head

Type	Dome Type, Hard Rock
Excavation Diameter (with Disc Cutters)	6520 mm - 6490 mm
Direction of Rotation	CW & CCW
Direction of Excavation	CW & CCW
Opening Ratio (approx.)	23%
Number of Disc cutter	44
Soft Ground Tools	Scrapers & Cutter bits
Copy Cutter	1 no
Wear Detection Bits	4 No

2.4 Cutter Head Drive

Driving Method	Electric – Variable Frequency Drive (VFD)
Installed Power	1200 kW
Number and unit power of drive motors	10 No. x 120 kW
Speed	0 - 1.8- 4.5 rpm
Nominal Torque	2574 kNm
Breakthrough Torque	6285 kNm
Main Bearing diameter	2.8 m
Bearing Housing Sealing	VD Seal (Inset Type Outward)/VD Seal (Inset Type Inward)/VD Seal (Outside lip)/VD Seal (Inner lip)/VD Seal (Inside lip)
Lubrication	Grease for the Seals
Lube for Housing	Grease for Planetary Gear Box drive Unit

2.5 Thrust System

Total Thrust (Max.)	37760 kN
Maximum Pressure	335 Bar
Number of Cylinders	16 nos.
Stroke of Cylinders	2200 mm
Maximum Advance Speed (all jacks extending)	75mm/min
Control sectors	4 (Up, Down, Left, Right)
Stroke Sensors	2 + 1 nos.

2.6 Articulation System

Type	Active
Articulation Angle	1.8° Horizontal(max.) 1.8° Vertical(max.)
Min. Horizontal Curve (Radius)	R250m
Total Thrust (Max.)	34580 KN
Max. Pressure	350 Bar
Number of Cylinders	14 nos.
Stroke of Cylinders	180 mm
Stroke Detectors	4 nos.

2.7 Man Lock

Type	Manlock +Material Lock Double Chamber
Working Pressure	3 bar
Main Chamber Capacity	4 persons
Access Chamber Capacity	4 persons (Sub chamber)
Breathable Air Supply	Cooling System, filtration System & Mass Controllers in Back-up cars.
Dimensions	I.D. Ø1706 mm & Length 2950 mm long

2.8 Back-Up System

Type Open Gantry	Wheels in bottom stage type
Rail Gauge	3000 mm
Total Length (from Bridge to last deck)	(20.250+85.5=105.750 m.)
Number of Decks Bridge	Rear Scaffold + Work Deck + Bridge + 10 (Right and Left Back-up Decks)
Rest on Steel Wheels on Rail Track	Each Back-up deck (R/L) consists of 2 wheels in bottom
Max. Width for Service Train	1800 mm
Rail Track Assembling Position On Bridge	Below
Rail Track Length (assumed)	6 mtr. in length

2.9 Segment Transport System

Segment Crane	Twin beam frame Chain & Pinion travelling type
Type Trolley & Hoist	Hoist
Pick-Up Method	Spreader Beam
Hoist Number and Capacity	Primary(Upper) & Secondary(Lower) Cap.4.8 Ton (2.5 T X 2)
Control Pendant	Wireless & Wire box remote type

2.10 Water System

Water Supply Requirement Flow x Temperature	TBM water in/out@ 290L/min X 30°C at 10bar Total : 40m ³ /hr.
Water Supply Temperature	25°C
TBM Water Cooling Type	Closed Loop
Water Pumps Number and Power	1 X 37.5KW (Vertical inline centrifugal pump)
Heat Exchanger	Included for Compressed Air Cooling only
Water Tank capacity	2 X 30m ³ (at Surface)

2.11 Dewatering System

Dewatering Pumps Type	Electrical operated
Location Bridge Gantry	Erection Area below Bridge
Dewatering Pumps Capacity	2 X 16hp External Dewatering pumps
Dewatering Tank Capacity	1 X 30m ³ (at Surface)

2.12 Compressed Air System

Number of Compressors, Power 2No x 45kW	Buyer's Scope
Max. Pressure	7-10bar

2.13 Air Reservoir

Capacity	Horizontal receiver tank - 2.4m ³ (Back-up Gantry)
Air Drier Included	Air Filtration and cooling system included

2.14 Ventilation System

Tunnel Air Duct Diameter	1200 mm
Booster Ventilation Line Diameter	600 mm

2.15 Hydraulic System

Total Installed Power in Hydraulic Station	158 KW
Oil Tank Capacity	3500Ltrs.
Oil Type	ISO VG46
Oil Filtration & Cooling System	Included

2.16 Greasing System

Main Seal	Centralised Lubrication Pumping System
Number of Pumps	2 Nos.
Type of Pump Electric	Electrically operated
Barrel Size	18kg for Centralized & 250 kg for Tail skin greasing
Number of Pumps	2 Nos.
Type of Pump	Electrical operated for main bearing & Pneumatic operated for Tail skin grease

2.17 Electrical System

Transformer Type	Dry type
Transformer Capacity	2000 KVA
Primary/Secondary Voltage	11,000V(For TBM& BU Car)/6,600V(Pumps in Tunnel) and 400V
Power Voltage	400V
Control Voltage	100V AC & 24V DC
Lights Voltage	100V
Frequency	50 Hz.
Protection for Electric Motors	IP55
Protection for Electric Cabinets	IP54 & IP 65
Cable Type Low Smoke and Fume (LSF)	2PNCT- for Power & VCT- for Lighting
PLC Brand	Mitsubishi Electric
M.V. Cable Storage System	Cable Basket
M.V. Cable Storage Capacity (Cable excluded)	200 m

2.18 Control Cabin

Type	Closed
Acoustic isolation	Included
Temperature control	Included
Control Panel	Included
TBM Data Logger System	Included
CCTV System	Included

2.19 Safety Systems

Gas Detecting System Included	Included
Number of sensors	6 Nos.
Gas to Detect	O ₂ /CO/CO ₂ /NO ₂ /H ₂ S/CH ₄
Emergency Lights	Included
Fire Detection & Alarm System	Included
Fire Fighting System	Manual Extinguishers (Buyer's scope)
Fire Curtain	Included
CCTV System	1 Monitor and 4 cameras
Intercommunication System (within TBM)	Included, 4 positions (Buyer's scope)

2.20 Guidance System

Brand Enzan	ENZAN
Model/Version	(ARIGATAYA Viewer Ver.3.2.61) / (ARIGATAYA Main Ver.3.2.101)
Ring Selection Program	YES
Total Station	YES
Total Station accuracy	3 sec

2.21 Backfilling System

Type 2-Liquid Type	Liq.A (Grout) + Liq.B (Sodium Silicate)
Grout Transfer	Grout Plant at Surface
Grouting Injection	Tail Shield Plate@330l/min
Number of Independent Grouting Lines	4 nos.
Number of Injection Ports on the Shield	4 nos.
Diameter of Injection Port on the Shield	Ø40mm
A-Liquid Tank Capacity	7.0m ³
A-Liquid Pumps Number x Capacity	4 x (50-100 l/min)
A-Liquid Pump Max. Pressure	15bar
B-Liquid Tank Capacity	1.0m ³
B-Liquid Pumps Number x Capacity	4 x (5-10 l/min)
B-Liquid Pump Max. Pressure	15bar
Instrumentation Digital measuring of Flow and Pressure	2" & 3/8" Electro-Magnetic Flow meters X 4 (Liq.A+Liq.B) 3MPa Diaphragm pressure Gauge with micro pressure switch

2.22 Additive Injection System (Grout Plant at Surface)

Type Polymer / Bentonite	Stabilizer
Additive Injection Total Flow	2.5L/min
Number of Independent Lines	1no.
Additive Pump Number x Capacity	1 x 2.5 l/min
Additive Tank Capacity	1.0m ³
Instrumentation	Digital measuring of Flow and Pressure
Control modes	Automatic

2.23 Additive Injection System (STP at Surface)

Type Polymer / Bentonite	CMC (Carboxy-methyl-cellulose)
Additive Injection Total Flow	100L/min
Number of Independent Lines	1no.
Additive Pump Number x Capacity	1 x 100 l/min
Additive Tank Capacity	3.0m ³
Instrumentation	Digital measuring of Flow and Pressure
Control modes	Automatic

2.24 Segment Erector

Type	Ring Type
Driving Method	Hydraulic driven Motors with brake
Installed Power	55 KW for Erector Rotation and 18.5 KW for Erector Jacks
Maximum Handling Weight	Max. 4.2 ton/piece
Rotation Speed	0.2/1.5 rpm
Rotation Angle	Clockwise & Counter clockwise 210°
Pick-Up Method	Fork and Stopper Pin type
Radial Force	144 KN (Hanging-up force)
Axial Force	210KN (Pushing force)
Radial Stroke	650 mm (Erector Lift stroke) and 150 mm (Erector Support stroke)
Axial Stroke	750 mm (Erector Slide stroke)
Control Remote	Wireless type

