



## **Feasibility Report**

For

Name of the Work: - “Survey, Design, Supply, Installation, Testing and Commissioning of KAVACH (Train Collision Avoidance System), Towers and other Associated works in Double Line Automatic Signalling Section New Boraki-New Khurja Jn-New Bhaupur-New Unchdih-New Sonnagar Section (931 Km approx.) of Eastern Dedicated Freight Corridor of DFCCIL.”

on

Engineering, Procurement and Construction (EPC) Mode

**Employer:**

**DEDICATED FREIGHT CORRIDOR CORPORATION OF  
INDIA LIMITED**

**O/o GGM/S&T/EC-I  
Corporate Office, Noida.  
(A GOVERNMENT OF INDIA ENTERPRISE)  
UNDER MINISTRY OF RAILWAYS**

## **Project Background**

Dedicated Freight Corridor Corporation of India (DFCCIL) is a special-purpose vehicle set up under the administrative control of the Ministry of Railways to undertake planning & development, mobilization of financial resources, and construction, maintenance, and operation of the Dedicated Freight Corridors.

DFCCIL has constructed two corridors – the Western DFC and Eastern DFC-spanning a total length of about 3300 route km.

The Eastern Corridor starts from Ludhiana in Punjab and passes through Sonnagar in Bihar. The Western Corridor traverses the distance from Dadri to Mumbai, passing through the states of UP, Delhi, Haryana, Rajasthan, Gujarat, and Maharashtra.

The route alignment of Freight Corridors is mostly parallel to the existing adjacent Indian Railway Track. However, alignment is on detour at some locations to avoid social/environmental/wild life impact.

DFCCIL is double line (except Khurja to Sahnewal) electrified rail corridor, capable of handling 32.5 ton axle load, longer trains than currently used on Indian Railways. The bridges and other structures designed to allow movement of 32.5 ton axle load while the track structure initially designed for 25-ton axle load, operating at a maximum train speed of up to 100 km/hr.

The Eastern Corridor from Sonnagar to Sahnewal of 1337 RKM has been successfully commissioned. DFCCIL aims at enhancing logistical efficiency, reduce transportation costs, and promote economic growth through improved infrastructure, and ensuring uncompromisable safety of train operations. In taking a step forward of enhancement of safety, DFCCIL plans to implement Automatic Train Protection System- Kavach.

Kavach is an Automatic Train Protection (ATP) system indigenously developed to enhance train safety and prevent accidents. It has been successfully implemented in Indian Railways. It uses technology to automatically control train movement, ensuring that trains do not collide or exceed speed limits. The system works by continuously monitoring the train's speed and location, and it intervenes by applying brakes if the train is about to violate safety protocols, such as running past a signal or exceeding the speed limit.

### **1.1. Project Overview**

The Eastern Corridor with a route length of 1847 km from New Sonnagar in Bihar to Sahnewal in Punjab. Eastern DFC Route will be approximately 1337 Km long from Khurja Jn (U.P) to Sahnewal (Ludhiana) via Sonnagar – Mughalsarai – Allahabad - Kanpur – Tundla – Aligarh - Khurja - Hapur – Meerut – Saharanpur – Ambala – Sahnewal.

Eastern Corridor has been divided into the following distinct sections:

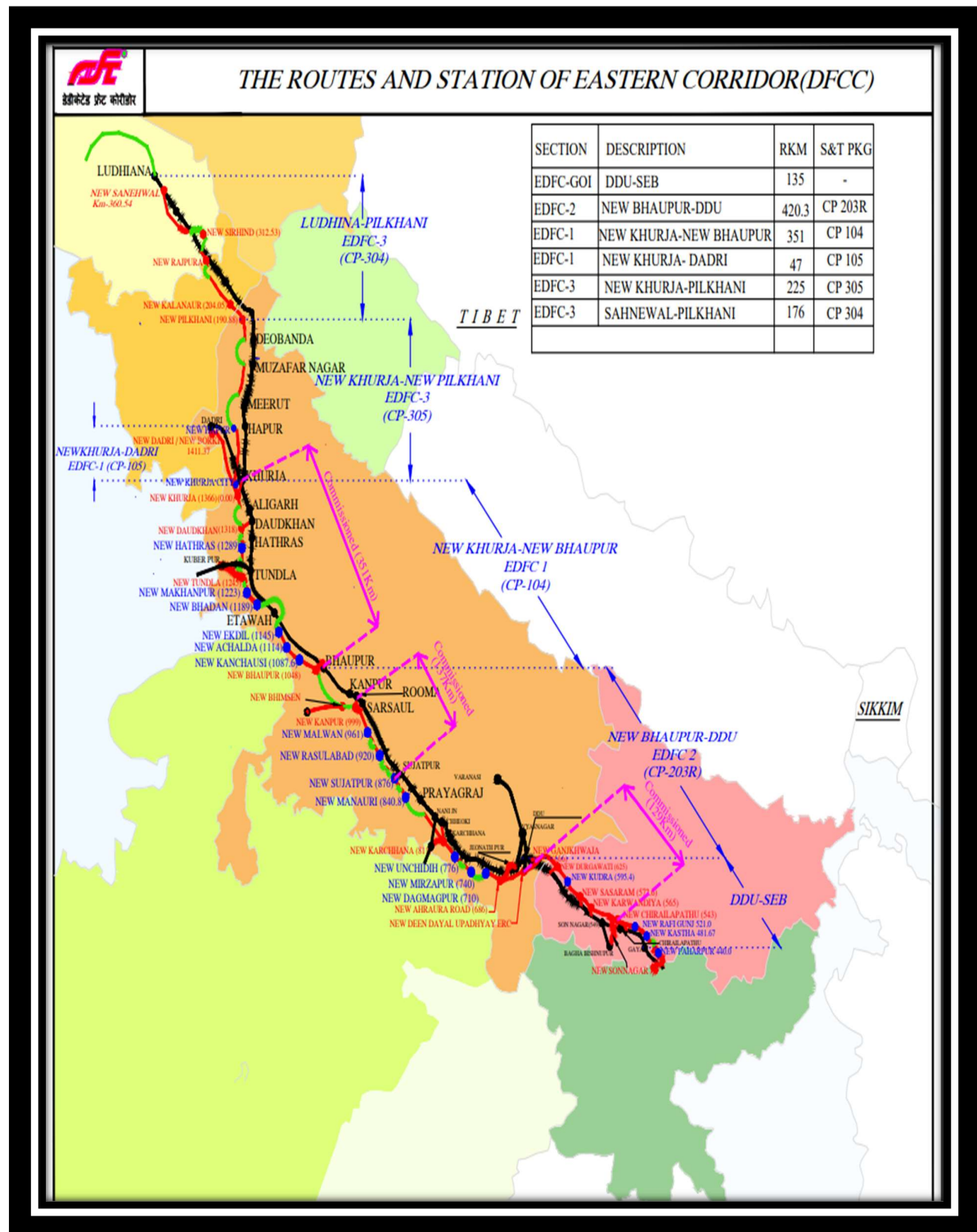
- i. Single line section of 406 km (approx.) from New Khurja Jn. To New Sahnewal.
- ii. Double line section: Khurja Jn to New Sonnagar of 1337 RKM (approx. has been divided into following sections:
  1. New Khurja Jn to New Dadri section-46.5 RKM
  2. New Khurja to New Bhaupur-333.6 RKM
  3. New Bhaupur to New Unchdih- 281 RKM
  4. New Unchdih to New Sonnagar- 252.3 RKM

