

DETAILED PROJECT REPORT FOR  
MAINTENANCE DEPOT OF  
BANGALORE SUBURBAN RAILWAY PROJECT  
AT AKKUPETE & BOMMAVARA VILLAGES  
IN DEVANAHALLI TALUK  
IN BENGALURU (RURAL) DISTRICT



RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LTD.

## **List of Abbreviations used in the document**

AFC	Automatic Fare Collection
AMF	Automatic Mains Failure
ATP	Automatic Train Protection
ATO	Automatic Train Operation
BPC	Break Power Certificates
BSRP	Bangalore Suburban Railway Project
CNC	Computer Numerical Control
DCC	Depot Control Centre
DG	Diesel Generator
E&M	Electrical & Maintenance
EMU	Electric Multiple Unit
EPU	Electric Overhead Traveling Crane
EOT	Epoxy Polyurethane
ETU	Electrical Test Unit
IOH	Intermediate Overhaul
JV	Joint Venture
K RIDE	Rail Infrastructure Development Company (Karnataka)
OCC	Operations Control Centre
OHE	Overhead Equipment
POH	Periodical Overhaul
PPIO	Planning, Progress and Investigation Organisation
QR	Quantitative Risk Assessment
SCADA	Supervisory Control and Data Acquisition
S&T	Signal and Telecommunication

## 1. PROJECT BACKGROUND

Bengaluru is the fifth largest metropolis in India and is one of the fastest growing cities in Asia. It is also the capital of Karnataka. It is globally recognized as IT capital of India and also as a well-developed industrial city. The city which was originally developed as a Garden City over the years, slowly transformed into an industrial and software hub of India. Emergence of IT sector has overshadowed other areas of development and has metamorphosed the city into a global hub.

The establishment of the IT hubs on the outskirts has converted the city and its surroundings into Silicon Valley of India. It has also caused an urban sprawl around, to some extent lop sided towards south and east. It has become a commercial, administrative and military centre for the Region because of its salubrious climate and cosmopolitan nature of people. It was also known as pensioner's paradise with well-developed residential areas, roads with well grown trees, good commercial establishments, shopping malls etc.

The urban infrastructure growth however, is unable to cope up with the expansion of the city resulting in traffic congestion and long commuting time for residents. To increase the share of public transport in Bengaluru, Railways had formed **RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED (K RIDE)** on 22<sup>nd</sup> November 2000 under the Company's act and the company is limited by shares and the Company has been restructured as a State JV consequent on revised Shareholders' Agreement dated 17.10.2018 with its corporate office at # 8, 1st Floor, Samparka Soudha, Dr. Rajkumar Road, opposite Orion Mall, Rajajinagar 1st Block, Bengaluru-560010.

K RIDE is entrusted with the responsibility of execution of Bengaluru Suburban Railway Project. The project comprises of four Corridors at a total length of 148.17 km along with the depots for maintenance and stabling are proposed.

### 1.1. Sub-Urban Rail Corridors

- a) Corridor 1: KSR Bengaluru City – Yelahanka – Devanahalli
- b) Corridor 2: Baiyyappanahalli – Yeshwantpur – Chikkabanawar

- c) Corridor 3: Kengeri – KSR Bengaluru City – White Field
- d) Corridor 4: Heelalige – Yelahanka – Rajankunte

## **1.2. Proposed Sub-Urban Rail Depots**

- a) Corridor 1: Devanahalli
- b) Corridor 2: Jalahalli
- c) Corridor 3: Jnanabharathi
- d) Corridor 4: Avalahalli, Sarjapur Road

## **2. INTRODUCTION**

A train depot is where trains are stabled and maintained. The depots have infrastructure to maintain the rakes with necessary facilities viz. stabling lines, scheduled inspection lines, workshop for overhaul, unscheduled maintenance including major repairs, wheel profiling, heavy interior/under frame/roof cleaning etc. for the rolling stock operational on all the corridors as well as maintenance facilities for Civil – track, buildings, water supply; Electrical – Traction, E&M; Signalling & Telecomm.; Automatic Fare Collection etc.