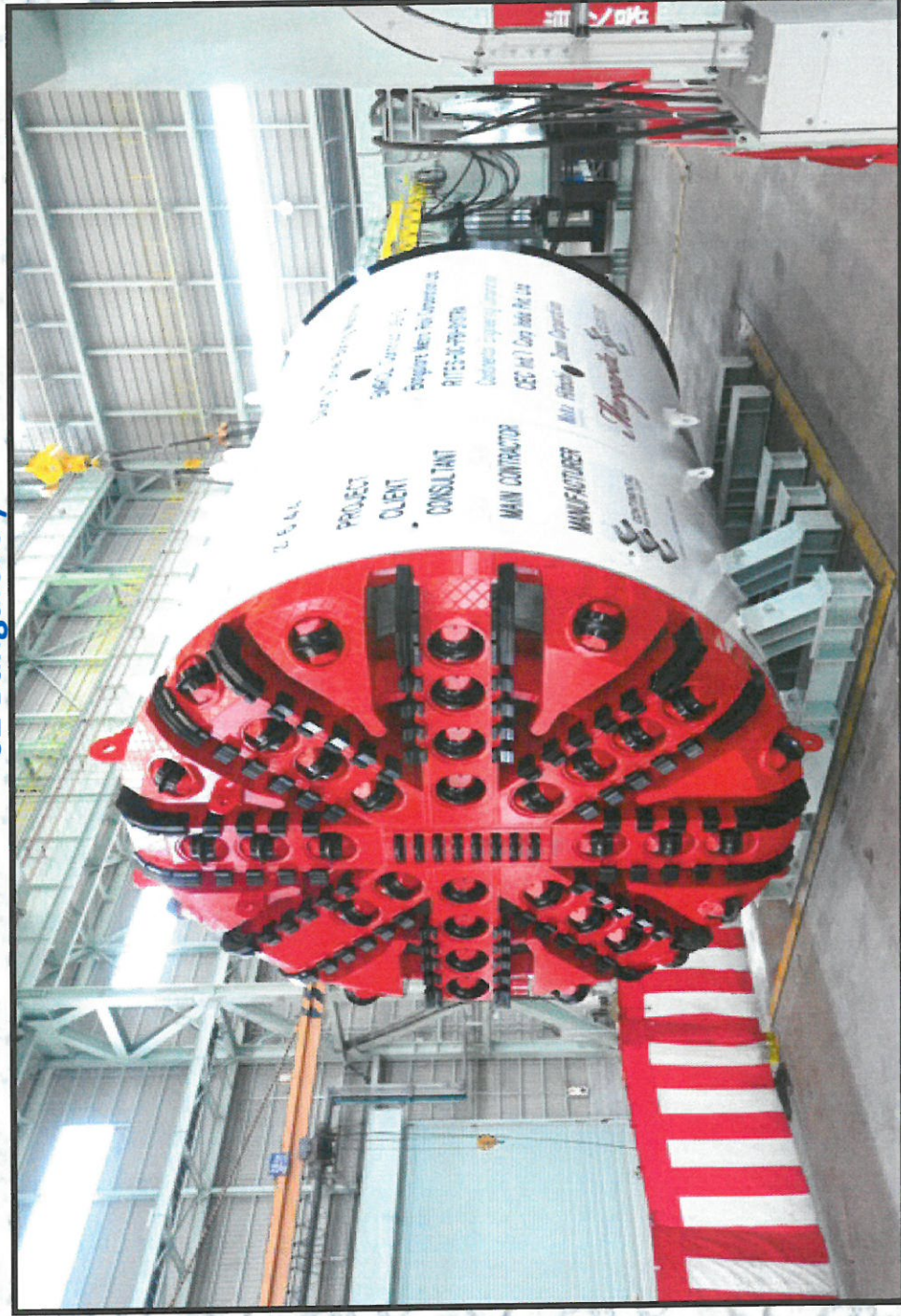
3 Slurry Treatment Plant

Sand Separators with Wedge-wire Screens	2 no Capacity : Max.Load/Set --- 72 ton/hr.
Gravel Separator with Rubber Screens	1 No / Capacity : Max.Load/Set--120t/hr.Weight load for Soil & Gravel Discharged / Water Load:16cum/min.
Cyclone Pumps Make Sakurajawa	4 No / Capacity : 2.5 cum/min. X 20mH
Cyclone Frames	12 No / Capacity : 0.8 cum/min.
Filter Press System (inc. High Pressure Slurry & dosing pumps)	3 No / Discharge cake volume : 10.9cum/set. at 5 bar filter pressure No.of Filter chamber:150 rooms/set
Slurry Plant In-line Pumps	1 set / Capacity : 456 KW
Waste Water Treatment plant	1 no / 20cum/hr.
Slurry Tanks	4 no / 120cum.

4 Slurry Transportation System

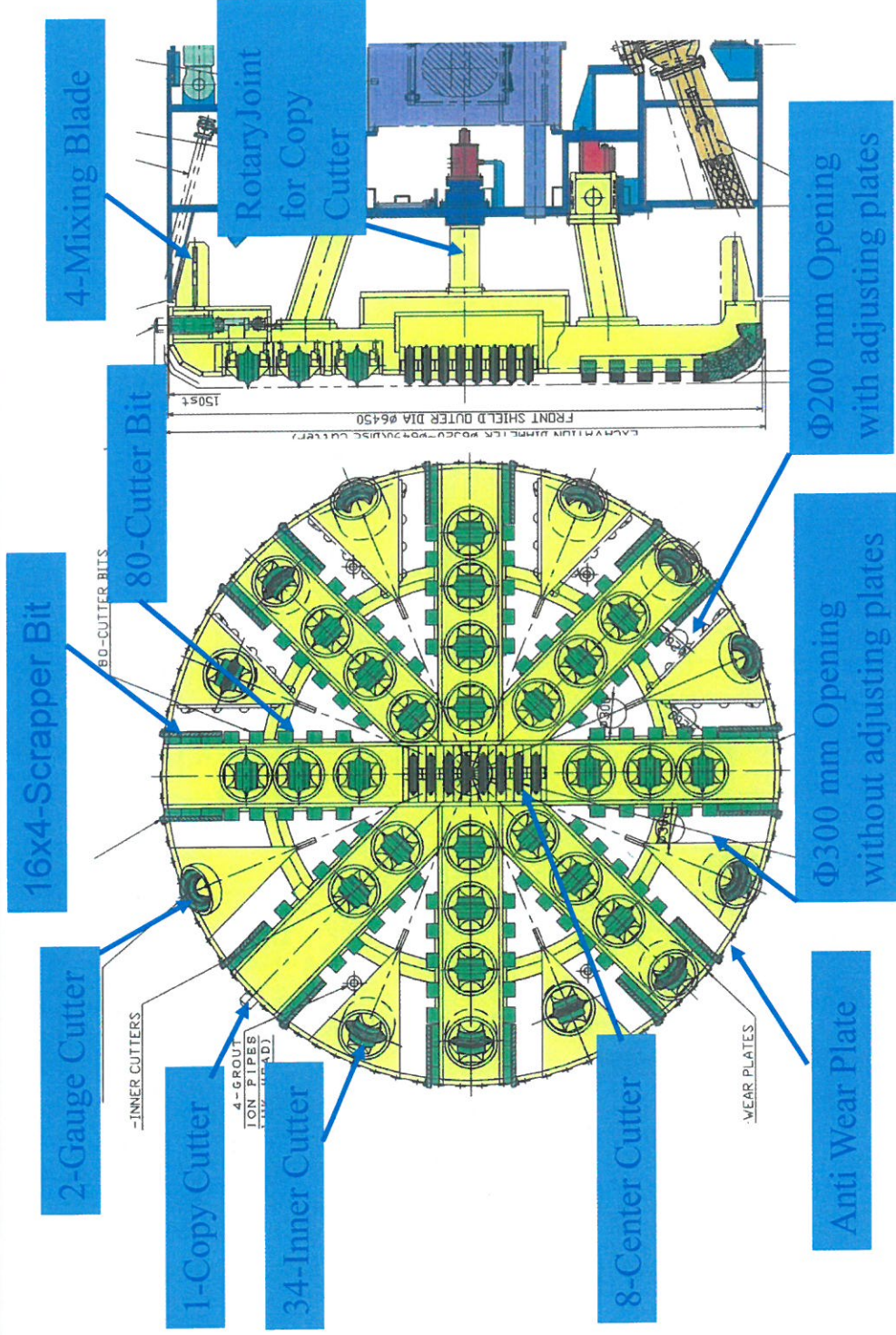
Feed & Discharge Slurry Pumps with Water Supply Units and Inverter Panels	(Model: SPD2-200 ; Capacity :7cum/min.) Make AKTIO
Slurry Transportation Pumps	3 No/ 200 KW
KW Slurry Transportation Pumps	3 no / 132 KW Slurry Pumps
KW Slurry Transportation Pumps	1 No / 90 KW Slurry Pumps
75 KW Slurry Transportation Pumps	2 No/ 75 KW
45 KW Slurry Transportation Pumps	1 No/ 45 KW
Dry Type Transformers Model :CCM	1 No / 300 KVA
	2 No/ 250 KVA
	6 No/ 200 KVA
	1 No/ 160 KVA
Densitometers at Bottom Shaft	1 no
Shaft Valve Set at Bottom Shaft	1 no
By-pass Valve Sets in Back-up Car	1 no
Stone ARB-250 Rotary Jaw Crusher in Back-up Car	1 no
Distributor in Back-up Car	1 no
Back-up Car Hose Reel for feed & Discharge Line in Back-up Car	1 no
3-Way Valve for Slurry Transfer System in Back-up Car	1 no

Ø6.440m Hard-Rock Slurry type Shielded TBM Tunnelling Conditions (UG-02 Bangalore)



Cutter-head and Cutter chamber

Shield Front Body Dia.= 6,440 mm Cutting Diameter By New Scraper Bits= 6,490 mm
 Cutting Diameter By Gauge Disc Cutter= 6,520 ~ 6,490 mm