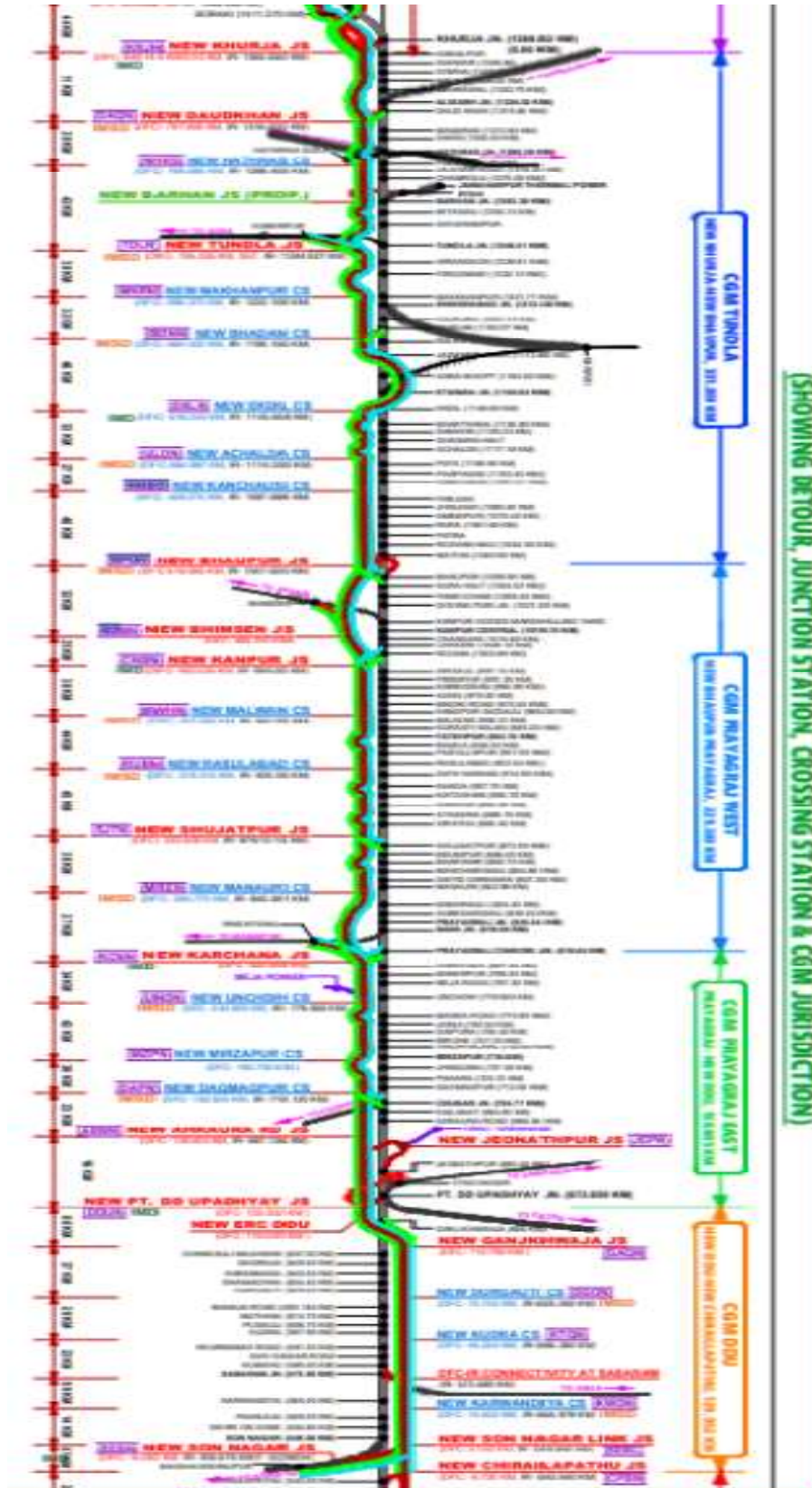
This Project aims to implement Automatic train protection system Kavach in Double line section of EDFC from New Khurja Jn- New Sonnagar.

Section details of EDFC for Kavach provision in EDFC:

| SN | Name of location From | Name of location To                | Start Chainage (km) | End Chainage (km)          | Length (km) | Remarks     |
|----|-----------------------|------------------------------------|---------------------|----------------------------|-------------|-------------|
| 1  | New Boraki            | New Khurja Jn (Ex.)                | 897.471             | 850.953                    | 46.518      | 1 station   |
| 2  | New Khurja Jn         | New Bhaupur                        | 850.953             | 517.302                    | 333.651     | 10 stations |
| 3  | New Bhaupur (Ex.)     | New Unchdih (Ex.)                  | 517.302             | 236.311                    | 280.991     | 7 stations  |
| 4  | New Unchdih           | New Sonnagar/<br>New Chirailapathu | 236.311             | SEBN: - 7.8<br>CPBN: - 8.2 | 252.311     | 13 stations |

In these 4 sections, locomotives fitted with Kavach on board loco equipment Kavach entering/exiting DFCCIL liens from IR connectivity lines, can





## **2. Details of the Section:**

### **2.1. Salient Features of Signalling System:**

- 2.1.1. The entire stretch from New Boraki- New Khurja-New Sonnagar has been provided with automatic Signalling system. Automatic Signalling has been provided in the block sections and main lines of the stations. Intersignal distance of 2Km is maintained in auto block sections.
- 2.1.2. The Single line tracks connecting DFCCIL Junction stations and IR stations have been provided with Absolute block signalling with block/slot working. All LC gates are interlocked on DFCCIL lines. The LC gates are protected with semi-automatic Gate signals. The Signals, Points, LC gates, Track-vacancy detection systems and other signalling equipment at the stations and in block sections are controlled/monitored by Electronic Interlocking (EI) located at stations.
- 2.1.3. Electronic Interlocking (EI) with standard II-R Interlocking, implemented with SIL-IV safety level.
- 2.1.4. Digital Axle counter technology is used for train detection function. The main lines in yards and block sections have been provided with main and supervisory track vacancy detection system.
- 2.1.5. IRS 220mm Point Machine (M/s Vossloh Make) with back drive for operation of Thick Web Switches are provided in the section.

### **2.2. Salient Features of Telecom system:**

- 2.2.1. EDFC communication is based on OFC backbone. The OFC backbone has two networks namely First Network and Second Network. Each network has two OFCs (24 core each) one main and the other as redundant OFC. The main and redundant OFCs of both networks laid with route and path diversity. The first network runs between stations and second network covers stations, relay huts, auto location huts etc.
- 2.2.2. Telecom Network for communication is designed with SDH, PDH, CCTV, Data Networking system, Wi-Fi, Telephone communication, Control Communication, Emergency Communication system, GSM-R communication system. Telecom system is monitored and

managed from central location at OCC Prayagraj.

2.2.3. Following are the main Telecom asset are installed:-

- SDH (STM-16 & STM-4)
- PDH Mux
- EPABX -Telephony exchange
- Master Clock/Sub master/Analog clock
- VHF system
- 48 V POWER SUPPLY (along with Battery set) SMPS 48 Volt
- along with NMS at OCC
- Data Networking System with L-3 switches & L-2 switches.

### 2.3. Brief Overview of EDFC sections:

2.3.1. **New Khurja Jn- New Boraki Jn** Double line section from New Khurja Junction(Excl.) to New Dadri (Excl.) spread over 47 RKM of EDFC passes through 2 Districts (Bulandshahr, G.B.Nagar) of Uttar Pradesh deals with substantial crossing of IR traffic.

| Description                                | Details                                     |
|--------------------------------------------|---------------------------------------------|
| Name of Section                            | <b>New Khurja Jn- New Boraki</b>            |
| Total Length                               | <b>59.103 ( including connecting lines)</b> |
| Link line                                  |                                             |
| Interlocked LCs                            | 02 Nos                                      |
| Junction Stations                          | <b>New Boraki Jna</b>                       |
| Crossing Stations                          | <b>Nil</b>                                  |
| <b>Auto Location Huts &amp; Relay Huts</b> | <b>3 RH &amp; 7 ALHs</b>                    |

2.3.2. **New Bhaupur-New Khurja section** is an integral part of EDFC having total length of 351 Kms (including link lines) located in the State of Uttar Pradesh and Operational Control Centre at Prayagraj. It Rail track passes through 08 districts namely Khurja, Aligarh, Hathras, Agra, Firozabad, Etawah, Auraiya & Kanpur. This Section has 10 stations, out of which 04 are junction stations.

| <b>Description</b>               | <b>Details</b>                                                                           |
|----------------------------------|------------------------------------------------------------------------------------------|
| Name of Section                  | New Bhaupur- New Khurja section                                                          |
| Total Length                     | 351 KM (including link lines)                                                            |
| Length in Parallel               | 226.50 KM                                                                                |
| Length in Detours                | 110.73 KM                                                                                |
| Link line                        | 23.44 KM                                                                                 |
| Interlocked LCs                  | 06 Nos                                                                                   |
| Junction Stations                | 05 nos.<br>New Bhaupur, New Bhadhan, New Tundla, New Daudkhan, New Khurja                |
| Crossing Stations                | <b>05 nos.</b><br>(New Hathras, New Makhanpur, New Ekdil, New Achhalda, & New Kanchausi) |
| Auto Location Huts<br>Relay Huts | 48 ALHS<br>19 RHs                                                                        |

2.3.3. **New Bhaupur (Excl) – New Unchdih (Ex)** is spread over 280.991 KMs within the state of Uttar Pradesh. This Section has 7 stations, out of which 04 are junction stations.

|                                  |                                                                                                                                                                              |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name of Section                  | New Bhaupur - New Pt. Deen Dayal Upadhaya                                                                                                                                    |
| Total Length                     | 280.991 RKM                                                                                                                                                                  |
| Link line                        | Absolute Block Working on single line section New Bhimsen-Bhimsen(IR) link line and New Kanpur-Rooma(IR) link line and slot working on New Sujatpur - Sujatpur(IR) link line |
| Interlocked LCs                  | 04                                                                                                                                                                           |
| Junction Stations                | 04<br>New Bhimsen, New Kanpur, New Sujatpur & New Karchana                                                                                                                   |
| Crossing Stations                | 03<br>New Malwan, New Rasulabad & New Manuari                                                                                                                                |
| Auto Location Huts<br>Relay Huts | 37 ALHs<br>19 RHs                                                                                                                                                            |

2.3.4. **New Unchdih(Incl)- New Sonnagar section** spread over 252.311 Km of EDFC network available in Uttar Pradesh and Bihar deals with substantial originating, terminating and cross traffic. ERCN-

CPBN section is parallel to existing the Indian Railway track alignment of ECR. The DFC junction station/cabin at around Chainage 6854m towards Howrah end of DFC Sone Bridge connected to the adjacent Chirailapathu station of IR and designated as New Chirailapathu. The New Sonnagar junction station of DFC connected to Bagahabishunpur station of IR. There are 07 numbers of crossing stations and 06 numbers junction stations between ERCN-CPBN/SEBN section.