The conceptual layout plan of Depot with above infrastructure will be developed upon finalization of suitable location with adequate area for the depot. Depending upon the type of rolling stock procured and recommendations of original equipment manufacturers of rolling stock and sub-assemblies, exhaustive list of machinery and plants along with tool and tackles shall be prepared for procurement so as to develop healthy maintenance practices for reliable operation of the rolling stock.

## **3. DEPOT LOCATION**

The Maintenance facilities for the Corridors of BSRP Chikkabanavara - Baiyyappanahalli (Corridor-2), Kengeri - White Field (Corridor-3) and Heelalige - Rajankunte (Corridor-4) are proposed to be provided at Jnanabharathi and for Bengaluru City - Devanahalli (Corridor-1), near Devanahalli.

### **3.1. Site Requirements**

The pre requisites of coach maintenance depot site is as under

- i. A plot size of adequate area - about 30 Ha depot;
- ii. Proximity to alignment: Site must be located as close to the alignment as possible so that no time is wasted in placement/retrieval of rakes from depot. In addition, it will save expenditure in construction and operation of the feeder line and dead run from and to depot;
- iii. Ease of movement: there should not be any obstruction to movement of rakes in either direction so that defective rakes can be withdrawn from service & placed in depot for maintenance and healthy rakes can be retrieved from depot & pressed in service;
- iv. A store depot within car-depot premises is to be set up.

### **3.2. Selection of Land Depot**

Ideally the location of Depot has to be near a terminal station for that the rakes can be sent to maintenance after completion of one trip and there is no necessity of any dry run.

Preferably, the quantum of land shall be much broader and longer in order to occupy, to halt, to maintain, to renovate, to alter the replacements if required for the multiple rakes simultaneously, without any time delay in a safe and elegant manner.

Desirably, the land for depot has to be located away from 'Silent zone' or in the isolated area as the prospects during repair, maintenance and alternations of train or using of heavy machineries like cranes, lifters etc. which may affect the livelihood, hospitals, educational institutions. Also, the sewer treatment plant and the water treatment plant are planned inside the depot which may also affect the livelihood.

Moreover, the land for depot is required without any overhead, underground restrictions as the BSRP substation are planned for electrification / traction purposes which may require clearances adequately.

A land which satisfies the above conditions is chosen for a depot.

As Devanahalli is the terminal station of Corridor – 1 of BSRP and if the proposed depot is located in Devanahalli, the requirement of dry run is reduced to 2km (approx.) as compared to that to the other locations. Consequently, for the said Depot, a land of 20.26 Ha. Approx. (excluding approach land) is proposed in survey no. 124 of Akkupete village (Land parcels of Forest land and Government of Karnataka) and survey no. 36 of Bommavara village (Land parcel of Government of Karnataka) in Kasaba Hobli, Devanahalli Taluk, Bengaluru Rural Dt. Out of this only 18.6 Ha in survey no. 124 is forest land Using Forest land has become inevitable in this regard.

#### 4. TRAIN DEPOT

Infrastructure	Devanahalli Depot
Stabling lines	29 lines of 6 car
Inspection lines	6 lines
Workshop lines	3 lines

#### 4.1. Operational Activities of Railways

##### 4.1.1. Train operation

- a. Train reception/Dispatch (working of power cabin)
- b. Placement/removal of coaching rake in/from washing lines and stabling lines including releasing of rake by TXR
- c. Shunting operation including loco movement
- d. Traction changing
- e. Crew management which includes, booking, signing off, crew changing involving handing over and taking over of the locomotive.
- f. Delivering of caution order and other documents to driver/guard
- g. Operation during emergency: track failure, signal failure, derailments etc.

#### **4.1.2. Infrastructure Operation and Maintenance**

- a. OHE operation and maintenance
- b. Signal operation and maintenance
- c. Track maintenance
- d. Electricity supply for Traction, Signal, Coach and locomotive maintenance depot area.