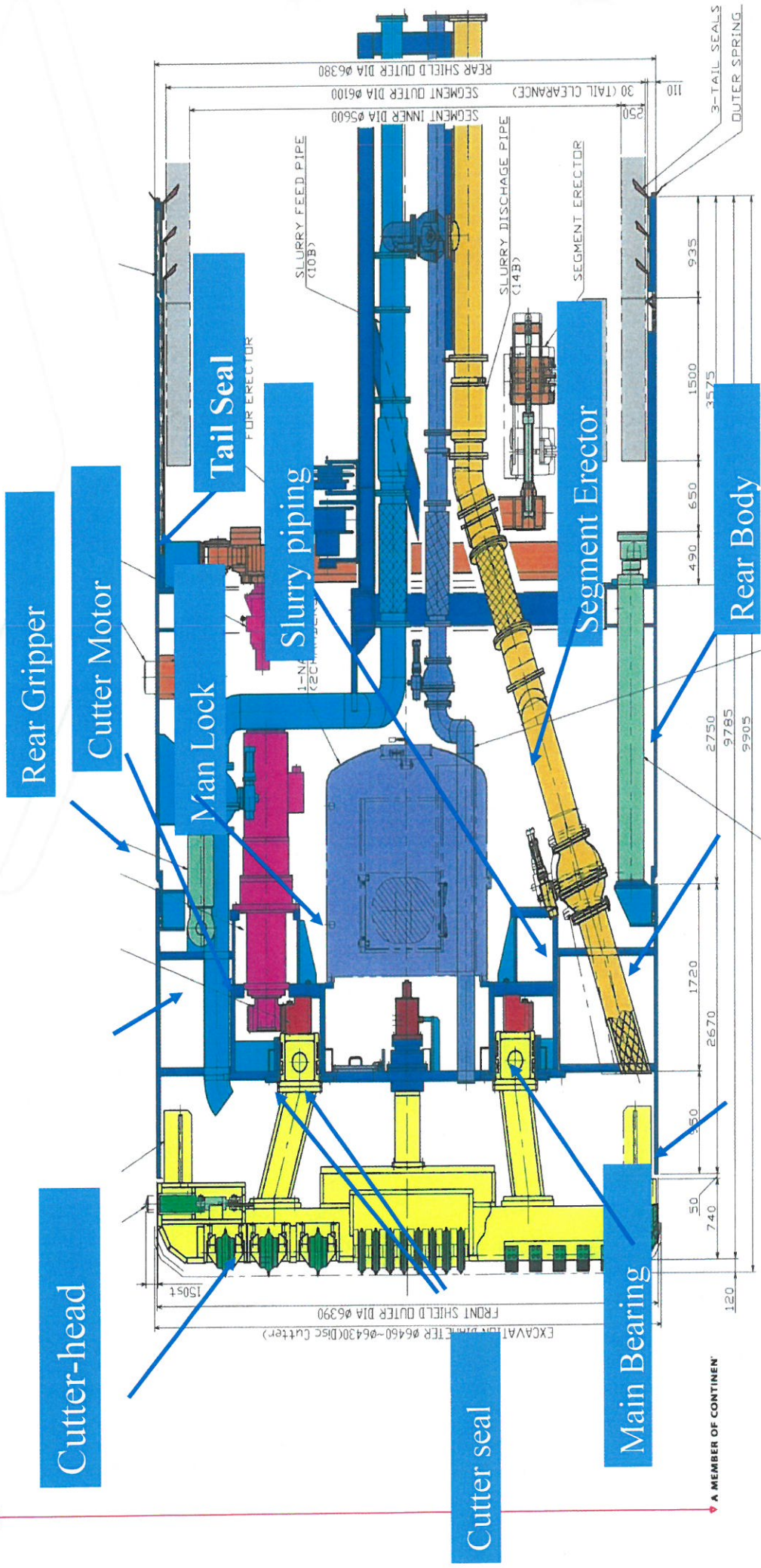




CEC INT'L CORP
INDIA PVT. LTD.

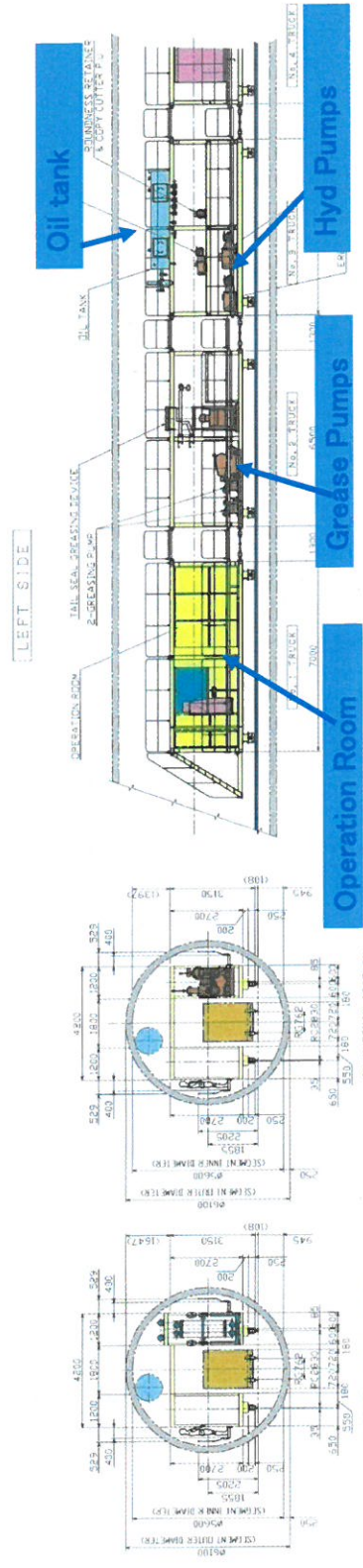
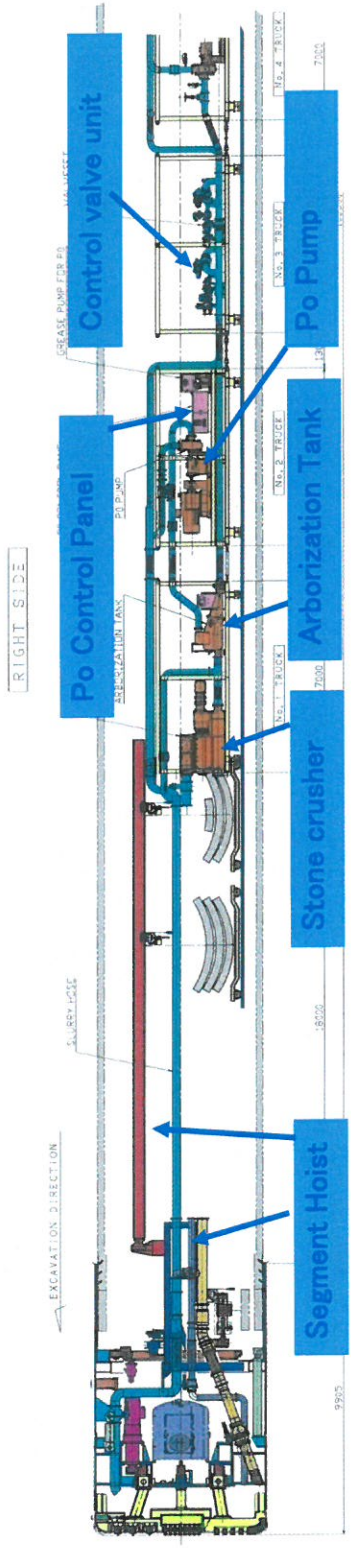
Ø6.440m Slurry Shield Hitachi Machine for Hard Rock