| <b>Name of Section</b>           | <b>New DDU- New Sonnagar</b>                                                                                                                         |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Total Length                     | 137.5 RKM                                                                                                                                            |
| Interlocked LCs                  | 12                                                                                                                                                   |
| Junction Stations                | 06<br>New Ahrarura, New Pt. Deen Dayal Upadhyay Junction, New ERC DDU., New Gankhwaja junction, New Sonnagar Junction & New Chiraila Pathu Junction. |
| Crossing Stations                | 07<br>New Unchdih, New Mirzapur, New Dagmagpur, New Durgawati, New Kudra, New Karwandia & New Sonnagar link                                          |
| Auto Location Huts<br>Relay Huts | 57 ALHs<br>42 RHs                                                                                                                                    |

### 3. Status of Existing Infrastructure: -

#### 3.1. Station Details

| SN | Station Details |              |        | DFCC Chainage | Junction /Crossing | Number of routes | No. of Lines |
|----|-----------------|--------------|--------|---------------|--------------------|------------------|--------------|
|    | Station Name    | Station Code | EI OEM |               |                    |                  |              |
| 1  | New Boraki      | BRKN         | Kyosan | 893.822       | Jn                 | 343              | 12           |
| 2  | New Khurja      | KRJN         | Alstom | 849.141       | Jn                 | 145              | 11           |
| 3  | New Daudkhan    | DAQN         |        | 797.852       | Jn                 | 113              |              |
| 4  | New Hathras     | NHRS         |        | 768.684       | X                  | 54               | 7            |
| 5  | New Tundla      | TDLN         |        | 726.045       | Jn                 | 147              | 10           |
| 6  | New Makkhanpur  | MNRN         |        | 696.372       | X                  | 56               | 10           |
| 7  | New Badhan      | BDNN         |        | 664.421       | Jn                 | 55               | 10           |

| SN | Station Details              |              |         | DFCC Chainage | Junction /Crossing | Number of routes | No. of Lines |
|----|------------------------------|--------------|---------|---------------|--------------------|------------------|--------------|
|    | Station Name                 | Station Code | EI OEM  |               |                    |                  |              |
| 8  | New Ekdil                    | EKLN         |         | 618.265       | X                  | 52               | 6            |
| 9  | New Achalda                  | ULDN         |         | 584.886       | X                  | 48               | 8            |
| 10 | New Kanchausi                | KNSD         |         | 558.274       | X                  | 63               | 9            |
| 11 | New Bhaupur                  | BPUN         |         | 518.087       | Jn                 | 118              | 13           |
| 12 | New Bhimsen                  | BZMN         | Siemens | 485.911       | Jn                 | 119              | 4            |
| 13 | New Kanpur                   | CNBN         |         | 460.536       | Jn                 | 132              | 5            |
| 14 | New Malwan                   | MWHN         |         | 422.666       | X                  | 58               | 4            |
| 15 | New Rasulabad                | RUBN         |         | 378.310       | X                  | 58               | 4            |
| 16 | New Sujatpur                 | SJTN         |         | 333.608       | Jn                 | 119              | 4            |
| 17 | New Manauri                  | MREN         |         | 295.772       | X                  | 58               | 4            |
| 18 | New Karchana                 | KCNN         |         | 268.868       | Jn                 | 221              | 6            |
| 19 | New Unchdih                  | UNDN         |         | 234.900       | Jn                 | 96               | 4            |
| 20 | New Mirzapur                 | MZPN         |         | 192.700       | X                  | 56               | 4            |
| 21 | New Dagmagpur                | DAPN         |         | 162.500       | X                  | 123              | 4            |
| 22 | New Ahraura Rd.              | ARWN         |         | 193.400       | Jn                 | 82               | 4            |
| 23 | New Pt. Deen Dayal Upadhyaya | DDUN         |         | 123.232       | Jn                 | 490              | 7            |
| 24 | ERC Cabin DDUN               | ERCN         | KYOSAN  | 119.200       | Jn                 | 6                | 2            |
| 25 | New GanjKhwaja               | GAQN         |         | 112.836       | Jn                 | 25               | 2            |
| 26 | New Durgauti                 | DGON         | SIEMENS | 75.750        | X                  | 49               | 4            |
| 27 | New Kudra                    | KTQN         |         | 46.080        | X                  | 46               | 4            |
| 28 | New Karwandiya               | KWDN         |         | 14.499        | X                  | 68               | 4            |
| 29 | New Sonnagar Link            | SEBL         | KYOSAN  | 0.160         | ALH/EI             | 30               | 4            |
| 30 | New Chirailapathu            | CPBN         |         | -6.720        | ALH/EI             | 34               | 2            |
| 31 | New Sonnagar                 | SEBN         |         | -6.030        | ALH/EI             | 94               | 4            |

### 3.2. LC Gates

| SN. | L.C. Gate No | Class | KM         | Section   | Traffic/ Engg Gate (T/E) | DFC Controlling Station |
|-----|--------------|-------|------------|-----------|--------------------------|-------------------------|
| 1   | 138          | C     | 1395/15-17 | KRJN-BRKN | E                        | BRKN                    |
| 2   | 145          | Spl   | 1410/26-28 | BRKN Yard | E                        | BRKN                    |

|    |      |   |               |            |   |      |
|----|------|---|---------------|------------|---|------|
| 3  | 94   | B | 532.77<br>0   | BPUN-KNSD  | E | BPUN |
| 4  | 5    | C | 561.91<br>8   | ULDN-KNSD  | E | KNSD |
| 5  | 10   | C | 576.22<br>2   | ULDN-KNSD  | E | ULDN |
| 6  | 18   | C | 602.04<br>5   | ULDN-EKLN  | E | EKLN |
| 7  | 23   | B | 619.83<br>3   | EKLN       | T | EKLN |
| 8  | 32   | C | 348.545       | SJTN- RUBN | T | SJTN |
| 9  | 10A  | A | 202/21-<br>23 | UNDN- MZPN | T | MZPN |
| 10 | 122A | A | 157/35-<br>37 | DAPN-ARWN  | T | DAPN |
| 11 | 112C | C | 127/35-<br>37 | ARWN-DDUN  | E | DDUN |
| 12 | 78   | C | 111.45<br>6   | GAQN-DGON  | E | GAQN |
| 13 | 76   | C | 106.12<br>2   | GAQN-DGON  | E | GAQN |
| 14 | 75   | C | 103.59<br>0   | GAQN-DGON  | E | GAQN |
| 15 | 74   | C | 101.51<br>5   | GAQN-DGON  | E | GAQN |
| 16 | 72   | A | 97.793        | GAQN-DGON  | T | DGON |
| 17 | 71   | C | 95.241        | GAQN-DGON  | E | DGON |
| 18 | 70   | C | 94.134        | GAQN-DGON  | E | DGON |
| 19 | 56   | C | 59.152        | DGON-KTQN  | E | KTQN |
| 20 | 53   | C | 51.161        | DGON-KTQN  | E | KTQN |
| 21 | 47   | C | 33.005        | KTQN-KWDN  | E | KWDN |
| 22 | 39   | C | 15.782        | KTQN-KWDN  | T | KWDN |
| 23 | 36   | C | 09.300        | KWDN-SEBL  | T | KWDN |

### 3.3. Station Details (Routes, Points, Signals & tracks)

| SN | Station Block/<br>Section Name | Routes | Signals | Points | Tracks | Signal (UP) | Signal (DN) |
|----|--------------------------------|--------|---------|--------|--------|-------------|-------------|
| 1  | CPBN                           | 34     | 6       | 10     | 22     | 3           | 3           |
| 2  | CPBN-<br>SEBL                  | -      | 2       | -      | 6      | 1           | 1           |
| 3  | SEBN                           | 94     | 13      | 24     | 39     | 4           | 4           |
| 4  | SEBN-                          | -      | 2       | -      | 6      | 1           | 1           |

| SN | Station Block/ Section Name | Routes | Signals | Points | Tracks | Signal (UP) | Signal (DN) |
|----|-----------------------------|--------|---------|--------|--------|-------------|-------------|
|    | SEBL                        |        |         |        |        |             |             |
| 5  | SEBL                        | 30     | 9       | 4      | 19     | 5           | 3           |
| 6  | SEBL-KWDN                   | -      | 12      | -      | 16     | 6           | 6           |
| 7  | KWDN                        | 68     | 13      | 21     | 36     | 4           | 4           |
| 8  | KWDN-KTQN                   | -      | 32      | -      | 58     | 13          | 13          |
| 9  | KTQN                        | 46     | 10      | 15     | 26     | 4           | 4           |
| 10 | KTQN-DGON                   | -      | 27      | -      | 56     | 14          | 13          |
| 11 | DGON                        | 49     | 11      | 14     | 29     | 5           | 4           |
| 12 | DGON-GAQN                   | -      | 43      | -      | 37     | 21          | 22          |
| 13 | GAQN                        | 25     | 7       | 4      | 19     | 3           | 3           |
| 14 | GAQN-ERCN                   | -      | 6       | -      | 14     | 3           | 3           |
| 15 | ERCN                        | 6      | 2       | 4      | 8      | 1           | 1           |
| 16 | ERCN-DDUN                   | -      | -       | 4      | 5      | -           | -           |
| 17 | DDUN                        | 490    | 43      | 89     | 112    |             |             |
| 18 | DDUN-ARWN                   | -      | 11      | -      | 19     | 6           | 5           |
| 19 | ARWN                        | 82     | 12      | 19     | 35     | 6           | 6           |
| 20 | AWRN-DAPN                   | -      | -       | -      | 22     | 7           | 7           |
| 21 | DAPN                        | 123    | 23      | 30     | 55     |             |             |
| 22 | DAPN-MZPN                   | -      | -       | -      | 42     | 13          | 13          |
| 23 | MZPN                        | 56     | 10      | 19     | 33     | 5           | 5           |

