



Detailed Project Report for "KAVACH" Implementation in Indian Railways

Mission Raftaar- 160 KMPH





भारतीय रेल
Indian Railways
Detailed Project Report of
KAVACH Works in
NAD – KOTA - MTJ
Section of
West Central Railway
2022

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ABBREVIATIONS:

Abbreviation	Description
AIP	Approval In Principle
ATP	Automatic Train Protection
BIU	Break Interface Unit
DCF	Discounted Cash Flow
DEMU	Diesel Electrical Multiple Unit
DMI	Driver Machine Interface
DRACAS	Defect Reporting and Corrective Action System
EMU	Electrical Multiple Unit
GTKM	Gross Tonne Kilometre
IBS	Intermediate Block Signal
IR	Indian Railways
LC	Level Crossing
LED	Light Emitting Diode
LHS	Limited Height Subway
LP	Loco Pilot
LTCAS	Locomotive Train Collision Avoidance System
MCB	Miniature Circuit Breaker
MEMU	Mainline Electric Multiple Unit
MMTS	Multi Modal Transport System
NTKM	Net Tonne Kilometre
OHE	Over Head Equipment
PSR	Permanent Speed Restriction
QCRA	Qualitative Cost Risk Analysis
RAM	Reliability, Availability and Maintainability

Abbreviation	Description
RFID	Radio Frequency Identification
RIU	Remote Interface Unit
ROB	Road Over Bridge
ROR	Rate of Return

1. EXECUTIVE SUMMARY:

1.1 Background

Indian Railways is experiencing phenomenal growth in gross turnover. Since 1950 Railways Passenger Kilometre, Freight Train Kilometre, Revenue earning freight traffic (NTKM), Gross Ton Per Km (GTKM), Wagon and Coach utilization is continuously increasing. In the year 2012-13, Indian Railways joined the exclusive club of billion-ton freight loading countries with China, Russia and USA. In terms of Passenger Km carried, IR is second largest passenger carrier in the world next only to Chinese Railways. Despite its phenomenal growth in terms of traffic, there has been no substantial improvement in the average speed of passengers as well as freight trains.

“In order to reverse this trend, Indian Railways has embarked upon the speed enhancement plan along with removing the capacity constraints by doubling, tripling and quadrupling of railway sections”.

Although performance of the Indian Railways on the safety front is showing continuous improving trend with zero passenger casualty during 2019-20 & 20-21. Yet in view of the enhancement of speed, doubling, tripling and quadrupling of track, this safety performance without any technical aid to loco pilots is difficult to sustain. Signal Passing at Danger, Breach of Block rules and failure to observe the prescribed speed by loco pilots are potential hazards.

“In order to mitigate the risks arising out of these incidents and provide aids to loco pilots for confident driving at higher speed, Indian Railways has planned to deploy the Modern Train Control System on its entire network in a time bound manner.”

In this context successful trial of indigenously developed Automatic Train Protection system has been carried out in 265 Kms section on Secunderabad Division of South-Central Railway. In addition to this, further deployment of this system in contiguous

section of Bidar – Prabhani, Manmad – Parbhani - Mudkhed – Secunderabad – Dhone – Guntakal (1200 RKMs) has been sanctioned and the work in that section is ongoing successfully.

Encouraged with the results, a conscious decision to have all Modern Train Control system works with indigenously developed Train Collision Avoidance System (TCAS) now named as **KAVACH** has been taken.

1.2 Project Overview

The section under consideration of this DPR i.e. NAGDA-MATHURA (NAD – MTJ), of West Central Railway, which is a part of the Delhi - Mumbai HDN (High Density Network) Route, has to be provided with the ATP system “KAVACH” (TCAS) under “Mission Raftar” for increasing the speed to 160 kmph from the present 130 kmph and enhancing safety at the same time.

Delhi - Mumbai route of Indian Railway is one of the busiest routes on Indian Railways. Of this Nagda to Mathura section of WCR is a major component. On this busy route, it will enable the Loco Pilots of KAVACH fitted Locomotives to take the experience and advantage of confident driving in a continuous long stretch of about more than 549 Kms of NAD - MTJ section of Kota Division on West Central Railway which is the site of this Project.

1.3 Project Location and description of section

The NAGDA-MATHURA (NAD – MTJ) section of Kota Division, West Central Railway is a part of Delhi – Mumbai HDN Route of Indian Railways.

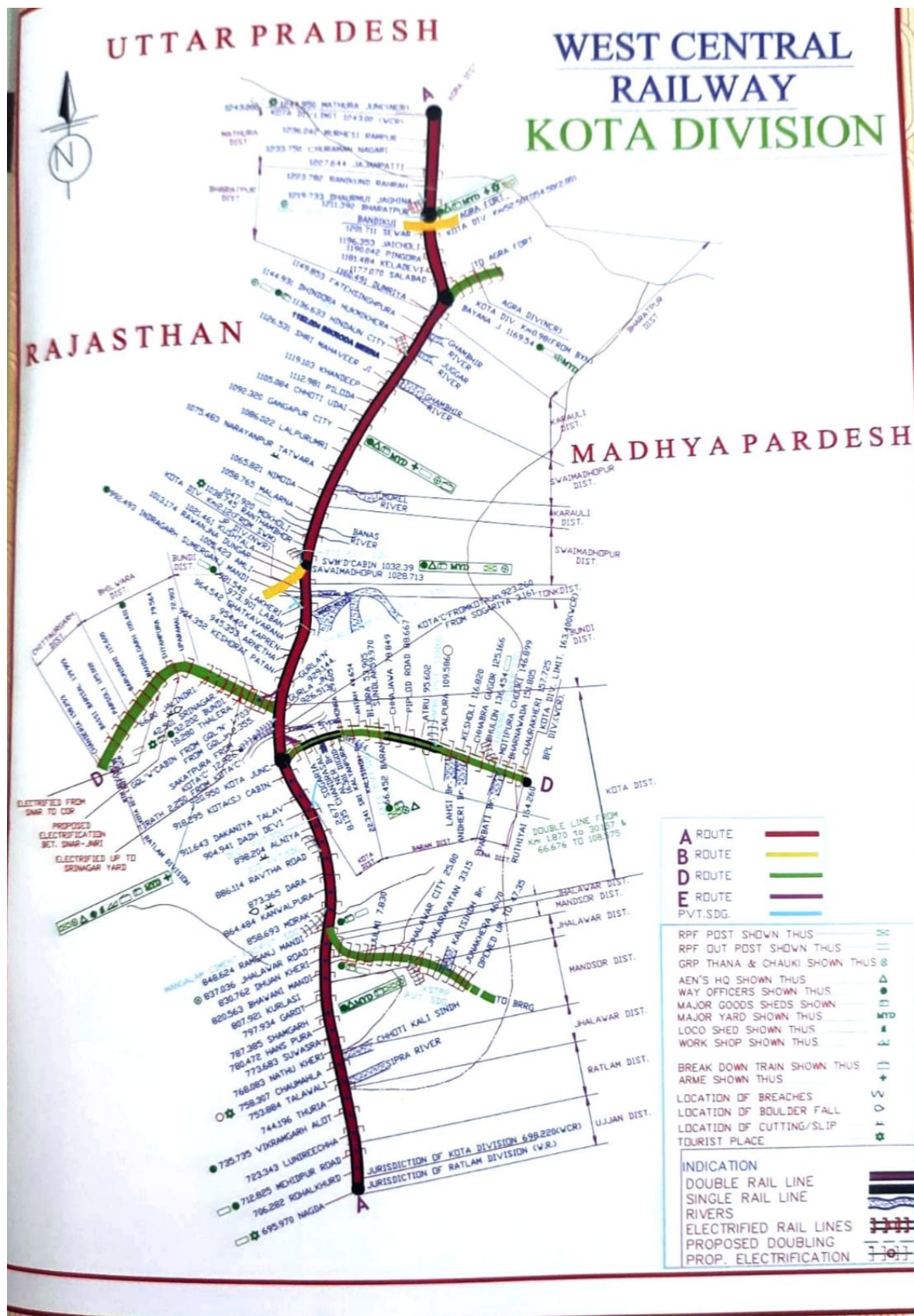
The section is of 549 Route Km length and passes through the state of Rajasthan & Madhya Pradesh, Uttar Pradesh, running parallel to major rivers like Chambal, Shipra, Gambhir, Morel etc. and their tributaries. The terrain of the section is mostly flat with ruling gradient of 1 in 200. The section is mostly in the Black cotton soil & Sandy soil plains & with some Rocky plains.

The section comprises of 50 way side stations and 7 Junction stations totaling to 57 numbers of stations, 123 numbers of Level crossing Gates, 40 Intermediate Block Signals and there is no Automatic signaling territory and it carries mix traffic of all kinds, viz. freight, mail / express, passenger and Memo trains.

Number of Passenger and freight trains in one direction and maximum permissible speeds of various categories of trains in the section are given in table below.

Table 1.1

SN	Type of Train	Numbers	Maximum Permissible Speed (KMPH)
1	Express	60	130
2	Passenger	11	110
3	DEMU	-	-
4	MEMU	03	100
5	EMU	-	-
6	Freight	56	100/75



The Site of the Railway Project comprises the section commencing from km 695.970 to km 1244.950 i.e. from the Station Nagda NAD (Excl) to Station Mathura MTJ (Excl) in the State of Uttar Pradesh, Madhya Pradesh & Rajasthan on Kota Division of West Central Railway. The land and other structures comprising the Site are described below

1. RAILWAY : West Central Railway
2. DIVISION : Kota Division
3. SECTION : From Km 695.970 to km 1244.950
4. LENGTH of Section : 548.980 Kms
5. Max Speed : 130 Kmph
6. No. Of Lines : 02

A. Double Line:

S.No	Section Name	Km	Remark
1.	Nagda-Mathura	548.980	This is a Double line section.

B. Single Line : NIL

C. Any Other : NIL.

D. Electrification : The Total Route is Electrified

E. Block Working :

1. Absolute Block Working: Nagda – Mathura
2. IBS BLOCK WORKING at 40 sections

F. A sub – section wise detail of the Route, including the sub – section length, Single / Double / Triple / Quad Line details, RE / Non RE details, number of Stations, IBS and number of LC gates are tabled below:

Table 1.2

SN	Div	Sub-Section	Sec. Length (Rkm)	Single/ Double Line	RE/ Non-RE	Stations (Nos.)	IBS (Nos.)	Auto Section (KMs)	LC Gates (Nos.)
1	Kota Division	Nagda (Excl) – Mathura (Excl) (NAD – MTJ)	548.98	D/L	RE	57	40	0	123

1.4 Project Objectives

Safe and incident free operation of trains not only results in satisfied customers but improve the productivity of costly fixed and movable assets, viz. track, OHE, signalling systems, locomotives, rolling stock and human resources. Automatic Protection System (ATP) contributes to achieve above objectives of a transport system.

KAVACH is an indigenously designed Automatic Train Protection system in line with the vision of Hon'ble PM of "Aatma Nirbhar Bharat" and "Make in India" initiative. KAVACH would benefit Indian Railways enhancing its performance in a cost-effective way through improvements in both safety and efficiency. At times when Railway control systems around the world has traditionally evolved in response to external pressures (such as accidents, technology advancements, customer satisfaction etc.), Modern train control systems such as KAVACH are an important milestone in Indian Railways' "VIKAS YATRA". Implementation of KAVACH will play a significant role in safer and efficient working of trains on Indian Railways.

1.5 Features of KAVACH

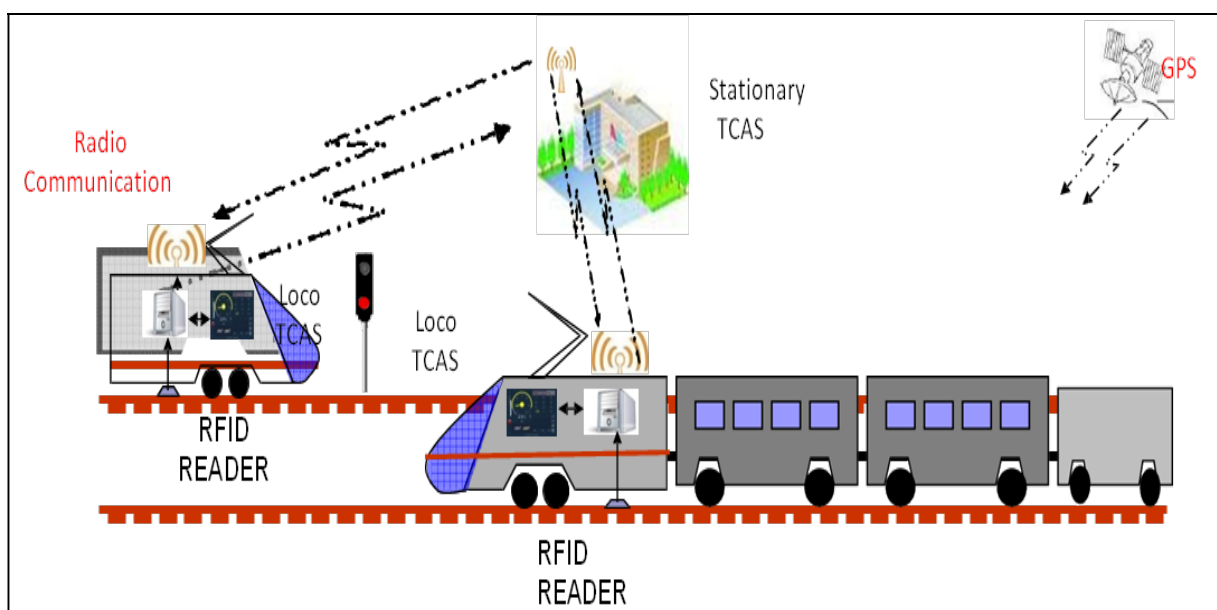
Train Collision Avoidance System KAVACH is an indigenous Automatic Train Protection System validated to SIL 4, highest level of Safety Integrity, developed by RDSO. The system alerts the Loco Pilot while approaching the signal about their aspects, Permanent Speed Restrictions (PSR) and requires him to acknowledge the warning in case of over speeding. In case the Loco pilot does not responds, the system initiates the brake application after a pre-defined delay. Salient features of the system are as follows:

- System is interfaced with existing signaling system and provides continuous update of Movement Authority.
- Prevention of Over speed: Section Speed & Loco Specific Speed
- Displays aspect of Signal on the DMI in the Locomotive.

- Manual SOS facility both from Loco and from Station in case of emergencies.
- Prevention of Side-collision, Head on collision, Rear end collision under certain specified conditions.
- Protection of roll back/ forward and reverse movement.
- Automatic whistling in the approach of LC Gates.

Components of KAVACH

The Train Collision Avoidance system shall comprise of track side equipment including Stationary TCAS Unit and On-board equipment.



The Trackside subsystem shall be comprised of

- a. Stationary TCAS Unit to Interface with Signaling at Station EI / RRI / panel or LC Gate or IBH Signaling System.
- b. Tower and Antenna along with the Radio Equipment.
- c. RFID tag.

The On-board subsystem shall be comprised of

- a. Loco TCAS Vital Computer
- b. RFID readers consisting of two RFID Reader Antenna in hot standby
- c. Loco TCAS Radio Unit consisting of two Radio Modems in hot standby with separate cables and antennae for each radio or LTE unit.
- d. Driver Machine Interface (DMI) for each locomotive CAB or one DMI for each Driving motor coach of EMU/DMU/MEMU/DEMU etc.
- e. Brake Interface Unit (BIU), where required.

The Communication Back – Bone: The System will also require a Back – Bone of a Optical Fiber Network in redundancy for the connectivity of the various Stationary Station TCAS / IB & LC TCAS / RIUs units as per requirement.

The details of KAVACH technology are given in Annexure A.

1.6 Factors for Project Engineering

During execution of the project a number of important aspects are to be looked into and planned well in advance. The important planning parameters for KAVACH are:

1. Radio Tele-Communication Sub System UHF/LTE -R
2. Requirement Of Towers, Tower Structure & Location
3. The Signalling Interface Options
4. Building Requirement if any
5. Communication Back Bone with IP-MPLS Technology
6. Priority Of Provision Of Loco TCAS and DMI location
7. Maintenance Strategy

1.7 Brief Scope of the Work:

The KAVACH (TCAS) shall be provided to cover entire section from Nagda (NAD) (695.970 Km) to Mathura (MTJ) (1244.950 Km) section of West Central Railway.

Design, Supply, Installation, Testing and commissioning of

- a. On Board TCAS equipment in locomotives.
- b. Track side Stationery TCAS equipment at station / IB/LC TCAS / RIU s in Block section along with associated works including RFID Tags
- c. Laying of 2x48 OFC cable as communication Back Bone with IP-MPLS routers.
- d. Design and Installation of Telecom Towers
- e. Building works as per requirement.

The Train Collision Avoidance System to be procured and installed shall conform to RDSO Specification No. RDSO/SPN/196/2012 version 3.2 or latest.

Draft Specifications RDSO/SPN/196/2020 Version 4.0 is under development stage and is likely to be finalized soon. The project envisages to commission finally based on Version 4.0 also.

1.8 Utility Shifting:

While executing the KAVACH work on the section, some of the critical works are like OFC cable laying, Tower erection, additional Relay rooms etc. All these work may require small works of utility shifting specially the existing cables on specific sites.

1.9 Impact of the Project KAVACH:

Land acquisitions are normally a major component of Infrastructure projects. In Project KAVACH the basic land requirement may arise due to installation of new Towers for UHF communication requirement and for construction of buildings for

STCAS equipments at the stations and in the Block Section for RIUs/IB/LC Gate. Apparently in the concerning section under discussion NAD-MTJ, no Land acquisition is required. However in case at a later stage if this requirement comes up, the same will have to be responsibility of the Zonal Railways and not the contractor.

Project KAVACH as an additional aid to the Loco Pilots is definitely going to enhance the Passenger safety as it monitors continuously the speed and Movement Authority and takes over in case of abnormalities.

The execution of TCAS project does not involve major civil works. As such there are no major Environment concerns.

1.10 Cost Estimation:

The proposed cost of the work is Rs. 214.00 Crores. Details of this cost are elaborated in the Cost Estimate section.

1.11 Project Risk and Assumptions:

Qualitative Cost Risk Analysis (QCRA) with the objective of identifying the projects risks for the KAVACH project with all stakeholders is to be done post contract award identifying significant risks to the achievement of the project objectives.

1.12 Project commissioning schedule:

It is proposed to complete the deployment of KAVACH system in 549 RKMs of the section within 20 months after award of the contract. Different milestones of the project are detailed in the Project Schedule.

PROJECT COMPLETION SCHEDULE

1 Project Completion Schedule

During Construction period, the Contractor shall comply with the requirements set forth in this Schedule-I for each of the Project Milestones and the Scheduled Completion Date. Within 15 (fifteen) days of the date of

each Project Milestone, the Contractor shall notify the Authority of such compliance along with necessary particulars thereof.

2 Project Milestone-I

2.1 Project Milestone-I shall occur on the date falling on the 150th (one hundred fifty) day from the Appointed Date (the “Project Milestone-I”).

2.2 Prior to the occurrence of Project Milestone-I, the Contractor shall have commenced construction of the Railway Project and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 10% (ten per cent) of the Contract Price.

2.3 In this period Design submissions & its approval is completed for Trial stations/Sections/Locos should be completed.

2.4 The trial section should involve minimum 3 stations, 2 Block sections & one loco of each type.

3 Project Milestone-II

3.1 Project Milestone-II shall occur on the date falling on the 250th (two hundred fifty) day from the Appointed Date (the “Project Milestone-II”).

3.2 Prior to the occurrence of Project Milestone-II, the Contractor shall have continued with construction of the Railway Project and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 30% (thirty per cent) of the Contract Price.

3.3 Works should be completed over 20 stations covering 19 Block sections & 10 nos of Loco.

4 Project Milestone-III

4.1 Project Milestone-III shall occur on the date falling on the 350th (Three hundred fifty)] day from the Appointed Date (the “Project Milestone-III”).

4.2 Prior to the occurrence of Project Milestone-III, the Contractor shall have continued with construction of the Railway Project and submitted to the Authority duly and validly

prepared Stage Payment Statements for an amount not less than 70% (seventy per cent) of the Contract Price.