for Bangalore UG-02

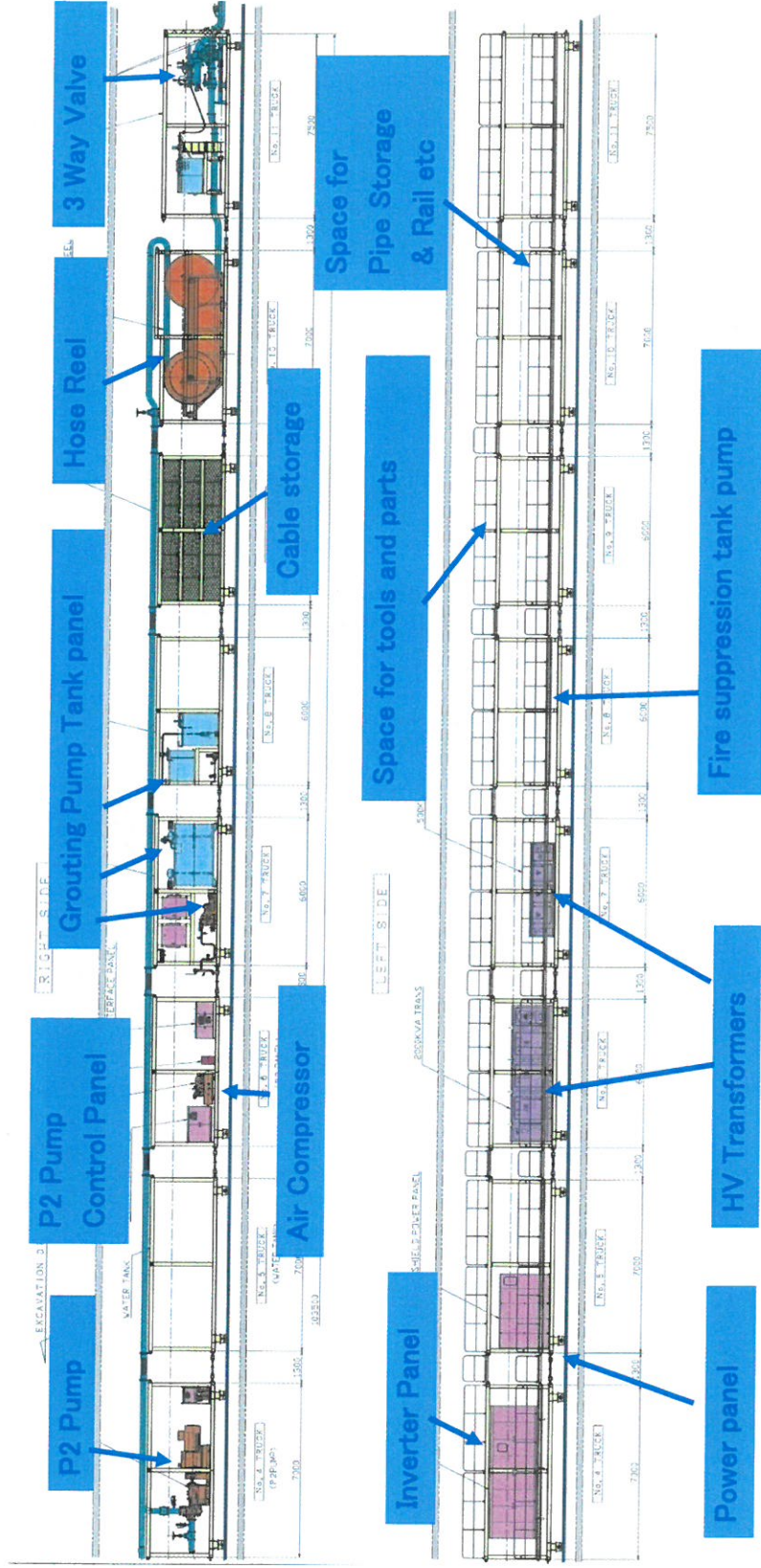


A MEMBER OF CONTINENT

Back Up Car Arrangement NO.1 ~ No.3 Cars



Back Up Car Arrangement No.4 ~ No.10 cars





BOQ- BILL OF QUANTITY
HITACHI ZOSEN TBM

Site: UG-02;Bangalore

Subject : Hitachi TBM and its anciliary/auxiliary and allied Equipments

its Retaled Equipment

Sl.No.	Asset	Description of Machinery	Technical Details	Quantity (in Set)	Remarks		
1	Helan	Hitachi TBM - 1 (1S210353#1 ;May2011)	TBM Type	Ø6.440 mtr. Suitable for finished tunnel Dia. of Ø5.600 mtr. Slurry (Hard-rock slurry type shielded TBM)	1 Nos		
			Cutter Head	Incl. Copy cutter jack & Cutter Tools Face : 34nos.; Gauge : 2nos. Center : 8nos. & Copy : 1 no.	1 Nos		
			Front Body Upper	Incl. Grout injection pipes	7		
			Front Body Lower	Incl. Stone push out jacks	2		
				Incl. Grout injection pipes	7		
			Cutter Driving Unit	Incl. Man Lock	1		
				Incl. Rotary joint	1		
			Middle Body Front Side	Incl. Articulation Jacks	14		
			Middle Body Rear Side	Incl Shield Jacks	16		
				Incl.Gripper Jacks	4		
			Rear Body	Incl. Erector (Ring)	1		
				Incl. Erector Lift jacks	2		
				Incl. Erector slide jacks	1		
				Incl. Erector support jacks	4		
				Incl. Erecor rotation hyd.motors	2		
				Incl. Back filling devices	4		
				Incl.Tail seal wire brushes	3(rows)		
				Cutter Motor (φ835 × L2750)	120KW Water Cooled Variable frequency drive	10	
				Rear Work Deck	Incl. Hose reel(Erector)		
					Incl. Cable reel(Erector)	1	
				Side Deck for Rear Work Deck		1	
				Shield jack shoes(L1046×W366×H245)		16	
				Bridge Deck	Incl.Hoses & Pipelines	1	
				No.1 Left Back up car Size: L7420 X W1200 X H3100) mm	Incl. Air conditioner unit	1	
					Incl. Control panels	1	
					Incl. Gas monitoring system	1	
					Incl. CCTV system	1	
				No.1 Right Back up car Size: L7420 X W1200 X H3100) mm	Incl.Stone Crusher ARB-250	1	
				No.2 Left Back up car Size: L7420 X W1200 X H3100) mm	Incl. Articulate jack pump unit	1	
					Incl. Shield jack pump unit	1	
					Incl. Erector jack pump unit	1	
					Incl. Erector rotation pump unit	1	
					Incl. Copy cutter pump unit	1	
					Incl. Oil tank	1	
				No.2 Right Back up car Size: L7420 X W1200 X H3100) mm	Incl.P0 Slurry Pump	1	
					Incl.Control Panel(P0)	1	
					Incl.Water Supply Unit(P0)	1	
					Incl.Grease Pump(Crusher)	1	
				No.3 Left Back up car Size: L6420 X W1200 X H3100) mm	Incl.Shield power panel	1	
					Incl.Tail seal greasing devices	1	
		Incl.Grease pump	1				
		Incl. Chain block	1				

Site: UG-02;Bangalore

Subject : Hitachi TBM and its anciliary/auxiliary and allied Equipments

its Retaled Equipment

Sl.No.	Asset	Description of Machinery	Technical Details	Quantity (in Set)	Remarks
			Incl.Cables for Grout injection	1	
		No.3 Right Back up car Size: L6420 X W1200 X H3100) mm	Incl.Bypass Slurry Valve Set	1	
		No.4 Left Back up car Size: L7420 X W1200 X H3100) mm	Incl. Cutter inverter panels	1	
		No.4 Right Back up car Size: L7420 X W1200 X H3100) mm	Incl.P2 Slurry Pump	1	
			Incl.Water Supply Unit(P0)		
		No.5 Left Back up car Size: L7420 X W1200 X H3100) mm	Incl.High Voltage transformer for shield machine	1	
		No.5 Right Back up car Size: L7420 X W1200 X H3100) mm	Incl. Grout injection System	1	
		No.6 Left Back up car Size: L6420 X W1200 X H3100) mm	Incl. Air compressor	1	
			Incl. High voltage transformer for STS	1	
		No.6 Right Back up car Size: L6420 X W1200 X H3100) mm	Incl. Grout injection System	1	
		No.7 Left Back up car Size: L6420 X W1200 X H3100) mm	Incl. cable storage	1	
		No.7 Right Back up car Size: L6420 X W1200 X H3100) mm	Empty space for tools and parts	1	
		No.8 Left Back up car Size: L6420 X W1200 X H3100) mm	Incl. Air filters	1	
			Incl. Receiver tank	1	
			Incl. Air control for Man lock	1	
		No.8 Right Back up car Size: L6420 X W1200 X H3100) mm	Incl. Fire suppression systems	1	
			Incl.Water tank	1	
			Incl.Fire Suppression tank pump	1	
		No.9 Left Back up car Size: L8620 X W1200 X H3100) mm	Incl. Air cooler	1	
			Incl. Air control for Man lock	1	
		No.9 Right Back up car Size: L8620 X W1200 X H3100) mm	Incl.Hose Reel	1	
		No.10 Left Back up car Size: L7420 X W1200 X H3100) mm	Incl.Cooling Tower	1	
		No.10 Right Back up car Size: L7420 X W1200 X H3100) mm	Incl.3-Way Rotary Valve	1	
		STP-1 (Slurry Treatment Plant)			
		Sand Separators with Wedge-wire Screens	Capacity : Max.Load/Set --- 72 ton/hr.	2	Make : AKTIO
		Gravel Separator with Rubber Screens	Capacity : Max.Load/Set-- 120t/hr.Weight load for Soil & Gravel Discharged / Water Load:16cum/min.	1	
		Cyclone Pumps	Capacity : 2.5 cum/min. X 20mH	4	

Site: UG-02;Bangalore

Subject : Hitachi TBM and its anciliary/auxiliary and allied Equipments

its Retaled Equipment

Sl.No.	Asset	Description of Machinery	Technical Details	Quantity (in Set)	Remarks
		Cyclone Frames	Capacity : 0.8 cum/min.	12	
		Filter Press System (inc. High Pressure Slurry & dosing pumps)	Discharge cake volume : 10.9cum/set. at 5 bar filter pressure No.of Filter chamber:150 rooms/set	3	
		Slurry Plant In-line Pumps	Capacity/ set : 456 KW	1	
		Waste Water Treatment plant		1	
		Slurry Tanks	120cum.	4	
3		STS-1 (Slurry Transportation System)			
			200 KW Slurry Transporatation Pumps	3	Make : AKTIO
		Feed & Discharge Slurry Pumps with Water Supply Units and Inverter Panels (Model: SPD2-200 ; Capacity :7cum/min.)	132 KW Slurry Transporatation Pumps	3	
			90 KW Slurry Transporatation Pumps	1	
			75 KW Slurry Transporatation Pumps	2	
			45 KW Slurry Transporatation Pumps	1	
		Dry Type Transformers Model :CCM	300 KVA	1	Make : AKTIO
			250 KVA	2	
			200 KVA	6	
			160 KVA	1	
		Densitometers at Bottom Shaft	Feed & Discharge line Vertical Pipe to measure the slurry density	1	Make : AKTIO
		Shaft Valve Set at Bottom Shaft	Feed / Discharge / Pressurizing Valves / Pressure release relief and Auxiliary Valves	1	Make : AKTIO
		By-pass Valve Sets in Back-up Car	Forward and Reverse Excavation feed/Dischage Slurry Valves and Control & Emergency face discharge Valve	1	Make : AKTIO
		Stone ARB-250 Rotary Jaw Crusher in Back-up Car	Capacity : 6.75 cum / min. ; Installed Power : 60KW	1	Make : AKTIO
		Distributor in Back-up Car	Capacity : 2.88 cum / min.	1	Make : AKTIO
		Back-up Car Hose Reel for feed & Discharge Line in Back-up Car	Size:8inch ; Length:15mtr. For Slurry Pipe Extension	1	Make : AKTIO
		3-Way Valve for Slurry Transfer System in Back-up Car	For Slurry Pipe Extension	1	Make : AKTIO
4	MARGRIT	Hitachi TBM - 2 1S210353#2 ;May2011			
		TBM Type	Ø6.440 mtr. Suitable for finished tunnel Dia. of Ø5.600 mtr. Slurry (Hard-rock slurry type shielded TBM)		Make: Hitachi Zosen Corp.;Japan
		Cutter Head	Incl. Copy cutter jack & Cutter Tools Face : 34nos.; Gauge : 2nos. Center : 8nos. & Copy : 1 no		Make : Hitachi
		Front Body Upper	Incl. Grout injection pipes	7	
		Front Body Lower	Incl. Stone push out jacks	2	
			Incl. Grout injection pipes	7	
		Cutter Driving Unit	Incl. Man Lock	1	
			Incl. Rotary joint	1	
		Middle Body Front Side	Incl. Articulation Jacks	14	
		Middle Body Rear Side	Incl Shield Jacks	16	
			Incl.Gripper Jacks	4	
		Rear Body	Incl. Erector (Ring)	1	
			Incl. Erector Lift jacks	2	
			Incl. Erector slide jacks	1	

