No. RCIL-CO0NTP(PLAN)/8/2024-O/o ADDL.GM/NTP/CNOC/RCIL (4365)
Dated: 07.09.2024

Corrigendum-I

Sub: Design, Supply, Installation, Testing & Commissioning of MDWDM system including Integration with the existing network of RailTel.

Ref: RailTel/Tender/OT/CO/Project/2024-25/MDWDM/013 Dated: 19.08.2024.

In reference to the above referred tender, amendments in the tender document are enclosed as Annexure-I.

Last Date and Time of Submission of bid 27.09.2024 upto 15:00 hrs
Date and Time of opening of bid 27.09.2024 at 15:30 hrs

All other terms and conditions of the Tender document and previous corrigenda, if any will remain unchanged.

(Ravi Vishvakarma)
Sr. DGM/Project
For General manager/TP

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Annexure-I

<table>
<tr><th>S.N.</th><th>Clause No</th><th>Existing Clause</th><th>Revised Clause</th></tr>
<tr><td>1</td><td>3.A.3.5-1-Xiii</td><td>All the Line ports of 100/200G Traffic Line System shall support minimum back-to-back OSNR sensitivity of -16 db or better at 100G line rate on 40 Channel system.</td><td>All the Line ports of 100/200G Traffic Line System shall support minimum back-to-back OSNR sensitivity of -16 db with 300 km distance or better at 100G line rate on 40 Channel system</td></tr>
<tr><td>2</td><td>3.A.3.5.13</td><td><table><tr><th>Sr. No.</th><th>Active Component</th><th>Types of Models allowed</th></tr><tr><td>1</td><td>Chassis (OADM)</td><td>Max. One Type</td></tr><tr><td>2</td><td>Chassis (ILA & ILA-OADM)</td><td>Max. One Type</td></tr><tr><td>2</td><td>Amplifiers (Booster, Pre-Amp & Midstate)</td><td>Max. Two Type</td></tr><tr><td>4</td><td>Mux/Demux (Min 8 Ch. Add/drop) at OADM</td><td>Only One type</td></tr><tr><td>5</td><td>Mux/Demux (Min 2 Ch. Add/drop) at ILA-OADM & FOADM</td><td>Only One type</td></tr></table></td><td><table><tr><th>Sr. No.</th><th>Active Component</th><th>Types of Models allowed</th></tr><tr><td>1</td><td>Chassis (OADM)</td><td>Max. Two Type</td></tr><tr><td>2</td><td>Chassis (ILA & ILA-OADM)</td><td>Max. Two Type</td></tr><tr><td>2</td><td>Amplifiers (Booster, Pre-Amp & Midstate)</td><td>Max. Two Type</td></tr><tr><td>4</td><td>Mux/Demux (Min 8 Ch. Add/drop) at OADM</td><td>Only One type</td></tr><tr><td>5</td><td>Mux/Demux (Min 2 Ch. Add/drop) at ILA-OADM & FOADM</td><td>Only One type</td></tr></table></td></tr>
<tr><td>3</td><td>3.A.3.3-b</td><td>For Alien wavelength, 10/100G Traffic matrix shall be designed and provisioned as per Annexure-II (Network topology) and Annexure-III (Link details) of tender. For 100G over Alien wavelength, bidder to considered (for designed purpose) minimum back-to-back OSNR sensitivity of -17 db or better at 100G line rate on 40 Channel system in between two locations of traffic matrix. For 10G over alien wavelength, shall be designed with a 0.5 db/km section loss + 3db repair margin (in case of km mentioned) otherwise OEM should consider repeater (OEO) at each OADM locations as per Annexure-II (Network topology). In case of actual losses/OSNR are more at that time of commissioning of Network, RailTel will either improve the section losses or New ILAs, Amplifiers & Transponder (If required) shall be arranged by RailTel through variation in existing contracts.</td><td>For Alien wavelength, 10/100G Traffic matrix shall be designed and provisioned as per Annexure-II (Network topology) and Annexure-III (Link details) of tender. The following parameters to be considered for designed purpose.

i. System shall be designed with a 0.45 db/km section loss + 3db repair margin per section.
ii. Bidder to consider parameter as per clause 3.A.3.1 for photonic layer with ROADM Network (6 dB insertion loss).
iii. The DWDM system shall be designed based on total distance in kilometres as specified in Annexure II (Network Topology). Not specified distance of section may be considered 60 km.
iv. Maximum fiber loss can be considered 32 db per span including repair margin.
v. In case actual losses are more at the time of commissioning of Network, RailTel will either improve the section losses or New ILAs, Amplifiers & Transponder (If required) shall be arranged by RailTel through variation in existing contracts.</td></tr>
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4	3.A.3.5-10-G	For Panvel to Madgaon (Goa) section, Bidder can propose SFPs based solution on existing switches/Routers of RailTel for 2x10G traffic (dropping at each station) in place of Transponder based solution as per the requirement of traffic matrix placed at Annexure-V. SFPs should be supported on D-Links, Edgecore, Watchdog, Cisco, Juniper and Techroute Switches/Routers.	In Panvel to Madgaon (Goa) section, Bidder/OEM can also have option to propose two separate Network for 100G traffic (Annexure-IV) and 10G/SDH (Annexure-V) as per traffic requirement. For 100G Traffic, DWDM ILA-OADM and FOADM Sites are not mandatory, and ILA may be proposed in place of ILA-OADM/FOADM Sites based on solution requirement of OEM (in case required). For 10G/SDH traffic, Bidder/OEM can also propose separate Network based on DWDM/MPLS/OTN single fiber Network. In case of MPLS based Network, Bidder can also have option to propose 1x Channelized STM-1 (63 E1s) with circuit emulation-based solution in place of STM-16 traffic (drop and continue at each station) requirement of Annexure-V.
5	3.A.3.5-10-H	For the Panvel to Madgaon (Goa) section, Bidder can also propose SFPs based solution on existing SDH Equipment of RailTel for 1xSTM-16 traffic (dropping at each station) in place of Transponder based solution as per the requirement of traffic matrix placed at Annexure-V. SFPs should be supported on Tejas Equipment's of TJ1270, TJ 1400 & TJ 1600.	Deleted

6	3.A.3.3-a	DWDM Network (photonics) & 10G/STM-16/STM-4/100G Traffic matrix shall be designed and provisioned as per Annexure-II (Network topology) and Annexure-III (Link details) of tender. The Roha to Madgaon (Goa) section in Panvel to Madgaon Route shall be designed with a 0.6 db/km + 3db repair margin and CSTM Section route shall be designed with a 1db/km + 3db repair margin. Other sections shall be designed with 0.45db/km + 3db repair margin. In case actual losses in the section is more than 28db at the time of commissioning of Network, RailTel will either improve the section losses or New ILAs, Amplifiers shall be arranged by RailTel through variation in existing contract. DWDM system should comply with technical specifications defined in Tender.	DWDM Network (photonics) & 10G/STM-16/STM-4/100G Traffic matrix shall be designed and provisioned as per Annexure-II (Network topology) and Annexure-III (Link details) of tender. Proposed DWDM system shall be designed with following losses 1. The DWDM system shall be designed based on total distance in kilometres as specified in Annexure III. Not specified distance of section may be considered 60 km. 2. CSTM Section route shall be designed with a 1db/km + 3db repair margin. 3. Other sections shall be designed with 0.45db/km + 3db repair margin per sections. 4. Maximum fiber loss can be considered 32 db per span including repair margin. 5. In case actual losses in the section is more at the time of commissioning of Network, RailTel will either improve the section losses or New ILAs, Amplifiers shall be arranged by RailTel through variation in existing contract. DWDM system should comply with technical specifications defined in Tender.
7	3.A.3.5-11-iv	Proposed Amplifiers (A to B Locations) at both sides for sections (0 to 50 Km distance) should be capable to cater 28 db fiber section loss for 8 Channel system design and for sections (50 to 80 Km distance) should be capable to cater 32 db fiber section loss for 8 Channel system design. Proposed Amplifiers for ILA should also be supported as Preamplifiers in case required at ILA-OADM & OADM Locations.	Proposed Amplifiers (A to B Locations) at both sides for sections (0 to 49 Km distance) should be capable to cater 28 db fiber section loss for 8 Channel system design and for sections (50km or more distance) should be capable to cater 32 db fiber section loss for 8 Channel system design. Proposed Amplifiers for ILA should also be supported as Pre-amplifiers in case required at ILA-OADM & OADM Locations.
8	3.A.3.5-21	The product shall be compliant to: Product shell be compliant to RoHS (Restriction of certain Hazardous Substances) requirements: - European Union (EU) Directive 2002/95/EC (lead-free design should be a long-term goal)	The product shall be compliant to: Product shell be compliant to RoHS (Restriction of certain Hazardous Substances) requirements: - European Union (EU) Directive 2002/95/EC (lead-free design should be a long-term goal) or equivalent
9	3.A.3.5-10-F-3-7(IP-MPLS Router)	Hardware Support for SRv6.	Deleted

10	3.A.3.5-10-F-2-iii (IP-MPLS Router)	All 10G and 100G interfaces should support LR & ER in case required.	All 10G and 100G interfaces should support SR & LR/2km rate in case required.
11	3.A.3.5-23	The product shall meet following standards and regulations: a.Generic requirements defined in ETS 300 019 (environmental cri-teria) b.NEBS level 3 c.Telcordia GR-3028-CORE: Thermal Management, Telecommunication Central Office d.Operation: ETS300 019 Class 3.1 e.Transport: ETS300 019 Class 2.2 f.Storage: ETS300 019 Class 1.1 g.EN300386 Telecommunication centres	The product shall meet following standards/regulations or equivalent standards/ regulations: a.Generic requirements defined in ETS 300 019 (environmental cri-teria) b.NEBS level 3 c.Telcordia GR-3028-CORE: Thermal Management, Telecommunication Central Office d.Operation: ETS300 019 Class 3.1 e.Transport: ETS300 019 Class 2.2 f.Storage: ETS300 019 Class 1.1 g.EN300386 Telecommunication centres
12	3.A.3.5-24	Compliance with following requirements has to be assured: ETSI EN 300 386-2: EMC requirements for Telecommunication network equipment.	Compliance with following requirements or equivalent standards/regulations has to be assured: ETSI EN 300 386-2: EMC requirements for Telecommunication network equipment.
13	3.A.3.5-10B(iii)	Bidder/OEM shall propose MUXPONDER that should support minimum 4 channel of 10GbE and 4 x 10GBE client	Bidder/OEM shall propose MUXPONDER that should support minimum 4 channel of 10G (OTU2) and 4 x 10GBE client
14	3.A.3.5-12(iv)	ILA sites are equipped with a minimum of 1 Nos. of Channel Mux/De-mux (minimum) at each direction and should also have an express port to pass through channels, if it's not dropping in between nodes.	Deleted
15	3.A.3.5-12(v)	OADM, ILA-OADM, ILA and FOADM sites should have common wavelengths at each site for drop and continue of Channels.	OADM, ILA-OADM and FOADM sites should have common wavelengths at each site for drop and continue of Channels.
16	3.A.3.2-2	ILA sites Should be equipped with Mid Stage/single Stage Amplifier for East Direction and West direction.	ILA sites Should be equipped with Mid Stage/single or dual Stage Amplifier for East Direction and West direction.