4.3 Complete works should be completed covering 40 Block sections/41 Stations & 60 Loco.

5 Project Milestone-IV

5.1 Project Milestone-IV shall occur on the date falling on the 500th (five hundredth)] day from the Appointed Date (the “Project Milestone-IV”).

5.2 Prior to the occurrence of Project Milestone-IV, the Contractor shall have continued with construction of the Railway Project and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 85% (Eighty five per cent) of the Contract Price.

5.3 Complete works should be completed covering 58 Block sections/59 Stations & 87 Locos

6 Extension of time

Upon extension of any or all of the aforesaid Project Milestones or the Scheduled Completion Date, as the case may be, under and in accordance with the provisions of this Agreement, the Project Completion Schedule shall be deemed to have been amended accordingly.

2. PROJECT OBJECTIVES:

2.1 Need for providing ATP

Assets used in railway applications are required to be more and more reliable and safe. The use of computer-based train protection systems is nowadays widespread, as it has been proven to be the most effective, if not the only practicable way to pursue such hard requirements.

Traditionally, train operations in Indian Railways have relied on the train drivers/loco pilots reacting to indications displayed to them by line-side

semaphore or colour light signals. During the 168 years of the train operations on Indian Railways, drivers' failures to appropriately respond to the line side signals aspects have led to a number of accidents, some causing very huge loss of life and property.

A majority of train accidents caused by Signal Passing at Danger (SPAD) are attributed to the human error (Loco pilots). Momentary loss of concentration, lack of alertness, assumption of signal aspect, judgement error and overconfidence of loco pilots are among the common reason for occurrence of SPAD. Indian Railways reports on average of 50 cases of SPAD each year (based on the data from 2016 to Mar 2021). Such SPAD cases can create highly unsafe condition and may lead to highly unsafe conditions and collisions.

In response to the continuing need to reduce risks arising out of SPAD, Breach of block Rules and over speeding, an ATP systems have been envisaged.

2.2 Ensuring Safety in Train Operation

KAVACH, the Indian ATP system continuously monitor actual train speed and enforce adherence to a commanded speed pattern in case the loco pilots fail to do so. This commanded speed pattern or allowable speed profile is based on the information received from the wayside signalling subsystem. In case of an erroneous or late intervention by the loco pilot, who interacts with the system by a Driver Machine Interface (DMI), the on-board control system automatically commands the braking procedure, directly acting on train-borne apparels via a specific interface, namely the Brake Interface Unit (BIU).



For various reasons, although mainly because of track geometry (curvature, etc.), it is necessary to limit the speed at which trains may travel over certain sections of the railway. These places are subject to what are termed 'Permanent Speed Restrictions' (PSRs). Non-compliance to the designated PSR in the section or yard by loco pilots can often result in derailment, damage to rolling stock or unacceptable discomfort to passengers.

KAVACH has been developed to enforce speed limits, including permanent speed restrictions. KAVACH initiates an intervention through warning message to Loco pilots if over speeding is detected. If the driver fails to react in the stipulated time, braking is initiated to bring the speed within allowable limits. Driving is still manual but speed limits are always enforced.

2.3 Improving Train Running Performance

In Northern part of the country, a large number of trains are affected every year during foggy weather in winter months. Poor visibility of signal aspect to loco pilots forces Loco pilots to drive the train at very low speeds even when line clear is granted and signal aspect is Proceed. Such slow speeds results in congestion along the route, train bunching and loss of capacity on the network.

KAVACH displays the aspect of signal ahead on the Driver Machine Interface Unit installed in the loco pilot's cab and conveys the signal indication even when the signal visibility becomes impaired due to foggy weather. The Movement authority monitored by KAVACH controls the safe distance for which the Loco pilots can run the train based on signalling information. This enable Loco Pilots to drive trains even during heavy fog. Loco Pilot can run the KAVACH equipped train confidently.

The delays in clearing the section can be reduced and punctuality performance of trains can be improved through installation of KAVACH system in fog prone regions of Indian Railways.

2.4 Supportive Objectives

The loco pilots suffer from tremendous stress at both personal and organizational level. This tremendous pressure over a long period of time reduces their cognitive capabilities including level of alertness. KAVACH is an additional aid to loco pilots which help them control the train when they are notable to take prompt action and respond in stipulated time. One additional feature of KAVACH which is an assistance to Loco pilots is the Automatic Whistling at Level Crossing Gates.

The Drivers of approaching trains should whistle continuously from the time they pass whistle boards to the time they cross the level crossing. This puts additional load on LP and ALP to continuously give whistle when approaching Level crossing gates.

KAVACH has an in-built feature in which automatic whistling is activated on passing the RFID tag installed on the track and demarcated for this purpose. When the KAVACH equipped trains passed over the gatetag (in KAVACH equipped section) on approach of a level crossing gate, continuous/intermittent whistling is activated till the train crosses the level crossing.

2.5 Speed requirements (SEM para):

As per Para 7.8.9 of SEM, Chapter 7 (Essentials of Signaling), for speeds of 160 Kmph it is essential to have an ATP system. This is due to the fact that at higher speeds it becomes difficult for the loco Pilot to continuously concentrate on line side signal aspects. As such one of the objectives of project KAVACH is as an enabler to run trains at 160 Kmph.

3. OVERVIEW OF THE SECTION:

3.1 Route details:

The TCAS Line side Equipment has to be provided in the various Yards and Block sections and to be interfaced with the Signalling of the Station.

For the section under consideration i.e. NAD-MTJ, the Site includes the following signaling infrastructure: All involved stations are in double distant color light territory with Std-IIIR.UFSBI Block panel (with HSSDAC/SSDAC) is provided for block working. Various safety and capacity enhancement works are going on in progress in the section, therefore present infrastructure may change. This should not be construed as change in scope. The section falls under 25KVA electrified area and is getting converted into 2x25KVA electrified area. The details of the Various Yards: Station Name, Station Code, Chainage, Standard of Signalling, Type of Interlocking (EI, RRI, PI), Number of Lines and No. of Routes, Junction or not etc. which will require interface with TCAS are detailed in the table below:

Table 3.1

Sl. No.	Station Code	Station Name	Central Line (Km No.)	Type of Interlocking	Make of Interlocking	No. of Routes	NO. of Lines	Junction or Not
1	NAD	Nagda Jn.	695.970	RTM Division, Western Railway				
2	RLK	Rohalkhurd	706.282	EI (Metal To Carbon)	Ansaldo/hithachi	27	4	-
3	MEP	Mehidpur Road	712.825	CPI (Metal To Metal)	Siemens	36	4	-
4	LNR	Luni Richha	723.343	EI (Metal To Carbon)	Ansaldo/hithachi	28	3	-
5	VMA	Vikramgarh Alot	735.735	CPI (Metal To Metal)	Siemens	26	4	-
6	THUR	Thuria	744.221	CPI (Metal To Metal)	Siemens	32	4	-
7	TLZ	Talavali	753.884	CPI (Metal To Metal)	ABB	08	2	-
8	CMU	Chau Mahla	758.307	CPI (Metal To Metal)	Siemens	36	4	-
9	NKH	Nathu Kheri	768.083	CPI (Metal To Metal)	Siemens	03	2	-
10	SVA	Suwasra	773.683	CPI (Metal To Metal)	Siemens	32	4	-
11	SGZ	Shamgarh	787.385	CPI (Metal To Metal)	Siemens	94	6	-
12	GOH	Garoth	797.934	CPI (Metal To Metal)	ABB	29	4	-
13	KRLS	Kurlasi	807.921	CPI (Metal To Metal)	Siemens	31	4	-
14	BWM	Bhawani	820.563	CPI (Metal To Metal)	Siemens	32	4	-

		Mandi						
15	DKRA	DhuanKheri	830.762	CPI (Metal To Metal)	Siemens	27	4	-
16	JHW	Jhalawar Road	837.036	CPI (Metal To Metal)	Siemens	27	4	-
17	RMA	Ramganj Mandi	848.624	CPI (Metal To Metal)	Siemens	97	5	Y
18	MKX	Morak	858.693	CPI (Metal To Metal)	Siemens	59	6	-
19	KIW	Kanwalpura	864.484	CPI (Metal To Metal)	Siemens	16	3	-
20	DARA	DARA	873.365	CPI (Metal To Metal)	Siemens	41	4	-
21	RDT	Ravtha Road	886.114	CPI (Metal To Metal)	Siemens	45	4	-
22	ALNI	Alniya	898.204	CPI (Metal To Metal)	Siemens	25	4	-
23	DDV	Dadhdevi	904.941	CPI (Metal To Metal)	Siemens	36	8	-
24	DKNT	Dakaniya Talav	911.643	CPI (Metal To Carbon)	British type	04	2	-
25	KOTA	Kota Jn.	920.950	EI (Metal To Carbon)	Kyosan (british)	496	8	Y
26	GQL	Gurla	926.513	CPI (Metal To Metal)	Siemens	95	6	Y
27	KPTN	Keshorai Patan	934.352	CPI (Metal To Metal)	Siemens	45	6	-
28	ARE	Arnetha	645.352	CPI (Metal To Metal)	Siemens	31	3	-
29	KPZ	Kapren	954.404	CPI (Metal To Metal)	Siemens	38	4	-
30	GKB	Ghat ka Varana	964.542	CPI (Metal To Metal)	Siemens	27	3	-
31	LBN	Laban	973.901	CPI (Metal To Metal)	Siemens	34	4	-
32	LKE	Lakheri	981.542	CPI (Metal To Metal)	Siemens	74	8	-
33	IDG	Indragarh Sumerganj Mandi	992.493	CPI (Metal To Metal)	Siemens	25	4	-
34	AMLI	Amli	1005.423	CPI (Metal To Metal)	Siemens	26	4	-
35	RWJ	Rawanjna Dungar	1013.174	CPI (Metal To Metal)	Siemens	28	4	-
36	KTA	Kushtala	1021.461	CPI (Metal To Metal)	ABB	25	4	-
37	SWM	Sawai Madhopur Jn	1028.713	EI (Metal to Caron)	Ansaldo/hithachi (british)	178	6	Y
38	RNT	Ranthambh or	1038.745	CPI (Metal To Metal)	Siemens	26	4	-
39	MXL	Makholi	1047.920	CPI (Metal To Metal)	ABB	27	4	-
40	MLZ	Malarna	1058.765	EI (Metal To Carbon)	Ansaldo/	40	4	-

					hithachi			
41	NMD	Nimoda	1065.821	EI (Metal To Carbon)	Ansaldo/ hithachi	28	3	-
42	NNW	Narayanpur Tatwara	1075.483	EI (Metal To Carbon)	Ansaldo/ hithachi	27	3	-
43	LRU	Lalpur Umri	1086.022	EI (Metal To Carbon)	Ansaldo/ hithachi	25	4	-
44	GGC	Gangapur City	1092.320	CPI (Metal To Metal)	ABB	103	4	Y
45	COO	Chhoti Odai	1105.084	CPI (Metal To Metal)	Siemens	38	4	-
46	PDZ	Piloda	1112.981	CPI (Metal To Metal)	Siemens	33	4	-
47	SMBJ	Shri Mahabirji	1126.531	CPI (Metal To Metal)	Siemens	30	4	-
48	HAN	Hindaun City	1136.633	CPI (Metal To Metal)	Siemens	40	4	-
49	FSP	Fateh Singhpura	1149.853	CPI (Metal To Metal)	Siemens	22	3	-
50	DY	Dumariya	1160.491	CPI (Metal To Metal)	Siemens	26	4	-
51	BXN	Bayana Jn.	1169.540	CPI (Metal To Metal)	ABB	91	7	Y
52	KEV	Kela Devi	1181.484	CPI (Metal To Metal)	Siemens	32	4	-
53	PNGR	Pingora	1190.402	CPI (Metal To Metal)	Siemens	21	3	-
54	SWAR	Sewar	1201.711	CPI (Metal To Metal)	Siemens	25	4	-
55	BTE	Bharatpur Jn.	1211.392	CPI (Metal To Metal)	Siemens	166	10	Y
56	DUM	Dhaurmui Jaghina	1219.733	EI (Metal To Carbon)	Ansaldo/ hitachi/ british	30	4	-
57	JJA	Jajjanpatti	1227.644	CPI (Metal To Metal)	Siemens	24	4	-
58	MSRP	Murhesi Rampur	1236.042	CPI (Metal To Metal)	Siemens	29	4	-
59	MTJ	Mathura Jn.	1244.950	AGC Division, North Central Railway				

EI- Electronic Interlocking, CPI- Central Panel Interlocking, IBH- Intermediate Block Hut

NOTE- Work of Replacement of PI with EI (*Siemens (MLK-II EI) is under progress at Malarna, Dumariya, Kanwalpura, Nathukheri & Mehidpur Road and Kyosan EI work is under progress at Keshorai Patan.

3.2 Other Signalling details:

3.2.1. All stations are equipped with :

- i. LED light Multi Aspect Colour Light Signalling,
- ii. Electrical/Electronic Interlocking with centralised operation of points and signals interlocked to Standard III R,
- iii. All running lines are track circuited
- iv. Double Distant Signal.
- v. The section comprises of Double line.
- vi. System of block working is Absolute Block,
- vii. All block sections are provided with Block Panel with UFSBI and Block proving by Axle counter for block working.

3.2.2 Telecommunications

- i. The section has been provided with optical fibre communication system for control and other communications and 6 Quad cable for block and emergency communication.
- ii. 24 fibre Optical fibre cable is owned and maintained by Railtel. Only four fibres are dedicated for Railway working.
- iii. 6 Quad cable is fully owned by Railways and is used for Block working, Emergency Control Communication Circuits and Gate Telephones.
- iv. All Block Stations on the route have been provided with Railway and BSNL Telephones and high power 25W VHF sets for communication with Guard, Driver and other Railway officials.
- v. Walkie-Talkie sets (5Watt VHF sets) have been provided to Loco Pilots and Guards of all Mail/Express and Goods Trains.
- vi. Portable control Telephones have been provided to Loco Pilots and Guards of all Passenger and Goods Trains for emergency communication.
- vii. Railway Telephone Network consists of Electronic & ISDN Exchanges for administrative communication requirements.

3.2.3 Requirements of Signalling and Telecommunication for 160Kmph

Important Signalling and Telecommunication features required for running of 160Kmph trains are-

3.2.3.1 Minimum –

- Provision of Clamp type locks along with Thick Web Switch (TWS) in facing direction points.
- Provision of Panel Interlocking /Electronic Interlocking system
- Provision of 2nd distant or Automatic Signalling system.
- Provision of Block Proving by Axle counter or Automatic Signalling..
- Minimization of LC by provision of ROB/RUB, interlocking and closing of LC.

- Provision of Train Protection and warning system (TPWS)

3.2.3.2 Recommended –

- Reliable train Radio communication between driver & guard and station & other staff i.e. LTE based Mobile Train Radio Communication (MTRC) system with OFC backbone .

3.2.4 Details of Present Infrastructure:

Other than the Station Yard, the TCAS is required to interface with the Signaling Installation in various Block section. The details of type of Block Signaling in the section under consideration are described below.

Absolute Block Signalling: 57

Block Sections with IB/INTERLOCKED LC GATE : 77

Automatic Block Signaling: NIL .

This will require interfacing of the Block Section Signals with TCAS, with the help of RIUs or LC / IB TCAS units placed in LC/IB Relay Huts. The details of the various IBS huts along with the Station details in between which they are placed are given in the table below.

There are in all 57 Stations with 58 number of Block sections having 40 IBS in the Block sections as detailed below:

Table 3.2

S. No.	Block Section	Chainage	IBH No
1	NAD-RLK	701.12	IBH-1
2	MEP-LNR	717.99	IBH-10
3	LNR-VMA	729.15	IBH-17
4	VMA-THUR	739.48	IBH-23
5	THUR-TLZ	748.38	IBH-27
6	CMU-NKH	764.25	IBH-35
7	SVA-SGZ	780.47	IBH- HNU
8	SGZ-GOH	793.4	IBH-48
9	GOH-KRLS	804.1	IBH-55
10	KRLS-BWM	813.7	IBH-61

11	BWM-DKRA	825.63	IBH-69
12	JHW-RMA	844	IBH-78
13	RMA-MKX	853.62	RMA-MKX
14	KIW-DARA	868.44	KIW-DARA
15	DARA-RDT	880.26	IBH-95
16	RDT-ALNI	892.15	DANI KASAR
17	KPTN-ARE	939.2	IBH-119
18	ARE-KPZ	949.38 (DN) 950.21 (UP)	IBH-125
19	KPZ-GKB	960.12	IBH-131
20	GKB-LBN	968.64	IBH LBN
21	LKE-IDG	986.88	IBH LKE
22	IDG-AMLI	999.1	IBH-140
23	RWJ-KTA	1017.3	IBH RWJ
24	RNT-MXL	1043.32	IBH-159
25	MXL-MLZ	1054.28	IBH MXL
26	NMD-NNW	1071.42	IBH-171
27	NNW-LRU	1080.35	IBH-173
28	GGC-COO	1096.28	IBH-180
29	PDZ-SMBJ	1119.18	IBH-192
30	SMBJ-HAN	1132.35	IBH-198
31	HAN-FSP	1144.81	IBH-DNHK
32	FSP-DY	1154.22	IBH-211
33	DY-BXN	1164.2	IBH-216
34	BXN-KEV	1176.4	IBH-224
35	KEV-PNGR	1186.2	IBH-229
36	PNGR-SWAR	1195.7	IBH-JCU
37	SWAR-BTE	1207.01	IBH-242
38	BTE-DUM	1216.02	IBH-247
39	JJA-MSRP	1231.84	IBH-258
40	MSRP-MTJ	1240	IBH-265

3.3 Level Crossing Gates: The section has a number of manned Level Crossing Gates which are both Interlocked and Non – Interlocked. In case of Interlocked Level Crossing Gate the same will have to be interfaced with the ATP system by either with the LC TCAS or with the help of RIU to the nearest station.

Also, if required, in case of both Interlocked and Non Interlocked gates the auto whistling feature of the TCAS needs to be activated before the LC gate.

The details of the Level Crossing Gates on the section viz Block section, LC number, Chainage, Classification of LC, TVU of the LC gate and if Interlocked or not are given in the table below. However, in this section all the LC gates are in automatic signaling territory.