| <b>SN</b> | <b>Station Block/Section Name</b> | <b>Routes</b> | <b>Signals</b> | <b>Points</b> | <b>Tracks</b> | <b>Signal (UP)</b> | <b>Signal (DN)</b> |
|-----------|-----------------------------------|---------------|----------------|---------------|---------------|--------------------|--------------------|
| 24        | MZPN-UNDN                         | -             | -              | -             | 65            | 21                 | 21                 |
| 25        | UNDN                              | 96            | 19             | 20            | 39            |                    |                    |
| 26        | UNDN-KCNN                         | -             | -              | -             | 55            | 16                 | 16                 |
| 27        | KCNN                              | 221           | 34             | 46            | 75            | 4                  | 4                  |
| 28        | KCNN-MREN                         | -             | -              | -             | 36            | 11                 | 11                 |
| 29        | MREN                              | 58            | 10             | 18            | 29            | 4                  | 4                  |
| 30        | MREN-SJTN                         | -             | -              | -             | 54            | 17                 | 17                 |
| 31        | SJTN                              | 119           | 18             | 27            | 47            | 4                  | 4                  |
| 32        | SJTN-RUBN                         | -             | -              | -             | 64            | 20                 | 20                 |
| 33        | RUBN                              | 58            | 10             | 18            | 30            | 4                  | 4                  |
| 34        | RUBN-MWHN                         | -             | -              | -             | 66            | 21                 | 21                 |
| 35        | MWHN                              | 58            | 10             | 18            | 25            |                    |                    |
| 36        | MWHN-CNBN                         | -             | -              | -             | 53            | 16                 | 17                 |
| 37        | CNBN                              | 132           | 20             | 35            | 53            |                    |                    |
| 38        | CNBN-BZMN                         | -             | -              | -             | 36            | 11                 | 11                 |
| 39        | BZMN                              | 119           | 18             | 22            | 44            |                    |                    |
| 40        | BZMN-BPUN                         | -             | -              | -             | 34            | 10                 | 10                 |
| 41        | BPUN                              | 118           | 21             | 36            | 75            |                    |                    |
| 42        | BPUN-KNSD                         |               |                |               | 38            | 19                 | 19                 |

| <b>SN</b> | <b>Station Block/Section Name</b> | <b>Routes</b> | <b>Signals</b> | <b>Points</b> | <b>Tracks</b> | <b>Signal (UP)</b> | <b>Signal (DN)</b> |
|-----------|-----------------------------------|---------------|----------------|---------------|---------------|--------------------|--------------------|
| 43        | KNSD                              | 63            | 19             | 17            | 40            |                    |                    |
| 44        | KNSD-ALDN                         |               |                |               | 22            | 11                 | 11                 |
| 45        | ALDN                              | 48            | 22             | 15            | 66            |                    |                    |
| 46        | ALDN-EKLN                         |               |                |               | 32            | 16                 | 16                 |
| 47        | EKLN                              | 52            | 10             | 17            | 42            |                    |                    |
| 48        | EKLN-BDNN                         |               |                |               | 42            | 21                 | 21                 |
| 49        | BDNN                              | 55            | 10             | 17            | 41            |                    |                    |
| 50        | BDNN-MNRN                         |               |                |               | 28            | 14                 | 14                 |
| 51        | MNRN                              | 56            | 8              | 18            | 38            |                    |                    |
| 52        | MNRN-TDLN                         |               |                |               | 24            | 12                 | 12                 |
| 53        | TDLN                              | 147           | 22             | 34            | 78            |                    |                    |
| 54        | TDLN-NHRS                         |               |                |               | 42            | 22                 | 20                 |
| 55        | NHRS                              | 54            | 10             | 15            | 39            |                    |                    |
| 56        | NHRS-DAQN                         |               |                |               | 26            | 13                 | 13                 |
| 57        | DAQN                              | 113           | 21             | 33            | 76            |                    |                    |
| 58        | DAQN-KRJN                         |               |                |               | 47            | 24                 | 23                 |
| 59        | KRJN                              | 145           | 23             | 43            | 85            |                    |                    |
| 60        | BRKN-KRJN                         |               |                |               | 54            | 18                 | 18                 |
| 61        | BRKN                              | 343           | 36             | 43            | 86            |                    |                    |

### 3.4. Longitude & Latitude of Stations/Auto location Huts/Relay Huts/Towers

| SN | Station/RH/<br>ALH/DH/TW | DFC<br>Chainage | Latitude        | Longitude   |
|----|--------------------------|-----------------|-----------------|-------------|
| 1  | DH-3                     | 7.8             | 24.8324967      | 84.220195   |
| 2  | SEBN                     | 7.2             | 24.8373204      | 84.2238402  |
| 3  | DH-4                     | 6.025           | 24.5046248<br>4 | 84.13477664 |
| 4  | DH-1                     | 8.138           | 24.8606221      | 84.2925868  |
| 5  | CPBN                     | 6.712           | 24.8623017      | 84.2786267  |
| 6  | DH-2                     | 5.264           | 24.86395        | 84.264445   |
| 7  | SEBL                     | 0.16            | 24.8886068      | 84.2229873  |
| 8  | ALH-1                    | 3.426           | 24.9083316      | 84.1953134  |
| 9  | ALH-2                    | 9.288           | 24.9334414      | 84.1451271  |
| 10 | KWDN (ALH-2A)            | 14.499          | 24.9498701      | 84.0961393  |
| 11 | KWDN (EI-1)              | 14.499          | 24.9498701      | 84.0961393  |
| 12 | EI-2                     | 19.392          | 24.9571459      | 84.049013   |
| 13 | EI-2A                    | 23.47           | 24.9561048      | 84.0084961  |
| 14 | EI-3                     | 26.17           | 24.9609157      | 83.9827257  |
| 15 | EI-4                     | 31.212          | 24.9815443      | 83.9384202  |
| 16 | EI-5                     | 36.236          | 25.0012767      | 83.8946733  |
| 17 | EI-6                     | 38.795          | 25.0115485      | 83.8709493  |
| 18 | EI-7                     | 40.718          | 25.0193209      | 83.853875   |
| 19 | KTQN (EI-8)              | 46.08           | 25.0419383      | 83.8067183  |
| 20 | EI-9                     | 49.97           | 25.0602734      | 83.7741578  |
| 21 | EI-10                    | 55.765          | 25.0929658      | 83.7293778  |
| 22 | EI-11                    | 59.283          | 25.1127338      | 83.7022488  |
| 23 | EI-12                    | 65.092          | 25.1455263      | 83.6573554  |
| 24 | EI-13                    | 69.691          | 25.1716693      | 83.622047   |
| 25 | EI-14                    | 74.321          | 25.1833566      | 83.6038689  |
| 26 | DGON (EI-15)             | 75.75           | 25.197078       | 83.5685768  |
| 27 | ALH-3                    | 81.577          | 25.2212998      | 83.5171521  |
| 28 | ALH-4                    | 86.802          | 25.2330318      | 83.4669483  |
| 29 | ALH-5                    | 91.98           | 25.2437216      | 83.4170951  |
| 30 | ALH-6                    | 97.357          | 25.2513634      | 83.3644568  |
| 31 | ALH-7                    | 101.773         | 25.2586334      | 83.3027545  |

|    |                                      |         |            |            |
|----|--------------------------------------|---------|------------|------------|
| 32 | ALH-8                                | 107.44  | 25.2607287 | 83.27799   |
| 33 | GAQN                                 | 112.836 | 25.2692566 | 83.2124277 |
| 34 | ALH-9                                | 116.936 | 25.27726   | 83.1737217 |
| 35 | ERCN                                 | 119.2   | 25.2965333 | 83.1679168 |
| 36 | DDUN RH-1                            | 119.97  | 25.298098  | 83.163751  |
| 37 | DDUN RH-2                            | 121.25  | 25.29284   | 83.154215  |
| 38 | DDUN RH-3                            | 121.77  | 25.290866  | 83.14832   |
| 39 | NEW PT. DEEN<br>DAYAL<br>UPADHYAY JN | 123.232 | 25.284566  | 83.135498  |
| 40 | DDUN RH-4                            | 124.08  | 25.281428  | 83.127902  |
| 41 | DDUN RH-5                            | 125.25  | 25.27547   | 83.11864   |
| 42 | DDUN RH-6                            | 126.62  | 25.270362  | 83.106635  |
| 43 | ALH-201                              | 129.08  | 25.255304  | 83.088356  |
| 44 | ALH-202                              | 133.68  | 25.133207  | 83.032203  |
| 45 | ARWN RH-1                            | 138.2   | 25.198359  | 83.023293  |
| 46 | NEW AHRAURA<br>JN                    | 139.4   | 25.192869  | 83.013156  |
| 47 | ARWN RH-2                            | 140.48  | 25.187892  | 83.003812  |
| 48 | ALH-203                              | 142.752 | 25.10393   | 82.590309  |
| 49 | ALH-204                              | 148.281 | 25.141882  | 82.940335  |
| 50 | ALH-205                              | 153.49  | 25.1148482 | 82.9038976 |
| 51 | GSMR BTS 1                           | 135.353 | 25.213274  | 83.041958  |
| 52 | DAPN RH1                             | 158.160 | 25.102519  | 82.861332  |
| 53 | DAPN RH2                             | 161.520 | 25.100171  | 82.827996  |
| 54 | NEW<br>DAGMAGPUR JN                  | 162.500 | 25.099391  | 82.818396  |
| 55 | DAPN RH3                             | 163.440 | 25.098848  | 82.809364  |
| 56 | ALH207                               | 167.820 | 25.105826  | 82.767035  |
| 57 | ALH208                               | 173.700 | 25.119976  | 82.711201  |
| 58 | ALH209                               | 177.620 | 25.123072  | 82.672839  |
| 59 | GSMR BTS 4                           | 182.340 | 25.096639  | 82.643663  |
| 60 | ALH-210                              | 183.660 | 25.094902  | 82.631198  |
| 61 | GSMR BTS 5                           | 187.660 | 25.094294  | 82.592759  |
| 62 | ALH-211                              | 189.403 | 25.089714  | 82.575094  |
| 63 | MZPN RH1                             | 191.700 | 25.095846  | 82.553749  |
| 64 | GSMR BTS 6                           | 192.700 | 25.101469  | 82.545795  |