17	3.A.3.5-1(i)	The DWDM OADM and ILA-OADM system at each location shall have the capability to support additional 400G (2x100G/200G) line traffic capacity after equipped with photonic layer and traffic card as per traffic matrix requirement. The system shall provide flexibility to map ODU2/ ODU2e/ ODU3/ ODU4/ ODU flex to 100/200G line ports. The system shall support client and line side protection (50 ms) on proposed 100/200G Traffic Line system (in case required in future).	The DWDM OADM and ILA-OADM system at each location shall have the capability to support additional 400G (2x100G/200G) line traffic capacity after equipped with photonic layer and traffic card as per traffic matrix requirement.
18	3.A.3.5-1(xii)	System shall be built in such a manner that it should work with existing DWDM network based on above parameters and supplied SDN Controller should provide latest APIs, which shall further facilitate multivendor interoperability. System shall support configuration management, open APIs, and standards-based SNMP/YANG models. These management features should be available at no cost to RailTel.	System shall be built in such a manner that it should work with existing DWDM network based on above parameters and supplied SDN-Controller/EMS/NMS should provide latest APIs, which shall further facilitate multivendor interoperability. System shall support configuration management, open APIs, and standards-based SNMP/YANG models. These management features should be available at no cost to RailTel.
19	3.A.3.5-5	Protection switching shall on Line port of 100/200G be triggered (50 ms) based on Loss of Signal, signal degrade, Pre-FEC BER Signal Failure and OSNR/Q factor signal degrade (if required).	For Protected services of 100G, Protection switching shall on Line port of 100/200G be triggered (50 ms) based on Loss of Signal, signal degrade, Pre-FEC BER Signal Failure or OSNR/Q factor signal degrade. This is applicable for both Alien and New MDWDM connectivity.
20	3.A.3.5-7	Proposed system shall have management through remote CLI/Telnet/http/https and for alarm management, system support SNMP trap, syslog and SNMP polling.	Proposed system shall have management through remote CLI/Telnet/http/https and for alarm management, system support SNMP trap and SNMP polling.
21	3.A.3.5-10(A)-iii	Traffic Line system should support fixed optics full C-band tunability (DWDM flex grid frequencies).	Traffic Line system should support fixed/pluggable optic full C-band tunability (DWDM flex grid frequencies).
22	3.A.3.5-10(B)-iv	System should support tunable DWDM SFP+ interface for 10GbE Services.	System should support tunable DWDM SFP+ interface for Line side.
23	3.A.3.5-10(B)-viii	It should support B/W and CWDM 10GbE SFP+ optical modules at the client.	Deleted

24	3.A.3.5-19-23	The Network Configuration Protocol (NETCONF) should support as defined in RFC 6241, is a management protocol that provides methods to install, manipulate, and delete the configuration of network devices, and retrieve non-configuration data. This management features should be available at no cost to RailTel.	Deleted
25		Annexure-II	Annexure-II (Updated enclosed)
26	4.C.4	Note: Bidder has to submit all required document online only. Original copy is needed to be submitted by the successful bidder before due date and time of submission of bids.	Note: Bidder has to submit all required document online only. Original copy of those documents which are mentioned in clause 4.B.7 of tender document is needed to be submitted by the bidders before due date and time of submission of bids.
27	3.A.3.5-6	The proposed system shall be managed by a single unified system/Controller with DC & DR (active location at Secundrabad and standby location at New Delhi) for all the active components. Bidder shall also propose Controller based Management System for managing system with DC & DR (active and standby). All licenses required for Northbound and Southbound interface (API) should be equipped with offered solution at no additional cost to RailTel. Bidder/OEM can also leverage existing Management system deployed in RailTel, if the OEM shall provide undertaking for long term support for 8 years for all existing components irrespective of End of Life of the existing hardware/License/Software. Hardware/License/Software required for such up gradation shall be included in the price bid.	The proposed system shall be managed by a single unified system/Controller with DC & DR (active location at Secundrabad and standby location at New Delhi) for all the active components. Bidder shall also propose Controller based Management System for managing system with DC & DR (active and standby). All licenses required for Northbound and Southbound interface (API) should be equipped with offered solution at no additional cost to RailTel. Bidder/OEM can also leverage existing Management system deployed in RailTel, if the OEM shall provide undertaking for long term support for 8 years for all existing components irrespective of End of Life of the existing hardware/License/Software. Hardware/License/Software required for such up gradation shall be included in the price bid. In case of MPLS or OTN based solution, Bidder needs to provide single unified system/Controller for Network management to manage the network elements (MPLS Router/OTN devices as wells Optical System) based on solution offered.

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28	3.A.3.5-10 (D)	All Protected services of STM-4/STM-16/10G shall be provision as per the requirement of traffic matrix placed at Annexure-V. and same should be protected from all possible paths (single, dual, inter ring and intra ring fiber cuts) available (including alien paths) in Network as per topology defined in Annexure II. Proposed solution for protection should have support from minimum three different paths (In case of available of paths in topology) from day-1 for services of STM-4/STM-16/10G. Protection switching shall be triggered within 50 ms.	A. All Protected services of STM-4, STM-16,10G &100G shall be provision as per the requirement of traffic matrix placed at Annexure-V & Annexure-IV. B. 10G, STM16, & STM4 traffic should be protected from all possible paths (single, dual, inter ring and intra ring fiber cuts) available (including alien paths) in Network as per topology defined in Annexure II. Proposed solution for protection should have support from minimum three different paths without overlapping (In case of available in topology) from day-1 for. Protection switching shall be triggered within 50 ms (on single fiber cut). There is no need to consider three different paths if the following options are available in the network: i. Wherever traffic passes through two different rings, a figure-eight scenario should be considered, ensuring that all paths do not overlap in any direction. ii. If traffic passes through three different rings, a figure-eight scenario should be considered after the completion of each ring, ensuring that all paths do not overlap in any direction. C. A 100G Linear/protected path (as per Annexure-IV traffic requirement) and their upgradeable capacity of proposed card can also be used for 10G, STM16, & STM4 for protected or unprotected traffic. However, the proposed solution should provide sufficient link capacity on traffic card/system to run both protected and unprotected traffic either through three different paths or under a figure-eight scenario using two or three rings or Linear.

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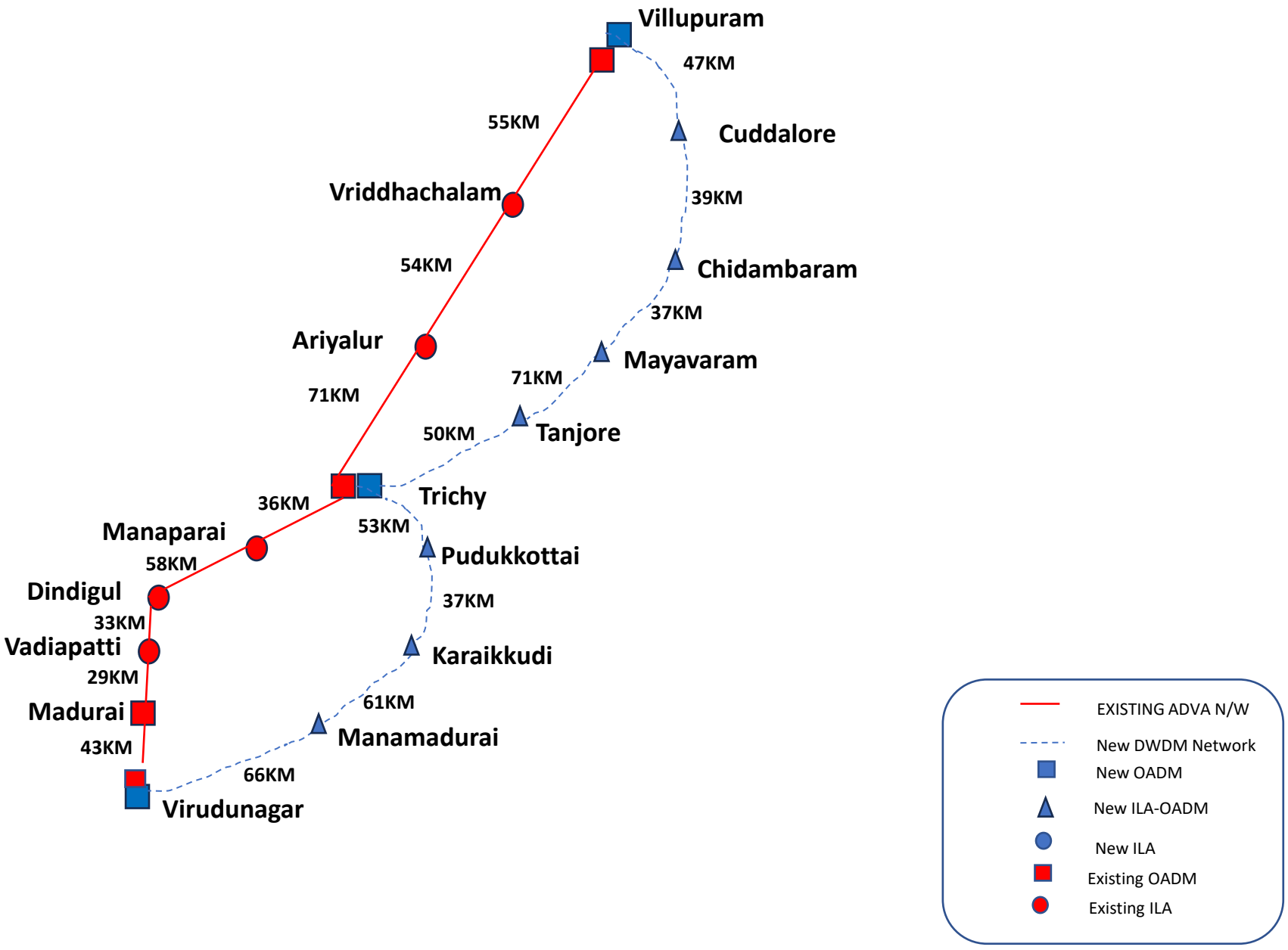
			D. An alien path can also be used for 100G, 10G, STM16, & STM4 for traffic protection. E. For protected services of 100G, Bidder/OEM can offer Linear 100G services from each Path-1 & Path-2 (as per Annexure-IV). In that case, Protection & Switching is not required. F. All the Line paths for protected services of STM-4, STM-16,10G & 100G shall provide following performance monitoring to check health of all paths in real time. i. Transmit Power ii. Receive Power iii. Wavelength (nm) or Frequency (THz) iv. OSNR/ESNR (for 100G service)