Table 3.3

S No.	Block Section	LC No.	Chainage	LC Classification	TVUs	Interlocked or Not
1	NAD-RLK	3	0703/12-14	SPL	191766	Interlocked
2	RLK-MEP	4	0707/04-06	B1	48672	Interlocked
3	MEP-LNR	8	0714/08-10	SPL	148238	Interlocked
4	MEP-LNR	10	0717/30-0718/02	C	4850	Non-Interlocked
5	MEP-LNR	11	0718/24-26	C	1067	Non-Interlocked
6	MEP-LNR	12	0720/12-14	C	6432	Non-Interlocked
7	LNR-VMA	14	0724/16-18	C	23030	Non-Interlocked
8	LNR-VMA	17	0729/04-06	C	2328	Non-Interlocked
9	LNR-VMA	20	0734/12-14	SPL	301350	Interlocked
10	VMA-THUR	21	0736/30-32	SPL	194702	Interlocked
11	VMA-THUR	23	0739/16-18	C	4738	Non-Interlocked
12	VMA-THUR	24	0741/18-20	C	7534	Non-Interlocked
13	THUR Yard	25	0743/20-22	C	10129	Interlocked
14	THUR-TLZ	28DN	0749/28 -0750/02	C	15214	Non-Interlocked
15	THUR-TLZ	28UP	0749/29-0750/01	C	15001	Non-Interlocked
16	TLZ-CMU	30	0754/12-14	C	10244	Non-Interlocked
17	CMU Yard	32	0757/22-24	SPL	218019	Non-Interlocked
18	CMU-NKH	35	0764/06-08	SPL	205092	Interlocked
19	NKH-SVA	38	0769/18-20	C	8314	Non-Interlocked
20	NKH-SVA	40	0772/20-22	SPL	161616	Interlocked
21	SVA-HNU	43	0779/02-04	C	7357	Non-Interlocked
22	SGZ Yard	46	0786/10-12	SPL	324992	Interlocked
23	GOH-KRLS	53	0799/24-26	SPL	187032	Interlocked
24	KRLS Yard	58	0808/16-18	C	6094	Interlocked
25	KRLS-BWM	60	0811/10-12	C	5504	Non-Interlocked
26	KRLS-BWM	61	0813/04-06	C	5186	Non-Interlocked
27	KRLS-BWM	62	0815/06-08	C	676	Non-Interlocked
28	BWM Yard	64X	0819/19-21	SPL	263728	Interlocked
29	BWM-DKRA	65	0821/19-21	SPL	332204	Interlocked
30	BWM-DKRA	69	0825/22-24	C	2585	Non-Interlocked
31	BWM-DKRA	70	0827/10-12	C	6695	Non-Interlocked
32	DKRA Yard	72	0831/18-20	B1	34093	Interlocked

33	JHW Yard	75	0836/18-20	SPL	262444	Interlocked
34	JHW-RMA	77	0841/06-08	C	4532	Non-Interlocked
35	JHW-RMA	80	0845/22-24	C	11122	Non-Interlocked
36	RMA-MKX	84	0851/28-852/2	C	1826	Non-Interlocked
37	RMA-MKX	85	0854/04-06	C	1915	Non-Interlocked
38	RMA-MKX	86	0856/18-20	C	2678	Non-Interlocked
39	MKX-KIW	88	0862/10-12	C	1926	Non-Interlocked
40	DARA-RDT	93	0876/16-18	C	27962	Non-Interlocked
41	DARA-RDT	94	0879/26-28	C	2152	Non-Interlocked
42	RDT-ALNI	97	0887/10-12	C	1635	Non-Interlocked
43	RDT-ALNI	101	0895/02-04	C	2245	Non-Interlocked
44	ALNI Yard	102	0897/22-24	C	7960	Interlocked
45	KOTA -GQL	110	0924/28-30	C	462	Non-Interlocked
46	GQL-KPTN	112	0928/06-08	C	747	Non-Interlocked
47	GQL Yard	113	0929/06-08	B1	29255	Interlocked
48	GQL-KPTN	114	0930/28-30	C	658	Non-Interlocked
49	GQL-KPTN	115	0932/10-12	C	539	Non-Interlocked
50	KPTN Yard	116	0933/08-10	SPL	177199	Interlocked
51	KPTN-ARE	117	0935/12-14	C	11589	Interlocked
52	KPTN-ARE	118	0937/02-04	SPL	47961	Interlocked
53	KPTN-ARE	119	0939/18-20	C	5372	Interlocked
54	KPTN-ARE	120	0942/18-20	SPL	93522	Interlocked
55	KPTN-ARE	122	0944/06-08	C	4104	Non-Interlocked
56	ARE Yard	123	0945/26-28	C	18751	Interlocked
57	ARE-KPZ	124	0947/25-27	A	17025	Interlocked
58	ARE-KPZ	125	0949/25-27	SPL	67260	Interlocked
59	ARE-KPZ	126	0951/10-12	A	41693	Interlocked
60	ARE-KPZ	127	0953/06-08	C	19078	Non-Interlocked
61	KPZ-GKB	128	0956/00-02	A	40180	Interlocked
62	KPZ-GKB	131	0960/12-14	C	1508	Non-Interlocked
63	GKB Yard	134	0963/29-0964/01	B1	31331	Interlocked
64	GKB-LBN	135	0966/02-04	B1	32883	Interlocked
65	GKB-LBN	136U	0967/14-16	C	4543	Non-Interlocked
66	LBN Yard	136TF	0973/14-16	B1	29576	Interlocked

67	LBN-LKE	136W	0976/28-0977/02	SPL	385988	Interlocked
68	LKE-IDG	137	0990/25-27	SPL	69463	Interlocked
69	AMLI Yard	141X	1004/28- 1005/2	B2	22944	Interlocked
70	KTA Yard	146	1020/24-26	C	9175	Interlocked
71	KTA-SWM	148	1024/10-12	C	1780	Non-Interlocked
72	KTA-SWM	149	1025/08-10	C	6919	Non-Interlocked
73	RNT Yard	156	1038/02-04	C	530	Non-Interlocked
74	RNT-MXL	159	1043/22-24	C	16303	Non-Interlocked
75	RNT-MXL	161	1047/02-04	SPL	87367	Interlocked
76	MXL-MLZ	163	1050/12-14	B1	52375	Interlocked
77	MXL-MLZ	164	1051/26-28	C	4041	Non-Interlocked
78	NNW Yard	172	1075/02-04	SPL	86289	Interlocked
79	NNW-LRU	173	1080/10-12	C	19673	Interlocked
80	NNW-LRU	174	1083/26-28	C	5679	Non-Interlocked
81	LRU Yard	175	1086/12-14	C	14036	Interlocked
82	LRU-GGC	176	1087/06-08	C	1111	Non-Interlocked
83	LRU-GGC	178	1090/06-08	C	6374	Non-Interlocked
84	GGC Yard	179	1091/10-12	SPL	175337	Interlocked
85	GGC-COO	179X	1095/00-02	SPL	383741	Interlocked
86	COO Yard	184	1104/18-20	C	1596	Interlocked
87	COO Yard	185	1105/22-24	C	1420	Interlocked
88	PDZ Yard	188	1112/18-20	C	38021	Interlocked
89	PDZ Yard	189	1114/10-12	C	9027	Interlocked
90	PDZ-SMBJ	190	1116/10-12	C	3027	Non-Interlocked
91	PDZ-SMBJ	191	1118/14-16	C	2891	Non-Interlocked
92	PDZ-SMBJ	192	1119/18-20	SPL	97513	Interlocked
93	SMBJ-HAN	196	1127/30-32	C	3748	Non-Interlocked
94	SMBJ-HAN	198	1132/08-10	SPL	485876	Interlocked

95	SMBJ-HAN	199	1133/28-30	SPL	354463	Interlocked
96	SMBJ-HAN	200	1135/10-12	SPL	701967	Interlocked
97	HAN Yard	202	1137/18-20	SPL	743981	Interlocked
98	HAN-FSP	205	1144/10-12	C	6818	Non-Interlocked
99	HAN-FSP	206	1146/26-28	SPL	65364	Interlocked
100	HAN-FSP	208	1149/00-02	SPL	154422	Interlocked
101	FSP-DY	211	1153/28-30	SPL	148754	Interlocked
102	DY Yard	213	1160/00-02	C	853	Interlocked
103	DY-BXN	214	1161/18-20	SPL	694846	Interlocked
104	DY-BXN	216	1164/00-02	SPL	90827	Interlocked
105	DY-BXN	217	1166/02-04	SPL	92276	Interlocked
106	DY-BXN	219	1168/06-08	SPL	331278	Interlocked
107	BXN-KEV	224X	1176/26-28	SPL	266179	Interlocked
108	KEV Yard	226	1180/28-30	SPL	97560	Interlocked
109	PNGR Yard	231	1189/24-26	SPL	81168	Interlocked
110	PNGR SWAR	232	1193/02-04	SPL	80535	Interlocked
111	SWAR BTE	239	1203/08-10	Spl	133242	Interlocked
112	SWAR BTE	242	1207/02-04	Spl	52462	Interlocked
113	BTE-DUM	246	1214/10-12	Spl	66732	Interlocked
114	BTE-DUM	248	1217/20-22	C	28186	Non-Interlocked
115	DUM Yard	250	1220/06-08	A	40215	Interlocked
116	JJA Yard	255	1227/12-14	B1	240410	Interlocked
117	JJA-MSRP	257	1229/28-30	C	1031	Non-Interlocked
118	JJA-MSRP	258	1231/26-28	B2	22681	Interlocked
119	JJA-MSRP	260	1233/18-20	B2	21304	Non-Interlocked
120	JJA-MSRP	261	1234/14-16	C	6840	Non-Interlocked
121	MSRP Yard	262	1235/16-18	C	11993	Interlocked
122	MSRP-MTJ	265	1240/17-19	C	17747	Non-Interlocked
123	MSRP-MTJ	267	1242/11-13	C	16828	Non-Interlocked

NOTE: Some of the LC Gates are to be **eliminated**. Parallel design strategy shall be followed for these Level Crossing gates.

3.4 Details of Spare Contacts in Existing Relay rooms

The ATP system “KAVACH” (TCAS) works on top of Existing Signalling system, taking Input from it and utilizing the same for Automatic Train Protection. Presently, in the referred section we have Electronic Interlocking, Panel Interlocking/ Route Relay Interlocking at all the stations from NAD-MTJ and also in the LC Gate/IB section Relay Hut.

There are two possibilities of taking the signalling input from the signalling system. Directly through EI using a SIL 4 protocol converter or by using relay contacts of the concerned relays from PI/EI which are ECRs, NWKRs / RWKRs & TPRs. Presently the OEMs have not developed protocol converters as such the provision of taking inputs from relays is being planned.

However, it is recommended that inputs to be initially planned with Relay based system and in due course migrate to protocol converters as and when they are developed.

The availability of Spare contacts in existing ECRs, NWKRs / RWKRs and the TPRs of the relays in various Relay Rooms of stations, Relay Huts of IB sections and Level crossing gates are enumerated in the table given as Annexure B.

The table also indicates the availability of space for Relays in Relay racks, provision of Relay racks and the TCAS station equipment in these Relay Huts.

NOTE 1: For the relays having no spare contact, the contacts wired for Data loggers shall be spared for TCAS working for opening repeater relays & the contact of repeater shall be proved in Data logger.

NOTE 2: It is preferred to take direct inputs from EI (at Data Level) instead of using relay interfacing for speedy execution as well as to enhance the reliability of the system.

3.5 SERVICE BUILDING DETAILS: At number of locations the availability of Space in Relay Room / Relay Huts / IBS/ LC Gates for the TCAS equipment is not there, a separate additional Service Building of suitable size will be required to be constructed just besides the Existing service building. The tentative locations are indicated in the table below:

Table 3.4

S.NO	STATION NAME	AVAILABILITY OF SPACE FOR		BETWEEN STATIONS
		Relay Rack	STCAS/RIU	
1.	IBS-1	NO	NO	NAD-RLK
2.	LC-3	NO	NO	NAD-RLK
3.	Rohalkhurd	YES	YES	
4.	LC-4	NO	NO	RLK-MEP
5.	3.9K.M	NO	NO	RLK-MEP
6.	Mehidpur	YES	YES	
7.	LC-8	NO	NO	MEP-LNR
8.	IBS-10	NO	NO	MEP-LNR
9.	Luniricha	YES	YES	
10.	LC-14	YES	YES	LNR-VMA
11.	IBS-17	NO	NO	LNR-VMA
12.	LC-20	NO	NO	LNR-VMA
13.	Vikramgarh Alot	YES	YES	
14.	LC-21	NO	NO	VMA-THUR
15.	IBH-23(LC-23 Non I/L	NO	NO	VMA-THUR
16.	Thuria	YES	YES	
17.	IBH-27	NO	NO	THUR-TLZ
18.	LC-28	YES	YES	THUR-TLZ
19.	Talavali	YES	YES	
20.	Chau Mahla	YES	YES	
21.	4.5K.M	NO	NO	CMU-NKH
22.	IBH-35(5.9 KM)	NO	NO	CMU-NKH
23.	Nathukhedi	YES	YES	
24.	LC-40	NO	NO	NKH-SVA
25.	Suwasra	YES	YES	
26.	LC-43	YES	YES	SVA-SGZ
27.	IBS-HNU	YES	YES	SVA-SGZ
28.	Shamgarh	YES	YES	

29.	IBH-48	NO	NO	SGZ-GOH
30.	Garoth	YES	YES	
31.	LC-53	NO	NO	GOH-KRLS
32.	IBH-55(6.17 KM)	NO	NO	GOH-KRLS
33.	7.5KM	NO	NO	GOH-KRLS
34.	Kurlasi	YES	YES	
35.	LC-60	YES	YES	KRLS-BWM
36.	IBH-61	NO	NO	KRLS-BWM
37.	Bhawani Mandi	YES	YES	
38.	LC-65	NO	NO	BWM-DKRA
39.	IBH-69	NO	NO	BWM-DKRA
40.	Dhuankhedi	YES	YES	
41.	Jhalawar Rd	NO	NO	
42.	IBH-79	NO	NO	JHW-RMA
43.	Ramganj Mandi	YES	YES	
44.	IBS(RMA-MKX)	NO	NO	RMA-MKX
45.	Morak	NO	NO	
46.	2.85Km	NO	NO	MKX-KIW
47.	Kanwalpura	YES	YES	
48.	IBH-KIW-DARA	NO	NO	KIW-DARA
49.	4.5KM	NO	NO	KIW-DARA
50.	5.3KM	NO	NO	KIW-DARA
51.	5.7KM	NO	NO	KIW-DARA
52.	6.5KM	NO	NO	KIW-DARA
53.	7.25KM	NO	NO	KIW-DARA
54.	8KM	NO	NO	KIW-DARA
55.	DARA	YES	YES	
56.	IBH-95(6.9 KM)	NO	NO	DARA-RDT
57.	7.25KM	NO	NO	DARA-RDT
58.	Ravtha Rd	YES	YES	
59.	3 KM	NO	NO	RDT-ALNI
60.	IBS(Dhanikasar)	NO	NO	RDT-ALNI
61.	Alaniya	YES	YES	
62.	Dadhdevi	NO	NO	
63.	Dakaniya Talav	YES	YES	
64.	Kota South	NO	NO	
65.	Kota Central	YES	YES	
66.	Kota B	NO	NO	
67.	Kota C	NO	NO	
68.	LC-110	YES	YES	KOTA-GQL
69.	Gurla	YES	YES	

70.	2.75KM	NO	NO	GQL-KPTN
71.	Keshorai Patan	YES	YES	
72.	LC-117	NO	NO	KPTN-ARE
73.	LC-118	NO	NO	KPTN-ARE
74.	IBS-119	NO	NO	KPTN-ARE
75.	LC-120	NO	NO	KPTN-ARE
76.	Arnetha	NO	NO	
77.	LC-124	NO	NO	ARE-KPZ
78.	IBH-125	NO	NO	ARE-KPZ
79.	LC-126	NO	NO	ARE-KPZ
80.	LC-127	YES	YES	ARE-KPZ
81.	Kapren	NO	NO	
82.	LC128	NO	NO	KPZ-GKB
83.	IBS-131	NO	NO	KPZ-GKB
84.	Ghat Ka Varana	YES	YES	
85.	LC-135	NO	NO	GKB-LBN
86.	IBS(LBN)	NO	NO	GKB-LBN
87.	Laban	YES	YES	
88.	LC-136(W)	NO	NO	LBN-LKE
89.	Lakheri	YES	YES	
90.	IBH-LKE	NO	NO	LKE-IDG
91.	LC-137	NO	NO	LKE-IDG
92.	IDG	YES	YES	
93.	IBH-140	NO	NO	IDG-AMLI
94.	AMLI	YES	YES	
95.	6.25	NO	NO	AMLI-RWJ
96.	Rawanjana Dungar	YES	YES	
97.	2.0 K.M	NO	NO	RWJ-KTA
98.	IBS(RWJ)	NO	NO	RWJ-KTA
99.	Kushtala	NO	NO	
100.	LC-148	YES	YES	KTA-SWM
101.	SWM-A	NO	NO	
102.	Sawai Madhopur	NO	NO	
103.	SWM-B	NO	NO	
104.	SWM-D	NO	NO	
105.	SWM+5Km	NO	NO	SWM-RNT
106.	Ranthambore	YES	YES	
107.	IBS-159	NO	NO	RNT-MXL
108.	LC-161	NO	NO	RNT-MXL
109.	Mokholi	YES	YES	
110.	LC-163	NO	NO	MXL-MLZ

111.	IBS(MXL)	NO	NO	MXL-MLZ
112.	Malarna	YES	YES	
113.	3.50 K.M	NO	NO	MLZ-NMD
114.	Nimoda	YES	YES	
115.	IBS-171	NO	NO	NMD-NNW
116.	Narayanpur Tatwara	YES	YES	
117.	IBH (LC-173)	NO	NO	NNW-LRU
118.	Lalpur Umri	YES	YES	
119.	Gangapur City	YES	YES	
120.	LC-179X	NO	NO	GGC-COO
121.	IBS-180	NO	NO	GGC-COO
122.	8.375KM	NO	NO	GGC-COO
123.	Chhoti Odai	YES	YES	
124.	Piloda	NO	NO	
125.	LC-189	NO	NO	PDZ-SMBJ
126.	IBS-192	NO	NO	PDZ-SMBJ
127.	Shri Mahabirji	NO	NO	
128.	IBS-198	NO	NO	SMBJ-HAN
129.	LC-199	NO	NO	SMBJ-HAN
130.	LC-200	NO	NO	SMBJ-HAN
131.	Hindaun City	YES	YES	
132.	IBS(DNHK)	NO	NO	HAN-FSP
133.	LC-206	NO	NO	HAN-FSP
134.	Fatehsingh Pura	NO	NO	
135.	IBH(LC-211)	NO	NO	FSP-DY
136.	Dumariya	YES	YES	
137.	LC-214	NO	NO	DY-BXN
138.	IBS-216	NO	NO	DY-BXN
139.	LC-217	NO	NO	DY-BXN
140.	LC-219	YES	YES	DY-BXN
141.	Bayana	YES	YES	
142.	IBS-224	NO	NO	BXN-KEV
143.	Kela devi	NO	NO	
144.	2.35KM	NO	NO	KEV-PNGR
145.	IBS-229	NO	NO	KEV-PNGR
146.	Pingora	NO	NO	
147.	LC-232	NO	NO	PNGR-SWAR
148.	IBS(JCU)	NO	NO	PNGR-SWAR
149.	Sewar	NO	NO	
150.	LC-239	NO	NO	SWAR-BTE
151.	IBS-242	NO	NO	SWAR-BTE

152.	Bharatpur	YES	YES	
153.	LC-246	NO	NO	BTE-DUM
154.	IBH-247	NO	NO	BTE-DUM
155.	Dhaurmui Jaghina	NO	NO	
156.	Jajanpatti	NO	NO	
157.	IBH-258	NO	NO	JJA-MSRP
158.	Murhesi Rampur	NO	NO	
159.	IBH-265	NO	NO	MSRP-MTJ

3.6 TELECOMMUNICATION DETAILS:

3.6.1 GSM-R based MTRC: NIL

3.6.2 Optical fiber Cable: The section from NAD (Excl) – MTJ (Excl) is equipped with 01 numbers of 24 fiber Optical fibre cable and the signalling circuits between Stations and Intermediate Block Huts are working over 6 Quad Cable.

Commissioning of 2x48 Fibre OFC with route diversity Backbone:

The Optical Fibre Communication System shall be provided for connecting Station KAVACH with RIU and adjacent KAVACH as required for implementation of KAVACH. However, in the offered KAVACH the tenderer shall indicate requirement of fibre(s)/bandwidth on OFC cable so that same can be made available by W.C. Railway, if required for early implementation of KAVACH.

3.6.3 Telephones and VHF Sets: All Block Stations on the route have been provided with Railway & BSNL Telephones along with 25W VHF sets. Also 5 Watt hand held Walkie-Talkie sets have been provided to Loco Pilots and Guards of all Mail / Express and Goods Trains

3.6.4 Exchanges: Railway Telephone Network comprising Electronic Exchanges with ISDN and VOIP features are available for administrative communication requirements.

3.6.5 Communication Towers: The location of Existing Towers, the height of Existing towers and the type of antennas already existing on these towers are indicated in the table below:

All stations are having VHF (25Watt) communication, Control Phone, Dy. Control Phone, TPC Control, Auto/ Railway Phone, landline/fixed wireless phone (FCT) phone, 24-Fibre OFC and 6-Quad Cable for block working is available in the section. VHF communication among Driver, Guard & Station Master and other train running staff is available in entire Nagda-Mathura section of Kota Division. At present 07 stations are having Microwave Tower of height more than 40 Metres, New UHF/LTE etc. Antenna can be mounted on these existing Towers.