|    |                                        |                   |            |            |
|----|----------------------------------------|-------------------|------------|------------|
| 65 | NEW MIRZAPUR                           | 192.700           | 25.101758  | 82.545703  |
| 66 | MZPN RH2                               | 193.680           | 25.110906  | 82.544223  |
| 67 | GSMR BTS 7                             | 196.34            | 25.133244  | 82.538042  |
| 68 | ALH-212                                | 197.785           | 25.142110  | 82.528499  |
| 69 | ALH-213                                | 202.040           | 25.163821  | 82.493304  |
| 70 | ALH-214                                | 207.964           | 25.175513  | 82.436445  |
| 71 | ALH-215                                | 213.700           | 25.159886  | 82.384461  |
| 72 | ALH-216                                | 219.4             | 25.157570  | 82.327742  |
| 73 | ALH-217                                | 224.9             | 25.155427  | 82.273297  |
| 74 | ALH-218                                | 229.900           | 25.165476  | 82.226948  |
| 75 | UNDN RH-1                              | 233.7             | 25.180569  | 82.192936  |
| 76 | New Unchdih                            | 234.900           | 25.184351  | 82.182188  |
| 77 | UNDN RH-2                              | 235.840           | 25.18791   | 82.173794  |
| 78 | ALH-219                                | 240.400           | 25.204548  | 82.131984  |
| 79 | ALH-220                                | 243.976           | 25.2177    | 82.099129  |
| 80 | ALH-221                                | 248.96            | 25.234736  | 82.057569  |
| 81 | ALH-222                                | 254.524           | 25.255741  | 82.006177  |
| 82 | ALH-223                                | 259.542           | 25.282086  | 81.963204  |
| 83 | ALH224                                 | 265.7             | 25.315288  | 81.91633   |
| 84 | KCNN RH-1                              | 267.5             | 25.325312  | 81.901991  |
| 85 | NEW KARCHANA<br>Jn.                    | 268.868           | 25.330268  | 81.889647  |
| 86 | GSMR KCNN<br>STATION                   | 268.868           | 25.330627  | 81.889374  |
| 87 | KCNN RH -2                             | 269.735           | 25.334051  | 81.881886  |
| 88 | GSMR 3                                 | 2/20              | 25.355173  | 81.874235  |
| 89 | GSMR 2                                 | 6/15-16           | 25.337704  | 81.831078  |
| 90 | GSMR 9                                 | 272/41-<br>273/01 | 25.348614  | 81.854036  |
| 91 | ALH-225                                | 275.04            | 25.356556  | 81.836105  |
| 92 | GSMR 10                                | 276/27-<br>29     | 25.364123  | 81.822875  |
| 93 | ALH-226 (GSM-R<br>BTS-11<br>colocated) | 280.991           | 25.395527  | 81.798669  |
| 94 | GSM-R BTS-12                           | 284.590           | 25.4171232 | 81.7716922 |
| 95 | ALH-227                                | 287.038           | 25.418227  | 81.747661  |

|     |                                        |         |            |            |
|-----|----------------------------------------|---------|------------|------------|
| 96  | GSM-R BTS-13                           | 288.680 | 25.420508  | 81.733475  |
| 97  | ALH-228 (GSM-R<br>BTS-14<br>colocated) | 292.558 | 25.434032  | 81.696585  |
| 98  | MREN RH-1                              | 294.980 | 25.454216  | 81.687709  |
| 99  | New Manauri                            | 295.772 | 25.459213  | 81.681894  |
| 100 | MREN RH-2                              | 296.700 | 25.463562  | 81.673874  |
| 101 | ALH-229                                | 301.180 | 25.483656  | 81.63541   |
| 102 | ALH-230                                | 306.500 | 25.5074126 | 81.5899102 |
| 103 | ALH-231                                | 312.640 | 25.535604  | 81.536599  |
| 104 | ALH-232 (GSM-R<br>BTS-15<br>colocated) | 318.600 | 25.553588  | 81.488326  |
| 105 | GSM-R BTS-16                           | 322.020 | 25.563872  | 81.469423  |
| 106 | ALH-233                                | 324.644 | 25.581609  | 81.450874  |
| 107 | ALH-234                                | 329.200 | 25.602252  | 81.409158  |
| 108 | SJTN RH-1                              | 332.300 | 25.615777  | 81.382644  |
| 109 | New Sujatpur                           | 333.608 | 25.621716  | 81.371133  |
| 110 | SJTN RH-2                              | 334.540 | 25.625999  | 81.363216  |
| 111 | ALH-235                                | 336.240 | 25.634285  | 81.352693  |
| 112 | GSM-R BTS-29                           | 339.940 | 25.640791  | 81.314869  |
| 113 | ALH-236                                | 342.244 | 25.657528  | 81.302503  |
| 114 | ALH-237                                | 348.740 | 25.698433  | 81.253835  |
| 115 | ALH-238                                | 354.540 | 25.712016  | 81.198048  |
| 116 | ALH-239                                | 360.586 | 25.7384023 | 81.1480477 |
| 117 | ALH-240                                | 366.934 | 25.7642605 | 81.0905968 |
| 118 | ALH-241                                | 372.650 | 25.792781  | 81.043494  |
| 119 | RUBN RH-1                              | 377.240 | 25.812576  | 81.003669  |
| 120 | New Rasulabad                          | 378.310 | 25.817228  | 80.994225  |
| 121 | RUBN RH-2                              | 379.280 | 25.821752  | 80.985881  |
| 122 | ALH-242                                | 383.350 | 25.839889  | 80.950795  |
| 123 | ALH-243                                | 389.500 | 25.867580  | 80.797673  |
| 124 | ALH-244                                | 395.050 | 25.890374  | 80.852284  |
| 125 | GSM-R BTS-17                           | 398.740 | 25.896404  | 80.816130  |
| 126 | ALH-245                                | 400.757 | 25.888983  | 80.797673  |
| 127 | GSM-R BTS-18                           | 403.200 | 25.903761  | 80.785129  |
| 128 | ALH-246                                | 406.590 | 25.930810  | 80.779205  |

|     |                                        |         |           |           |
|-----|----------------------------------------|---------|-----------|-----------|
| 129 | ALH-247                                | 412.250 | 25.967359 | 80.739707 |
| 130 | ALH-248                                | 417.700 | 26.002513 | 80.701598 |
| 131 | MWHN RH-1                              | 421.630 | 26.027739 | 80.673995 |
| 132 | New Malwan                             | 422.666 | 26.034475 | 80.666740 |
| 133 | MWHN RH-2                              | 423.640 | 26.040872 | 80.660019 |
| 134 | ALH-249                                | 427.259 | 26.064239 | 80.634766 |
| 135 | ALH-250                                | 433.018 | 26.101420 | 80.594492 |
| 136 | ALH-251                                | 437.035 | 26.130205 | 80.570207 |
| 137 | ALH-252                                | 442.999 | 26.174533 | 80.536039 |
| 138 | ALH-253                                | 448.942 | 26.212807 | 80.495453 |
| 139 | ALH-254                                | 454.917 | 26.263572 | 80.476172 |
| 140 | CNBN RH-1                              | 459.500 | 26.302763 | 80.461031 |
| 141 | New Kanpur                             | 460.536 | 26.312032 | 80.457930 |
| 142 | CNBN RH-2                              | 461.300 | 26.318108 | 80.454937 |
| 143 | ALH-255 (GSM-R<br>BTS-19<br>colocated) | 465.469 | 26.343098 | 80.431740 |
| 144 | GSM-R BTS-20                           | 469.780 | 26.366698 | 80.397134 |
| 145 | ALH-256                                | 471.340 | 26.368143 | 80.380082 |
| 146 | GSM-R BTS-21                           | 474.020 | 26.368913 | 80.356135 |
| 147 | ALH-257                                | 474.957 | 26.368161 | 80.346229 |
| 148 | GSM-R BTS-22                           | 477.840 | 26.366388 | 80.317658 |
| 149 | ALH-258                                | 480.653 | 26.376576 | 80.291952 |
| 150 | GSM-R BTS-23                           | 482.920 | 26.388206 | 80.273077 |
| 151 | BZMN RH-1                              | 484.440 | 26.395239 | 80.260118 |
| 152 | New Bhimsen                            | 485.911 | 26.408177 | 80.248593 |
| 153 | BZMN RH-2                              | 486.940 | 26.413368 | 80.245548 |
| 154 | GSM-R BTS-24                           | 487.500 | 26.417996 | 80.242023 |
| 155 | ALH-259 (BTS-25<br>Colocated)          | 491.500 | 26.43328  | 80.216033 |
| 156 | GSM-R BTS-26                           | 496.060 | 26.415938 | 80.170775 |
| 157 | ALH-260                                | 497.760 | 26.416314 | 80.153913 |
| 158 | GSM-R BTS-27                           | 501.860 | 26.445990 | 80.131535 |
| 159 | ALH-261                                | 502.100 | 26.447773 | 80.129283 |
| 160 | GSM-R BTS-28                           | 505.420 | 26.461749 | 80.100860 |
| 161 | ALH-262                                | 506.400 | 26.465380 | 80.091217 |