#### **4.1.3. Coach maintenance**

- a. Washing Line Operation
- b. Cleaning of Coaches
- c. Sick Line Operation
- d. Watering of coaches
- e. Train cleaning including system of clean train station
- f. Pre-cooling and battery charging of coaches in platform lines and washing and stabling lines
- g. Rolling in examination at both ends of platform for all lines.
- h. Continuity check of brake power and issue of Break Power Certificates (BPC)
- i. Axle box feeling (if not covered in rolling in examination)
- j. Train examination of passing trains rolling in examination.

#### **4.1.4. Locomotive Operation**

- a. Locomotive out pit operation and maintenance
- b. Attaching/detaching locomotive

#### **4.1.5. Security**

- a. Security of Railway installations
- b. Crime prevention/control

#### **4.2. Non-Operational Activities Concessionaire**

#### **4.2.1. Utilities**

- a. Water supply including water-harvesting/recycling facilities
- b. Electricity Supply except for Traction, Signal, Coach and locomotive maintenance depot area
- c. Drainage Management

#### **4.2.2. Cleaning**

- a. Staff offices and other building cleaning
- b. Garbage collection and disposal

#### **4.2.3. Inter modal Connectivity**

- a. Parking management: four-wheeler, two-wheeler
- b. Pre-paid taxi/auto rickshaw
- c. Maintenance of circulating area and approach roads including parking area

#### **4.2.4. Security and Safety**

- a. Access control systems, if any
- b. Security surveillance system
- c. Fire safety

### **4.3. Facilities at Train Depot**

#### **4.3.1. Train Stabling Area / Yard**

Stabling Area is a place where trains are parked when they are not in operation. Typically, trains return to the stabling facility at the end of service and until they are required again.

#### **4.3.2. Train Workshop Building**



Servicing requirements shall be determined from the Rolling Stock manufacturer. Depending upon manufacturer's requirements, servicing facilities may be provided to include the ability to carry out the inspection, maintenance, overhaul and repair of the rolling stock fleet, including the following components:

- a. Body furnishing.
  - b. Bogie.
  - c. Wheels.
  - d. Traction Motor
  - e. Axle box and axle bearing
  - f. Pentagraph.
  - g. Electrical equipment like transformer, converter/inverter, circuit breaker, relays.
  - h. Battery.
  - i. Air compressor.
  - j. Air conditioning equipment.
  - k. Brake equipment.
  - l. Door actuators.
  - m. Control and measuring equipment.
  - n. Pneumatic equipment
  - o. Dampers and Springs
  - p. Couplers/ Gangways
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- a. **Inspection Lines**

Inspection line is used for inspecting the train regularly as per inspection schedule. Facility of Roof inspection of train is also available in these lines. All Roof access platform has interlock system with OHE (Overhead Equipment). If OHE is charged this door will be inactive.
  - b. **Maintenance/Workshop Lines**

These lines are used for heavy repair workshop for trains. Shunter to be used for hauling any train in these lines. Attending any under frame system is also available in these lines These lines are equipped with lifting system.

#### **4.3.3. Automatic Coach Washing Plant**

Provision is made for Rolling Stock exterior surfaces to be washed using a fully automated Coach Washing Plant. The rolling stock wash plant is used for removing dust, greasy dirt and other stains on the exterior of EMUs. The wash plant automatically washes the two flanks, front and rear ends, the vehicle top side slope, door and window glass by chemical and physical effects of water and detergents and washing brushes.

#### **4.3.4. Test Track**

This line is used for internal testing of train and other systems. Test track is equipped with signalling equipment (ATP/ATO). It is used for the commissioning of the new trains, their trials and testing of the trains after the Intermediate Overhaul (IOH) and Periodical Overhaul (POH). In compliance to safety norms, the boundary of the track shall be completely fenced to prevent unauthorized trespassing across or along the track.