Table 3.5

• N/A= Not available

S. No.	Station Name	Height of MW Tower	Longitude (Decimal Degree)	Latitude (Decimal Degree)	Type/ Size of Existing Antenna	Presence of Any Airport, Wireless Stn. Etc.
1.	VikramgarhAlot	100	75.5304	23.1647	03 (Railtel)	N/A
2.	Shamgarh	70	75.6437	24.1924	03 GSM & 01 MW (Airtel), 03 GSM & 01 MW (Idea)	N/A
3.	Bhawani Mandi	80	78.8303	24.4193	03 GSM & 01 MW (Jio)	N/A
4.	Kota Jn.	80	75.8814	25.2191	03 GSM & 01 MW (Jio)	N/A
5.	Gangapur City	60	76.7266	26.4681	03 GSM & 01 MW (Airtel), 03 GSM & 01 MW (Jio)	N/A
6.	Hindaun City	80	77.0313	26.7556	03 GSM & 01 MW (Airtel)	N/A
7.	Bharatpur Jn.	50	77.4865	27.2363	03 GSM & 01 MW (Idea)	N/A

3.6.6 Tunnels

Communication need not be mandatory in tunnels except for those which are on immediate approach (distance corresponding to 30 seconds at highest permissible

speed of any TCAS equipped train at that spot) of a signal. Leaky feeder cable type communication arrangements are to be made available in such tunnel. The details of the tunnels in the section for the purpose are listed in table below:

Table 3.6

S.No	Block Section	Chainage		Length of Tunnel
		From	To	
1	NIL	-	-	-

3.7 Power Supply Details:

While the KVACH (TCAS) is installed at Stations and in IBHs of Block Section, power supply requirement will be there. It is planned to use existing IPS and conventional power supply where ever available. However certain locations may require augmentation of Power supply, addition of DC to DC converters etc. at stations and IBHs/LC Gates. For 220 V AC supply it is planned to use existing AT available. The details of Power supply, Type of equipment, capacity and loading details are given in Table as Annexure C.

3.8 Details of Bridges / ROBs / RUBs /LHS / ROR Bridge

As already discussed in Chapter I, KAVACH project requires laying of OFC cable as well as tower erection. The cable will have to be laid across various Bridges, ROBs, RUBs and Rail Over Rail Bridges. The site has a number of these enroute and they are as listed below:

Table 3.7

Details of Bridges / ROBs / RUBs /LHS / ROR Bridge			
S.NO	Item	Numbers	Details
1.	Important Bridges	25	As in Annexure x
2.	Major Bridges	92	As in Annexure D
3.	Minor Bridges	1167	As in Annexure E
4.	ROBs	35	As in Annexure F
5.	RUBs / LHS	196	As in Annexure G
6.	ROR Bridge	1	As in Annexure H

3.9 The site also includes a no. of “**Transmission lines crossing**” the right of way. The details of the same are given in the table as Annexure I and also it includes a no. of “**Underground power lines**” crossing the right of way. The details of the same are given in the table as Annexure J.

3.10 Electrification Details: Presently the section under consideration is a 25 KV AC Traction system which has TSS, SP and SSP as detailed below:

Table 3.8

A. LOCATION OF TSS					
S.No	Railway	STATE	Name of TSS	Section / Route	Chainage
1	WCR	M.P.	SVA	774/9-11	774/168.25
2	WCR	RAJ	RMA	850/2	849/995.92
3	WCR	RAJ	GQL	926/4-8	926/510.00
4	WCR	RAJ	LKE	983/4-8	985/313.50
5	WCR	RAJ	SWM	1030/19-21	1025/868.075
6	WCR	RAJ	HAN	1137/4-6	1137/62.39
7	WCR	RAJ	BTE	1214/3-5	1214/172.45

Table 3.9

B. LOCATION OF SP					
S.No	Railway	STATE	Name of TSS	Section / Route	Chainage
1	WCR	RAJ	RDT	882/16-18	882/432.00
2	WCR	RAJ	SABD	1175/30- 1176/2A	1176/57.83
3	WCR	U.P.	MSRP	1241/4-6	1241/89.85

Table 3.10

C. LOCATION OF SSP					
S.No	Railway	STATE	Name of TSS	Section / Route	Chainage
1	WCR	RAJ	JHW	838/3-5	838/156.40
2	WCR	RAJ	KIW	863/10-12	863/487.16
3	WCR	RAJ	DARA	873/1-3	873/036.17
4	WCR	RAJ	ALNI	897/10-12	897/20.22
5	WCR	RAJ	ARE	943/17-21	942/615.11
6	WCR	U.P.	JJA	1228/9	1228/287.12

However the work of 2 X 25 KV Electrification, in connection with the works of “MISSION RAFTAR to achieve 160 Km/h” the TSS, SP and SSP new locations are detailed below and are likely to be completed by xx.xx.2023

Table 3.11

D. LOCATION OF TSS for new 2 X25 KV					
S.No	Railway	STATE	Name of TSS	Section / Route	Chainage
1	WCR	RAJ	LKE	983/4-8	985/313.50
2	WCR	RAJ	SWM	Location change	
3	WCR	RAJ	GGC	1090/26	1090/700.00

Table 3.12

E. LOCATION OF SP for new 2 X25 KV					
S.No	Railway	STATE	Name of TSS	Section / Route	Chainage
1	WCR	M.P.	THUR	749/27-750/01	752/632.60
2	WCR	M.P.	KRLS	803/19-21	803/263.00
3	WCR	RAJ	KPZ	955/2-8	951/418.00
4	WCR	RAJ	AMLI	1000/3-5	1002/340.25
5	WCR	RAJ	MLZ	1056/5-7	1062/509.10
6	WCR	RAJ	PDZ	1112/21-25	1116/164.39

Table 3.13

F. LOCATION OF SSP for new 2 X25 KV					
S.No	Railway	STATE	Name of TSS	Section / Route	Chainage
1	WCR	M.P.	MEP	714/9-11	711/938.56
2	WCR	M.P.	LNR	724/13-15	722/104.56
3	WCR	M.P.	VMA	736/8-12	733/717.20
4	WCR	RAJ	CMU	759/29-35	759/70.50
5	WCR	M.P.	SGZ	789/17-19	789/221.85
6	WCR	M.P.	BWM	822/22-24	822/014.65
7	WCR	RAJ	KOTA	918/26-28	918/679.40
8	WCR	RAJ	GKB	963/28-30	961/077.05
9	WCR	RAJ	LBN	976/9-17	972/626.70
10	WCR	RAJ	RWJ	1012/2-6	1021/478.83
11	WCR	RAJ	MXL	1040/8-12	1046/510.085
12	WCR	RAJ	NNW	1074/27-29	1074/934.50

F. LOCATION OF SSP for new 2 X25 KV					
S.No	Railway	STATE	Name of TSS	Section / Route	Chainage
13	WCR	RAJ	SMBJ	1126/35	1126/829.03
14	WCR	RAJ	FSP	1149/6-4	1150/505.70
15	WCR	RAJ	BXN	1164/8-10	1168/924.70
16	WCR	RAJ	PNGR	1196/26-28	1189/826.37

3.11 Details of Permanent Speed Restrictions in NAD-MTJ section:

A number of Permanent speed restrictions are prevailing on Up & Down Line on NAD-MTJ section. The same will be monitored by the KAVACH. The details of these speed restrictions are given in table below:

3.11.1 Details for the Up Line are as follows

Table 3.14

S. No.	Block Section	Chainage (Km)	Speed	Reason	Remarks
1.	Dhaurmui Jaghina-Bharatpur	1213/23 – 1212/15	115	2.25° Curve	
2.	Bharatpur Yard	1212/03 – 1211/25	115	2° Curve	
3.	Bharatpur Yard	BTE1039-C – BAF/29-28	10	Negotiating Sharp Curve, While entering in line No. 6 from MTJ	For all M/E, HST & Goods trains
4.	Bharatpur Yard	BTE1039-C – BAF/29-28	10	Negotiating Sharp Curve, While leaving from line No. 6 to BXN	For all M/E, HST & Goods trains
5.	Bharatpur-Sewar	1210/21 – 1209/15	120	1.85° Curve	
6.	Bayana-Bandh Baretha (SL)	BXN/1157 – 02/06		Inadequate cant on 3° Curve	
7.	Chhoti Odai-Gangapur City	1093/1 – 1092/27	90	1 in 12 turnout taking off from inside of reverse Curve of 1° without transition	

				length and cant	
8.	Lalpur Umri-Narayanpur Tatwara	1085/21 – 1085/01	90 95 for HST only	Inadequate cant on 3° Curve	
9.	Malarna-Mokholi	1055/41 – 1055/09	105 M/Ex 110 for HST only	2.5° Curve	
10.	Malarna-Mokholi	1054/27 – 1054/17	45	For loaded Goods train with CC+8+2T & CC+6+2T due to bridge No. 343	
11.	Mokholi-Ranthambhor	1041/03 – 1040/17	125	1.75° Curve	
12.	Sawaimadhopur Yard	1032/03 – 1031/21	125	1 in 12 turnout taking off from outside of 1° Curve	
13.	SWM-Devpura (SL)	1/1 – 1/07	30	1:12 Turn out taking off from inside of 5.20° Curve	Speed matrix issued vide HQ letter No. W.HQ.311.R.CRS.GE N.CORR dt 29.04.11
14.	Sawaimadhopur-Kushtala	1027/19 – 1027/17	45	For loaded Goods train with CC+8+2T & CC+6+2T due to bridge No. 322	
15.	Rawanjna Dungar-Amli	1012/19 – 1011/07	125	1 & 1.75° Curve	
16.	Rawanjna Dungar-Amli-Indargarh	1006/27 – 1002/25	120	2° Curve	
17.	Indargarh-Lakheri	987/23 – 982/33	120	2° Curve	
18.	Lakheri Yard	982/33 – 981/27	100 (M/Exp.) 110 (HST)	Inadequate transition length on 2° Curve due to points & crossings	
19.	Lakheri-Laban	979/25 – 979/11	45	For loaded Goods train with CC+8+2T & CC+6+2T due to bridge No. 250	
20.	Gurla-Kota	923/11 – 922/27	45	For loaded Goods train with CC+8+2T & CC+6+2T due to bridge No. 211	
21.	Kota Yard	921/03 – 921/01	50	FOB column of MTJ end. Infringing SOD	Length of PSR reduced on 18.12.14
22.	Kota South Cabin-Dakaniya Talav	918/11 – 917/15	75	Series of 1 in 12 & 1 in 8.5 turnouts	

				taking off from inside & outside of 2° & 2.5° Curve	
23.	Ravtha Road-Dara	874/47 – 874/07	90 100 For HST only	3.1° Curve	
24.	Dara-Kanwalpura	873/09 – 867/11	75 for goods train comprise with 4-wheeler BVZC 80 for Pass & Goods only 85 for HST only	Inadequate cant on 4 to 4.5° Curve	
25.	Nathukheri-Chaumehla	759/03 – 758/29	105 (M/E) 105 (HST)	1 in 12 turnout taking off from outside of 1.5° Curve	
26.	Mehidpur-Rohalkhurd	709/29 – 709/11	120	2° Curve	
27.	Rohalkhurd-Nagda	697/15 – 697/02	95	3° Curve	

3.11.2 Details of PSRs for the Down Line are listed below:

Table 3.15

S. No.	Block Section	Chainage (Km)	Speed	Reason	Remarks
1.	Nagda-Rohalkhurd	697/2 – 697/16	95	3° Curve	RTM Divn
2.	Rohalkhurd-mehidpur	709/12 – 709/30	120	2° Curve	
3.	Lunirichha-Vikramgarh Alot	732/02 – 732/34	120	2° Curve	
4.	Thuria-talavali	747/02 – 747/20	120	2° Curve	
5.	Thuria-Talavali	751/08 – 752/26	120	2° Curve	
6.	Chaumehla-Nathukheri	759/12 – 760/04	100 105 for HST only	Inadequate can 3° Curve	
7.	Hanspura-Shamgarh	781/04 – 781/24	120	2° Curve	
8.	Garoth-Kurlasi	803/26 – 804/14	120	2° Curve	
9.	Kurlasi-Bhawani Mandi	811/02 – 811/24	120	2° Curve	
10.	Kanwalpura-Dara	867/02 – 873/10	75 for Goods train	Inadequate cant on 4 to 4.5° Curve	

			comprise with 4-wheeler BVZC		
			80 for Pass. & goods only		
			85 for HST only		
			90		
11.	Dara-Ravtha Road	874/08 – 874/48	100 for HST only	3° Curve	
12.	Ravtha Road-Alaniya	896/06 – 897/20	120	2° Curve	
13.	Dadhdevi-Dakaniya Talav- Kota South Cabin	910/08 – 915/10	120	2° Curve	
14.	Dakaniya Talav Kota South Cabin	917/16 – 918/12	75	Series of 1 in 12 & 1 in 8.5 turnouts taking off from inside and outside of 2 & 2.25° Curve	
15.	Kota Yard	921/02 – 921/04	50	FOB Column of MTJ end. infringing SOD	Length of PSR reduced by lowering water hydrants on date 18.12.14
16.	Lakheri Yard	981/32 – 982/34	105 (M/Exp) 110 (HST)	2° Curve	
17.	Lakheri-Indargarh	982/34 – 987/22	120	2° Curve	
18.	Indargarh-Amli-Rawanjna Dungar	1002/26 – 1006/28	120	2° Curve	
19.	Amli-Rawanjan Dungar	1011/08 – 1012/20	125	1 & 1.75° Curve	
20.	Makholi-Malarna	1055/10 – 1055/40	100 (M/Exp) 105 For HST only	3° Curve	
21.	Lalpur Umri-Narayanpur Tatwara	1085/02-22	95 (M/Exp) 100 For HST only	3° Curve	
22.	SWM-Devpura (S/L)	1/1 – 1/07	1:12 turnout taking off from inside of 5.20° Curve		
23.	Gangapur City-Chhoti Odai	1092/24 – 1093/02	90	1 in 12 turnout taking off from	

				inside of reverse Curve of 1° without transition length and cant	
24.	Bayana-Bandh Baretha (SL)	BXN/1169-02/06	100	Inadequate cant on 3° Curve	Agra Divn (NCR)
25.	Sewar-Bharatpur	1209/14 – 1210/24	120	1.85° Curve	
26.	Bharatpur Yard	1210/33 – BAF/14	10	Negotiating Sharp Curve, While entering in line No. 6 from BXN	For all M/E, HST & Goods trains
27.	Bharatpur Yard	BAF/28 – BTE1039-C	10	Negotiating Sharp Curve, While depart from line No. 6 to MTJ	For all M/E, HST & Goods trains
28.	Bharatpur Yard	1211/22 – 1212/04	115	2° Curve	
29.	Bharatpur-Dhaumui Jaghina	1212/16 – 1213/22	115	2.25° Curve	

3.12 Details of The Locos on WCR:

The On Board Loco TCAS Equipment shall be fitted on selected Locomotives in nominated Loco sheds of Indian Railway along with UHF radio system for communication between On Board TCAS equipment in Loco & Station TCAS equipment all along the route.

The tentative holding of Locomotives with WCR is appended here under:

Table 3.16

Type of Loco	MPS in Kmph	No. Of Locomotives					
		ELS/TKD	DLS/ET	ELS/ET	ELS/NKJ	DLS/NKJ	TOTAL
WAP-4	140	--	10	65	--	--	75
WAP-7	140	95	--	23	--	--	118
WAG-5	80	--	10	--	32	247	289
WAG-7	105	--	--	--	76	--	76
WAG-9	100	135	--	115	40	--	290
WAM-4	110	--	--	--	--	--	-

WDG-3A	105	--	--	--	--	--	-
WDM-3A	120	--	--	--	--	--	-
WDM-3D	120	--	--	--	--	--	-
WDG-4	105	--	--	--	--	--	-
WDG-4D	105	--	--	--	--	--	-
WDP-4D	135	--	--	--	--	--	-
TOTAL		230	20	203	148	247	848

The various type of Locos based on type of braking i.e Conventional (IRAB), E-70 and CCB will require to have different type of BIUs. The tentative percentages of Locos of different type of Locomotives on WCR are also detailed below:

Table 3.17

S.No	Type of Loco Motive	Approximate Percentage
1	Conventional (IRAB)	15 %
2	E – 70	40 – 45 %
3	CCB	35 – 40 %

3.13 Plans and Drawings – SIPs, Gradient details etc.

Existing Signal Interlocking Plan (SIP) of all stations and Block sections in NAD-MTJ Section of Kota Division of West Central Railway are attached in Annexure-M

The Existing Gradient details of the section from Nagda to Mathura are attached as Annexure – L.

The Standard drawings of various Locos showing the location where Loco TCAS and DMI are to be installed are provided at RDSO web site.

4. Factors For Project Planning

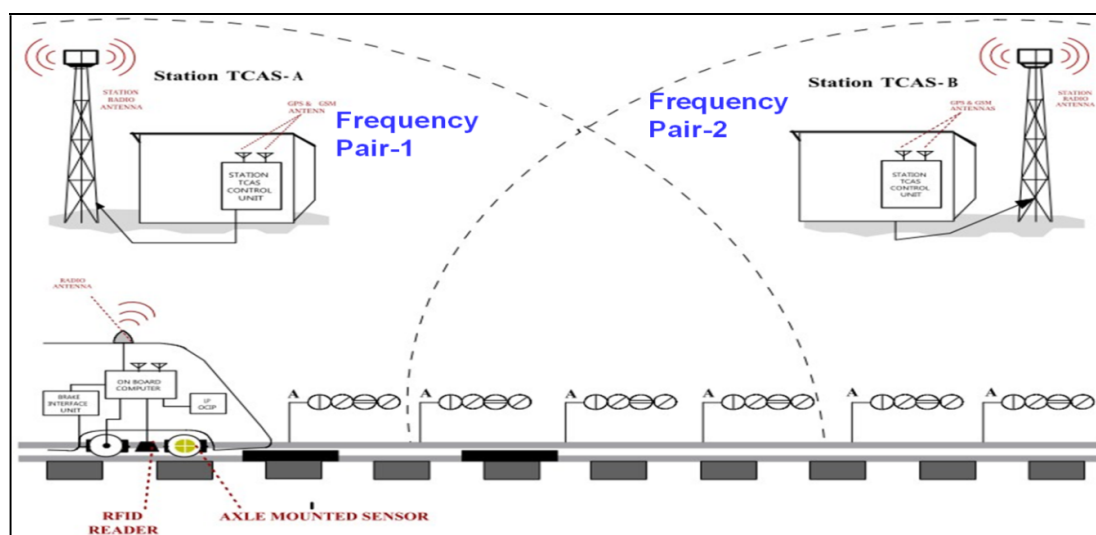
4.1 Specifications and future developments:

The Train Collision Avoidance System to be procured and installed shall conform to RDSO Specification No. RDSO/SPN/196/2012 version 3.2.

Draft Specifications RDSO/SPN/196/2020 Version 4.0 is under development stage and is likely to be finalized soon. The project envisages to commission finally based on Version 4.0 also.

4.2 RADIO TELECOMMUNICATION SUB - SYSTEM: The indigenous ATP system KAVACH (TCAS) is a system based on continuous updating of “MA” (Movement Authority), which requires continuous radio communication in “Communication Mandatory Zone”.

Presently the RDSO specification specifies use of UHF frequency based system and the section concerned is having GSM-R based MTRC system. In view of GSM-R being out dated, presently the section is being planned with the UHF frequency based system which can be at a later stage capable to migrate to LTE-R once it is implemented on IR.



4.3 TOWER PLANNING:

4.3.1 Additional REQUIREMENT OF TOWERS: Due to the requirement of continuous update of MA (Movement Authority) and the section having Automatic Signaling throughout, *proper Radio Signal Strength will play a very important role for success of the project.*

As such it is planned to have an initial software based simulation of Received signal strength (RSSI survey) so as to correctly judge the numbers, location and height of towers required for present UHF based communication. The initial survey report is also a part of this DPR as **Annexure - K**. It is planned to have a fade margin of 30dB.

Subsequently a detailed survey is proposed by the successful contractor on the project. These towers are also required to be planned in such a way so as to have complete coverage in the MTJ-NAD section with overlapping zone of 3km for two adjacent towers and also to ensure a smooth transition to LTE based KAVACH.

In order to economize on the cost of the project and make use of the existing facilities, the use of existing MW and MTRC towers is also suggested. However care needs to be taken for ensuring the effective tower height available for use of TCAS radio Equipment.



4.3.2 TOWER STRUCTURE: Based on experience of South-Central Railway and North Central Railway ongoing projects, it is proposed to have site specific tower structure preferably Lattice type or in certain cases Monopole type. The structure can be suitably designed by the contractor, duly approved by a 3rd party before being approved by IR. The norms followed by IR need to be taken care by the contractor. Certain standard designs of super-structure and sub-structure of the tower are available on RDSO site, the same can also be utilized.