Network Diagram

Annexure-II

Route: SR : Villupurm- Virudhu Nagar



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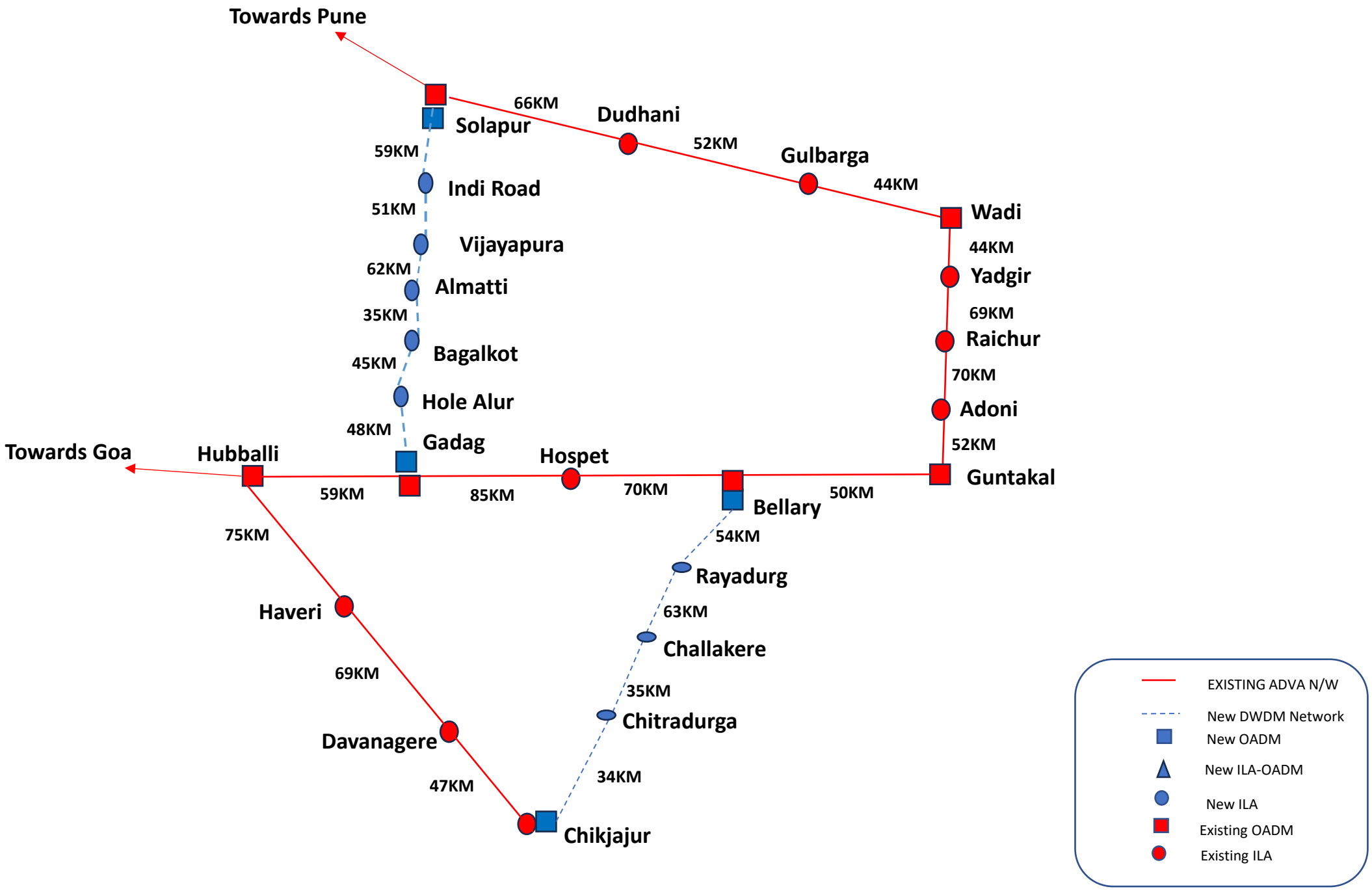
Network Diagram

Route: SR : Chikjajur- Bellary & Gadag-Solapur



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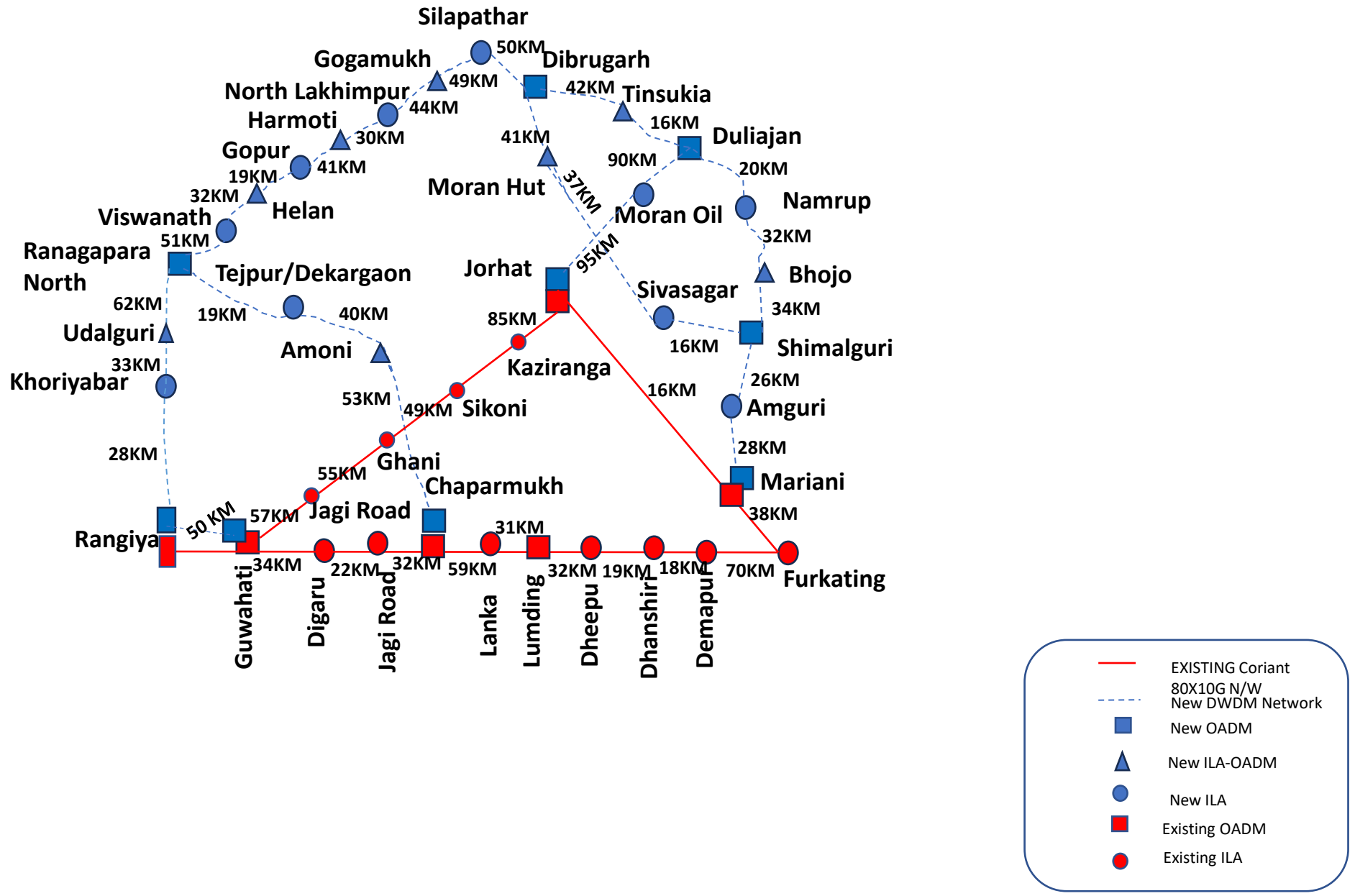
Network Diagram