#### **4.3.5. Operation Control Centre and Depot Control Centre**

Control of train operation will be done centrally from Operations Control Centre (OCC), which will house Traffic Control Centre, SCADA System for Traction Power Control & Monitoring, SCADA System for Auxiliary Power, VAC Control & Monitoring, Telecommunication, CCTV Control & Monitoring etc. Movement of trains inside depot shall be controlled from Depot Control Centre (DCC) located inside the depot.

#### **4.3.6. Administrative Building**

An administrative building close to the main entrance is planned. It can be suitably sized and architecturally designed at the detailed design stage. A security office is also provided close to main entrance. It is equipped with suitable Access Control System for all the staff working in the complex.

#### **4.3.7. P-Way Building**

A P-way building is provided with local workshop and offices with road and rail access for stabling and maintenance of Maintenance Vehicles.

#### **4.3.8. Under-floor Wheel Lathe**

The under-floor wheel lathe will simultaneously machine the two-wheel treads of each wheel-set. This under-floor wheel employs the state-of-the-art CNC or microprocessor technology. The lathe is equipped with an automatic wear-measuring device to achieve the minimum removal of wheel material.

#### **4.3.9. Car Delivery Area**

The newly procured coaches, which are transported by road, shall reach the Depot Workshop by the road on trailers. To unload the coaches and bring them to the track, provision of space, along the side of shunting neck, has to be made for unloading of cars and other heavy materials. There should be enough space available for movement of heavy cranes for lifting of coaches. The unloading area should be easily accessible for heavy duty hydraulic trailers.

#### **4.3.10. Stores**

Storage facilities are provided to ensure that all appropriate spares, parts, tools and consumables are delivered to and issued from a single main store with as few sub-stores as practical. Accommodation of the complete range of spares and supplies, for the maintenance and operation of the rail system are provided.

#### **4.3.11. Parking Facilities**

- a. Ample parking space shall be provided for the two wheelers and four wheelers at the following points.
  - i. Close to the Depot entry.
  - ii. Close to the stabling lines.
  - iii. Close to repair bay.
- b. Space for parking of road vehicles and re-railing equipment.

#### **4.3.12. Shed and Buildings**

The shed and buildings normally provided in the depot with their sizes and brief functions are indicated in Annexure-I. The shed and buildings are not depicted on the layout drawing. At the detailed design stage depending upon the land availability, the

decision to locate these buildings can be taken. These can then be architecturally and functionally grouped. Moreover, the shed and buildings shall be suitable for installation of solar system in future.

a. **Repair shed**

Each shed to have two EOT cranes of 10 Ton capacity each with EPU (epoxy polyurethane) flooring, inspection pits and grilled base. Galvanised Aluminium /Aluminium sheet with thermal insulation layer and natural drift exhaust system which will have 10-15% translucent sheets in the roof shall be provided. Pneumatic circuits with tapping arrangements at required locations shall be provided.

b. **Sub-assembly shed**

For Gearbox, axle, Engine, hydraulic, pneumatic, electrical, electronic and Lifting unit sections with suitable partition with air conditioning & test bench Each shed to have one EOT crane of 5 t capacity with EPU (epoxy polyurethane) flooring. Galvanised Aluminium /Aluminium sheet with thermal insulation layer and natural drift exhaust system which will have 10-15% translucent sheets in the roof shall be provided. Pneumatic circuits with tapping arrangements at required locations shall be provided.

c. **Shed for Overhauling**

Each shed to have one EOT crane of 5 t capacity with EPU (epoxy polyurethane) flooring. Galvanised Aluminium /Aluminium sheet with thermal insulation layer and natural drift exhaust system which will have 10-15% translucent sheets in the roof shall be provided. Pneumatic circuits with tapping arrangements at required locations shall be provided. Concrete aprons of approx. 20 m length with hydrant and jet cleaning arrangement having proper drainage system shall be provided.

d. **Heavy Cleaning Shed**

Monthly heavy cleaning of interior walls, floors, seats, windows glasses done by manually in the interior cleaning plant shall be designed for cleaning of one six car train at a time. A line adjacent to inspection shed to be provided that placement of rakes is possible from workshop or inspection lines & vice – versa conveniently & with ease.