4.3.3 LOCATION OF TOWERS: A detailed survey is required to be done in the initial phase of the project to assess the strength of Radio Communication in the nominated KAVACH section based on which the location and height of the additional Towers is required to be planned.

The towers at the Stations are already existing or are to be planned at the station where not existing. However in the Block section in order to have proper signal strength of UHF in the project initially and latter on of LTE – R additional towers will be required. All the additional towers in mid section will have to be planned adjacent to IBS/ LC gates following all the Railway norms and regulations. As such the survey will have to be done taking due care of this.

4.4 SIGNALING INTERFACE:

The ATP system “KAVACH” (TCAS) works on top of Existing Signaling system, taking Input from it and utilizing the same for Automatic Train Protection. Presently in the referred section we have Electronic Interlocking/Panel Interlocking at all the stations from NAD-MTJ and also in the IBS section.

There are two possibilities of taking the signaling input from the signaling system. Directly through EI using a SIL 4 protocol converter or by using relay contacts of the concerned relays which are ECRs, NWKRs / RWKRs & TPRs. Presently the OEMs have not developed protocol converters as such the provision of taking inputs from relays is being planned.

As such it is planned to initially use Relay contacts of the concerned relays and in due course migrate to protocol converters as and when they are developed.

4.5 Requirement for Building:

The Train Collision Avoidance system as discussed above will require Interfacing with the Existing Signalling system, wherein the Equipment’s will be required to be placed in the Existing Relay Rooms / LC Gate /IBS section. However, at number of places the existing Relay Room/ LC Gate/ IBSs may not have proper space for provision of Relay Racks, TCAS equipment, Power supply augmentation etc. Hence, a detailed survey will be requirement for this and the scope of work will also need to include the same.

4.6 Communication backbone:

The ATP (Automatic Train Protection) System will also require a **Back – Bone of an Optical Fiber Network in redundancy** for the connectivity of the various Stationary Station TCAS with LC & IB TCAS with the help of RIUs (Remote Interface Units) in the Absolute Block Signalling section as per requirement.

In order to achieve this, two numbers of minimum 48 core OFC cables are required to be laid, one on each side of the track for connecting the RIUs / LC TCAS to the Station TCAS as per requirement. Presently a Telecom OFC is running parallel to track on the whole of the section.

For the section under consideration, it is decided that, for Automatic Train Protection System, 2x48 Fiber OFC cable will be laid throughout the section with route diversity". This OFC cable will have to be terminated in the required IBSs /LC also as a part of the scope of work. The scope also includes provision of IP-MPLS routers at all stations in NAD-MTJ section including NAD and MTJ.

4.7 Loco TCAS planning:

The Locos running on the section are required to be equipped with Loco TCAS. As it is not possible to have all the Locos equipped with Loco TCAS simultaneously, under discussion with the Electrical Department following priority has been decided for prioritizing the Locos:

- a. High Speed Locos.
- b. Mail Express Locos.
- c. All other passenger Locos.
- d. Goods Locos.

However it will also depend on availability of these Locos, as such some the priority needs to be followed as far as possible.

4.8 Maintenance Strategy

KAVACH is a new technology on Indian Railways with only some experience with South Central Railways. Being a new technology, a defect liability period of **additional 2 years (Normal 2 years plus additional 2 years)** is planned along with the life cycle maintenance contract.

In addition to this Training by OEMs and training centres over Indian Railways are also being planned.

5. SCOPE OF WORK

5.1 Introduction:

The KAVACH (TCAS) shall be provided to cover entire section from Nagda (695.970 Kms) to Mathura (1244.950 Kms) section of West Central Railway. This Project scope includes detailed survey of the geography, geology and topography of the section, detailed design for deliverables as listed in Chapter 6, design approvals, fitment of TCAS at stations, IBSS, LC Gates as per requirement, fitment of Loco TCAS, Construction of towers including foundation, power, signalling and OFC cabling, quality check and inspection, independent safety assessment and introduction of system in service. Thereafter monitoring of performance through DRACAS (Defect Reporting and corrective Action System), corrective actions required if any to achieve the performance criteria and maintenance support.

Works to be done by all wings of the Railways including approval, sanctions, Quality inspections and Acceptance tests:

- a. Bridge Engineering: Substructure and Superstructure design of towers.
- b. Traction (Electrical): Loco TCAS fitment in Electrical Locomotives.
- c. Traction (Diesel): Loco TCAS fitment in Diesel Locomotives.
- d. S&T: Radio Link design, STCAS, LC TCAS/IB TCAS/RIUs design and installation and all associated activities as per deliverable listed in Chapter 6 of this document.

Works to be done by the contractor including arranging statutory approvals as per labour laws, local regulations etc, requirement of land on rent to enable the work execution in railway land or access to railway land shall be defined in the Contract Requirements, i.e., scope described of the tender to be floated.

The Train Collision Avoidance System to be procured and installed through this tender shall conform to RDSO Specification No. RDSO/SPN/196/2012 version 3.2 or latest.

Draft Specifications RDSO/SPN/196/2020 Version 4.0 is under development stage and is likely to be finalized soon. The project envisages to commission finally based on Version 4.0 also.

5.2 Survey:

5.2.1 RSSI Survey: Though a preliminary RSSI Signal strength survey report is attached at Annexure - K. However as communication is one of the most important part for success of the project, a detailed RSSI survey is required to be done in the initial phase of the project to assess the strength of Radio Communication in the nominated TCAS section based on which the location and height of the additional Towers is required to be planned.

5.2.2 Aerial Drone Survey: The project scope also includes the aerial drone survey for entire track profile so as to have the mapping of all signals enroute for provision of RFID tags.

5.2.3 Survey for cable route plan: Cable Route plan is to be prepared and approved before starting of cable trenching and laying as per the scope of works.

5.2.4 Survey for Civil works: A detailed site survey is required for firming up the locations of the additional Towers (preferably near IBSS and Level crossing for Block section), requirement of additional Building structures and any requirement of utility shifting.

5.3 Design of Station / LC TCAS and RIUs

The scope also incorporates design of station specific TCAS Table of controls, TCAS RFID TIN Layout, RFID Tag Data, Wiring diagrams for TCAS relay interface, Equipment Layout diagrams of STCAS, Radio and Loco TCAS Equipment. It also includes power supply arrangement design, Radio link design including the design

of Towers with foundation if required. The Tower design if required need to be certified by a 3rd party. Standard Tower design available on RDSO site can also be used. The designs should be made available to Railways in both soft and hard copies by the Contractor.

5.4 Provision of Additional Building and Towers:

The scope includes the provision of additional rooms of suitable size, wherever there is no space in the existing relay rooms. These specifications need to be specified. Further based on the RSSI survey there might be a requirement of additional Towers, the scope also includes the provision of these additional Towers, preferably of 40/20 metres high keeping in view of future requirement of LTE – R.

5.5 Provision of Track side KAVACH (TCAS):

Stationery TCAS equipment to be installed in this project will be from Nagda (695.970 Kms) to Mathur (1244.950 Kms) section of West Central Railway. This includes 50 Way side station, 07 Junction stations and 77 IBSS/LC Gates/RIU. The scope of project KAVACH on the section includes the supply, installation, testing and commissioning of

1. Station TCAS for interfacing with Station Signalling,
2. LC TCAS and RIUs for interfacing with Signalling in the Block section/IBH Relay Huts.
3. UHF communication arrangement at these locations so as to enable STCAS to talk to the Loco TCAS.
4. Provision of RFID Tags on the track as per the design.
5. Provision of the SMOCIP at the stations for SOS functioning.
6. Enhancement of power supply as per requirement.

5.6 Installation of LOCO TCAS

5.6.1 The On Board Equipment (Loco TCAS) shall be fitted on selected Locomotives in nominated Loco sheds of Indian Railway along with UHF radio system for communication between On Board TCAS equipment in Loco & Station TCAS equipment all along the route.

Test bench is also to be provided in nominated Loco Sheds of IR. The scope of this project covers provision of Loco TCAS on 87 Locomotives.

5.6.2 BRAKE INTERFACE UNIT: The Brake Interface Unit (BIU) is an integral part of Loco TCAS. It shall be capable of giving following three levels of brake commands for train braking:

- i. Normal Brake (NB) command (not applicable for EMUs and other self-propelled vehicles)
- ii. Full Service Brake (FSB) command
- iii. Emergency Brake (EB) command.

The various type of Locomotives based on type of braking i.e Conventional (IRAB), E-70 and CCB will require to have different type of BIUs. It will be advised in details.

5.7 Provision of 2x48 Fibre OFC with route diversity:

Remote Interface Units of the Block section are required to be connected in ring fashion so that they shall be able to connect to station TCAS even in case of failure of Main Path.

The scope also includes Supply, laying of HDPE pipe of size 40/33 mm duct through trenching at a depth of 1.2 mtr or more and blowing of 2x48 Fiber OFC cable, splicing of OFC cable in the entire section, dropping & termination of 2x48 fibre at each station and dropping & termination of 24 fiber out of 48 fibres at LC / IBS hut etc and balance 24 fibres to be made through in FDMS Tray as finalized by railway or may change as per site requirements.

5.8 Provision of Network Management System:

The scope also includes provision of a Network management system at “Kota Test Room”. It includes extending the required E1 channel from the given place in the OFC room or connecting through Dark fibre with associated Hardware & Software of Modems, Optical Network Unit with interconnecting Cables/ Pig Tails & Wiring. It also includes OFC cable laying & Termination / U/G Splicing as required up to nearby place for Dark Fibre / E1 channel as required. The E1 channel will be provided by the Zonal Railways.

5.9 Certification by ISA:

The scope of the project incorporates a proper certification by an “Independent Safety Assessor” (ISA) after the testing and commissioning of the entire section from NAD to MTJ or a workable part of the section.

5.10 Training of Railway Officers / Staff

Training should be given to Railway Officers/Staff for TCAS equipments Of Station/LC gate/IBH/RIU/Loco TCAS/Track side equipments including all other associated systems.

6. DELIVERABLES:

6.1 Detailed design necessary for justifying the chosen sub systems like Radio, towers, Transmission media other than Radio, Remote Interface units (RIU), Brake interface units and construction to take place.

6.2 RAM Plan showing how the reliability, Availability and Maintainability is addressed on this project.

6.3 System RAMS Assessment to support the RAM Plan.

6.4 Programme on DRACAS (Defect Reporting and Corrective Action System) to report failures and track the corrective actions.

6.5 Survey & Mapping Report to confirm the location and features details already furnished and its fitness for detailed design.

6.6 General and Detailed Design:

6.6.1 Buried Service Records (Pipes and Cables)

6.6.2 Cable Routing strategy and Route Plan detailing routing strategy for all cables and to demonstrate the method of achieving full diversity.

6.6.3 Cable schedule showing cables across all sub systems including termination and jumpering details.

6.6.4 TCAS Table of Control.

6.6.5 TCAS RFID Tin Layout.

6.6.6 RFID Tag Data.

6.6.7 Wiring Diagram (TCAS Relay Interface)

6.6.8 Equipment layout Diagram (STCAS and Radio)

6.6.9 Locomotive TCAS Equipment Layout Diagram including Locomotive Desk.

6.6.10 Radio link Design.

6.6.11 Power Supply Scheme.

6.6.12 Redundant Communication Scheme.

6.6.13 Earthing Diagram showing earthing across all sub systems.

6.7 Engineering Assurances:

6.7.1 Design Risk Log: Records of identified risks and assumptions and interdependencies identified during the design process and approval.

6.7.2 Design Compliance Certificate: Confirmation that the design complies with the requirements and later in the project life cycle that the installation complies with the design.

6.7.3 Inter Disciplinary Review Records.

6.7.4 Inter Disciplinary Check Certificate.

6.7.5 Master Records Register: Register of Master Records that are signed copies of the working installation.

6.7.6 Entry into Service Strategy showing how entry into service will be carried out with a checklist of deliverables.

6.7.7 Testing Plan and Commissioning Strategies including Pre-Commissioning Checklists/Post-Commissioning Checklists.

6.7.8 QA Certification including all inspection and test records of all sub systems and integrated system.

6.7.9 Test Certificates: Records who has tested to which specification and the results.

6.8 Functional Train Collision Avoidance System as per RDSO Specification No. RDSO/SPN/196/2012, version 3.2 or Latest at all Stations, Intermediate Block Signals, LC Gates and Locomotives with all subsystems including communication.

6.9 ISA certification and approved Application Safety Case for the project before introduction of services.

6.10 As Built Designs (Tower including foundation, STCAS, IBS, LC Gate, Loco TCAS) that describes the assets that has been installed.

6.11 Maintenance

6.11.1 Report on future maintenance requirements due to proposed solutions.

6.11.2 Maintainability Study: It shall determine suitable options for access to the Relay Room, Radio Towers, IBS and LC Gate Relay rooms and Locomotives and requirement of competent resources along with their deployment matrix.

7. ROLES AND RESPONSIBILITY OF EMPLOYER AND EXECUTIVE

7.1 Table below describes the Role and responsibility for Stations, NMS and Loco.

S.N	Item	Responsibility	Remarks
A. For each station			
1	Station number allocation	Railway & OEM	Follow RDSO TAN
2	Central location in Kilometer	Railway	Stations / LC / AH
3	Communication Mandatary Zone	Railway	For Continuous Radio Coverage
4	Stationary TCAS wise Frequency pair allocation (Pair 1 and Pair2 shall be alternative)	Railway	F ₀ - 441.8 MHz, Pair 1: F1/F2-456.8MHz and 416.8 MHz, Pair 2: F3/F4-466.8 MHz and 426.8 MHz
5	TIN number allocation (Track Identification Numbers)	Railway & OEM	As per RDSO TAN no STS/E/ TAN/ 5001 dated; 20.02.2019
6	RFID Tag number allocation	Railway & OEM	-do-
7	SIP (Including Stations, LC gates and IBS etc.,)	Railway	Existing SIPs are at Annexure M.
8	Table Of Control (TOC) or Selection Table	OEM	To be prepared by Successful bidder for approval by Railways.
9	Gradient Data	Railway	As per details at Annexure L.
10	Turnout Speed Restriction Details	Railway	Can be derived from SIPs.
11	PSR information	Railway	As per Chapter 3 Para 3.10
12	Latest Working Timetable	Railway	
13	Whether LC Gate warning Tags to be provided (Yes/No)	Railway	Yes
14	Whether Auto Whistling feature is to be provided (Yes/No)	Railway	
15	Whistling pattern	Railway	As per extant guidelines

S.N	Item	Responsibility	Remarks
16	Frequency slot allocation	OEM & Railway	WPC clearance also required.
17	RSSI Survey	OEM	Draft provided at Annexure K
18	Drone Survey data	OEM	To be arranged by the bidder.
18	GSM SIM Card1 Details	Railway	Reliance Jio
19	GSM SIM Card2 Details	Railway	BSNL or as decided by authority
20	Relay Contact Analysis data	Railway	As per Annexure B
21	Relay Rack Charts	Railway & OEM	Existing shall be made available by Railway. New Relay rack chart to be prepared by OEM.
22	Whether new Relay Rack is to be erected or not	OEM	Yes, Repeater relay, if any is to be opened in new relay rack.
23	Whether Circuit to be submitted as per British/Siemens Practice	Railway	As per the existing Interlocking. British in this section.
24	Cable Route Plan	OEM & Railway	To be prepared by OEM and approved by Railway.
25	Floor plan of S&T Equipment Room.	OEM & Railway	To be prepared by OEM and approved by Railway.
26	Location of RIUs	Railway	As per Table 3.2
27	Floor plan of Relay huts, if RIU is to be installed in huts	OEM	To be prepared by OEM and approved by Railway.
28	Number of RIUs for which Location boxes are to be supplied	OEM	RIUs to be installed in Brick Rooms/ building
29	Number of RIUs for which Power supply 230V AC is provided	OEM & Railway	Power Supply of 230 V AC will be made available, but if required to be extended
30	Proposed Location of Tower	OEM & Railway	After RF/RSS survey, the tower

S.N	Item	Responsibility	Remarks
	(Latitude and Longitude)		location and tower height to be determined.
31	Design of Stationary TCAS tower and foundation	OEM & Railway	Ads per Standard design or non standard design approved by 3 rd party to be submitted for approval.
32	WPC or/and SACFA Clearance Procedure	OEM & Railway	Clearance will be taken by OEM and reimbursed by Railways.
33	Location of Stationary TCAS Test Benches	Railway	One for each Division
B	For each NMS (To be provided at Kota)		
1	No of Stn TCAS unit in one E-1 Ring	Railway	It shall be limited to 5-7
2	Proposed connectivity of stationary TCAS at mid-section where E-1 is not available	OEM	
3	PC Configuration	Bidder	For connecting 150 number of 4-Line stations following PC configuration is recommended 1. 12 CPU CORES 2. 12 GB RAM 3. 1 TB storage for 90 days Data 4. Windows 10 or higher version
4	Static IP address of NMS	Railway	Will be provided
5	Internet bandwidth of 25 MBPS	Bidder	Assuming 4 live consoles & 2 report generators working in parallel

S.N	Item	Responsibility	Remarks
6	Whether furniture for NMS is to be provided(Yes/No)	Bidder	Yes
7	Floor plan for S&T Control office for NMS	OEM & Railway	To be prepared by bidder and to be approved by Railway
8	VDU Quantity , Size & Resolution	Railway	43" (Min 4k resolution) at each station and control office
9	UPS backup for NMS	Bidder	
C	For each Loco		
1	Loco Type	Railway	Tentative as per Table 3.18 & 3.19
2	Loco ID	Railway	
3	Loco Shed	Railway	
4	Type of Brake System	Railway	As per item no. 1 above.
5	Loco Wheel dia	Railway	As per item no. 1 above.
6	GSM SIM Card1 Details	Railway	Reliance Jio
7	GSM SIM Card2 Details	Railway	BSNL or as decided by CA
8	Axes for providing pulse generators	Railway	As per RDSO's fitment diagram.
9	Fitment diagrams	Railway	Fitment drawing for Onboard Eqpts in Loco are available at http://10.100.2.19/Signal/Policy
10	Interface details for auto-whistling	Railway	As per RDSO's drawings
11	Interface for Traction cut-off	Railway	As per RDSO's drawings
12	Responsible Authorities in Shed	Railway	Sr DEE/TRS or any other authority nominated by Rly
13	Location of Loco TCAS Test Benches	Railway	

7.2 The table below gives the Roles and Responsibility for Various Factors for Design Outputs:

S.N	For each station	Responsibility	Relevant Inputs
1	RFID Tag Layout	OEM	SIP, TOC, Drone data, Tag & TIN Ids
2	RFID Tag data	OEM	RFID Tag Layout
3	Interface circuits	OEM	SIP, Contact analysis
4	TCAS Table of Control (TOC)	OEM	SIP, Tag layout, TOC
5	Station Application Data	OEM	TOC(TCAS), Tag Layout
6	Floor Plans	OEM	Drone Survey
7	Drone Data	OEM	Drone Survey
8	Stationary and Loco TCAS timeslots and frequency channel pairs	OEM	Maximum trains, Frequency allocation
9	Cable route plan, Cable core plan, Power supply diagram, Location / CTR details, Relay Contact Chart, Interface and Logic Circuits in Case of EI alteration, Circuit diagram in case of PI alteration, LC Gate/IBH Circuits, Testing reports, SWRD, SWR, GWR, VDU/ Panel Diagrams, 1W/2W/ bell test details/ Quality Audit documents/ completion plans (laminated) etc. as per WCR practice	OEM	SIP

8. COST ESTIMATION:

8.1 INTRODUCTION:

The Cost Estimation for the project have been done by including the **cost of Station TCAS** including the cost of interfacing with the existing signaling & cost of Radio Equipment for that station, **Cost of Civil engineering** works including the Tower cost & that of Building and other structure, **Cost of Equipment provided on the track** which includes the RIFD Tags cost along with equipment utilized for programming these RIFD, **Cost of the Loco TCAS** including radio Equipment cost and interface equipment with the track side RFID and the interface with the Loco Pilots,

The cost has also a **component of the Telecommunication OFC** based back bone, the cost of WPC and SCAFA License fee and 15 years of AMC as a part of the project. The costing is based on SC Railway LOA of Nov 2019 and the SOR rates of the West Central Railways.