Route: ER : Rangiya-Jorhat



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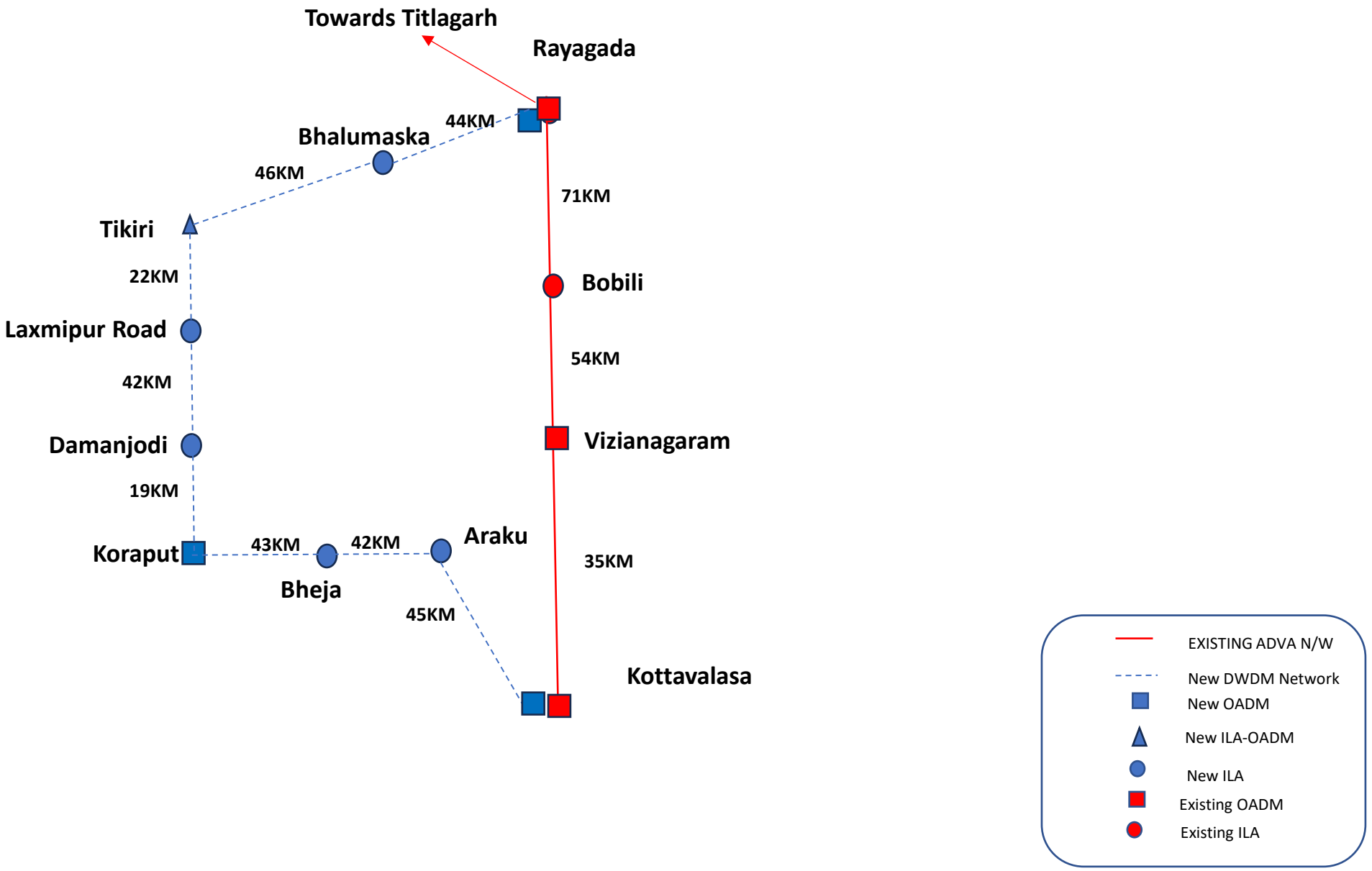
Network Diagram

Route: ER : Rayagada-Kottavalasa



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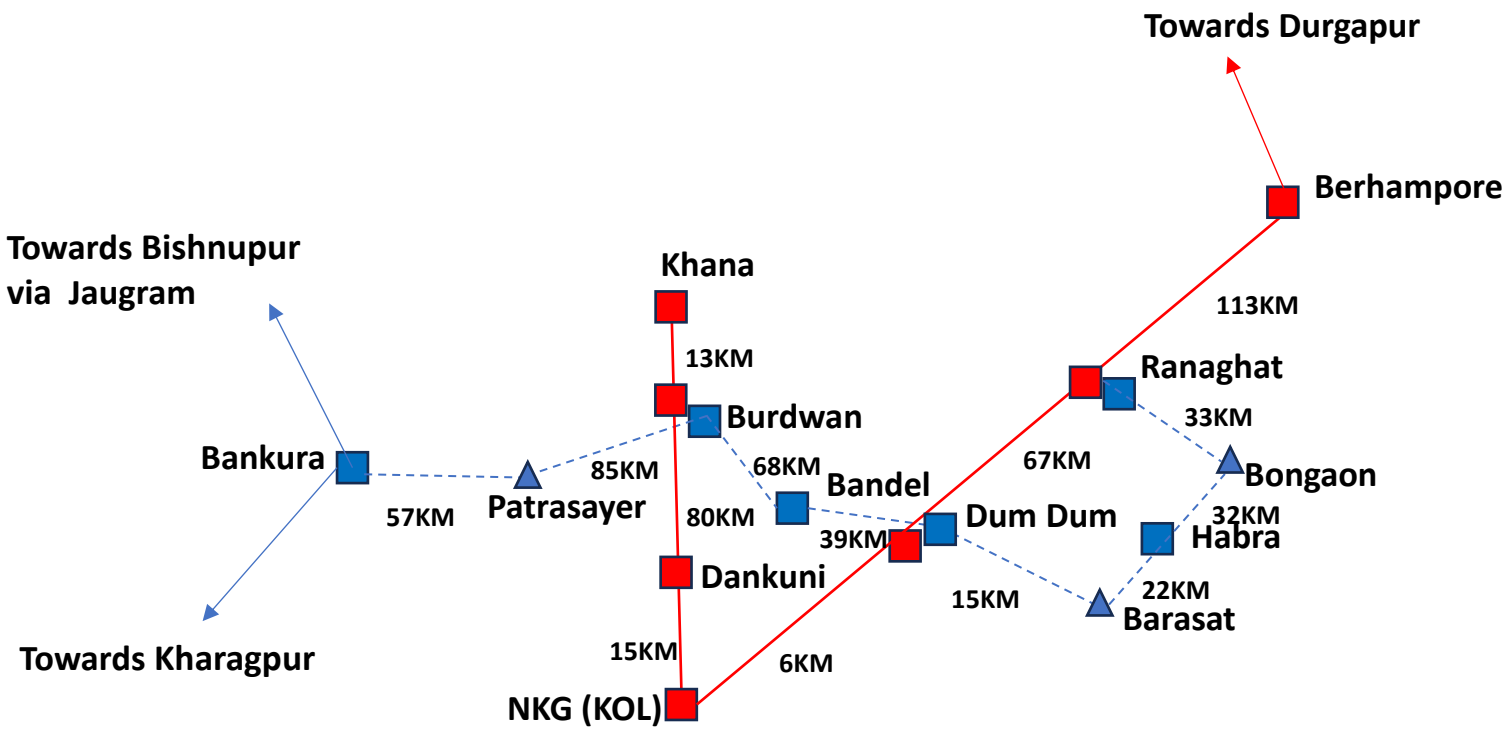
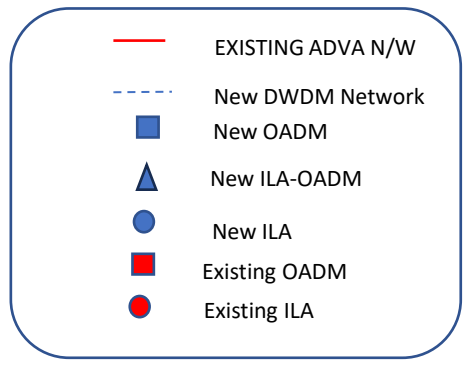
Network Diagram

Route: ER : Bankura-Ranaghat





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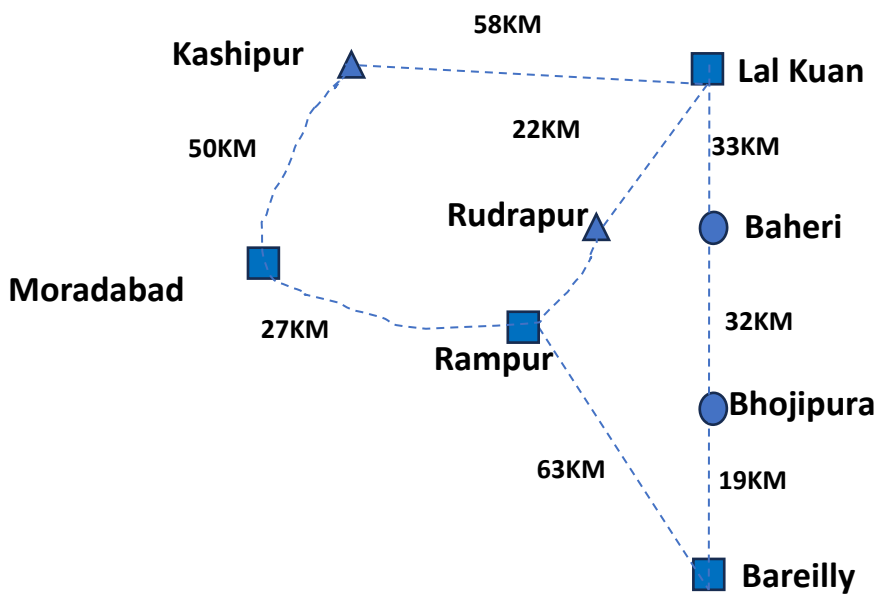
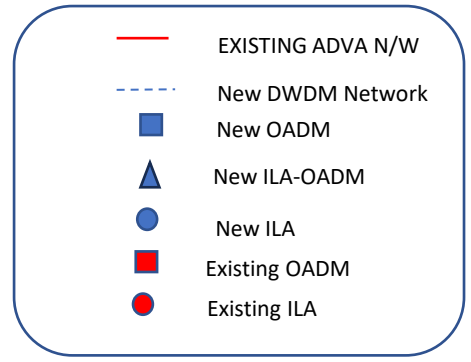
Network Diagram