Site: UG-02;Bangalore

Subject : Hitachi TBM and its anciliary/auxiliary and allied Equipments

its Retaled Equipment

Sl.No.	Asset	Description of Machinery	Technical Details	Quantity (in Set)	Remarks
			Incl. Erector support jacks	4	
			Incl. Erecor rotation hyd.motors	2	
			Incl. Back filling devices	4	
			Incl.Tail seal wire brushes	3(rows)	
		Cutter Motor (φ835 × L2750)	120KW Water Cooled Variable frequency drive	10	
		Rear Work Deck	Incl. Hose reel(Erector)	1	
			Incl. Cable reel(Erector)	1	
		Side Deck for Rear Work Deck		1	
		Shield jack shoes(L1046xW366xH245)		16	
		Bridge Deck	Incl.Hoses & Pipelines	1	
		No.1 Left Back up car Size: L7420 X W1200 X H3100) mm	Incl. Air conditioner unit	1	
			Incl. Control panels	1	
			Incl. Gas monitoring system	1	
			Incl. CCTV system	1	
		No.1 Right Back up car Size: L7420 X W1200 X H3100) mm	Incl.Stone Crusher ARB-250	1	
			Incl.Distributor	1	
		No.2 Left Back up car Size: L7420 X W1200 X H3100) mm	Incl. Articulate jack pump unit	1	
			Incl. Shield jack pump unit	1	
			Incl. Erector jack pump unit	1	
			Incl. Erector rotation pump unit	1	
			Incl. Copy cutter pump unit	1	
			Incl. Oil tank	1	
		No.2 Right Back up car Size: L7420 X W1200 X H3100) mm	Incl.P0 Slurry Pump	1	
			Incl.Control Panel(P0)	1	
			Incl.Water Supply Unit(P0)	1	
			Incl.Grease Pump(Crusher)	1	
		No.3 Left Back up car Size: L6420 X W1200 X H3100) mm	Incl.Shield power panel	1	
			Incl.Tail seal greasing devices	1	
			Incl.Grease pump	1	
			Incl. Chain block	1	
			Incl.Cables for Grout injection	1	
		No.3 Right Back up car Size: L6420 X W1200 X H3100) mm	Incl.Bypass Slurry Valve Set	1	
		No.4 Left Back up car Size: L7420 X W1200 X H3100) mm	Incl. Cutter inverter panels	1	
		No.4 Right Back up car Size: L7420 X W1200 X H3100) mm	Incl.P2 Slurry Pump	1	
			Incl.Water Supply Unit(P0)		
		No.5 Left Back up car Size: L7420 X W1200 X H3100) mm	Incl.High Voltage transformer for shield machine	1	
		No.5 Right Back up car Size: L7420 X W1200 X H3100) mm	Incl. Grout injection System	1	
		No.6 Left Back up car Size: L6420 X W1200 X H3100) mm	Incl. Air compressor	1	

Site: UG-02;Bangalore

Subject : Hitachi TBM and its anciliary/auxiliary and allied Equipments

its Retaled Equipment

Sl.No.	Asset	Description of Machinery	Technical Details	Quantity (in Set)	Remarks	
			Incl. High voltage transformer for STS	1		
		No.6 Right Back up car Size: L6420 X W1200 X H3100) mm	Incl. Grout injection System	1		
		No.7 Left Back up car Size: L6420 X W1200 X H3100) mm	Incl. cable storage	1		
		No.7 Right Back up car Size: L6420 X W1200 X H3100) mm	Empty space for tools and parts	1		
		No.8 Left Back up car Size: L6420 X W1200 X H3100) mm	Incl. Air filters	1		
			Incl. Receiver tank	1		
			Incl. Air control for Man lock	1		
		No.8 Right Back up car Size: L6420 X W1200 X H3100) mm	Incl. Fire suppression systems	1		
			Incl. Water tank	1		
			Incl. Fire Suppression tank pump	1		
		No.9 Left Back up car Size: L8620 X W1200 X H3100) mm	Incl. Air cooler	1		
			Incl. Air control for Man lock	1		
		No.9 Right Back up car Size: L8620 X W1200 X H3100) mm	Incl. Hose Reel	1		
		No.10 Left Back up car Size: L7420 X W1200 X H3100) mm	Incl. Cooling Tower	1		
		No.10 Right Back up car Size: L7420 X W1200 X H3100) mm	Incl. 3-Way Rotary Valve	1		
5		STP-2 (Slurry Treatment Plant)	Sand Separators with Wedge-wire Screens	Capacity : Max.Load/Set --- 72 ton/hr.	2	Make : AKTIO
			Gravel Separator with Rubber Screens	Capacity : Max.Load/Set-- 120t/hr.Weight load for Soil & Gravel Discharged / Water Load:16cum/min.	1	
			Cyclone Pumps	Capacity : 2.5 cum/min. X 20mH	4	
			Cyclone Frames	Capacity : 0.8 cum/min.	12	
			Filter Press System (inc. High Pressure Slurry & dosing pumps)	Discharge cake volume : 10.9cum/set. at 5 bar filter pressure No.of Filter chamber:150 rooms/set	3	
			Slurry Plant In-line Pumps	Capacity/ set : 456 KW	1	
			Waste Water Treatment plant		1	
			Slurry Tanks	120cum.	4	
6		STS-2 (Slurry Transportation System)	Feed & Discharge Slurry Pumps with Water Supply Units and Inverter Panels (Model: SPD2-200 ; Capacity :7cum/min.)	200 KW Slurry Transporatation Pumps	3	Make : AKTIO
				132 KW Slurry Transporatation Pumps	3	
				90 KW Slurry Transporatation Pumps	1	
				75 KW Slurry Transporatation Pumps	2	
				45 KW Slurry Transporatation Pumps	1	
			Dry Type Transformers	300 KVA	1	Make : AKTIO
				250 KVA	2	

Site: UG-02;Bangalore

Subject : Hitachi TBM and its anciliary/auxiliary and allied Equipments

its Retaled Equipment

Sl.No.	Asset	Description of Machinery	Technical Details	Quantity (in Set)	Remarks	
			Model :CCM	200 KVA	6	
				160 KVA	1	
			Densitometers at Bottom Shaft	Feed & Discharge line Vertical Pipe to measure the slurry density	1	Make : AKTIO
			Shaft Valve Set at Bottom Shaft	Feed / Discharge / Pressurizing Valves / Pressure release relief and Auxiliary Valves	1	Make : AKTIO
			By-pass Valve Sets in Back-up Car	Forward and Reverse Excavation feed/Dischage Slurry Valves and Control & Emergency face discharge Valve	1	Make : AKTIO
			Stone ARB-250 Rotary Jaw Crusher in Back-up Car	Capacity : 6.75 cum / min. ; Installed Power : 60KW	1	Make : AKTIO
			Distributor in Back-up Car	Capacity : 2.88 cum / min.	1	Make : AKTIO
			Back-up Car Hose Reel for feed & Discharge Line in Back-up Car	Size:8inch ; Length:15mtr. For Slurry Pipe Extension	1	Make : AKTIO
			3-Way Valve for Slurry Transfer System in Back-up Car	For Slurry Pipe Extension	1	Make : AKTIO
7		Auxiliary Items	Segment Hoist (Wireless Type)		2	Make : Hitachi (Built-in TBM / Back
			Back-filling device in Back-up Car		2	
			Fire Suppression System		2	
			Ventilation Duct on Back-up Cars		2	
			High Voltage Transformer 11 KV		2	
			CCTV System		2	
			Oxygen & Gas Monitoring System		2	
			Guidance, Data Monitoring & Recording System		2	
			Probe Drill		1	
Air Receiver Tank, Manlock Air controller		2				
8		Segment moulds	Segment Moulds	Finished Diameter: 5.6m Width:1.5m & Thickness: 280mm	36	
9		Miscellaneous	Grout Mixing Unit	Model:RS-7B SP Capacity: 7cum/min	1	Make : Tachibana Material /Sagami servo Co.Ltd;
			Cutter Workshop 20ft. Contain	100 Ton Hydraulic Vertical Press/ Insulation Heater/ 250 Kg HoistCrane/Transformer etc;	1	Make: Hitachi Zosen Corporation



BOQ- BILL OF QUANTITY
TBM RELATED EQUIPMENT
(ANCILIARY ASSETS)

Site: UG-02;Bangalore						
Subject : Hitachi TBM and its anciliary/auxiliary and allied Equipments						
Hitachi TBM and its Retaled Equipment						
Anciliary Assets						
Sr.No.	Asset Code	Description of Asset	Area of Application	Technical Details	Q'ty(nos.)	Remarks
1	11102284	Bentonite Silo 40 Ton	Component of Surface Grout Plant	40 Mt	1 Nos	
2	11102285	Cement Silo Capacity 100 Ton		100 Mt	1 Nos	
3	11102309	Screw Conveyor for Silo		Dia 219	1 Nos	
4	11100480	Air Compressor with Accessories/Air Marshal-GC65T			1 Nos	
5	11100883	Pneumatic Conveying System			1 Nos	
6	11102282	50HP Motor Foot Mounting For Blower "1500RPM"			1 Nos	
7	11102633	Cement Silo Top Vibrator filter assy.WAM		40 Mt	1 Nos	
8	11102546	Control Panel with Inverter Model (Hitachi)	Tunnel Secondary Grouting System		1 Nos	
9	11102636	Grout Tank 1500x100x4mm with bottom covered			1 Nos	
10	11102530	Grout Tank 1900MMX920MM With Agitator/Sew Eurodrive			1 Nos	
11	11102550	Electric Chain Hoist/ 2.5 Ton/Kito	Primary/Secondary Segment Hoist used in TRM	2.5 Mt	1 Nos	
12	11102551	Electric Chain Hoist/ 2.5 Ton/Kito		2.5 Mt	1 Nos	
13	11100859	14T Battery Locomotive Model: JXK-7/196 ; Gauge : 900 mm	Tunnel Rolling Stock Equipment		1 Nos	
14	11100860	14T Battery Locomotive Model: JXK-7/196 ; Gauge : 900 mm			1 Nos	
15	11100864	14T Battery Locomotive Model: JXK-7/196 ; Gauge : 900 mm			1 Nos	
16	11103009	Grease Pump/Kowa	TBM Lubrication System Equipment		1 Nos	
17	11103150	Penumatic Grease Lubrication System			1 Nos	
18	11101377	Hydraulic Power Jack / Tangee Oew / Model:XI150150			1 Nos	
19	11101378	Hydraulic Jack / Tangee Oew / Model:XI150150			1 Nos	
20	11102523	Hydraulic Hose Cleaning Tool			1 Nos	
21	11102376	Aeroquip Crimp Machine-PRO Crimp 1390/FINN POWER			1 Nos	
22	11102657	Hydraulic Power Pack 600tn(HYD Torque Wrench)			1 Nos	
23	11102495	Drive Torque Wrench Mod:-EDGE-4 / 4500Nm			1 Nos	
24	11102496	Ultrasonic Thickness Guage(TT-310)/sr. 5051171			1 Nos	
25	11102519	Insulation Tester / Fluke 1507			1 Nos	
26	11102248	Hydraulic Crimping Tool upto 400			1 Nos	
27	11102457	Electric Pipe Grooving Machine3" to12" /Sr.VG-652			1 Nos	
28	11102387	Threading Machine DIES BSPT 1-1/2(2)			1 Nos	
29	11102388	Threading Machine DIES BSPT 1-1/2(2)			1 Nos	
30	11102389	Threading Machine DIES BSPT AUTO/AT 2.1/2-4			1 Nos	