#### **4.3.13. Inspection Pit**

Each depot will be provided with an inspection pit of length given with proper drainage arrangement for examination of under gears of machines.

#### **4.3.14. Compressed Air Supply**

An independent compressor unit shall be provided at designated/required locations for the supply of compressed air in workshop and Inspection Bay.

#### **4.3.15. Water Supply, Sewerage and Drainage Works**

In house facilities shall be developed for the water supply of the Depot. Sewerage, storm water drainage shall be given due care while designing the Depots for efficient system functioning. Past records of Municipal Corporation shall be used to design the drainage system. Rainwater harvesting would be given due emphases to charge the underground reserves.

#### **4.3.16. Plant and Machinery**

Requirement of major plants and machinery, which are vital for operational needs, is given in Annexure-II.

#### **4.3.17. Power Supply**

An auxiliary substation has been planned for catering to the power supply requirement of the whole depot and workshop. Details of connected load feeder shall be worked out. Taking diversity factor of 0.5, the maximum demands shall be computed. Two Auxiliary sub-stations are proposed as the demand by machines in Workshop area would be very large.

#### **4.3.18 Standby Power Supply**

The standby power supply is proposed through DG set with AMF panel. The capacity of DG set will be adequate to supply all essential loads without over loading. This will also be housed in both the sub-stations

#### **4.3.19 OHE Depot cum ETU Workshop**

This workshop will have two lines, both at floor level with provision of pits. In this workshop major & minor repairs of Tower wagon, shunters, Rail-Road Vehicles and other ancillary vehicles will be done. These vehicles will also be housed here itself. Heavy lifting works can be carried out in main Workshop. OHE Depot will be used for storing all OHE parts and their maintenance. Provision for small lifting is done in this shed.

### **5. DEPOT CAPACITY**

Depot capacity is a matter of design. Franchise obligations, fleet mileage, structure of the Maintenance Plan and availability targets must be used to quantify the capacity and capability needed from the depot(s) to maintain the fleet and to support out-of-course activities, including potential fleet modifications.

In detail, the process for planning maintenance work and ensuring that trains are diagrammed to return according to an achievable work plan. Depot capacity doesn't just depend on the number and type of vehicle berths and equipment. Progression of vehicles through the facility, sequencing of work and vehicle downtimes are equally important, as are team structure and their working methods.

### **6. SAFETY FEATURES**

#### **6.1. During the Design of Maintenance depots.**

- 6.1.1. 1.5 EOT cranes in the inspection bay should be interlocked with OHE in such a way that the cranes become operational only when OHE is isolated and grounded.
- 6.1.2. Red flasher lights should be installed along the inspection lines at conspicuous location to indicate the OHE is 'Live'.
- 6.1.3. Multi-level wheel and TM stacking arrangement should be an inbuilt feature at the end of Workshop Lines.
- 6.1.4. Pillars in the inspection bay & workshop should have provision for power sockets.
- 6.1.5. Placement of rakes from inspection/workshop lines on to washing lines for interior cleaning on their own power should be possible. Linking of OHE and its isolation at the cleaning area should be provided. Necessary requirements of safety should be kept in view.
- 6.1.6. The roof inspection platform should have at least two openable doors to facilitate staff to go up the roof for cleaning of roof. Suitable safety interlock should be provided to ensure maintenance staff are enabled to climb on the roof inspection platform only after the OHE is isolated.
- 6.1.7. Control Centre, PPIO & store depot must be close to Workshop.
- 6.1.8. Width of the doors of the sections wherein repairs of equipments' are done shall be at least 2 meters wide to allow free passage of equipment through them.
- 6.1.9. Provision of water hydrants should be done in workshops stabling yards also.
- 6.1.10. Compressed air points along with water taps should be available in interior of buildings for cleaning

## **6.2. Rolling stock maintenance system**

- 6.2.1. Rolling stock failure countermeasures.
  - a. It is necessary that causes of failure should be investigated and countermeasures are to be established and these things must be notified to the employees of rolling stock.