The Overall Cost of the project is approximately **214.00 Crores**. However this cost does not include the cost of change over to LTE – R from UHF communication in a later stage. Separate works for provision of LTE – R over IR are being sanctioned.

8.2 CIVIL ENGINEERING COST:

As envisaged for the project there is no need of land procurement for the project. The two basic components of civil Engineering costing will be provision of Towers and the provision of Building structure where there is a space constraint in the Existing Relay Room.

It is envisaged that in addition to the Existing towers of MW additional Towers are required to be built in Block sections where the length of block section is more than 8 Km and as envisaged in the preliminary RSSI survey report. Also provision of shifting to LTE – R in future needs to be taken care.

For the Building works as per survey the same is required to be provided at 112 locations.

8.3 LINE SIDE & STATION TCAS COST:

This cost includes the cost of Supply, Installation, Testing and Commissioning of Station TCAS equipment along with associated Radio Equipment, Cost of LC TCAS equipment along with Radio Equipment required for additional Tower sites in the Block section at IBSs, Cost of the RIUs at balance IBSs section, cost of SM operation panel, cost of Relays and other accessories for interfacing with the existing signaling and cost of equipment required to program the STCAS / LC TCAS and the Test benches required for testing the TCAS.

This cost is also inclusive of RFID tags (required for knowing the position and direction of the locomotive movement) which are to be provided in duplicate at all the signals, 200 mtrs before each signal and in station Yards for demarcating the point zone and the berthing track circuits.

The cost of this has been based on Nov' 2019 LOA of the SC Railway.

8.4 LOCO TCAS COSTING:

The cost of Loco TCAS is the cost of Supplying, installation, testing and commissioning of all the equipments to be provided on board the Locos to be used on the System.

This includes the costing of OBC (On Board Computer), DMI (Driver Machine Interface), on board radio equipments for UHF communication, GPS and GPRS communication, RFID readers, BIU (Brake Interface units) and the other accessories.

This cost will also include the test bench to be provided in the Loco Sheds and has been worked out per Loco basis and planned for 87 locos.

8.5 COST OF COMMUNICATION BACKBONE:

For efficient working of TCAS a telecom backbone of 2x48 Fiber OFC is required to be laid throughout the section. This cost is also an important element of the project and includes the cost of supply and laying of HDPE pipe and 2x48 fiber OFC with route diversity

OTHER CHARGES:

The capital cost of the project also includes the WPC & SCAFA license fee for the

period of the project.

Summary Table:

Scheme Elements	Cost Estimate (%)
Signalling work of provision of KAVACH	70.505 %
Telecommunication Back Bone	26.069%
Civil Engg cost (Towers, Buildings etc)	03.426 %
TOTAL	100 %

9. PROJECT RISK AND ASSUMPTIONS

9.1 Qualitative Cost Risk Analysis (QCRA) with the objective of identifying the projects risks for the KAVACH project with all stakeholder is to be done post contract award and risk owners identified to:

- Identify significant risks to the achievement of the project objectives
- Establish a project risk register
- Conduct an assumption analysis and identify any constraints

9.2 Each risk shall be analysed to understand the probability of occurrence and impact of the risks on the project outcome ranging from very high likelihood of occurrence / impact to very low likelihood of occurrence / impact. Few examples but not limited to these can be:

- Tower Sites near the water bodies, drains etc.
- Soil with abnormally low bearing capacity or encountering of unexpected rocks, underground water streams etc.
- Non-availability or delayed availability of a particular type of locomotive.
- WPC AND SACFA CLEARANCES: The frequency of the operation for TCAS

has been defined by RDSO. The application for WPC & SACFA shall be filed by the Railway so that the license remains with Railways. The WPC and SACFA clearance are required for the use of towers and radios. As this factor is dependent on external agency any delay in getting these clearances becomes a potential Risk.

- Interoperability between various new and Existing KAVACH OEMs.

10. IMPACT ON EXISTING INTERNAL CUSTOMER

10.1 Train working by LOCO Pilot:

TCAS equipped locos are provided with Brake Interface Unit (BIU), Driver Machine Interface (DMI), RFID reader and LTCAS. In general, Loco pilot checks driving console position, load meter response, Main reservoir pressure, Brake pressure, Feed pressure and air continuity. In TCAS equipped loco, in addition to the mandatory checks mentioned above, Loco Pilot has to bring the LTCAS system into functioning at the time of starting the train. Procedure of activating LTCAS involves switching on of all MCBs, booting of DMI, operation of Isolation switch to Normal position, operation of leading/non leading switch, selection of train type and Staff Responsible Mode/ Shunt Mode depending upon the intended movement of train. This entire procedure takes 2 to 3 minutes in addition to the time required for energization of Loco. Further depending on the aspects of signals in DMI proper mode selection to be done by Loco Pilot.

10.2 Train Working by Station Master:

In TCAS equipped territories Station Master Operation cum Indication Panel (SMOCIP) is installed in SM rooms to generate and cancel SOS (Save Our Soul) messages during emergency situations. SMOCIP displays TCAS related information like number of locos in the Station's vicinity, their absolute positions and TCAS health condition such as status of Battery voltage through LED indications etc. Station Master on duty is responsible for operation of SMOCIP (Station Master

Operation cum Indication Panel) and custody of keys to prevent unauthorized operation. on receiving any message that endangers through traffic and requires stoppage of train, station master shall generate SOS and the same is to be recorded in the register. Apart from generation and acknowledgement of SOS, failure of STCAS and its restoration shall be reported to all concerned and accordingly records are to be updated.

10.3 Signalling System Maintenance

As TCAS system makes use of existing signaling relays for computing movement authority, all the maintenance requirement for existing signaling system are applicable to TCAS maintenance. In addition to maintenance of additional relays picked up for TCAS working, maintenance and monitoring of RFID tags and RIU's installed in remote locations is a vital activity. Round the clock monitoring of real time events through NMS is another crucial maintenance activity. Apart from maintenance of TCAS gears any signaling alteration work on account of shifting of points, extension of track circuits, shifting of signals, provision of additional points/track circuits/signals need to be incorporated in TCAS.

Man power requirement need to be worked out for the maintenance activities mentioned above. This can be done through assigning maintenance units to TCAS sub systems and use existing yard sticks as done in computation of man power requirement for any signal installation. Till creation of manpower, maintenance of TCAS can be outsourced.

10.4 Locomotive Periodical Maintenance

Periodical maintenance of the locomotives is carried out by trip sheds and main sheds once in 45 days and 90 days respectively. The condition of the brake blocks, brake power and the pantograph are checked and cleaning of the filters is carried out at Trip sheds in general. The wheel profile, Bogie inspection & topping up of lubricants will be carried out at main sheds. The chances of interference & damage

of TCAS equipment are minimal as the duration between two consecutive maintenance schedule is not very high however, TCAS maintenance team/OEM engineers should test the system thoroughly and attend all the failures if any before putting the system in to service. Coordination between shed officials and the maintenance team of OEM is very crucial for maintenance of LTCAS.

10.5 Locomotive Periodical Overhauling

Overhauling of the locomotives is carried out approximately once in 09 years and 18 years for passenger locos and goods locos respectively. During the overhauling all the equipment & bearings except the cables are stripped out and new items will be installed. Proper care should be taken to safe guard the fitted TCAS equipment in the locomotives. Maintenance of LOCO and LTCAS has to be synchronized otherwise improper removal/handling of wiring and LTCAS sub systems during overhauling of LOCO will result into permanent damage of LTCAS. After completion of the Periodical overhauling of the locomotives, TCAS OEM engineers should test the system thoroughly and attend all the failures if any before putting the system in to service.

10.6 Track Maintenance

Functioning of TCAS involves fixing of RFID tags on tracks that determines the absolute location of loco and the track ID on which the loco is running. These RFID tags are required to be removed during PQRS and other track machine working. Hence the working of track machine in TCAS territory needs a close coordination between Civil and S&T engineers. Other than increased extent of co-ordination there is no major impact on the track maintenance as such with the introduction of TCAS

10.7 Towers Maintenance

Periodic maintenance is essential to keep the tower structures in good fettle. Technical competency is required to maintain the tower structures. Hence, Bridge

inspectors need to be deployed for proper maintenance and supervision of the towers. Outsourcing of this activity can also be an option however, supervision of maintenance, proposed to be carried out through outsourced agency, still need to be done by Bridge inspectors.

11. ENVIRONMENTAL APPRAISAL

As no major Civil works are involved, the project has no major Environmental Impact. However the execution of TCAS project involves the excavation of earth and erection of high steel structure for radio towers and hence requires consideration about following environmental factors. These factors shall be identified for each worksite during the post contract survey and mitigation measures shall find place in the concept design.

- (i) The worksite within a floodplain and/or subject to flooding from rivers, sea, surface water or groundwater.
- (ii) The worksite in or over a watercourse or drainage channel or near the bank of a watercourse or near marine waters, on coastal areas below mean high tide or affecting navigation.
- (iii) Any river bank, ditch or a pond bank physically impacted by excavation works.
- (iv) Draining down or diversion of any water body as a result of the works.
- (v) Any geotechnical stability problems for example erosion, subsidence or landslides associated with the site.
- (vi) The project may require to clear few trees, vegetation or hedgerows on the work site or its compounds, access routes or staging areas.
- (vii) The project affecting agricultural land or impact any agricultural holding.
- (viii) Ponds within 500 metres.
- (ix) Residences, businesses, schools, medical facilities etc that could be affected by noise/ vibration and or dust/ poor air quality during construction?

- (x) Any footpath or road closures/ diversions required during project delivery.

12. STANDARDS

Following standards, codes and manuals shall be followed in the proposed work of deployment of TCAS in the section under the consideration.

- (i) General Rules for Indian Railways (Open Line) 1976
- (ii) Indian Railway Signal Engineering Manual – July 2021
- (iii) Indian Railway Telecommunication Manual – September 2021
- (iv) RDSO Specification for TCAS – RDSO/SPN/96/2012, Ver. 3.2 or latest
- (v) Indian Railway – Standard Code of Practice for the Design of Microwave Towers of Self-Supporting Type – 1982
- (vi) Indian Railway – Standard Code of Practice for Fabrication and Erection of Steel Works on Microwave Towers: Self Supporting Type – 1979
- (vii) Policy on Design Basis Report / Checklist for Design of Superstructure of TCAS Tower by RDSO B&S Directorate issued vide letter No. CVS/R/DRT/TCAS, dated 11.1.2021
- (viii) EN50126: Specification and demonstration of RAMS for all railway applications
- (ix) EN50128: Railway applications - Communication, signalling and processing systems - Software for railway control and protection systems.
- (x) EN50129: Railway applications - Communication, signalling and processing systems - Safety related electronic systems for signalling.
- (xi) EN50159: Railway applications - Communication, signalling and processing systems - Safety-related communication in transmission systems.
- (xii) For other activity corresponding IS Codes shall be referred.

13. CONTRACTING STRATEGY

Following system of contracting shall be adopted.

- I. Pre – Bid survey contract for identification of most critical radio tower location, height, space and desktop survey for Received Signal Strength at various heights of antenna.
- II. Engineering, Procurement and Construction contract (EPC) for detailed survey, concept design, detailed design, installation, testing and commissioning of various subsystems, Independent Safety Assessment of the project, training, As Made designs, introduction of system into service and subsequent defect reporting and corrective action and maintenance support.

14. On Going Works In The Section

Following On Going Works in the Section are as under:

- (i) Replacement of Signaling gears with EI at KPTN station.
- (ii) Replacement of Signaling gears with EI at MLZ station.
- (iii) Replacement of Signaling gears with EI at NKH, MEP, KIW & DY stations.
- (iv) Replacement of outdoor signaling gears at RNT, MXL, SMBJ, HAN, FSP, PNGR, SWAR, DUM & JJA stations.
- (v) Track circuiting at Line No. 5 to 10 at BXN station.
- (vi) Interlocking of LC Gate No. 14, 28 (UP & DN), 43, 60, 110, 127 & 148 in connection with raising of speed to 160 kmph in NAD-MTJ section.
- (vii) Re-alignment of curves in connection with raising of speed to 160 kmph in NAD-MTJ section.
- (viii) Indoor & outdoor telecom equipments in connection with OFC communication between cable hut to newly constructed SP/SSP/TSS (25 Nos.) in connection with raising of speed to 160 kmph in NAD-MTJ section.



ANNEXURES

Annexure A

KAVACH Technology:

1 Concept:

KAVACH (TCAS) is an indigenously developed Automatic Train Protection (ATP) System meant to provide protection to trains against Signal Passing at Danger (SPAD), excessive speed and collisions. It provides continuous update of Movement Authority (distance upto which the train is permitted to travel without danger). Hence during unsafe situations when brake application is necessitated, and the Crew has either failed to do so, or is not in position to do so, automatic brake application shall take place. TCAS has additional features to display information like speed, location, distance to signal ahead, Signal aspects etc. in Loc Pilot's cab and generation of Auto and Manual SOS messages (Distress messages) from Loco as well as Station unit in case of emergency situation.

2 Working of KAVACH:

The trackside sub-system of TCAS consists of RFID tags fitted on track in station section and block section for giving Trackside information to Loco TCAS unit installed in the locomotive. Portions of track including berthing tracks, point and block sections are assigned unique IDs called Track Identification Number (TIN). TIN along with RFID Tags are used to determine the direction of train.

The system also consists of Stationary TCAS unit installed at Station with radio tower to communicate with locomotives in station area. Stationary TCAS is interfaced with station interlocking to acquire real-time dynamic information related with signalling such as various signal aspects. Route information of all the signals monitored by a specific stationary TCAS unit is configured on the basis of TCAS Control Table (excluding shunt signals and overlaps). Stationary TCAS unit gets real-time information regarding Locations, Speed etc of various trains in its jurisdiction through UHF Radio Communication.

The diagram illustrates the proposed LoCoTCAS architecture. At the top left, the **Network Management System** (orange box) is connected via an orange line to the **Stationary TCAS** (white box with a red oval). The **Stationary TCAS** is connected to the **Station Master** (white box) and **Interlocking** (white box) via green lines. The **Station Master** sends **SoS Messages** to the **Stationary TCAS**. The **Interlocking** sends **Signal and Track Status** to the **Stationary TCAS**. The **Stationary TCAS** sends **Location Info** (blue arrow) to the **Locomotive-1** and **Permission to proceed** (blue arrow) to the **Interlocking**. The **Locomotive-1** is shown with various components: **Radio ANTENNAE**, **GPS ANTENNA**, **OCIP** (On-Board Control Interface Panel) on the **Cabin-B side**, **BIU** (Baseband Interface Unit), **Speedometer Pulses**, **Loco TCAS**, **Loco Pilot**, **OCIP** on the **Cabin-A side**, and **RFID Reader** and **RFID Tags**. A **Track circuit** is shown at the bottom right, connected to the **Interlocking**. A **Signal** (yellow and red lights) is also shown. A **Station Master** and **Interlocking** are shown at the top right. A **Network Management System** is shown at the top left. A **Stationary TCAS** is shown in the center. A **Locomotive-1** is shown at the bottom. A **Signal** is shown at the bottom right. A **Track circuit** is shown at the bottom right. A **Station Master** and **Interlocking** are shown at the top right. A **Network Management System** is shown at the top left. A **Stationary TCAS** is shown in the center. A **Locomotive-1** is shown at the bottom. A **Signal** is shown at the bottom right. A **Track circuit** is shown at the bottom right.

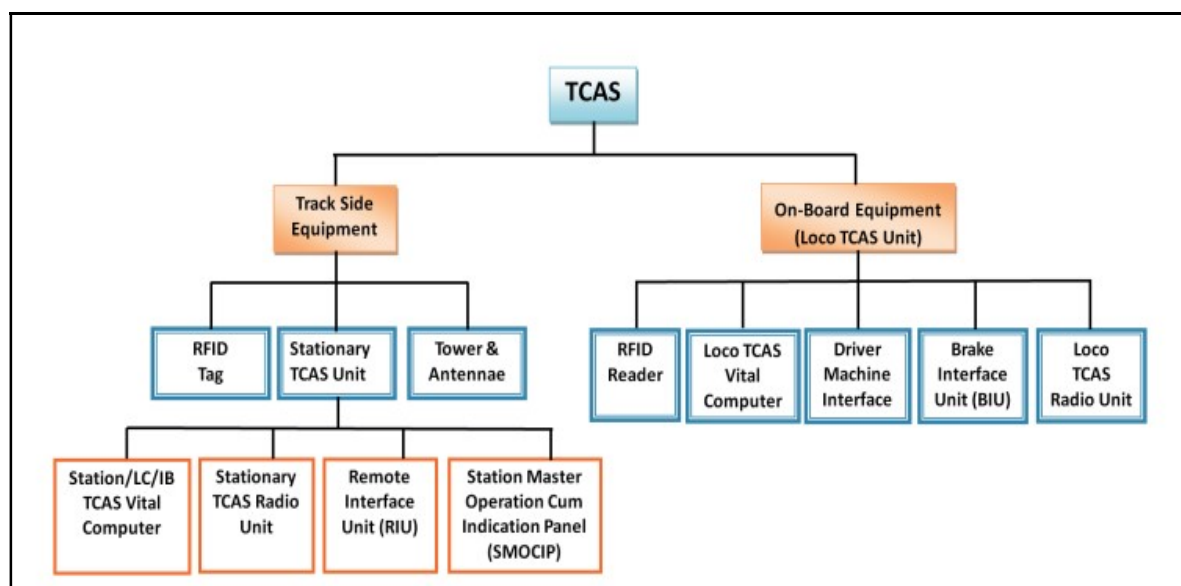
DETAILED PROJECT REPORT- “KAVACH”

The Stationary TCAS unit shall use the direction of movement of Loco/Train, to find approaching signal of the Loco/Train. Stationary TCAS unit shall then calculate the movement authority based on the signal aspect or/and track circuit status or/and route locking status, point position and the status of the berthing track circuit. Stationary TCAS unit shall then transmit the Movement Authority to the Loco TCAS in its jurisdiction in station area. The length of the movement authority is decided based on the signal aspect of the approaching Stop Signal. The Loco unit shall make speed profile/ brake curve for different situations based on movement authority, speed restriction and other information as received from Trackside sub-system. The Loco TCAS unit shall display the train speed, the permitted speed, the target distance and the target speed to the loco pilot through a Driver Machine Interface (DMI).

4.3 Components of KAVACH:

The Train Collision Avoidance system broadly comprises of following components:

(i). Trackside equipment including Stationary TCAS Unit and (ii). On-board equipment.



4.3.1 Trackside Sub-system:

(A) RFID Tag

RFID Tags provide site specific static information to Locomotive. Apart from acting as Location references, these relieve the Radio Channels and provide immediate information such as crossing the signal etc. to Loco Unit. RFID tags shall be fitted on track in station section, point zones, near Signals & track in block section for giving Trackside information to Loco TCAS unit.



The RFID tags shall be fitted on the sleepers between the rails as per guidelines given for Indian Railways. RFID tag shall be as per following specifications:

- Suitable for reliable working at train speed upto 200 KMPH (minimum).
- Frequency of operation: 865-867 MHz.
- Can be programmable with minimum 128 bits (including CRC) of user data.
- Shall be able to work even when submerged in water up to rail level.
- Under field operating conditions RFID reader antenna shall be able to read RFID tag from a vertical distance of 700 mm from bottom of RFID reader antenna to top of the rail level.

(B) Stationary TCAS Unit

Stationary TCAS Unit shall be universally suitable for various types of signalling of Indian Railways with provision of colour light signalling. By default, it shall be suitable for interfacing with Panel Interlocking and Electronic / Solid State Interlocking. Normally Stationary TCAS Unit shall be provided at Stations to cover all the trackside signals. It shall also be provided at Intermediate Block Locations (IBS) and midsection interlocked Level Crossing Gates where the radio signal coverage of station TCAS tower is not adequate.