Site: UG-02;Bangalore								
Subject : Hitachi TBM and its anciliary/auxiliary and allied Equipments								
Hitachi TBM and its Retaled Equipment								
Anciliary Assets								
Sr.No.	Asset Code	Description of Asset	Area of Application	Technical Details	Q'ty(nos.)	Remarks		
31	11102390	Threading Machine DIES BSPT AUTO/AT 2.1/2-4			1 Nos			
32	11102441	Air Compressor/ELGI/TS15120HN/15 HP,500Ltrs			1 Nos			
33	21100103	Roots Air Blower for Cement Feeding			Cement Feeder (in Surface Grout Plant)			
34	11501898	Drager Aerotest Kit /Alpha/ 6527150	TBM Back-up Car Gas detector & Monitoring device		1 Nos			
35	11100475	Inclinometer System/Encardio-Rite	Geo-Technical Instruments and Equipments		1 Nos			
36	11102499	Brunton Compass F-5006-020			1 Nos			
37	11101296	Dynamic Probing Ring LMSR-VK/Survey Machine			1 Nos			
38	11102592	Point Load Tester-HR72.25			1 Nos			
39	11500901	Junction Box - 11KVA			1 Nos			
40	11500902	Junction Box - 11KVA			1 Nos			
41	11500903	Junction Box - 11KVA			1 Nos			
42	11500904	Junction Box - 11KVA			1 Nos			
43	11500905	Junction Box - 11KVA			1 Nos			
44	11500906	Junction Box - 11KVA			1 Nos			
45	11500907	Junction Box - 11KVA			1 Nos			
46	11500908	Junction Box - 11KVA			1 Nos			
47	11501496	Tunnel Distribution Box/Marsh Switchgear					1 Nos	
48	11501497	Tunnel Distribution Box/Marsh Switchgear					1 Nos	
49	11102435	10 HP/Vibrate Motor/BBL Make Tefcso Cage	Spare Vibrator Motors for Slurry Plant Separators		1 Nos			
50	11102436	10 HP/Vibrate Motor/BBL Make Tefcso Cage			1 Nos			



BOQ- BILL OF QUANTITY
TBM SPARES AVAILABLE

Site: UG-02;Bangalore					
Subject : Hitachi TBM and its anciliary/auxiliary and allied Equipments					
Hitachi TBM and its Retaled Equipment					
Anciliary Spares- TBM					
Sl.No.	Part Description	Assembly	Make	Quantity (in Set)	Remarks
1	PRESSURE CONTROL VALVE-KCV-2	TBM Automatic Lubrication System	KOWA Corp.	2	
2	GREASE ELECTRIC DISTRIBUTOR	TBM Automatic Lubrication System	SUMITOMO	2	
3	DUAL LINE GREASE DISTRIBUTOR -KW-36 RC 1	Main Bearing Lubrication System	KOWA	2	
4	DUAL LINE GREASE DISTRIBUTOR -KW-54 RC 1	Main Bearing Lubrication System	KOWA	1	
5	RELIEF VALVE DBW20A 2-5X/3506EW 100N9DL	Erector Unload Relief Valve	BOSCH	1	
6	HYDRAULIC HOSE	Erector Hyd. Hose Reel	OEM/Hitachi	2	
7	Erector jack (For lift)	Ring Erector unit	Hitachi	1	
8	Erector jack (For slide)	Ring Erector unit	Hitachi	1	
9	Shield jack(φ356×L3100)	Middle Body Hyd.Jacks	Hitachi	1	
10	Articulation jack(φ360×L1335)	Middle Body Hyd.Jacks	Hitachi	1	
11	ROTARY JOINT SEAL VD 220X253X20MM	RotaryJoint	Palmeiri	2	
12	ROTARY JOINT O-RING OD: 294.5MM THICK 20	RotaryJoint	Palmeiri	2	
13	DETECTOR SHIELD JACK 0-2000MM	Shield/Propulsion Jack	Nippon Liniax Corp. Ltd;	1	
14	PRESSURE TRANSDUCER - NS 111A-35MP-1221-	Articulation Jack	OEM/Hitachi	5	
15	DETECTOR - PW-200(0-200M)	Articulation Jack	Nippon Liniax Corp. Ltd;	4	
16	SOLENOID VALVE- 4WRZ 25W 625-7X	TBM Hyd.Powerpack Back-up Car	Rexroth Bosch	2	
17	SOLENOID VALVE - H-4WEH 25E70	TBM Hyd.Powerpack Back-up Car	Rexroth Bosch	4	
18	SOLENOID VALVE-4WE6J6X / EW 100NDJL	TBM Hyd.Powerpack Back-up Car	Rexroth Bosch	1	
19	SOLENOID VALVE-4WEH 16E7X	TBM Hyd.Powerpack Back-up Car	Rexroth Bosch	1	
20	SOLENOID VALVE-H-4WEH 25E7X	TBM Hyd.Powerpack Back-up Car	Rexroth Bosch	1	
21	SOLENOID VALVE -4WE6H6X	TBM Hyd.Powerpack Back-up Car	Rexroth Bosch	1	
22	SOLENOID - 4WE6D6X/EW100N9DALB08	TBM Hyd.Powerpack Back-up Car	Rexroth Bosch	1	
23	RELIEF VALVE - DB30-2N52/350	TBM Hyd.Powerpack Back-up Car	Rexroth Bosch	1	
24	VALVE TOP TVA SERIES 1"	Tail Seal Brushes Lubrication	TOPWORX	3	
25	OIL SEAL -AD5412A3	Stone Crusher	AKTIO	2	
26	MUM TYPE GREASE DISTRIBUTOR	Stone Crusher Lubrication	IHI	1	
27	CONIC BEARING - 32044 XU	Stone Crusher	NTN	2	

Site: **UG-02;Bangalore**

Subject : **Hitachi TBM and its anciliary/auxiliary and allied Equipments**

Hitachi TBM and its Retaled Equipment

Anciliary Spares- TBM

Sl.No.	Part Description	Assembly	Make	Quantity (in Set)	Remarks
28	Drive part collar L=180mm	Stone Crusher	AKTIO	1	
29	Side plate outer type	Stone Crusher	AKTIO	2	
30	Side plate inner type for motor side	Stone Crusher	AKTIO	2	
31	Side plate inner type for front side	Stone Crusher	AKTIO	2	
32	Lining plate(A)	Stone Crusher	AKTIO	36	
33	Lining plate(B)	Stone Crusher	AKTIO	12	
34	Roller bearing(23044B)	Stone Crusher	AKTIO	1	
35	Fixed Jaw A Type	Stone Crusher	Non-OEM	6	
36	Fixed Jaw B Type	Stone Crusher	Non-OEM	12	
37	KNOCK PIN- EN19	Stone Crusher	Non-OEM	14	
38	INNER BIT	Stone Crusher	Non-OEM	1	
39	SEAL COLLAR 195.5MM	Stone Crusher	Non-OEM	1	
40	SEAL PACKING 200X15MM	Slurry Bypass Valves	Non-OEM	5	
41	CV1 VALVE	Slurry Bypass Valves	NDV(NipponDahiyaValves)	2	
42	8" SLURRY FEEDER FLEXIBLE PIPES (1.1 m long)	Slurry transportation system / Back-up Car	Non-OEM/Hyd.Power Sol.	8	
43	8" FLEXIBLE SLURRY HOSE 5MTR	Slurry transportation system / Bridge Section	Non-OEM/Hyd.Power Sol.	5	
44	8" SLURRY FLEXIBLE HOSE PIPE 2 MTR	Slurry transportation system / Back-up Car	Non-OEM/Hyd.Power Sol.	2	
45	8" SLURRY FLEXIBLE HOSE PIPE 1.8 MTR	Slurry transportation system / Back-up Car	Non-OEM/Hyd.Power Sol.	2	
46	10" SLURRY FLEXIBLE HOSE PIPE 5 MTR	Slurry transportation system / Bridge Section	Non-OEM/Hyd.Power Sol.	3	
47	10" SLURRY FLEXIBLE HOSE PIPE 2 MTR	Slurry transportation system / Back-up Car	Non-OEM/Hyd.Power Sol.	1	
48	12" SLURRY FLEXIBLE HOSE PIPE 5 MTR	Slurry transportation system / Bridge Section	Non-OEM/Hyd.Power Sol.	2	
49	FLEXIBLE HOSE 14"	Slurry transportation system / Rear Scaffold	Non-OEM/Hyd.Power Sol.	1	
50	Slurry hose 10 inch (1.0m long)	Slurry transportation system	AKTIO	1	
51	Slurry hose 8 inch (1.0m long)	Slurry transportation system	AKTIO	1	
52	Telescopic pipe 14 inch	Slurry transportation system	AKTIO	1	
53	Telescopic pipe 10 inch	Slurry transportation system	AKTIO	1	
54	Telescopic pipe 8 inch	Slurry transportation system	AKTIO	1	