- b. Effective rolling stock maintenance system should be established by transmitting details of temporary maintenance / repair carried out in depot to workshop.

#### **6.2.2. Spare parts control system**

- a. The stored place of spare parts should be controlled, so that effective rolling stock maintenance system could be established.
- b. For effective rolling stock maintenance, the parts control system should be established, in which kinds and quantities of necessary parts will be controlled.

#### **6.2.3. Safety Management Methods**

Safety in the heavy rail transit industry involves

- a. Hazard Identification and Management
- b. Quantitative Risk Assessment (QRA)
- c. Design Review
- d. Traceability from Initial Design to Acceptance Testing (Safety Certification) A Separate Safety Management and Reporting Function
- e. Training of station staff in assessment and management of emergency condition



## Annexure – I

### List of Buildings in Depot

Sl. No.	Name of the Building	Size (in m)	Brief Function
1	Inspection Shed	220 x 30	Servicing of for 10 days and 30 days inspection.
	Workshop Shed	160 x 42	Major repair and overhaul of rolling stocks, diesel shunters, electric tractors, tower wagons. All heavy lifting hobs
	Associated Sections	160 x 8	Rooms for carrying out the inspection and workshop activity.
2	Stores Depot & Offices including Goods platform with ramp	42.5 x 42.5	i. Stocking of spares for regular and emergency requirement including consumable items. ii. This store caters for the requirement of dept for rolling sock and other disciplines. iii. To be provided with computerized inventory control. iv. Loading / unloading of material received by road.
3	Electric Substation DG set room	30 x 20	To cater for normal and emergency power supply for depot, workshop, service and all other ancillary buildings, essential power supply for essential loads and security light.
4	Track Feed Traction repair depot and E&M repair shop	80 x 30 (partly double storey)	Stabling and routine maintenance of shunting engine etc. and maintenance depot.  For maintenance of lifts / escalators and other general service works.
5	Cycle and Scooter stand	25 x 6	To park cycles and scooters.
6	Auto Coach washing plant and washing apron	160 x 10	For automatic washing of coaches, washing apron is for collection of dripping water and its proper drainage.
7	Interior cleaning plant	160 x 6.5	Heavy wet washing of rakes from inside, under frame, roof at 30 days interval.
8	P. way office, store and	80 x 20	i. For track maintenance of section and depot. ii. To weld rails for construction period only.

	workshop including welding plant		iii. To stable track tamping machine.
9	Security office and Time Office garages (4nos.)	15 x 8	i. For security personnel ii. For time punching iii. For parking vehicle jeep, truck, etc.
10	Check post (2 nos.)	5 x 3	For security check of incoming/ outgoing staff material and coaches.
11	Watch tower (3nos.)	3.5 x 2.5	For security of the depot, especially during night time.
12	Depot control centre and Crew booking centre	25 x 20 (double storey)	To control movement of trains in and out of the depot & out of the depot & crew booking.
13	O.H raw water tank	1,00,000 L capacity	Storage of water, capacity 1,00,000 litres capacity
14	Pump house bore well	7.3 x 5.1; 200mm	Submersible type pump planned with 200m diameter bore well.
15	Repair shops for S & T	40 x 20	For the AFC gates, signalling and telecom equipment.
16	Workshop manager office	30 x 20 10 x 5 5 x 5 - (2 No's) 5 x 5 - (6 No's) 10 x 10 10 x 10 10 x 10 10 x 10  10 x 10 5 x 5 10 x 10 - (2 No's) 10 x 5	Office of Depot-in-charge Office in-charge Other Officer  Supervisor / Procurement Cell  Conference Room Training hall Electrical + Internet Panels Depot Control Centre  Drawing Office/Record Room First Aid Room / Creche for Children Changing Room + Personal Tool for (Ladies & Gents) Visitor Room
17	ATP & ATO room	4 x 5	To keep equipments of ATP / ATO

18	Waste water treatment plant	12 x 6	For treating the discharge waters of the depot and remove the oil, acids etc. before discharging into the river, with U/ G tank.
19	Canteen	200 sqm.	To cater staff of depot and workshop. Obligatory as per statutory requirements
20	Testing line with ATP / ATO	1000	Testing after heavy repairs, IOH # POH and new train formations.