Route: NR : Moradabad-Kasipur-Lalkuan & Rampur-Rudrapur-Lalkuan-Bareilly





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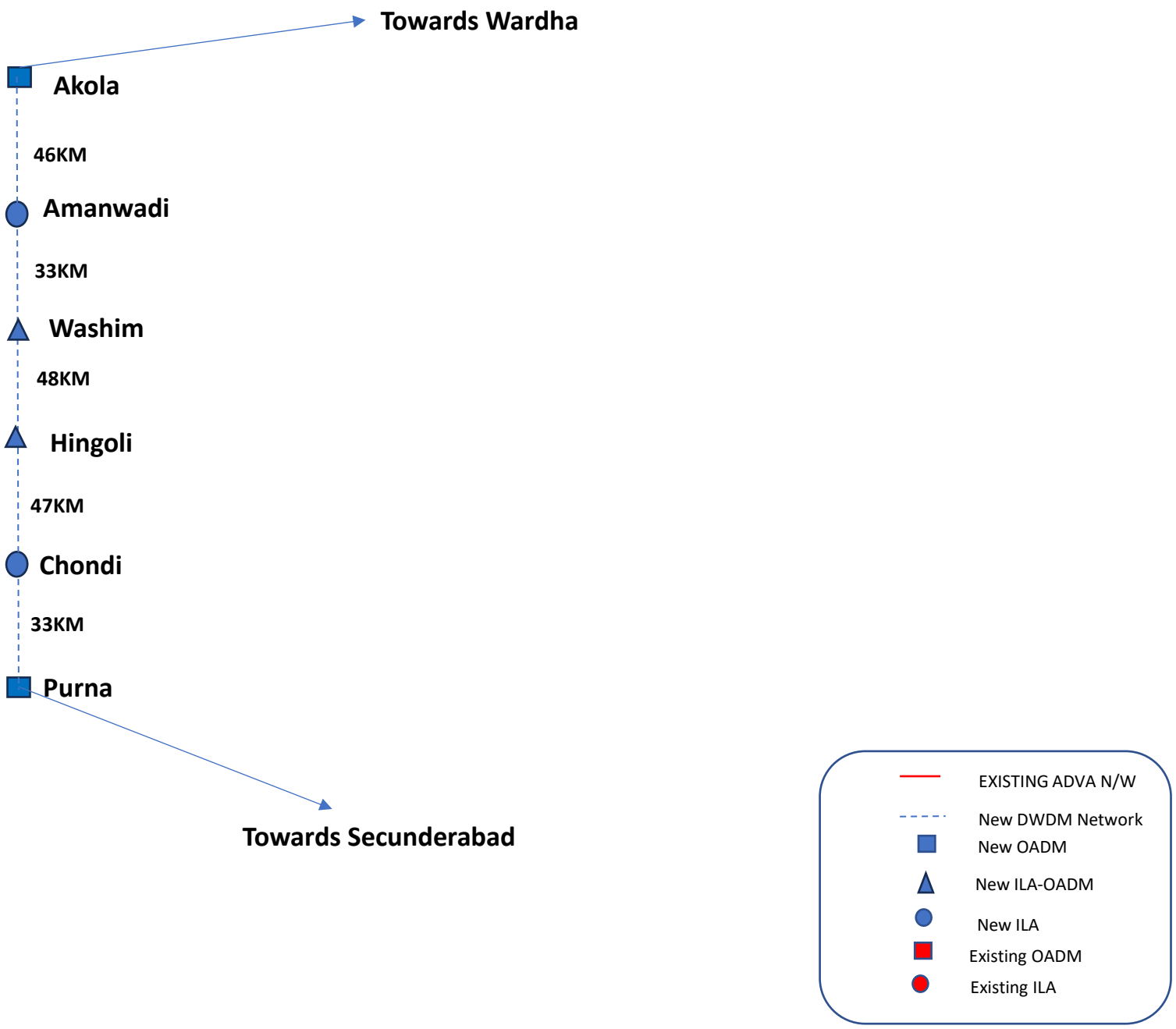
Network Diagram

Route: SR : Akola-Purna



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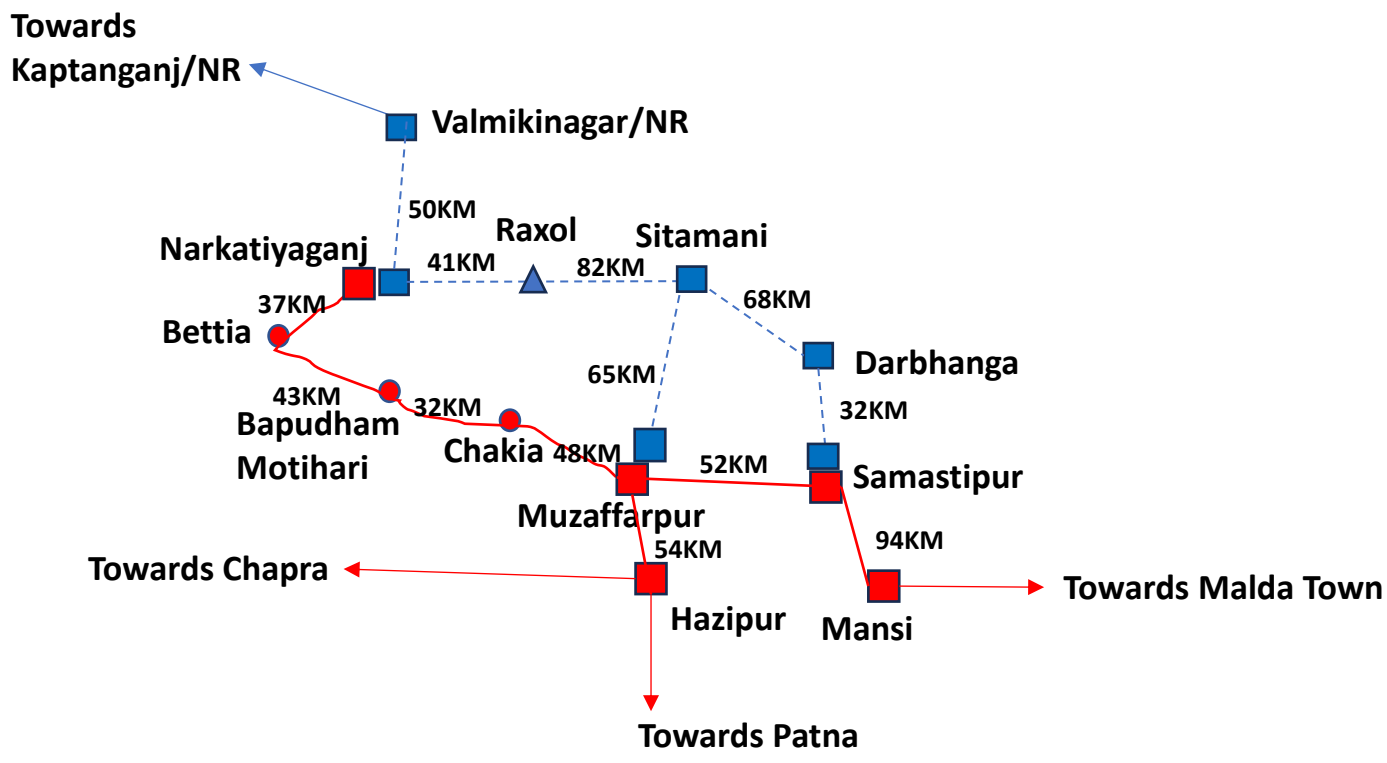
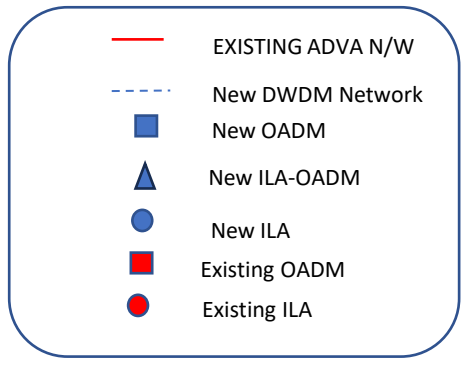
Network Diagram

Route: ER : Narkatiyaganj-Hazipur





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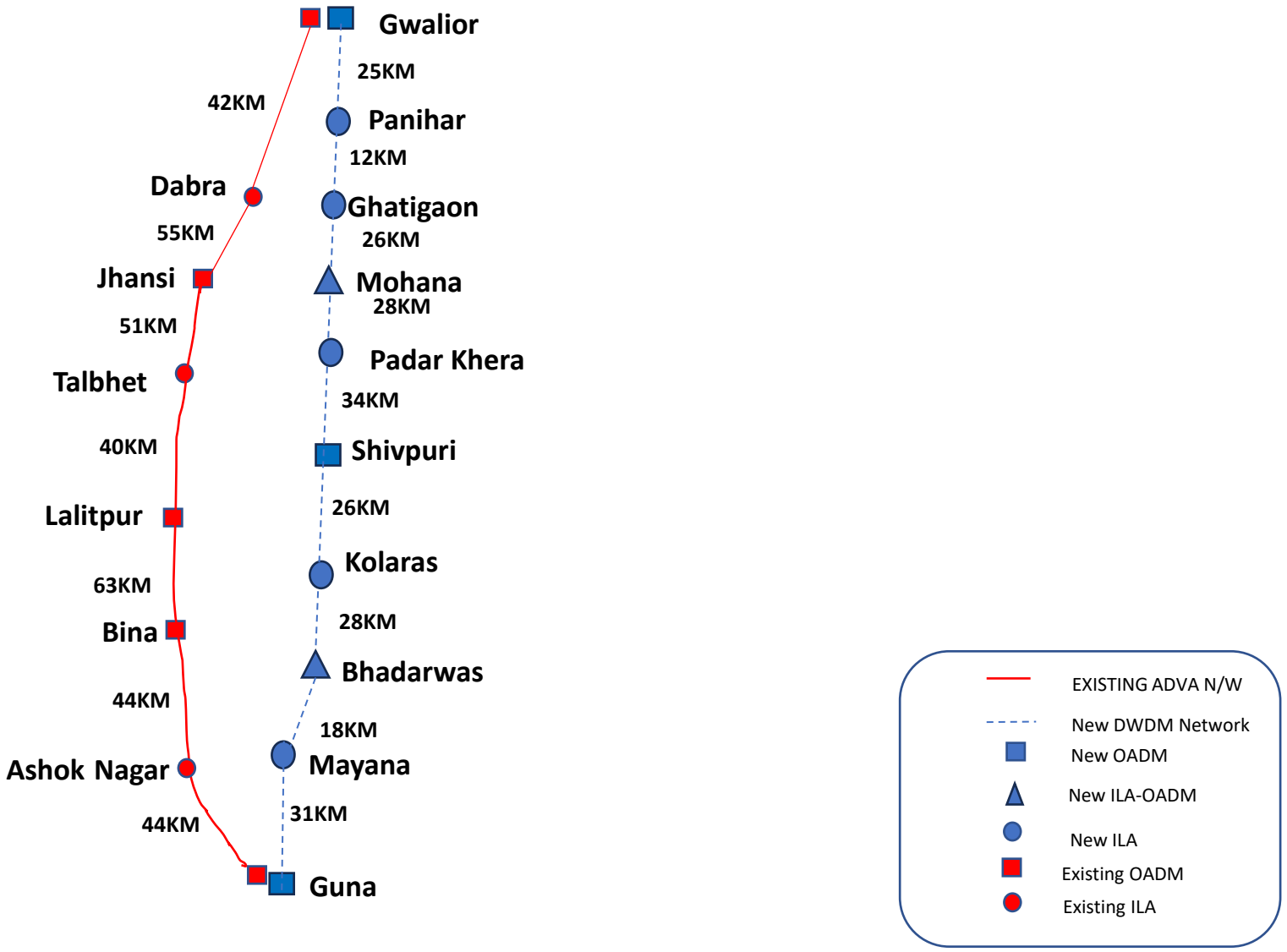
Network Diagram