Site: UG-02;Bangalore					
Subject : Hitachi TBM and its anciliary/auxiliary and allied Equipments					
Hitachi TBM and its Retaled Equipment					
Anciliary Spares- TBM					
Sl.No.	Part Description	Assembly	Make	Quantity (in Set)	Remarks
55	CENTER CUTTER RING (JAPAN)	Cutter Head Tools	Palmeiri	15	
56	FACE CUTTER RING (WIRTH)	Cutter Head Tools	WIRTH	2	
57	SCRAPER A (KOREA)	Cutter Head Tools	TIX Corp.	65	
58	SCRAPER B (KOREA)	Cutter Head Tools	TIX Corp.	192	
59	CUTTER BIT (KOREA)	Cutter Head Tools	TIX Corp.	95	
60	SCRAPER 1 RIGHT - B-3R FOR TBM	Cutter Head Tools	OEM/Hitachi	55	
61	SCRAPER 1 LEFT - B-3L FOR TBM	Cutter Head Tools	OEM/Hitachi	80	
62	SCRAPER 2 RIGHT - B-2R FOR TBM	Cutter Head Tools	OEM/Hitachi	100	
63	CUTTER BIT - A FOR TBM	Cutter Head Tools	OEM/Hitachi	130	
64	CUTTER RING 17MM - 11029242	Cutter Head Tools	Palmeiri	51	
65	CUTTER RING 19MM - 11069883	Cutter Head Tools	Palmeiri & E-Berk	141	
66	CUTTER RING - 13MM	Cutter Head Tools	Palmeiri	29	
67	CUTTER DISC HOUSING FOR FACE CUTTER	Cutter Head refurbishment parts	Non-OEM	4	
68	INSERT SHELL (FACE CUTTER) -LKG-1-R01	Roller Cutter Disc Installation	Palmeiri	5	
69	BARREL NUT TYPE "A" (79MM)	Cutter Head refurbishment parts	Non-OEM	9	
70	BARREL NUT TYPE "B" (59MM)	Cutter Head refurbishment parts	Non-OEM	4	
71	SEAL -FSN-760S185FS	Roller Cutter Disc Assembly parts	Federal Mogul	20	
72	BEARING 90381/90744	Roller Cutter Disc Assembly parts	NTN Corp.	14	
73	FABRICATE HUB BODY FOR FACE CUTTER	Roller Cutter Disc Assembly parts	Non-OEM	29	
74	SEAL PLATE FOR CENTER CUTTER	Roller Cutter Disc Assembly parts	Non-OEM	6	
75	SEAL SET-2900.025.36	Roller Cutter Disc Assembly parts	Palmeiri	28	
76	FABRICATE RETAINING RING FACE/GAUGE	Roller Cutter Disc Assembly parts	Non-OEM	24	
77	SLIDE RNG PACKING LWD 76.97 H-23 NB60	Roller Cutter Disc Assembly parts	Non-OEM	92	
78	FABRICATE RETAINING RING OF CENTER CUTTER	Roller Cutter Disc Assembly parts	Non-OEM	9	
79	CAP FOR CUTTER DISC EN 19	Roller Cutter Disc Assembly parts	Non-OEM	8	
80	BEARING INNER/ OUTER - HH224334-HH224310	Roller Cutter Disc Assembly parts	TIMKEN	85	
81	Segment transporting device (Roller chain)	Segment Hoist Beam unit	Hitachi	1	

Site: UG-02;Bangalore					
Subject : Hitachi TBM and its anciliary/auxiliary and allied Equipments					
Hitachi TBM and its Retaled Equipment					
Anciliary Spares- TBM					
Sl.No.	Part Description	Assembly	Make	Quantity (in Set)	Remarks
82	2.5 T BOTTOM HOOK	Segment Hoist	KITO	2	
83	2.5 T BOTTOM YOKE	Segment Hoist	KITO	2	
84	PUMP TUBE T-65	Grouting Pumps / Back-up Car	Sagami ServoCorp.Ltd.	1	
85	PUMP TUBE T-32	Grouting Pumps / Grout Plant	Sagami ServoCorp.Ltd.	2	
86	KS-65 PERISTALTIC GROUT TUBE	Grouting Pumps / Back-up Car	Meiwa Corp.Ltd.	3	
87	CLEANER PIG - 1.25B	Cleaning of Grout Supply Lines	OEM/Hitachi	24	
88	HSS CUTTER WHEEL	Workshop Threading M/c	Rothenberger	12	
89	V-BELT KV0.056.28.0.00	Locomotive Air Compressor	Non-OEM	1	
90	PUSH BUTTON - ABN3G02-R(2B)	Electrical	OEM/Hitachi	2	
91	PUSH BUTTON - ABN210-B(WITH OC-11B)	Electrical	OEM/Hitachi	2	
92	SWITCH - ASLN332211DN-R-203	Electrical	OEM/Hitachi	2	
93	SQUARE LIGHT - HW2P-1Q4W DC 24V(LED-W)	Electrical	OEM/Hitachi	2	
94	SQUARE LIGHT - HW2P-1Q4R DC 24V(LED-R)	Electrical	OEM/Hitachi	2	
95	SQUARE LIGHT - HW2P-1Q4A DC 24V(LED-R)	Electrical	OEM/Hitachi	2	
96	MULTI ANALOG UNIT - 61C-161-R	Electrical	OEM/Hitachi	2	
97	SIGNAL CONVERTER - M8MS-6A-R-X	Electrical	OEM/Hitachi	2	
98	POWER SUPPLY UNIT - S8VM-05024C	Electrical	OEM/Hitachi	1	
99	SIGNAL CONVERTER - M8YV-A6A-R	Electrical	OEM/Hitachi	1	
100	ERECTOR CONTROL BOX(WIRE)	Electrical	OEM/Hitachi	2	
101	VARIABLE FREQUENCY DRIVE-V100, 415VAC	Electrical	OEM/Hitachi	1	
102	HOIST REMOTE BATTERY - BA223030	Electrical	OEM/Hitachi	4	
103	MELSEC-Q RS-422/485 -QJ71C24N	Electrical	AKTIO	2	
104	MAGNETIC PROXIMITY -AX115CE	Electrical	OEM/Hitachi	6	
105	ANALOG INPUT BOARD -FX3G-2AD-BD	Electrical	OEM/Hitachi	5	
106	PLC MODEL- FX3G-60M	Electrical	OEM/Hitachi	2	
107	BCP-A5 CANARE CONNECTOR	Electrical	AKTIO	266	
108	ASync SHORT HAUL MODEM PLUS	Electrical	Non-OEM	1	



BOQ- BILL OF QUANTITY
STP SPARES AVAILABLE

Site: UG-02;Bangalore					
Subject : Hitachi TBM and its anciliary/auxiliary and allied Equipments					
Hitachi TBM and its Retaled Equipment					
Insventory Spares STP					
Sl.No.	Part Description	Assembly	Make	Quantity (in Set)	Remarks
1	Uninterruptible power system	Slurry Central Monitoring Panel	AKTIO	1	
2	ROTARY VANE PUMP PA1504X	Water Supply Unit (Slurry Pumps)	FLUID - O-TECH Pump	16	
3	FLOW SENSOR ND TYPE - ND10D-TATAAA-RC	Water Supply Unit (Slurry Pumps)	AICHI TOKEI DENKI Co. Ltd.	5	
4	PRESSURE REGULATOR - WR2-15-N	Water Supply Unit (Slurry Pumps)	CKD	6	
5	ROTARY JAW COUPLING -EN 19	Water Supply Unit (Slurry Pumps)	Non-OEM	17	
6	FLOTLESS LEVEL SWITCH 61F-GP-N-200V AC	Water Supply Unit (Slurry Pumps)	Non-OEM	10	
7	Mechanical seal	Slurry Pump spare	AKTIO	2	
8	Front end packing	Slurry Pump spare	AKTIO	4	
9	Impeller packing	Slurry Pump spare	AKTIO	2	
10	IMPELLER - SPD2-100	Slurry Pump parts	AKTIO	2	
11	V-BELT 5V-950	Slurry Pump spare	BANDO POWER ACE	6	
12	V-BELT 5V-800	Slurry Pump spare	BANDO POWER ACE	4	
13	V-BELT 5V-750	Slurry Pump spare	BANDO POWER ACE	5	
14	V-BELT 5V-710	Slurry Pump spare	BANDO POWER ACE	5	
15	V-BELT 5V-950	Slurry Pump spare	BANDO POWER ACE	11	
16	V-BELT 5V-800	Slurry Pump spare	BANDO POWER ACE	10	
17	SHAFT SLEEVE - SP2H-50	Slurry Pump spare	Non-OEM	8	
18	MECHANICAL SHAFT SEAL - SRA4-075S7	Cyclone Pump spare	Flowguards	1	
19	OIL SEAL - AC3618E	Cyclone Pump spare	Non-OEM	5	
20	IMPELLER FOR CYCLONE PUMP	Cyclone Pump spare	Non-OEM	1	
21	SUCTION COVER LINER	Cyclone Pump spare	Non-OEM	1	
22	Overflow Elbow	Cyclone Frame	AKTIO	4	
23	Cyclone over pipe unit	Cyclone Frame	AKTIO	5	
24	Feed Chamber	Cyclone Frame	AKTIO	4	
25	Feed shim	Cyclone Frame	AKTIO	5	
26	Corn section	Cyclone Frame	AKTIO	3	
27	CYCLONE OVER PIPE UNIT FOR CYCLONE MD-9	Cyclone Frame Spare	AKTIO	1	
28	VORTEX FINDER FOR CYCLONE MD-9	Cyclone Frame Spare	AKTIO	10	
29	FEED SHIM FOR CYCLONE MD-9	Cyclone Frame Spare	AKTIO	5	
30	CONE SECTION RUBBER MD-9	Cyclone Frame Spare	AKTIO	7	
31	APEX VALVE 65MM OD:157MM ID:48MM	Cyclone Frame Spare	Non-OEM	6	