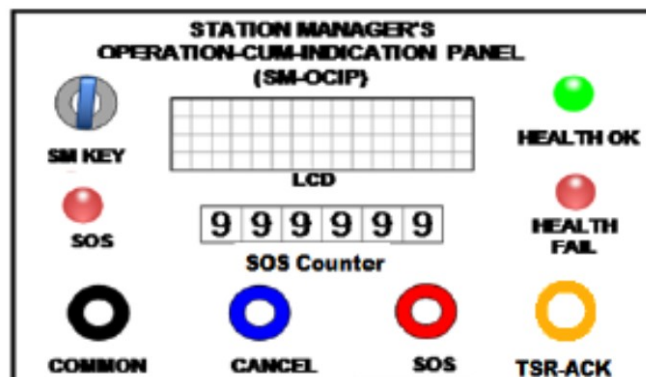


This shall be interfaced with interlocking equipment to acquire real-time dynamic information related with signalling such as various signal aspects. It has database of static signalling related information such as location & details of RFID tags and Speed Restrictions. It gets real-time information regarding Locations, Speed etc of various trains in its jurisdiction through UHF Radio Communication. On the basis of this information, it detects any emergency situation and can direct the command to Loco to take action to stop. Stationary TCAS Unit shall comprise of:

(a). Station/LC/IB TCAS Vital Computer: The Vital Computer of Station/LC/IBS TCAS Unit is a computer-based system that generates messages to be sent to the train on basis of information received from interlocking inputs and on basis of information exchanged with the Loco TCAS units.

(b). Stationary TCAS Radio Unit: Radio communication network shall be used for the bi-directional exchange of messages between Loco TCAS unit and Stationary TCAS units. Stationary TCAS Radio Unit shall have two UHF full duplex Radio modems with separate cable and antennae in hot standby mode to communicate with Loco TCAS unit.

(c). Remote Interface Unit: Remote Interface Unit (RIU) is a miniature version of STAS without radio communication unit, which captures (multiplexing) the relay information wired to it and exchanges the data with master STCAS directly without any relay interfaces. Remote Interface Unit (RIU) shall be used where remote signalling functions are required to be fetched to a nearby Stationary TCAS unit, for example from end cabin, distributed interlocking, a nearby LC Gate, Intermediate Block or Automatic Signalling section. RIU at such end cabins /distributed interlockings or LC gate/IB shall be installed if they are coming within the radio coverage of station tower. RIU is used to communicate remote signalling inputs to STCAS over OFC media.



(d). Station Master Operation cum Indication Panel (SMOCIP):

SMOCIP consists of following:

- LED Indications
- Switches
- LCD Panel
- Buzzer
- 6 digits counter which are updated on pressing of manual SOS switch
- Station Master's key.

It has the following LED Indications on the Console:

Sr. No.	LED Name	Colour	Description
1	HEALTH OK	GREEN	Indicates Station TCAS Healthy
2	HEALTH FAIL	RED	Indicates Station TCAS Un Healthy
3	SOS	RED	When SOS generated from Station

It has the following switches on the Console:



Sr. No.	LED Name	Colour	Description
1	COMMON	BLACK	Common switch to press along with SOS switch
2	CANCEL	BLUE	To cancel the SOS from station
3	SOS	RED	To generate SOS from Station

No functionality of switches is allowed without SM-KEY insertion into SM-OCIP.

(C) Tower and Antenna:

The antennae for stationary communication system at station/ IBS/ midsection interlocked Gate unit shall be combination of vertically polarized omni and/ or directional antennae.

4.3.2 On-board Sub-system (Loco TCAS Unit):

(A) Loco TCAS Vital Computer

The Loco TCAS vital computer is a system that supervises the movement of the train to which it belongs, on basis of information exchanged with Stationary TCAS units and other Loco TCAS units.

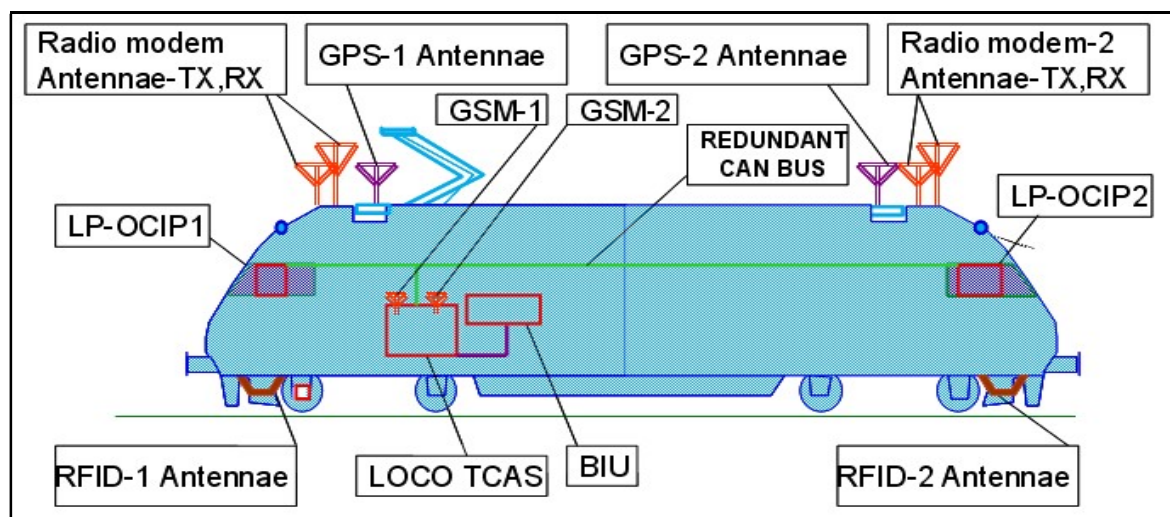
Loco TCAS vital computer shall have provision for the following:

- To interface with train interface unit & brake interface unit.
- Two Direction sensing type Speed Sensor interface for distance and speed measurement.
- To interface with RFID reader to read RFID tags fitted on the track.

- To interface with BTM reader to read Balise fitted on the track in TPWS sections.
- To interface with Driver Machine Interface (DMI) consisting of display arrangement buttons/ switches for operation.
- Two GSM interfaces for connectivity with centralized Network monitoring System (NMS) and Key Management System (KMS). It shall be also to be operable with LTE where LTE is proved.
- USB interface for downloading of log & other data for diagnostic purposes.

(B) Loco TCAS Radio Unit

Loco TCAS Radio Unit specifications shall be similar to Stationary TCAS Radio unit. Loco TCAS Radio Unit shall have two UHF full duplex Radio modems with separate cable and antennae in hot standby mode to communicate with Stationary TCAS unit. Loco unit Antenna shall be Omni-directional & shall have vertical polarization.



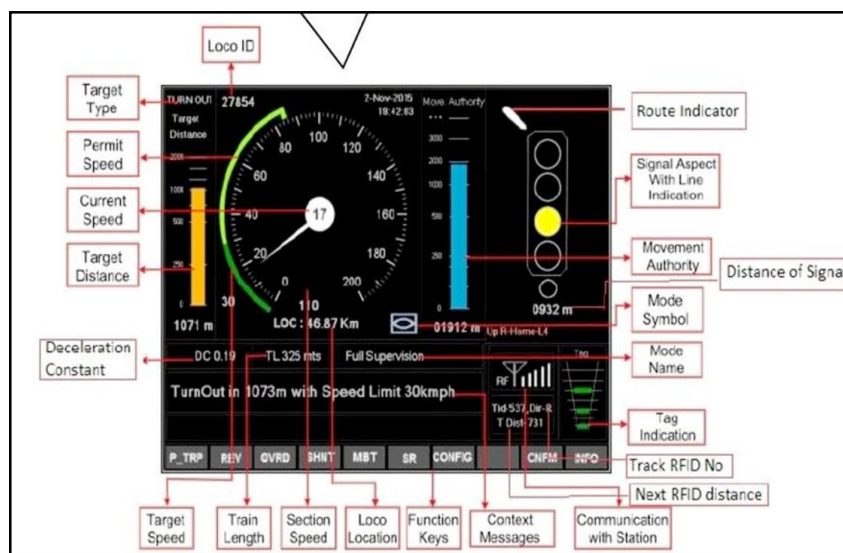
(C) RFID Reader

Each Loco TCAS unit shall have two RFID readers for getting the information from RFID tags fitted on the trackside in hot standby manner.



(D) Loco Pilot Machine Interface (DMI)

Most of the information displayed is in form of Analog Displays in form of Circular Gauges (Arcs) and bars keeping ergonomics and convenience of Loco Pilots. Digital values have also been additionally displayed. Audio prompts and warnings also are implemented.



(E) Brake Interface Unit (BIU)

BIU shall apply normal, service & emergency brakes of locomotives respectively based on the type of brake command received from Loco TCAS unit. In addition to these brakes, it shall also apply Loco brake, if Loco Brake command is generated by Loco TCAS.

BIU consists of two modules:

1. Electronic Module: It consists of a Control Card having built-in air brake control logic. Control Card interfaces with Analog Input Module, Digital Input Module & Digital Output Module to monitor and control air brake application/release.
2. Pneumatic Panel: It consists of different valves, pressure transducers and manual cocks-Interfaced with IRAB system & Electronic Module for brake control purpose.

Working of BIU:

- TCAS identifies the braking requirement.
- TCAS communicates braking signal(s) to BIU.
- BIU communicates signals to existing brake system of locomotive
- BIU communicates signal for cutting off traction of locomotive
- BIU generates audio-visual indication for Loco Pilot
- BIU gives status of execution of braking command to TCAS.

Details of spare contacts & space availability								ANNEXURE - B			
S. No.	Station/LC/ IBS	POINTS NWKR/RWKR		SIGNALS		TRACK CKT		Availability of Space in Relay Room		Data Logger Contact	
				ECRs		TPRs					
		Relays with Spare Contact s	Relays without Spare Contact s	Relays with Spare Contact s	Relays without Spare Contact s	Relays with Spare Contact s	Relays without Spare Contact s	For Rela y Rack	For TCA S	Spare	Total
1	IBS-2	0	0	3	8	0	0	NO	NO		
2	LC-3	0	0	5	7	0	0	NO	NO	7	64
3	Rohalkhurd	0	12	0	27	14	0	YES	YES	677	1024
4	LC-4	0	0	4	6	0	0	NO	NO	7	64
6	Mehidpur	0	18	1	28	10	2	YES	YES	43	512
7	LC-8	0	0	0	12	0	0	NO	NO	6	64
8	IBS-10	0	0	2	12	0	0	NO	NO	15	64
9	Luniricha	0	10	0	34	12	0	YES	YES	694	1024
11	IBS-17	0	0	2	12	0	0	NO	NO	15	64
12	LC-20	0	0	6	4	0	0	NO	NO	8	64
13	Vikramgarh Alot	2	10	7	15	5	9	YES	YES	582	1024
14	LC-21	0	0	1	9	0	0	NO	NO	1	64
15	IBH-23(LC-23 Non I/L	0	0	2	12	0	0	NO	NO	15	64
16	Thuria	12	4	9	32	10	4	YES	YES	232	
17	IBH-27	0	0	1	13	0	0	NO	NO	14	64
19	Talavali	0	2	4	18	9	0	YES	YES	664	1024
20	Chau Mahla	4	14	4	30	3	11	YES	YES	386	1024
22	IBH-35(5.9 KM)	0	0	4	13	0	0	NO	NO	NA	
23	Nathukhedi	0	0	0	14	4	0	YES	YES	262	512
24	LC-40	0	0	1	9	0	0	NO	NO	NA	
25	Suwasra	10	4	3	31	8	6	YES	YES	315	1024
27	IBS-HNU	0	0	6	8	0	0	YES	YES	NA	
28	Shamgarh	27	11	17	31	6	12	YES	YES	1450	2560
29	IBH-48	0	0	0	14	0	0	NO	NO	13	64

30	Garoth	10	2	22	7	14	0	YES	YES	425	1024
31	LC-53	0	0	3	9	0	0	NO	NO	50	64
32	IBH-55(6.17 KM)	0	0	0	14	0	0	NO	NO		
34	Kurlasi	10	4	15	19	12	4	YES	YES	335	1024
36	IBH-61	0	0	0	14	0	0	NO	NO		
37	Bhawani Mandi	6	10	10	18	4	10	YES	YES	89	512
38	LC-65	0	0	4	12	0	0	NO	NO	NA	64
39	IBH-69	0	0	3	11	0	0	NO	NO	16	64
40	Dhuankhedi	8	4	12	22	7	7	YES	YES	41	512
41	Jhalawar Rd	6	6	5	29	8	4	NO	NO	182	512
42	IBH-78	0	0	2	12	0	0	NO	NO	14	64
43	Ramganj Mandi	34	2	20	60	13	4	YES	YES	319	2560
44	IBS(RMA-MKX)-85	0	0	2	12	0	0	NO	NO	11	64
45	Morak	20	8	11	27	10	4	NO	NO	488	1024
47	Kanwalpura	8	0	4	28	7	4	YES	YES	201	512
48	IBH-KIW-DARA	0	0	2	12	0	0	NO	NO	15	64
55	DARA	11	5	14	24	13	1	YES	YES	252	1024
56	IBH-95	0	0	0	19	0	0	NO	NO	15	64
58	Ravtha Rd	21	0	17	22	15	0	YES	YES	166	1024
60	IBS(Dhanik asar)	0	0	0	14	0	0	NO	NO	16	64
61	Alaniya	12	0	22	10	12	0	YES	YES	164	512
62	Dadhdevi	17	7	14	19	13	1	NO	NO	335	1024
63	Dakaniya Talav	2	0	10	8	4	4	YES	YES	287	512
64	Kota South	36	0	0	39	3	0	NO	NO	156	512
65	Kota Central	72	0	5	39	9	0	YES	YES	392	512
66	Kota B	48	0	0	48	0	0	NO	NO	83	512
67	Kota C	9	1	0	19	8	0	NO	NO	283	512
69	Gurla	5	29	7	46	9	11	YES	YES	163	1024
	GQL-N	1	3	8	9	2	4			213	512
71	Keshorai Patan	2	22	10	27	2	12	YES	YES	NA	
72	LC-117	0	0	2	5	0	0	NO	NO		

73	LC-118	0	0	6	2	0	0	NO	NO		64
74	IBS-119	0	0	1	19	0	0	NO	NO	365	512
75	LC-120	0	0	2	12	0	0	NO	NO		
76	Arnetha	10	2	14	18	12	1	NO	NO	426	1024
77	LC-124	0	0	8	5	0	0	NO	NO		
78	IBH-125	0	0	3	11	0	0	NO	NO	1	64
79	LC-126	0	0	7	3	0	0	NO	NO	5	64
81	Kapren	7	9	6	24	5	11	NO	NO	398	1024
82	LC128	0	0	3	9	0	0	NO	NO	NA	64
83	IBS-131	0	0	1	13	0	0	NO	NO	13	64
84	Ghat Ka Varana	6	4	14	20	0	12	YES	YES	343	1024
85	LC-135	0	0	8	3	0	0	NO	NO	11	64
86	IBS(LBN)	0	0	4	10	0	0	NO	NO	7	64
87	Laban	14	6	7	26	0	15	YES	YES	143	1024
88	LC-136(W)	0	0	0	14	0	0	NO	NO	11	64
89	Lakheri	0	26	1	48	0	18	YES	YES	173	1024
90	IBH-LKE	0	0	0	14	0	0	NO	NO	21	64
91	LC-137	0	0	0	12	0	0	NO	NO	NA	
92	IDG	1	11	2	28	7	9	YES	YES	NA	
93	IBH-140 RMG	0	0	1	13	0	0	NO	NO	14	64
94	AMLI	0	12	0	34	2	14	YES	YES	3	512
96	Rawanjana Dungar	3	13	0	38	0	14	YES	YES	323	1024
98	IBS(RWJ)-144	0	0	1	10	0	0	NO	NO	26	64
99	Kushtala	1	11	3	31	11	3	NO	NO	27	512
100	LC-148	0	0	0	14	0	0	YES	YES		
101	SWM-A	30	0	26	5	6	0	NO	NO	112	
102	Sawai Madhopur	0	0	0	0	0	0	NO	NO	512	512
103	SWM-B	30	0	0	22	0	9	NO	NO	165	512
104	SWM-D	0	10	0	19	0	6	NO	NO	106	512
106	Ranthambore	1	11	0	34	8	6	YES	YES	13	512
107	IBS-159	0	0	0	14	0	0	NO	NO	25	64
108	LC-161	0	0	1	10	0	0	NO	NO	2	64
109	Mokholi	0	12	6	41	14	0	YES	YES	NA	
110	LC-163	0	0	0	15	0	0	NO	NO		

111	IBS(MXL)	0	0	0	14	0	0	NO	NO		
112	Malarna	16	0	0	34	14	0	YES	YES	103	512
114	Nimoda	12	0	7	25	11	1	YES	YES	654	1024
115	IBS-171	0	0	0	14	0	0	NO	NO	6	64
116	Narayanpur Tatwara	10	0	4	28	12	0	YES	YES	674	1024
117	IBH (LC- 173)	0	0	1	21	0	0	NO	NO	416	512
118	Lalpur Umri	10	0	0	32	14	0	YES	YES	684	1024
119	Gangapur City	0	42	2	51	5	10	YES	YES	1273	2560
120	LC-179X	0	0	0	8	0	0	NO	NO		
121	IBS-180	0	0	5	6	0	0	NO	NO	12	64
123	Chhoti Odai	10	6	10	32	10	4	YES	YES	147	1024
124	Piloda	10	6	13	22	14	0	NO	NO	215	1024
125	LC-189	0	0	7	3	0	0	NO	NO		
126	IBS-192	0	0	3	13	0	0	NO	NO	NA	64
127	Shri Mahabirji	5	9	1	33	5	11	NO	NO	NA	512
128	IBS-198	0	0	0	12	0	0	NO	NO	NA	64
129	LC-199	0	0	5	2	0	0	NO	NO	64	64
130	LC-200	0	0	6	2	0	0	NO	NO		
131	Hindaun City	14	4	2	39	11	1	YES	YES	771	1024
	LC-202	0	0	6	6	0	0				
132	IBS(DN HK)	0	0	4	9	0	0	NO	NO	23	64
133	LC-206	0	0	10	2	0	0	NO	NO	1	64
	LC-208	0	0	0	7	0	0			12	64
134	Fatehsingh Pura	0	8	0	28	11	2	NO	NO	528	1024
135	IBH(LC- 211)	0	0	0	14	0	0	NO	NO	1	64
136	Dumariya	0	12	0	30	6	6	YES	YES	30	512
137	LC-214	0	0	2	4	0	0	NO	NO		
138	IBS-216	0	0	0	12	0	0	NO	NO	1	64
139	LC-217	0	0	2	11	0	0	NO	NO	9	64
140	LC-219	0	0	1	6	0	0	YES	YES	4	64
141	Bayana	31	35	10	73	19	5	YES	YES	1419	2560
142	IBS-224	0	0	0	14	0	0	NO	NO	2	64

143	Keladevi	0	14	0	36	0	14	NO	NO	252	
145	IBS-229	0	0	0	14	0	0	NO	NO	14	64
146	Pingora	0	8	0	29	0	11	NO	NO	121	
147	LC-232	0	0	0	10	0	0	NO	NO	15	64
148	IBS(JCU)	0	0	0	16	0	0	NO	NO	11	64
149	Sewar	0	12	0	29	0	13	NO	NO	152	512
150	LC-239	0	0	0	9	0	0	NO	NO	12	64
151	IBS-242	0	0	0	14	0	0	NO	NO	4	64
152	Bharatpur	0	66	0	91	0	36	YES	YES	487	2048
153	LC-246	0	0	0	12	0	0	NO	NO	1	64
154	IBH-247	0	0	0	13	0	0	NO	NO	16	64
155	Dhaurmui Jaghina	0	14	0	33	0	18	NO	NO	390	512
156	Jajanpatti	0	12	0	34	0	12	NO	NO	1	512
157	IBH-258	0	0	0	14	0	0	NO	NO	4	64
158	Murhesi Rampur	0	12	0	34	0	12	NO	NO	8	512
159	IBH-265	0	0	0	14	0	0	NO	NO	NA	