Route: WR : Gwalior-Shivpuri-Guna



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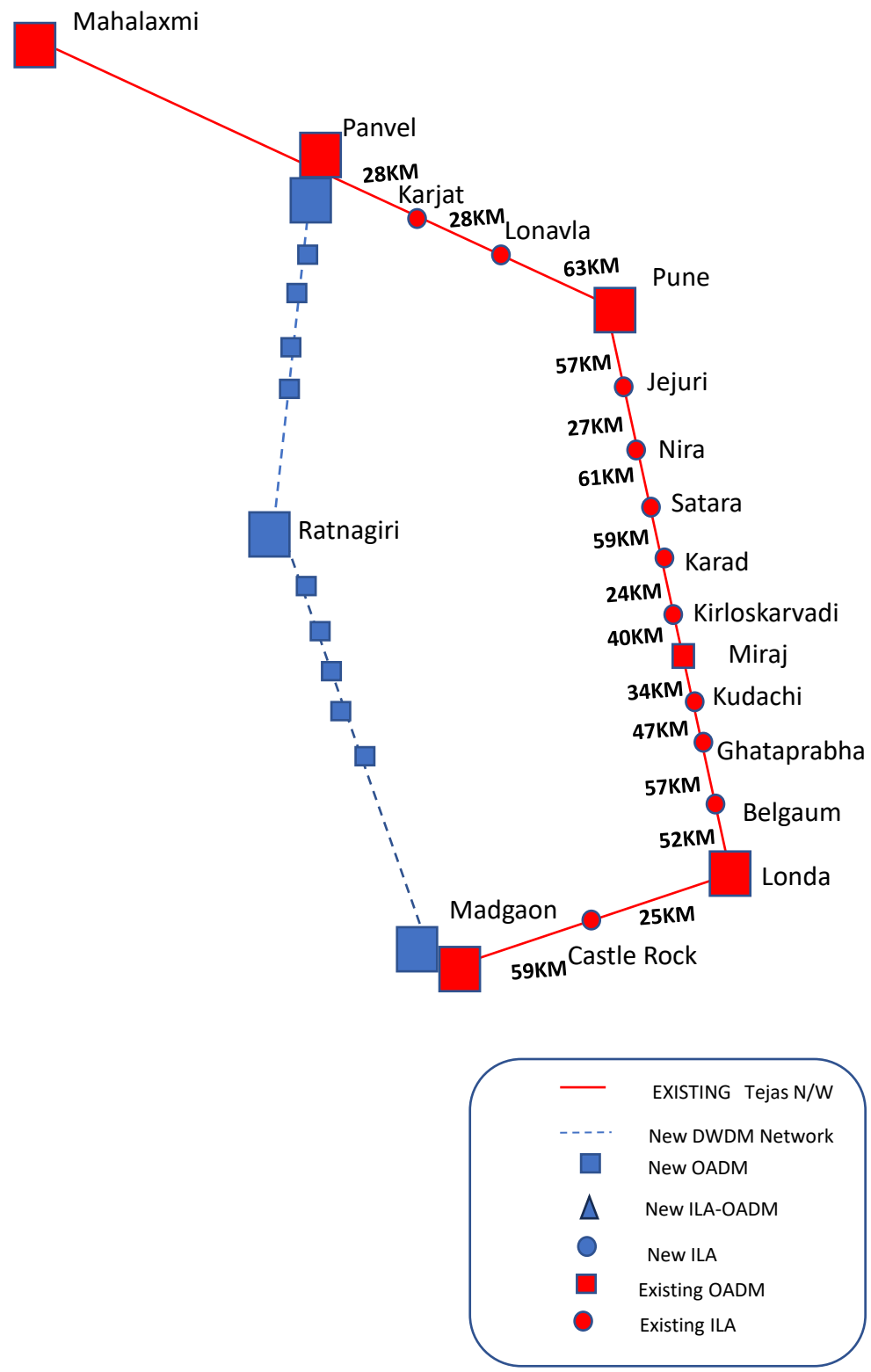
Network Diagram

Route: WR: KRCL: Panvel-Ratnagiri-Madgaon

SN	Site Name	OADM/ILA	END A	END B	Fiber Length (in KM)
1	Panvel	OADM	Panvel	Pen	35
2	Pen	ILA-OADM	Pen	Nagothane	27
3	Nagothane	FOADM	Nagothane	Roha	13
4	Roha	OADM	Roha	Kolad	26
5	Kolad	ILA-OADM	Kolad	Indapur	11
6	Indapur	FOADM	Indapur	Mangon	7
7	Mangon	OADM	Mangon	Goregaon	10
8	Goregaon	FOADM	Goregaon	Veer	6
9	Veer	ILA-OADM	Veer	Sapevamne	8
10	Sapevamne	FOADM	Sapevamne	Karanjadi	8
11	Karanjadi	OADM	Karanjadi	Vinhare	8
12	Vinhare	FOADM	Vinhare	DWV	10
13	DWV	ILA-OADM	DWV	Kalambani	10
14	Kalambani	FOADM	Kalambani	Khed	8
15	Khed	OADM	Khed	Anjani	13
16	Anjani	FOADM	Anjani	Chiplun	16
17	Chiplun	OADM	Chiplun	Kamathe	10
18	Kamathe	FOADM	Kamathe	Savarda	9
19	Savarda	OADM	Savarda	Aravali	4
20	Aravali	ILA-OADM	Aravali	Kadwai	13
21	Kadwai	FOADM	Kadwai	Sangameshwar	7
22	Sangameshwar	OADM	Sangameshwar	Uksi	14
23	Uksi	ILA-OADM	Uksi	Bhoke	13
24	Bhoke	FOADM	Bhoke	Ratnagiri	7
25	Ratnagiri	OADM	Ratnagiri	Nivsar	15
26	Nivsar	FOADM	Nivsar	Adavali	16
27	Adavali	OADM	Adavali	Veravali	10
28	Verawali	FOADM	Verawali	Vilvade	6
29	Vilvade	OADM	Vilvade	Rajapur	17
30	Rajapur	ILA-OADM	Rajapur	Kharepatan	9
31	Kharepatan	FOADM	Kharepatan	Vaibhavwadi	8
32	Vaibhavwadi	OADM	Vaibhavwadi	Achirene	9
33	Achirene	ILA-OADM	Achirene	Nandgaon	7
34	Nandgaon	FOADM	Nandgaon	Kankavali	15
35	Kankavali	ILA-OADM	Kankavali	Sindhdurg	18
36	Sindhdurg	FOADM	Sindhdurg	Kudal	11
37	Kudal	OADM	Kudal	Zarap	10
38	Zarap	FOADM	Zarap	Sawantwadi	11
39	Sawantwadi	OADM	Sawantwadi	Madure	8
40	Madure	ILA-OADM	Madure	Pernem	11
41	Pernem	FOADM	Pernem	Thivim	11
42	Thivim	OADM	Thivim	Karmali	17
43	Karmali	OADM	Karmali	Verna	16
44	Verna	ILA-OADM	Verna	Majroda	5
45	Majroda	FOADM	Majroda	Madgaon	8
46	Madgaon	OADM			