Site: UG-02;Bangalore					
Subject : Hitachi TBM and its anciliary/auxiliary and allied Equipments					
Hitachi TBM and its Retaled Equipment					
Insventory Spares STP					
Sl.No.	Part Description	Assembly	Make	Quantity (in Set)	Remarks
32	Feed adapter	Cyclone Frame	AKTIO	2	
33	PLASTIC NET - PE - FOR SLURRY PLANT	Filter Press spare part	AKTIO	13	
34	SEAL PACKING -NP - FOR SLURRY PLANT	Filter Press spare part	AKTIO	10	
35	FILTER CLOTH 65"	Filter Press spare part	AKTIO	115	
36	FILTER PRESS RAIL SHOE - 20X44X5MMX38MM	Filter Press spare part	Non-OEM	109	
37	Filter Plate	Filter Press	AKTIO	4	
38	Flat Bar 32X1.65m	Filter Press	AKTIO	2	
39	Plate lifter	Filter Press	AKTIO	3	
40	Chain	Filter Press	AKTIO	8	
41	High pressure Slurry pump	Filter Press	AKTIO	1	
42	WEDGE WIRE SCREEN - W340XL1380XH30 MM	Sand Separator spare part	AKTIO	4	
43	WEDGE WIRE SCREEN - W340XL540XH30 MM	Sand Separator spare part	AKTIO	8	
44	Bearing	Sand / Gravel Separator	AKTIO	2	
45	Motor 7.5KW	Sand / Gravel Separator	AKTIO	1	
46	Motor 11KW	Sand / Gravel Separator	AKTIO	1	
47	Bearing	Sand / Gravel Separator	AKTIO	2	
48	Bearing sleeve	Sand / Gravel Separator	AKTIO	1	
49	Air Dumper	Sand / Gravel Separator	AKTIO	4	
50	V-belt	Sand / Gravel Separator	AKTIO	1	
51	Coil spring	Sand / Gravel Separator	AKTIO	16	
52	Coil spring attachment	Sand / Gravel Separator	AKTIO	17	
53	Clip plate	Sand / Gravel Separator	AKTIO	32	
54	Vibration Oil Seal	Sand / Gravel Separator	AKTIO	4	
55	Vibration bearing sleeve	Sand / Gravel Separator	AKTIO	2	
56	Vibration cover gasket L	Sand / Gravel Separator	AKTIO	2	
57	Vibration cover gasket S	Sand / Gravel Separator	AKTIO	2	
58	Manhole gasket	Sand / Gravel Separator	AKTIO	1	
59	V - belt	Sand / Gravel Separator	AKTIO	3	
60	V - belt	Sand / Gravel Separator	AKTIO	6	
61	Vibration cover gasket L	Sand / Gravel Separator	AKTIO	2	
62	Manhole gasket	Sand / Gravel Separator	AKTIO	2	
63	Vibration cover gasket S	Sand / Gravel Separator	AKTIO	2	
64	V-BELT C-74	Sand / Gravel Separator Spare part	BANDO POWER ACE	7	
65	V-BELT C-63	Sand / Gravel Separator Spare part	BANDO POWER ACE	5	
66	V-BELT C-88	Sand / Gravel Separator Spare part	BANDO POWER ACE	4	
67	V-BELT B-91	Sand / Gravel Separator Spare part	MITSUBOSHI	15	
68	V-BELT B-89	Sand / Gravel Separator Spare part	BANDO POWER ACE	5	
69	V-BELT B-71	Sand / Gravel Separator Spare part	BANDO POWER ACE	5	
70	V-BELT B-66	Sand / Gravel Separator Spare part	BANDO POWER ACE	3	
71	LEVEL SENSOR FP-1A	Slurry Reservoir Tanks	Endress+Hauser	1	
72	Slurry pump	Surplus Tank Pump	AKTIO	1	

Site: UG-02;Bangalore					
Subject : Hitachi TBM and its anciliary/auxiliary and allied Equipments					
Hitachi TBM and its Retaled Equipment					
Insventory Spares STP					
Sl.No.	Part Description	Assembly	Make	Quantity (in Set)	Remarks
73	Water Pump	Fresh Water Tank	AKTIO	1	
74	Cyclone Gear motor	High Density Tank	AKTIO	1	
75	Detector	Slurry Regulating Tank	AKTIO	1	
76	Sampling Pump	Slurry Regulating Tank	AKTIO	1	
77	Electromagnetic Valve	Waste Water Treatment plant	AKTIO	1	
78	PH composite	Waste Water Treatment plant	AKTIO	1	
79	PAC injection pump	Waste Water Treatment plant	AKTIO	1	
80	Polymer injection pump	Waste Water Treatment plant	AKTIO	1	
81	Sensor for turbidity meter	Waste Water Treatment plant	AKTIO	1	
82	Line mixer	Waste Water Treatment plant	AKTIO	1	
83	Electric operated valve	Waste Water Treatment plant	AKTIO	1	
84	Drainage pump	Waste Water Treatment plant	AKTIO	1	
85	Electric valve for carbonic	Waste Water Treatment plant	AKTIO	1	
86	No return valve	Waste Water Treatment plant	AKTIO	1	
87	Pressure regulator	Waste Water Treatment plant	AKTIO	1	
88	Recording paper	Waste Water Treatment plant	AKTIO	1	
89	Print pen	Waste Water Treatment plant	AKTIO	10	
90	Proof liquid PH4	Waste Water Treatment plant	AKTIO	5	
91	Proof liquid PH7	Waste Water Treatment plant	AKTIO	5	
92	Potassium chloride solution	Waste Water Treatment plant	AKTIO	6	
93	POLY ALUMINIUM CHLORIDE	Slurry Admixture(Formation of Cake from Slurry)	Non-OEM	5.74Ton	



BOQ- BILL OF QUANTITY
STS SPARES AVAILABLE

Site : UG-02;Bangalore

Subject : Hitachi TBM and its anciliary/auxiliary and allied Equipments

Hitachi TBM and its Retaled Equipment

Insventory Spares STS

Sl.No.	Part Description	Assembly	Make	Qty	Remarks
1	REAR END COVER -SPD2-200	Slurry Pump parts	AKTIO	3	
2	BEARING INNER - NU 320 CM	Slurry Pump spare	SKF	4	
3	BEARING - 30320 DB10X	Slurry Pump spare	SKF	4	
4	LANTERN RINGFOR SLURRY PUMP SP2H 50-C	Slurry Pump spare	Non-OEM	9	
5	BACK LINER FOR SLURRY PUMP SP2H 50-C	Slurry Pump spare	AKTIO	3	
6	FRONT LINER FOR SLURRY PUMP SP2H 50-C	Slurry Pump spare	AKTIO	1	
7	BACK COVER - SP2H-50	Slurry Pump spare	AKTIO	2	
8	LINER FOR OIL SEAL BOX	Slurry Pump spare	Non-OEM	9	
9	FRONT COVER - SPD2-200	Slurry Pump spare	Non-OEM	1	
10	SHAFT SLEEVE SAE 4140	Slurry Pump spare	Non-OEM	11	
11	LANTERN RING -SUS304	Slurry Pump spare	Non-OEM	9	
12	SLINGER	Slurry Pump spare	Non-OEM	5	
13	STUFFING BOX - FC20	Slurry Pump spare	Non-OEM	9	
14	SEAL RING - SPD2-200	Slurry Pump spare	AKTIO	31	
15	NON RETURNABLE VALVE - 3/8"	Slurry Pump spare	Non-OEM	4	
16	ROUND PACKING GASKET 4MM OD:342MM	Slurry Pump spare	Non-OEM	10	
17	ROUND PACKING GASKET 4MM OD:330MM	Slurry Pump spare	Non-OEM	25	
18	ROUND PACKING GASKET 3MM O.D 630MM I.D 510	Slurry Pump spare	Non-OEM	3	
19	ROUND PACKING GASKET 2MM O.D 630MM I.D 510	Slurry Pump spare	Non-OEM	8	
20	ROUND PACKING GASKET 1MM	Slurry Pump spare	Non-OEM	21	
21	STUD BOLT M24X110MM	Slurry Pump spare	Non-OEM	19	
22	CKD PNEUMATICS VALVE - 4F320-10-M3-B	Slurry Bypass Valves	CKD	3	
23	CKD PNEUMATICS VALVE - 4F310-10-M3-B	Slurry Bypass Valves	CKD	2	
24	REGULAR UNIT BOX (Repeater Unit Box)	Electrical	AKTIO	1	
25	RELAY MY4N\220\240\V2C	Electrical	Non-OEM	5	
26	DATA LINK UNIT - QJ71BR11	Electrical	AKTIO	5	
27	MELSEC NET/10, MODEL: A1SJ71BR11	Electrical	AKTIO	5	
28	M-NET/10 REPITER - A6BR10	Electrical	AKTIO	3	
29	RELAY MY4N\220\240\V2C	Electrical	Non-OEM	5	





ROLLING STOCK AVAILABLE

Rolling Stock

Sl No	Name of Equipment	Qty in Nos	Date of Aquisition	Capacity	Make	Location	Remarks
1	Grout Plant	1	2011	7 to 10 cum/h	Meiwa	Bengaluru	
2	Locomotive - Battery Operated	3	2007	14 MT	Lanzhou gold cow track transportation	Bengaluru	
3	Locomotive -Diesel	2	2013	35 MT	Schoma	Delhi	
4	Locomotive -Diesel	1	2014	40 MT	Schoma	Delhi	
5	Muck Car with trolley (L5500xW1500xH1794)	16	2007	15 cum	Sengang development Investment Limited	Delhi	
6	Flat Car L6500xW 1380x H 430	4	2007	15 ton	Muhlhauser	Delhi	
7	Segment Car L4500xW1500xH450	8	2013	15 MT	Muhlhauser	Delhi	