|     |                            |               |           |            |
|-----|----------------------------|---------------|-----------|------------|
| 162 | GSMR-Bhaupur<br>CL-1       | 03/06B        | 26.282627 | 80.060147  |
| 163 | GSMR-Bhaupur<br>CL-2       | 03/15B        | 26.275396 | 80.044336  |
| 164 | RH-1                       | BPUN/10<br>07 | 26.473449 | 80.052001  |
| 165 | IMSD Bhaupur               | 517/41-<br>43 | 26.47355  | 80.051111  |
| 166 | New Bhaupur<br>Stn. (JS)   | 518/01-<br>05 | 26.474018 | 80.048915  |
| 167 | RH-2                       | 519/35        | 26.475194 | 80.032877  |
| 168 | ALH-101                    | 524/09-<br>11 | 26.479211 | 79.987122  |
| 169 | ALH-102                    | 529/05        | 26.482761 | 79.938565  |
| 170 | LC-94                      | 532/29-<br>30 | 26.485871 | 79.90242   |
| 171 | ALH-103                    | 534/09-<br>11 | 26.488813 | 79.887033  |
| 172 | ALH-104                    | 540/01        | 26.51275  | 79.831765  |
| 173 | LC-98                      | 544/11-<br>13 | 26.527828 | 79.79696   |
| 175 | ALH-105                    | 545/23-<br>25 | 26.533071 | 79.78393   |
| 176 | ALH-106                    | 551/25        | 26.556723 | 79.730035  |
| 177 | RH-3                       | 557/07        | 26.57753  | 79.680491  |
| 178 | New Kanchausi<br>Stn. (CS) | 558/16-<br>18 | 26.581985 | 79.67058   |
| 179 | IMSD Kanchausi             | 559/07        | 26.585424 | 79.662002  |
| 180 | RH-4                       | 559/21        | 26.586634 | 79.659403  |
| 181 | LC-5C                      | 561/35        | 26.596851 | 79.637324  |
| 182 | ALH-107                    | 564/35        | 26.608748 | 79.609602  |
| 183 | ALH-108                    | 571/21        | 26.633701 | 79.550807  |
| 184 | LC-9/C/E                   | 573/27        | 26.64359  | 79.530463  |
| 185 | ALH-109                    | 578/25        | 26.663887 | 79.486136  |
| 186 | LC 10/C/E                  | 576/07        | 26.65367  | 79.508732  |
| 187 | RH5                        | 583/23        | 26.684045 | 79.442621  |
| 188 | IMSD Achalda               | 584/37        | 26.689496 | 79.429654  |
| 189 | New Achalda Stn.<br>(CS)   | 584/33        | 26.689167 | 79.430921  |
| 190 | RH-6                       | 585/31-       | 26.693246 | 79.4223752 |

|     |                                                                        |               |           |           |
|-----|------------------------------------------------------------------------|---------------|-----------|-----------|
|     |                                                                        | 33            |           |           |
| 191 | GSMR-01<br>(Achalda P3)<br>(Height of GSMR<br>tower is 35 mtr.)        | 587/10,       | 26.694704 | 79.409605 |
| 192 | GSMR-02<br>(Achalda P6)<br>(Height of GSMR<br>tower is 35 mtr.)        | 589/07        | 26.702675 | 79.396651 |
| 193 | ALH-111                                                                | 590/21        | 26.710057 | 79.386133 |
| 194 | ALH-112                                                                | 596/07        | 26.731828 | 79.334871 |
| 195 | LC 18/C                                                                | 601/31        | 26.740429 | 79.279996 |
| 196 | ALH-113                                                                | 601/30        | 26.740429 | 79.279996 |
| 197 | GSMR-03<br>(Bharthana P3)<br>(Height of GSMR<br>tower is 35 mtr.)      | 603/17        | 26.742588 | 79.264754 |
| 198 | GSMR-04<br>(Bharthana P1)<br>(Height of GSMR<br>tower is 35 mtr.)      | 606/14        | 26.734218 | 79.23697  |
| 199 | ALH-114                                                                | 607/37        | 26.73453  | 79.223891 |
| 200 | GSMR-05<br>(Bharthana P2)<br>(Height of GSMR<br>tower is 35 mtr.)      | 609/41        | 26.740396 | 79.207311 |
| 201 | ALH-115                                                                | 612/41        | 26.755666 | 79.183815 |
| 202 | RH-7                                                                   | 617/19-<br>21 | 26.762064 | 79.140094 |
| 203 | IMD Ekdil                                                              | 617/37-<br>47 | 26.762912 | 79.134945 |
| 204 | New Ekdil Stn.<br>(CS)                                                 | 618/14-<br>16 | 26.763153 | 79.131051 |
| 205 | RH-8                                                                   | 619/21        | 26.765375 | 79.11934  |
| 206 | LC 23/B/T                                                              | 619/38        | 26.765883 | 79.115626 |
| 207 | ALH-116 +<br>GSMR Etawah<br>P2<br>(Height of GSMR<br>tower is 35 mtr.) | 623/25-<br>27 | 26.77745  | 79.081619 |
| 208 | GSMR-07<br>(Etawah P3)<br>(Height of GSMR                              | 626/11-<br>13 | 26.79586  | 79.06899  |

|     |                                                                        |               |           |           |
|-----|------------------------------------------------------------------------|---------------|-----------|-----------|
|     | tower is 35 mtr.)                                                      |               |           |           |
| 209 | ALH-117 +<br>GSMR ETAWAH<br>P4<br>(Height of GSMR<br>tower is 35 mtr.) | 629/17-<br>19 | 26.818024 | 79.050279 |
| 210 | GSMR ETAWAH<br>P5<br>(Height of GSMR<br>tower is 35 mtr.)              | 632/11-<br>13 | 26.829124 | 79.026835 |
| 211 | ALH-118 +<br>GSMR Etawah<br>P7<br>(Height of GSMR<br>tower is 35 mtr.) | 635/15-<br>17 | 26.844206 | 78.998501 |
| 212 | GSMR ETAWAH<br>P8<br>(Height of GSMR<br>tower is 35 mtr.)              | 639/12        | 26.845209 | 78.960099 |
| 213 | ALH-119                                                                | 641/33        | 26.8457   | 78.934963 |
| 214 | ALH-120                                                                | 647/25-<br>27 | 26.877693 | 78.886825 |
| 215 | ALH-121                                                                | 653/27-<br>29 | 26.910921 | 78.83797  |
| 216 | ALH-122                                                                | 659/7-9       | 26.940639 | 78.794205 |
| 217 | RH9                                                                    | 663/11        | 26.962239 | 78.762161 |
| 218 | Bhadan IMSD                                                            | 663/30        | 26.96433  | 78.7594   |
| 219 | New Bhadan Stn.<br>(CS)                                                | 664/15-<br>17 | 26.968459 | 78.752506 |
| 220 | RH-10                                                                  | 665/24-<br>26 | 26.974884 | 78.743666 |
| 221 | ALH-123                                                                | 669/19-<br>21 | 26.996519 | 78.711752 |
| 222 | ALH-124                                                                | 675/21-<br>23 | 27.029393 | 78.6631   |
| 223 | ALH-125                                                                | 681/9-11      | 27.060753 | 78.616736 |
| 224 | ALH-126                                                                | 685/29-<br>31 | 27.083228 | 78.580339 |
| 225 | ALH-127                                                                | 692/19-<br>21 | 27.104824 | 78.51582  |
| 226 | New Makhanpur<br>Stn. (CS)                                             | 696/15-<br>17 | 27.115844 | 78.479323 |
| 227 | RH-11                                                                  | 697/31-       | 27.120351 | 78.466129 |