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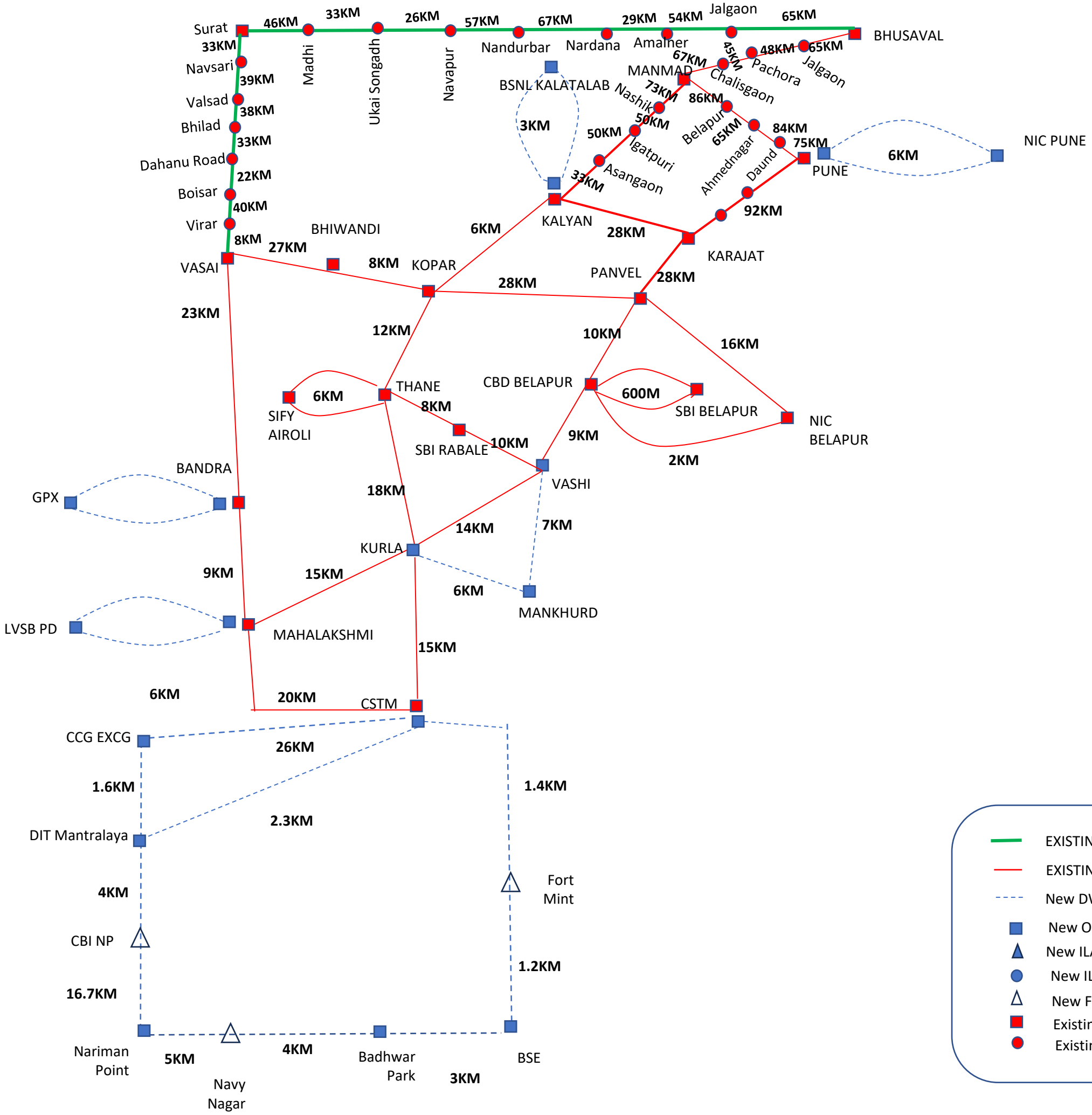
Date: 2024.09.07 19:01:40 IST

NETWORK DIAGRAM

Route: WR : MUMBAI METRO RING



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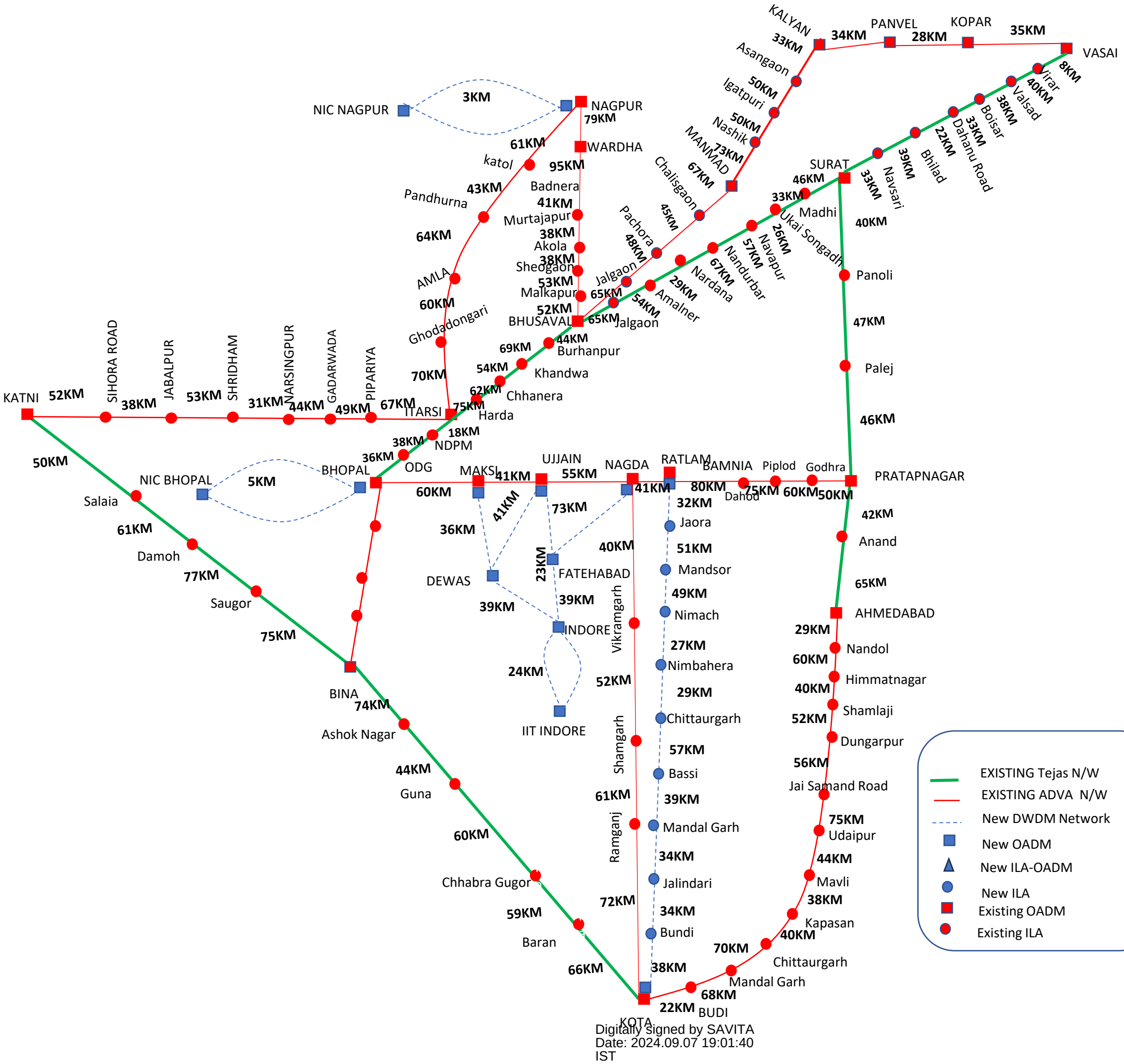
Date: 2024.09.07 19:01:40 IST

Network Diagram

Route: WR : Ratlam-Kota, NIC/Nagpur, NIC/Bhopal & IIT/Indore



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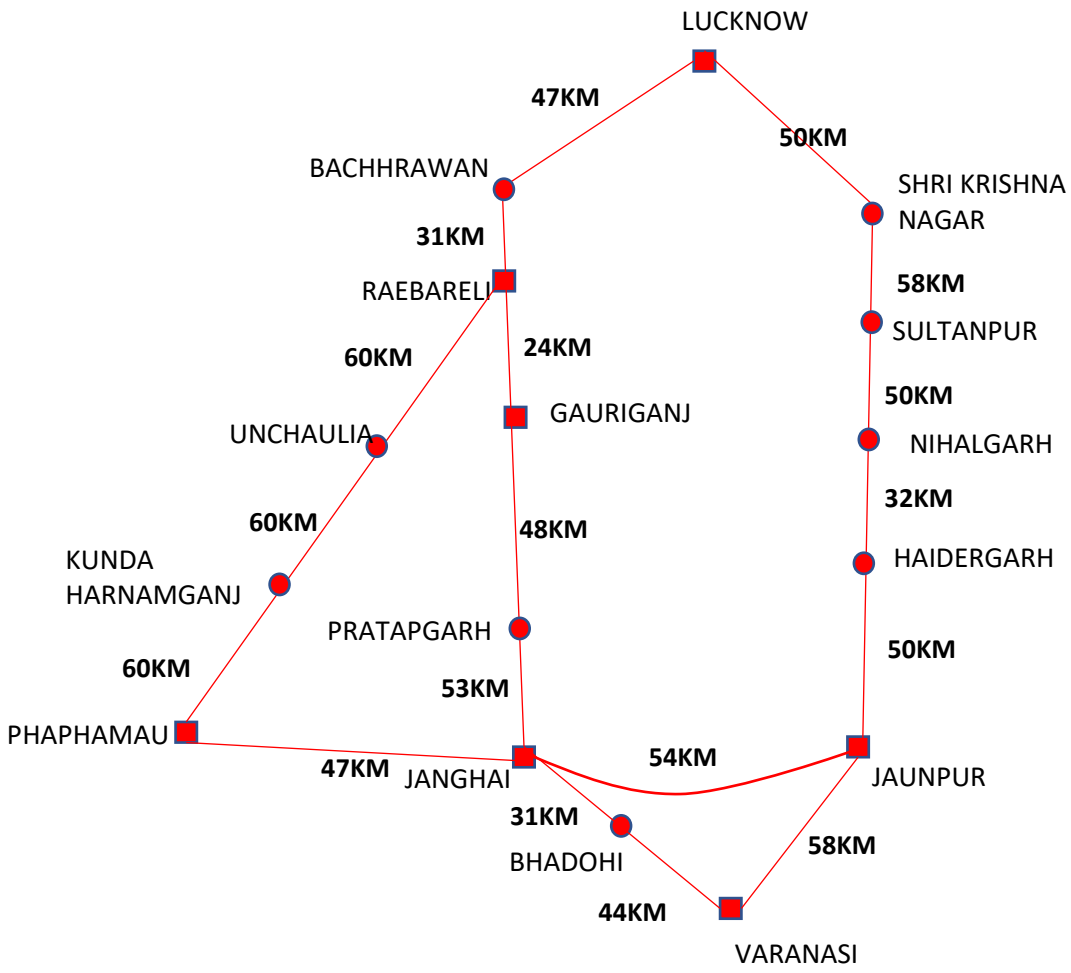
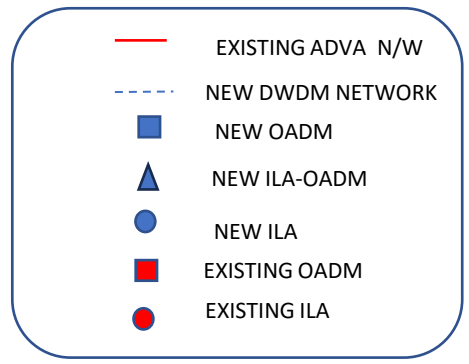
Date: 2024.09.07 19:01:40 IST