**NOTE:**

- I. Depending on the administrative decision, the location and exact dimensions of each building shall be suitably decided at the detailed design stage incorporating the site topography, architectural nitty gritty and minor adjustment in sizes looking to the available land.
- II. Some of the buildings like stabling shed; security office etc. shall be pre – engineered structures. The decision in this regard will be taken at the detailed design stage.
- III. The above shown area includes road, pathway etc.

**Annexure – II**  
**List of Plants and Equipment**

<b>Sl. No.</b>	<b>Equipment</b>	<b>Qty.</b>	<b>Unit</b>	<b>Imp / Ind</b>
1	Under floor Pit wheel lathe, Chip crusher and conveyor for lathe on pit, Electric tractor for movement over under floor wheel lathe	1	Nos.	Imp
2	Under floor lifting system for 2 car unit for replacement of bogie	2	Set	Imp
3	Mobile jacks 15T for lifting cars.	24 + 12	Nos	Imp
4	Re-railing equipment consisting of rail cum road vehicle and associated jack system etc.	1	Set	Imp
5	Run through type Automatic washing plant for Metro cars	1	Nos	Imp
6	Rail fed Bogie wash plant	1	Nos	Imp
7	Bogie test stand	1	Nos	Imp
8	Work lift platform	6	Nos	Imp
9	ELECTRIC Bogie tractor for pulling cars and bogies inside workshops	2	Nos	Imp
10	Chemical cleaning tanks, ultrasonic cleaning tanks, etc.	1	Set	Imp
11	Compressor for Inspection shed and shop air supply	2	Nos	Ind
12	Travelling O / H crane workshop 10T – 4 nos.; 5T – 4 nos. (with auxiliary capacity of 5T)	8	Nos	Ind
13	Mobile job crane	4	Nos	Ind
14	Mobile lifting table	6	Nos	Ind
15	Car body stands	36 + 12	Nos	Ind
16	Bogie turn tables	3	Nos	Ind
17	Under frame & Bogie blowing plant	1		Ind
18	AC filter cleaning machine	1	Nos	Ind
19	Portable cleaning plant for rolling stock	1	Nos	Ind
20	High-pressure washing pump for front and rear end cleaning of car.	2	Nos	Ind
21	Shot blast cleaner	1	Set	Ind
22	Paint booth for small parts	1	Set	Ind

23	Axle shaft inspection station	1	Set	Ind
24	Industrial furniture	1	L.s.	Ind
25	Minor equipment and collective tools	-	Set	Ind
26	Induction heater	1	No.	Ind
27	Oven for the motors	1	No.	Ind
28	EMU battery charger	3	Nos.	Ind
29	Welding equipments (Mobile welding, oxyacetylene, fixed arc welding)	1	Set	Ind
30	Electric and pneumatic tools	-	Set	Ind
31	Measuring and testing equipment	-	Set	Ind
32	Tool Kits	-	Nos.	Ind
33	Mobile safety steps	15 + 5	Nos.	Ind
34	Forklift tractor	2	Nos.	Ind
35	Pallet trucks	6	Nos.	Ind
36	Diesel / battery shunting locomotive.	1	No.	Ind
37	Road vehicles (pickup van / truck)	2	Set	Ind
38	Miscellaneous office equipments	-		Ind
39	Vertical boring machine for wheel discs	1	No.	Ind
40	Press for removal and pressing of the wheels in axles	1	No.	Ind
41	Surface wheel lathe	1	No.	Ind
42	Axle journal turning and burnishing lathe	1	No.	Ind
43	Special jigs, fixtures and test branches for rolling stock.			IN

SY.NO.36

REQUIRED FOREST AREA  
FOR BSRP DEPOTSY.NO.124