|     |                                                                           |               |                 |             |
|-----|---------------------------------------------------------------------------|---------------|-----------------|-------------|
|     |                                                                           | 33            |                 |             |
| 228 | Makhanpur-<br>IMSD                                                        | 698/01-<br>02 | 27.120985       | 78.463591   |
| 229 | GSMR-12<br>(Firozabad P2)<br>(Height of GSMR<br>tower is 35 mtr.)         | 701/09-<br>10 | 27.1203488      | 78.4326638  |
| 230 | ALH-128                                                                   | 702/4-6       | 27.1203112      | 78.4327708  |
| 231 | GSMR-13<br>(Firozabad P3)<br>(Height of GSMR<br>tower is 35 mtr.)         | 703/44        | 27.1312311      | 78.4080593  |
| 232 | GSMR-14<br>(Firozabad P4)<br>(Height of GSMR<br>tower is 35 mtr.)         | 706/21        | 27.1329787      | 78.3842174  |
| 233 | ALH-129+GSMR-<br>15(Firozabad P5)<br>(Height of GSMR<br>tower is 35 mtr.) | 708/24-<br>26 | 27.1460711      | 78.3708168  |
| 234 | ALH-130                                                                   | 713/21-<br>23 | 27.1696959<br>4 | 78.32991857 |
| 235 | ALH-131                                                                   | 719/29-<br>31 | 27.1922228<br>5 | 78.27266688 |
| 236 | GSMR-16<br>(Tundla P5)<br>(Height of GSMR<br>tower is 35 mtr.)            | 721/01-<br>03 | 27.11447        | 78.153866   |
| 237 | GSMR-17<br>(Tundla P3)<br>(Height of GSMR<br>tower is 35 mtr.)            | 724/07-<br>09 | 27.113739       | 78.134793   |
| 238 | RH12                                                                      | 724/39        | 27.196316       | 78.225168   |
| 239 | New Tundla stn.<br>(JS)                                                   | 726/02        | 27.202604       | 78.214325   |
| 240 | Tundla IMSD<br>(6.150)                                                    | 726/23        | 27.204659       | 78.210548   |
| 241 | RH-13 + GSMR-<br>18 (Tundla P2)<br>(Height of GSMR<br>tower is 35 mtr.)   | 727/09        | 27.208212       | 78.20483    |
| 242 | GSMR Tundla CP<br>(Height of GSMR<br>tower is 35 mtr.)                    | 732/15        | 27.208227       | 78.204884   |

|     |                                                                             |               |                 |            |
|-----|-----------------------------------------------------------------------------|---------------|-----------------|------------|
| 243 | GSMR-19<br>(Tundla P1)<br>(Height of GSMR<br>tower is 35 mtr.)              | 730/20        | 27.2272165<br>2 | 78.173706  |
| 244 | ALH-132                                                                     | 731/39-<br>41 | 27.239521       | 78.184979  |
| 245 | GSMR-20<br>(Tundla P4)<br>(Height of GSMR<br>tower is 35 mtr.)              | 733/39-<br>40 | 27.228148       | 78.182839  |
| 246 | ALH-133                                                                     | 738/03-<br>05 | 27.239467       | 78.184954  |
| 247 | ALH-134 +<br>GSMR-21<br>(Barhan P2)<br>(Height of GSMR<br>tower is 35 mtr.) | 743/19-<br>21 | 27.329718       | 78.184356  |
| 248 | ALH-135                                                                     | 748/31        | 27.3770276      | 78.1828583 |
| 249 | ALH-136                                                                     | 753/05        | 27.4151272      | 78.1757565 |
| 250 | ALH-137                                                                     | 758/31        | 27.466028       | 78.1663248 |
| 251 | ALH-138                                                                     | 763/37        | 27.5111315      | 78.1579409 |
| 252 | RH-14                                                                       | 768/09        | 27.5487115      | 78.150701  |
| 253 | New Hatras Stn.<br>(CS)                                                     | 768/28-<br>30 | 27.5531769      | 78.1498091 |
| 254 | Hatras IMSD                                                                 | 769/26        | 27.561946       | 78.1479366 |
| 255 | RH-15                                                                       | 770/03        | 27.5656283      | 78.14778   |
| 256 | HTR GSMR P5<br>(Height of GSMR<br>tower is 35 mtr.)                         | 771/229       | 27.5779603      | 78.1416519 |
| 257 | ALH-139 + HTR<br>GSMR P3<br>(Height of GSMR<br>tower is 35 mtr.)            | 773/30        | 27.5917796      | 78.1281677 |
| 258 | HTR GSMR P1<br>(5.390)<br>(Height of GSMR<br>tower is 35 mtr.)              | 775/34        | 27.6095192      | 78.1243456 |
| 259 | HTR GSMR P2<br>(8.134)<br>(Height of GSMR<br>tower is 35 mtr.)              | 778/27        | 27.6347496      | 78.1262795 |
| 260 | ALH-140                                                                     | 780/25        | 27.6500328      | 78.1321069 |
| 261 | ALH-141                                                                     | 785/27        | 27.6969413      | 78.1233156 |

|     |                                                                |             |            |            |
|-----|----------------------------------------------------------------|-------------|------------|------------|
| 262 | ALH-142                                                        | 791/15-17   | 27.7473456 | 78.1138903 |
| 263 | RH-16                                                          | 796/37      | 27.7956209 | 78.1046062 |
| 264 | New Daud Khan Stn. (JS)                                        | 797/33      | 27.8046499 | 78.1028661 |
| 265 | Daud Khan IMSD                                                 | 798/19      | 27.8100227 | 78.1017513 |
| 266 | RH-17                                                          | 799/09      | 27.8156217 | 78.100897  |
| 267 | GSMR-26 (Aligarh P1) (Height of GSMR tower is 35 mtr.)         | 802/35      | 27.842291  | 78.0835626 |
| 268 | ALH-143                                                        | 805/33      | 27.8537022 | 78.0560777 |
| 269 | GSMR-27 (Aligarh P2) (Height of GSMR tower is 35 mtr.)         | 806/09      | 27.8552881 | 78.052347  |
| 270 | GSMR-28 (Aligarh P3) (Height of GSMR tower is 35 mtr.)         | 810/26      | 27.8797492 | 78.017136  |
| 271 | ALH-144                                                        | 811/21      | 27.8846793 | 78.0115285 |
| 272 | GSMR-29 (Aligarh P4) (Height of GSMR tower is 35 mtr.)         | 813/41-43   | 27.9070465 | 78.010228  |
| 273 | ALH-145+GSMR-30 (Aligarh P5) (Height of GSMR tower is 35 mtr.) | 817/27-29   | 27.9394589 | 78.0095122 |
| 274 | GSMR-31 (Aligarh P6) (Height of GSMR tower is 35 mtr.)         | 822/36      | 27.9811359 | 77.9869558 |
| 275 | ALH-146                                                        | 823/24      | 27.9867871 | 77.9838025 |
| 276 | ALH-147                                                        | 829/19      | 28.0347968 | 77.9634013 |
| 277 | ALH-148                                                        | 835/13      | 28.077004  | 77.9278144 |
| 278 | ALH-149                                                        | 841/21      | 28.1219577 | 77.8899349 |
| 279 | RH-18                                                          | 848/09      | 28.1694796 | 77.849511  |
| 280 | New Khurja Stn. (JS)                                           | 849/05 - 07 | 28.1765481 | 77.843531  |
| 281 | RH-19                                                          | 850/11      | 28.1837521 | 77.8374176 |
| 282 | Khurja IMD                                                     | 850/13 -    | 28.1846871 | 77.8366297 |

|     |                    |                |                |             |
|-----|--------------------|----------------|----------------|-------------|
|     |                    | 21             |                |             |
| 283 | RH-C (BRKN)        | 897D/15<br>-17 | 28.515569<br>N | 77.555870 E |
| 284 | RH-B (BRKN)        | 895D/03<br>-05 | 28.498447<br>N | 77.570911 E |
| 285 | BRKN               | 893D/37<br>-39 | 28.489403<br>N | 77.578376 E |
| 286 | IMSD               | 893D/29<br>-31 | 28.488058<br>N | 77.579492 E |
| 287 | RH-A (BRKN)        | 891D/43<br>-45 | 28.476719<br>N | 77.590590 E |
| 288 | ALH-156            | 885D/26<br>-28 | 28.433421<br>N | 77.629911 E |
| 289 | SSP DANKOUR        | 884D/33<br>-35 |                |             |
| 290 | ALH-155            | 880D/13<br>-15 | 28.393154<br>N | 77.660631 E |
| 291 | ALH-154            | 876D/07<br>-09 | 28.362388<br>N | 77.686711 E |
| 292 | TSS WAIR           | 875D/40<br>-42 | 28.342541<br>N | 77.695753 E |
| 293 | GSMR-3             | 873D/31<br>-33 | 28.342990<br>N | 77.695883 E |
| 294 | ALH-153            | 869D/09<br>-11 | 28.314803<br>N | 77.726928 E |
| 295 | ALH-152            | 863D/08<br>-10 | 28.270840<br>N | 77.764186 E |
| 296 | SSP<br>SIKANDARPUR | 860D/14<br>-16 |                |             |
| 297 | ALH-151            | 855D/16<br>-18 | 28.221909<br>N | 77.805620 E |
| 298 | GSMR-2             | 855D/29<br>-31 | 28.215328<br>N | 77.801152 E |
| 299 | GSMR-1             | 852D/37<br>-39 | 28.196533<br>N | 77.813598 E |
| 300 | ALH-150            | 851D/03<br>-05 | 28.189649<br>N | 77.832723 E |

**3.5. Space Availability for installation of TCAS equipment in Existing Relay Room in section-**

In general at stations/ALH/RH/LC , sufficient space is available in Relay Rooms for installation stationary Kavach Equipment. Wherever, there is a space constraint, space shall be made available by the Employer to Contractor for installation of Kavach Equipments.

### 3.6. Telecommunication Infrastructure

All stations are equipped with Control Phone, DLT phone, Admin Phone, WLL, GPH mobile phones of MTRC working on 24-Fibre OFC. All the LC gates also provided with DLT Telephone communication. Besides, communication through VHF sets is provided to Driver, Guard & Station master.