NETWORK DIAGRAM

NR : RGIPT/Amethi





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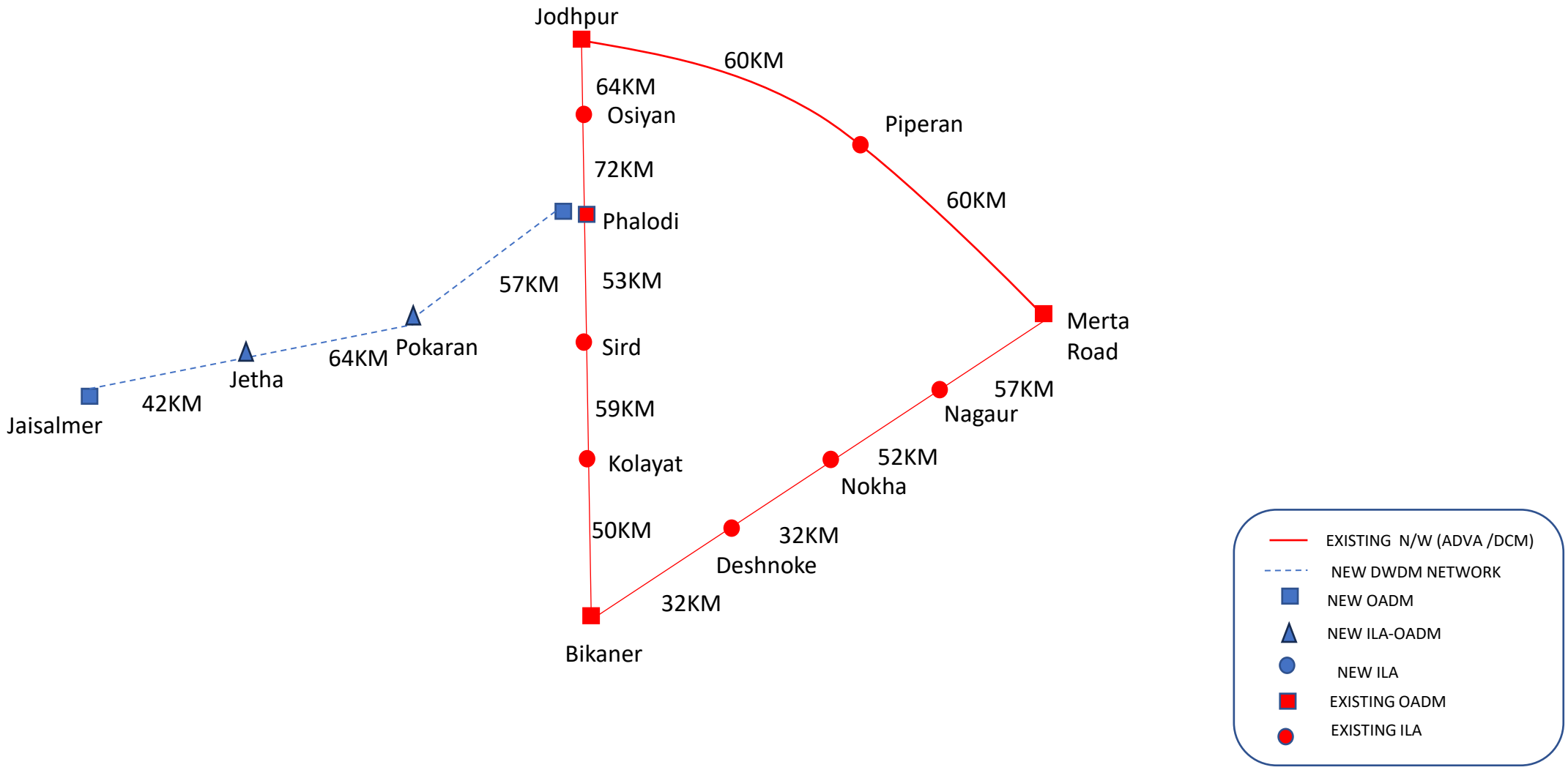
NETWORK DIAGRAM

NR : Jodhpur-Jaisalmer



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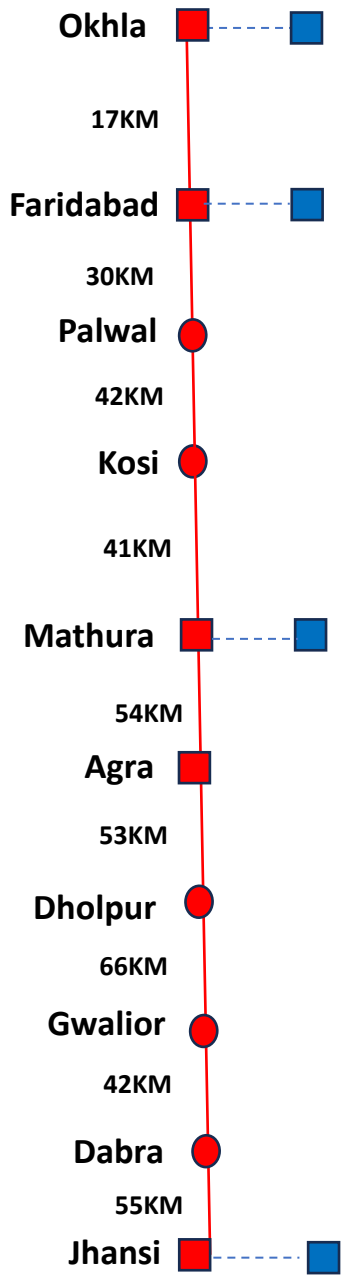
Network Diagram

Route : NR : Okhla-Jhansi (CDOT)



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Network Diagram

Route: WR: Shifting of Surat Pop

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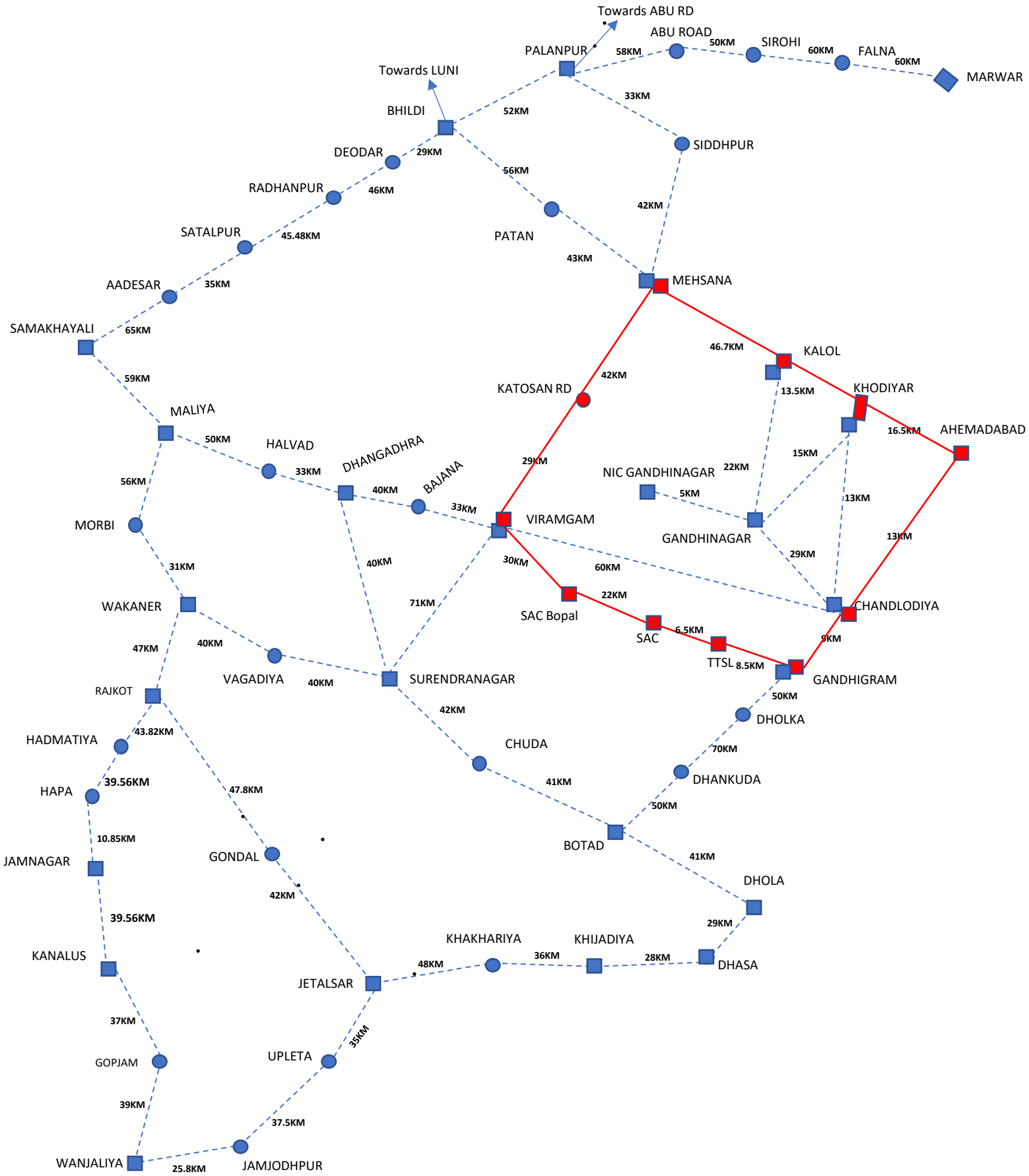
Network Diagram
WR : Saurashtra



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