MTRC Towers of height (30 Meters) as per Radio Survey report are provided in detour portions, new UHF/LTE Antenna & modems can be mounted on these existing Towers.

| SN | GSM-R Location                  | Latitude     | Longitude    | Tower Height | Power Supply Arrangement |
|----|---------------------------------|--------------|--------------|--------------|--------------------------|
| 1  | GSMR-1                          | 28.196533 N  | 77.813598 E  | 35M          | 48VDC                    |
| 2  | GSMR-2                          | 28.215328 N  | 77.801152 E  | 35M          | 48VDC                    |
| 3  | GSMR-3                          | 28.342990 N  | 77.695883 E  | 35M          | 48VDC                    |
| 4  | GSMR-31 (Aligarh P6)            | 27.9811359   | 77.9869558   | 35m          | 48VDC                    |
| 5  | * ALH-145+GSMR-30 (Aligarh P5)  | 27.9394589   | 78.0095122   | 35m          | IPS-110VDC               |
| 6  | GSMR-29 (Aligarh P4)            | 27.9070465   | 78.010228    | 35m          | 48VDC                    |
| 7  | GSMR-28 (Aligarh P3)            | 27.8797492   | 78.017136    | 35m          | 48VDC                    |
| 8  | GSMR-27 (Aligarh P2)            | 27.8552881   | 78.052347    | 35m          | 48VDC                    |
| 9  | GSMR-26 (Aligarh P1)            | 27.842291    | 78.0835626   | 35m          | 48VDC                    |
| 10 | HTR GSMR P2 (8.134)             | 27.6347496   | 78.1262795   | 35m          | 48VDC                    |
| 11 | HTR GSMR P1 (5.390)             | 27.6095192   | 78.1243456   | 35m          | 48VDC                    |
| 12 | * ALH-139 + HTR GSMR P3         | 27.5917796   | 78.1281677   | 35m          | IPS-110VDC               |
| 13 | HTR GSMR P5                     | 27.5779603   | 78.1416519   | 35m          | 48VDC                    |
| 14 | * ALH-134 + GSMR-21 (Barhan P2) | 27°19'46.13' | 78°11'3.01"  | 35m          | IPS-110VDC               |
| 15 | GSMR-20 (Tundla P4)             | 27°14'50.82  | 78°12'11.48" | 35m          | 48VDC                    |
| 16 | GSMR-19 (Tundla P1)             | 27°13'41.16' | 78°10'58.15" | 35m          | 48VDC                    |
| 17 | GSMR Tundla CP                  | 27°13'36.55' | 0 78°9'23.26 | 35m          | 48VDC                    |
| 18 | * RH-13 + GSMR-18               | 27°12'29.99  | 78°12'16.20" | 35m          | IPS-                     |

|    |                                  |            |            |     |                |
|----|----------------------------------|------------|------------|-----|----------------|
|    | (Tundla P2)                      |            |            |     | 110VD<br>C     |
| 19 | GSMR-17 (Tundla P3)              | 27.113739  | 78.134793  | 35m | 48VDC          |
| 20 | GSMR-16 (Tundla P5)              | 27.11447   | 78.153866  | 35m | 48VDC          |
| 21 | * ALH-129+GSMR-15(Firozabad P5)  | 27.1460711 | 78.3708168 | 35m | IPS-110VD<br>C |
| 22 | GSMR-14(Firozabad P4)            | 27.1329787 | 78.3842174 | 35m | 48VDC          |
| 23 | GSMR-13(Firozabad P3)            | 27.1312311 | 78.4080593 | 35m | 48VDC          |
| 24 | GSMR-12(Firozabad P2)            | 27.1203488 | 78.4326638 | 35m | 48VDC          |
| 25 | GSMR ETAWAH P8                   | 26.845209  | 78.960099  | 35m | 48VDC          |
| 26 | * ALH-118 + GSMR Etawah P7       | 26.844206  | 78.998501  | 35m | IPS-110VD<br>C |
| 27 | GSMR ETAWAH P5                   | 26.829124  | 79.026835  | 35m | 48VDC          |
| 28 | * ALH-117 + GSMR ETAWAH P4       | 26.818024  | 79.050279  | 35m | IPS-110VD<br>C |
| 29 | GSMR-07 (Etawah P3)              | 26.79586   | 79.06899   | 35m | 48VDC          |
| 30 | * ALH-116 + GSMR Etawah P2       | 26.77745   | 79.081619  | 35m | IPS-110VD<br>C |
| 31 | GSMR-05 (Bharthana P2)           | 26.740396  | 79.207311  | 35m | 48VDC          |
| 32 | GSMR-04(Bharthana P1)            | 26.734218  | 79.23697   | 35m | 48VDC          |
| 33 | GSMR-03(Bharthana P3)            | 26.742588  | 79.264754  | 35m | 48VDC          |
| 34 | GSMR-02 (Achalda P6)             | 26.702675  | 79.396651  | 35m | 48VDC          |
| 35 | GSMR-01 (Achalda P3)             | 26.694704  | 79.409605  | 35m | 48VDC          |
| 36 | GSMR-Bhaupur CL-2                | 26.275396  | 80.044336  | 35m | 48VDC          |
| 37 | GSMR-Bhaupur CL-1                | 26.282627  | 80.060147  | 35m | 48VDC          |
| 38 | * GSM-R BTS-28                   | 26.461749  | 80.100860  | 35M | IPS-110VD<br>C |
| 39 | * GSM-R BTS-27                   | 26.445990  | 80.131535  | 35M | IPS-110VD<br>C |
| 40 | * GSM-R BTS-26                   | 26.415938  | 80.170775  | 35M | IPS-110VD<br>C |
| 41 | * ALH-259(GSMR BTS-25 colocated) | 26.43328   | 80.216033  | 35M | IPS-110VD<br>C |
| 42 | * GSM-R BTS-24                   | 26.417996  | 80.242023  | 35M | IPS-110VD      |

|    |                                          |                   |                   |     |                |
|----|------------------------------------------|-------------------|-------------------|-----|----------------|
|    |                                          |                   |                   |     | C              |
| 43 | * GSM-R BTS-23                           | 26.388206         | 80.273077         | 30M | IPS-110VD<br>C |
| 44 | * GSM-R BTS-22                           | 26.366388         | 80.317658         | 35M | IPS-110VD<br>C |
| 45 | * GSM-R BTS-21                           | 26.368913         | 80.356135         | 30M | IPS-110VD<br>C |
| 46 | GSM-R BTS-20                             | 26.366698         | 80.397134         | 30M | IPS-110VD<br>C |
| 47 | * ALH-255(GSM-R<br>BTS-19 colocated)     | 26.343098         | 80.431740         | 35M | IPS-110VD<br>C |
| 48 | * GSM-R BTS-18                           | 25.903761         | 80.785129         | 35M | IPS-110VD<br>C |
| 49 | * GSM-R BTS-17                           | 25.896404         | 80.816130         | 35M | IPS-110VD<br>C |
| 50 | * GSM-R BTS-29                           | 25.640791         | 81.314869         | 35M | IPS-110VD<br>C |
| 51 | * GSM-R BTS-16                           | 25.563872         | 81.469423         | 30M | IPS-110VD<br>C |
| 52 | * ALH-232<br>(GSM-R BTS-15<br>colocated) | 25.553588         | 81.488326         | 35M | IPS-110VD<br>C |
| 53 | * ALH-228<br>(GSM-R BTS-14<br>colocated) | 25.434032         | 81.696585         | 30M | IPS-110VD<br>C |
| 54 | * GSM-R BTS-13                           | 25.420508         | 81.733475         | 30M | IPS-110VD<br>C |
| 55 | * GSM-R BTS-12                           | 25.4171232        | 81.7716922        | 30M | IPS-110VD<br>C |
| 56 | * ALH-226 (GSM-R<br>BTS-11 colocated)    | 25.395527         | 81.798669         | 30M | IPS-110VD<br>C |
| 57 | BST-10                                   | 25°21'50.02"<br>N | 81°49'22.03"<br>E | 35M | IPS-110VD<br>C |
| 58 | BTS-9                                    | 25°22'54.03"<br>N | 81°51'14.04"<br>E | 35M | IPS-110VD<br>C |
| 59 | Cheoki Link line,BTS-                    | 25°21'19.1"N      | 81°52'26.8"       | 30M | IPS-           |

|    |                                   |             |                  |     |                     |
|----|-----------------------------------|-------------|------------------|-----|---------------------|
|    | 3                                 |             | N                |     | 110VD<br>C          |
| 60 | Iradatganj link<br>line,BTS-2     | 25°20'15."N | 81°49'52.2"<br>N | 30M | IPS-<br>110VD<br>C  |
| 61 | * NEW KARCHANA Jn.<br>(GSMR BTS 8 | 25.330268   | 81.889647        | 30M | IPS-<br>110VD<br>C  |
| 62 | * GSMR BTS 7                      | 25.133244   | 82.538042        | 30M | IPTS-<br>110VD<br>C |
| 63 | * NEW MIRZAPUR<br>(GSMR BTS 6)    | 25.101758   | 82.545703        | 30M | IPTS-<br>110VD<br>C |
| 64 | * GSMR BTS 5                      | 25.094294   | 82.592759        | 35M | IPS-<br>110VD<br>C  |
| 65 | * GSMRBTS4                        | 25.096639   | 82.643663        | 35M | IPS-<br>110VD<br>C  |
| 66 | GSMR BTS-1                        | 25.213274   | 83.041958        | 30M | IPS-<br>110VD<br>C  |