POWER SUPPLY DETAILS										ANNEXURE - C	
S. No.	Station	LOC	ROUTE	Make	Date of Installation	No. of CVT	No. of SMR	No. of Inverter	No. of DC-DC Converter	IPS Serial No.	Specification No.
1	IBS-2 (RLK-NAD)	IBH	A	STATCON	29.07.2009	1	3	2	17	2k808533	RDSO/SPN/1 65/2004
2	LC - 3	LC	A	STATCON	18.03.2011	1	3	2	17	2k806404	RDSO/SPN/1 65/2004
3	RLK	Station	A	AMARRAJA	26.08.2020	3	6	5	48	03161845 000040705	RDSO/SPN/1 65/2012 ver 3.0
4	MEP	Station	A	STATCON	05.03.2009	3	6	4	44	2K807477	RDSO/SPN/1 65/2004
5	IBS-10 (MEP-LNR)	IBH	A	STATCON	06.12.2009	1	3	2	17	2K808531	RDSO/SPN/1 65/2004
6	LNR	Station	A	AMARRAJA	31.12.2019	3	6	4	44		
7	IBS-17 (LNR-VMA)	IBH	A	STATCON	26.05.2009	1	3	2	17	2K809619	RDSO/SPN/1 65/2004
8	VMA	Station	A	STATCON	15.04.2011	3	6	4	44	2K809562	RDSO/SPN/1 65/2004
9	IBS-23 (VMA-THUR)	IBH	A	STATCON	06.06.2009	1	3	2	17	2K809616	RDSO/SPN/1 65/2004
10	THUR	Station	A	AMARRAJA	21.04.2018	3	6	4	47	3.153E+10	RDSO/SPN/1 65/2012
11	IBS-27 (THUR-TLZ)	IBH	A	STATCON	24.06.2013	1	3	2	17	2K809617	RDSO/SPN/1 65/2004
12	TLZ	Station	A	AMARRAJA	28.01.2017	3	6	5	49	3163022 000010700	RDSO/SPN/1 65/2012
13	CMU	Station	A	STATCON	06.06.2009	3	6	4	44	2K811768	RDSO/SPN/1 65/2004
14	IBS-35 (CMU-NKH)	IBH	A	STATCON	25.02.2009	1	3	2	17	2K810678	RDSO/SPN/1 65/2004

POWER SUPPLY DETAILS										ANNEXURE - C	
S. No.	Station	LOC	ROUTE	Make	Date of Installation	No. of CVT	No. of SMR	No. of Inverter	No. of DC-DC Converter	IPS Serial No.	Specification No.
15	NKH	Station	A	STATCON	18.03.2009	2	3	2	17	2K809615	RDSO/SPN/1 65/2004
16	LC-40	LC	A	STATCON	10.01.2019	1	3	2	9	2K808529	RDSO/SPN/1 65/2004
17	SVA	Station	A	AMARRAJA	22.06.2017	3	6	5	42	3153026 00001	RDSO/SPN/1 65/2012 ver-03
18	IBH-HNU	IBH	A	STATCON	04.09.2018	1	6	2	42	12C02611H 2012	RDSO/SPN/1 65/2012
19	SGZ	Station	A	STATCON	27.07.2016	3	6	4	44	2K906454H 1/2009	RDSO/SPN/1 65/2004
20		Station	A	STATCON	27.07.2016	3	6	4	44	2K809564/ 2008	RDSO/SPN/1 65/2012
21	IBS-48 (SGZ-GOH)	IBH	A	STATCON	31.03.2009	1	3	2	19	2K809620/ 2008	RDSO/SPN/1 65/2004
22	GOH	Station	A	STATCON	30.09.2015	3	6	4	44	2K804347/ 2008	RDSO/SPN/1 65/2004
23	LC-53	LC	A	STATCON	19.07.2013	1	3	2	18	2K807499	RDSO/SPN/1 65/2004
24	IBS-55 (GOH-KRLS)	IBH	A	STATCON	25.03.2009	1	3	2	19	2K806408/ 2008	RDSO/SPN/1 65/2004
25	KRLS	Station	A	AMARRAJA	24.06.2018	3	6	5	48	03161845 000060705	RDSO/SPN/1 65/2012 ver-03.0
26	IBS-61 (KRLS-BWM)	IBH	A	STATCON	05.03.2009	1	3	2	18	2K810683/ 2008	RDSO/SPN/1 65/2004
27	BWM	Station	A	STATCON	04.06.2010	3	6	4	49	2K909676 H1/2009	RDSO/SPN/1 65/2012
28	IBS-69 (BWM-DKRA)	IBH	A	STATCON	17.03.2009	1	3	2	16	2K810677/ 2008	RDSO/SPN/1 65/2004

POWER SUPPLY DETAILS										ANNEXURE - C	
S. No.	Station	LOC	ROUTE	Make	Date of Installation	No. of CVT	No. of SMR	No. of Inverter	No. of DC-DC Converter	IPS Serial No.	Specification No.
29	DKRA	Station	A	STATCON	31.12.2008	3	6	4	44	2K804340/2004	RDSO/SPN/165/2004
30	JHW	Station	A	STATCON	11.06.2010	3	5	4	44	2K806449/2008	RDSO/SPN/165/2012
31	IBS-78 (JHW-RMA)	IBH	A	STATCON	30.01.2009	1	3	2	19	2k810680	RDSO/SPN/165/2004
32	RMA	Station	A	AMARRAJA	19.04.2017	3	10	5	73	03153034000010402	RDSO/SPN/165/2012
33		Station	A	AMARRAJA	19.04.2017	3	10	5	73	03153034000010705	RDSO/SPN/165/2012
34	IBS-85 (RMA-MKX)	IBH	A	STATCON	27.02.2009	1	3	2	19	2K810679	RDSO/SPN/165/2004
35	MKX	Station	A	STATCON	21.01.2010	3	6	4	44	2K908626 H-1	RDSO/SPN/165/2012
36	MKX	Station	A	STATCON	15.07.2020	3	6	4	44	2K909674 H-1	RDSO/SPN/165/2012
37	KIW	Station	A	STATCON	15.07.2010	3	6	4	44	2K909677 H-1	RDSO/SPN/165/2012
38	IBH DARA-KIW	IBH	A	HBL-NIFE	25.04.2019	1	4	3	17	2K18/1755 /D03S001401	RDSO/SPN/165/2012 ver-03
39	DARA	Station	A	AMARRAJA	15.01.2021	3	6	4	44		
40	IBS-95 (DARA-RDT)	IBH	A	STATCON	07.08.2009	1	3	2	19	2K810682	RDSO/SPN/165/2004
41	RDT	Station	A	AMARRAJA	21.06.2020	3	6	5	47	03161845000080705	RDSO/SPN/165/2012Version 3.0
42	IBS-DKQ (RDT-ALNI)	IBH	A	STATCON	27.08.2009	1	3	2	19	2K809618	RDSO/SPN/165/2004

POWER SUPPLY DETAILS										ANNEXURE - C	
S. No.	Station	LOC	ROUTE	Make	Date of Installation	No. of CVT	No. of SMR	No. of Inverter	No. of DC-DC Converter	IPS Serial No.	Specification No.
43	ALNI	Station	A	STATCON	20.09.2012	3	6	4	44	12CO2588 H-1	RDSO/SPN/1 65/2012
44	DDV	Station	A	STATCON	28.06.2012	3	6	4	44	12CO2590 H-1	RDSO/SPN/1 65/2012
45	DKNT	Station	A	STATCON	12.08.2012	3	6	4	44	12CO2589 H-1	RDSO/SPN/1 65/2012
46	KTSC	Station	A	AMARRAJA	10.05.2018	3	6	5	41	3161851 000010705	RDSO/SPN/1 65/2012 version-3.0
47	KOTA-Center Cabin	Station	A	AMARRAJA	10.05.2018	0	6	3	20	3161849 000010402	RDSO/SPN/1 65/2012 version-3.0
48		Station	A	AMARRAJA	10.05.2018	2	6	3	25	3161853 000010604	RDSO/SPN/1 65/2012 version-3.0
49	KOTA B	Station	A	AMARRAJA	10.05.2018	2	5	3	44	3161853 000020604	RDSO/SPN/1 65/2012 version-3.0
50	KCCN	Station	A	AMARRAJA	10.05.2018	3	6	5	40	3161851 000020705	RDSO/SPN/1 65/2012 version-3.0
51	GQL	Station	A	STATCON	28.11.2008	3	6	4	44	2K807475 D00H00	RDSO/SPN/1 65/2004
52	GQL N	Station	A	STATCON	10.01.2009	3	6	4	44	2K806419 D00H01	RDSO/SPN/1 65/2004
53	GQL W	Station	C	STATCON	01.02.2016	3	6	4	48	12CO2632 H-1	RDSO/SPN/1 65/2012
54	KPTN	Station	A	STATCON	25.09.2009	3	6	4	44	2K811762	RDSO/SPN/1 65/2004

POWER SUPPLY DETAILS										ANNEXURE - C	
S. No.	Station	LOC	ROUTE	Make	Date of Installation	No. of CVT	No. of SMR	No. of Inverter	No. of DC-DC Converter	IPS Serial No.	Specification No.
55	LC-118	LC	A	STATCON	07.03.2019	3	5	4	8	2K809567	RDSO/SPN/1 65/2004 Amd-05
56	IBS-119 (KPTN-ARE)	IBH	A	HBL-NIFE	30.07.2019	1	4	3	18	IPS/FRPC 2K18/1756 /DO3S001 HO1	RDSO/SPN/1 65/2012 ver-03
57	LC-120	LC	A	STATCON	03.06.2010	1	3	2	17	2K808530	RDSO/SPN/1 65/2004
58	ARE	Station	A	STATCON	28.12.2012	3	6	4	50	12CO266 H-1	RDSO/SPN/1 65/2004
59	LC-124	LC	A	STATCON	12.09.2013	3	5	4	40	12CO2613 H-1	RDSO/SPN/1 65/2004
60	IBS-125 (ARE-KPZ)	IBH	A	STATCON	04.01.2013	3	3	4	27	12CO2602 H-1	RDSO/SPN/1 65/2004 VERD00 H01
61	LC-126	LC	A	STATCON	15.06.2017	1	3	2	12	2K806409/2008	RDSO/SPN/1 65/2004 VERD00 H01
62	KPZ	Station	A	STATCON	08.01.2014	3	7	4	54	13E10092 H-1/2013D00 H01	RDSO/SPN/1 65/2012 VER
63	LC-128 (KPZ-GKB)	LC	A	HBL-NIFE	04.04.2016	1	3	3	16	2K12/312/D02 H-02	RDSO/SPN/1 63/2004 AMD-5
64	IBS-131 (KPZ-GKB)	IBH	A	HBL-NIFE	30.10.2012	1	4	3	21	2K11/105/D02/H01	RDSO/SPN/1 65/2004
65	GKB	Station	A	AMARRAJA	16.07.2019	3	6	5	47	03153028 000030705	RDSO/SPN/1 65/2012 version-3.0
66	LC-135 (GKB-LBN)	LC	A	HBL-NIFE	18.04.2015	1	3	3	25	HBL/2K12/315/D02	RDSO/SPN/1 65/2004

POWER SUPPLY DETAILS										ANNEXURE - C	
S. No.	Station	LOC	ROUTE	Make	Date of Installation	No. of CVT	No. of SMR	No. of Inverter	No. of DC-DC Converter	IPS Serial No.	Specification No.
67	IBS (GKB-LBN)	IBH	A	HBL-NIFE	30.09.2012	1	4	3	23	2K11/104/D02/H01	RDSO/SPN/1 63/2004 AMD-6
68	LBN	Station	A	AMARRAJA	18.02.2019	3	6	5	48	03161845 000010705	RDSO/SPN/1 65/2012 version-3.0
69	LC-136 W	LC	A	STATCON	06.06.2018	2	3	4	17	12CO2620 H1 D00H01-2012	RDSO/SPN/1 65/2004
70	LKE	Station	A	STATCON	21.03.2011	3	4	4	45	2K806447 D00H00 2008	RDSO/SPN/1 65/2004
71	IBH-LKE	IBH	A	HBL-NIFE	28.07.2012	1	2	2	14	IPS/2K11/1 06/002/HB L/H01 D02H01 2011	RDSO/SPN/1 65/2004
72	LC137	LC	A	HBL-NIFE	19.03.2021	1	4	3	13	IPS/FRBC of DCDB/2K1 9/2667/D0 3S001H11	
73	IDG	Station	A	STATCON	27.10.2009	3	4	4	42	2K804341 D00H00 2007	RDSO/SPN/1 65/2004
74	IBH-140 Ramnagar (IDG-AMLI)	IBH	A	STATCON	17.10.2016	1	3	2	16	2KD00518 H1 D00H01 2010	RDSO/SPN/1 65/2004
75	AMLI	Station	A	STATCON	31.12.2007	3	4	4	34	2K708459 D00H00 2007	RDSO/SPN/1 65/2004
76	RWJ	Station	A	AMARRAJA	27.12.2018	3	5	4	48	3153028 000050700	RDSO/SPN/1 65/2012 ver-03
POWER SUPPLY DETAILS										ANNEXURE - C	

S. No.	Station	LOC	ROUTE	Make	Date of Installation	No. of CVT	No. of SMR	No. of Inverter	No. of DC-DC Converter	IPS Serial No.	Specification No.
77	IBS-144 (RWJ-KTA)	IBH	A	HBL-NIFE	17.03.2013	1	2	2	14	2K11/099/D02H01 D02H01 2004	RDSO/SPN/1 65/2004
78	KTA	Station	A	STATCON	25.05.2009	3	5	4	37	2K811781 D00H00 2008	RDSO/SPN/1 65/2004
79	SWM-A	Station	A	STATCON	15.09.2011	3	4	4	40	2K908622H 1 D00H01 2009	RDSO/SPN/1 65/2004
80	SWM CENTRAL	Station	A	STATCON	15.09.2011	0	4	0	10	2K908666H 1 D00H01 2009	RDSO/SPN/1 65/2004
81	SWM-B	Station	A	STATCON	15.09.2011	3	4	4	37	2K908623H 1 D00H01 2009	RDSO/SPN/1 65/2004
82	SWM 'D'	Station	A	STATCON	04.05.2013	3	4	4	30	2XE00621H 1 D00H01 2010	RDSO/SPN/1 65/2004
83	RNT	Station	A	STATCON	24.01.2010	3	4	4	35	2K909699H 1 D00H01 2009	RDSO/SPN/1 65/2004
84	IBS-159 (RNT-MXL)	IBH	A	HBL-NIFE	24.06.2013	1	3	2	14	2K11/098/D02H01 D02H01 2004	RDSO/SPN/1 65/2004
85	MXL	Station	A	STATCON	15.09.2009	3	6	4	44	2K811765	RDSO/SPN/1 65/2004
86	LC-163	LC	A	STATCON	06.01.2012	3	6	4	44	12CO2630 H1	RDSO/SPN/1 65/2004
87	IBS MXL-MLZ	IBH	A	HBL-NIFE	12.11.2013	1	4	3	25	2K11/101/D02HO	RDSO/SPN/1 65/2004
88	MLZ	Station	A	STATCON	27.03.2010	3	6	4	47	2K909675H 1	RDSO/SPN/1 65/2004
89	NMD	Station	A	AMARRAJA							

POWER SUPPLY DETAILS										ANNEXURE - C	
S. No.	Station	LOC	ROUTE	Make	Date of Installation	No. of CVT	No. of SMR	No. of Inverter	No. of DC-DC Converter	IPS Serial No.	Specification No.
90	IBS-171 (NMD-NNW)	IBH	A	HBL-NIFE	30.01.2013	1	4	3	25	2K11/102/D02HO	RDSO/SPN/1 65/2004
91	NNW	Station	A	AMARRAJA	09.07.2021	3	6	4	47		
92	IBS NNW-LRU	IBH	A	HBL-NIFE	16.08.2013	1	4	3	25	2K11/100/D02HO	RDSO/SPN/1 65/2004
93	LC-173 (NNW-LRU)	IBH	A	HBL-NIFE	18.11.2019	1	4	3	18		RDSO/SPN/1 65/2012 ver-03
94	LRU	Station	A	AMARRAJA	16.02.2021	3	6	6	50		RDSO/SPN/1 65/2012 ver-04
95	GGC	Station	A	AMARRAJA	22.07.2021	3	6	4	50		
96	LC-179 X	LC	A	STATCON	05.02.2012	1	3	2	19	2K807498	RDSO/SPN/1 65/2004
97	IBS-180 (GGC-COO)	IBH	A	STATCON	22.08.2007	1	3	2	19	2K611457	RDSO/SPN/1 65/2004
98	COO	Station	A	AMARRAJA	29.08.2019	3	6	5	48	031618450 00070701-05	RDSO/SPN/1 65/2012 ver-03
99	PDZ	Station	A	AMARRAJA	14.08.2017	3	6	4	47	03153026 000020-705	RDSO/SPN/1 65/2012
100	IBS-192 (PDZ-SMBJ)	IBH	A	STATCON	13.10.2008	1	3	2	17	2K804356	RDSO/SPN/1 65/2004
101	SMBJ	Station	A	STATCON	11.08.2010	2	6	4	44	2K909684 H-1	RDSO/SPN/1 65/2012
102	IBS-198 (SMBJ-HAN)	IBH	A	STATCON	18.11.2008	1	3	2	17	2K804355	RDSO/SPN/1 65/2004

POWER SUPPLY DETAILS										ANNEXURE - C	
S. No.	Station	LOC	ROUTE	Make	Date of Installation	No. of CVT	No. of SMR	No. of Inverter	No. of DC-DC Converter	IPS Serial No.	Specification No.
103	LC-199	LC	A	STATCON	15.04.2012	1	3	2	17	2k808534	RDSO/SPN/1 65/2004
104	HAN	Station	A	STATCON	27.05.2014	2	6	4	44	12C02619 H-1	RDSO/SPN/1 65/2012
105	LC-206	LC	A	STATCON	02.07.2019	3	6	4	47	12C02607H 1	RDSO/SPN/1 65/2004
106	IBS-Hukmi khera (HAN-FSP)	IBH	A	STATCON	12.12.2008	1	3	2	17	2K809621	RDSO/SPN/1 65/2004
107	FSP	Station	A	STATCON	15.09.2009	2	6	4	44	2K811763	RDSO/SPN/1 65/2004
108	IBS-211 (FSP-DY)	IBH	A	STATCON	27.12.2008	1	3	2	17	2K806453	RDSO/SPN/1 65/2004
109	DY	Station	A	STATCON	18.02.2010	2	6	4	44	2K909680 H-1	RDSO/SPN/1 65/2012
110	IBS-216 (DY-BXN)	IBH	A	STATCON	12.12.2008	1	3	2	17	2K806407	RDSO/SPN/1 65/2004
111	LC-217	LC	A	AMARRAJA	22.01.2011	1	2	2	9	03110465 000040401	RDSO/SPN/1 65/2012
112	BXN	Station	A	AMARRAJA	21.10.2020	3	6	5	48		RDSO/SPN/1 65/2012 ver 3.0
113	BXN	Station	A	AMARRAJA	21.10.2020	3	6	5	48		RDSO/SPN/1 65/2012 ver 3.0
114	IBS-224 (BXN-KEV)	IBH	A	STATCON	08.11.2010	1	3	2	17	2K808532	RDSO/SPN/1 65/2012

POWER SUPPLY DETAILS										ANNEXURE - C	
S. No.	Station	LOC	ROUTE	Make	Date of Installation	No. of CVT	No. of SMR	No. of Inverter	No. of DC-DC Converter	IPS Serial No.	Specification No.
115	KEV	Station	A	AMARRAJA	07.08.2018	1	6	5	47	03153028 000060705	RDSO/SPN/1 65/2012
116	IBS-229 (KEV-PNGR)	IBH	A	STATCON	16.12.2008	1	3	2	17	2K806454	RDSO/SPN/1 65/2012
117	PNGR	Station	A	STATCON	07.01.2010	2	6	4	44	2K9096794 1	RDSO/SPN/1 65/2012
118	LC232	LC	A	HBL-NIFE	18.01.2022	1	3	3	11		
119	IBS-JCU (PNGR-SWAR)	IBH	A	STATCON	26.11.2008	1	3	2	17	2K806406	RDSO/SPN/1 65/2012
120	SWAR	Station	A	STATCON	05.08.2010	2	6	4	44	2K806417	RDSO/SPN/1 65/2012
121	IBS-242 (BTE-SWAR)	IBH	A	STATCON	31.03.2008	1	3	2	17	2K804354	RDSO/SPN/1 65/2012
122	BTE	Station	A	STATCON	28.08.2008	2	6	4	44	2K709484	RDSO/SPN/1 65/2012
123		Station	A	STATCON	28.08.2008	2	6	4	44	2K709486	RDSO/SPN/1 65/2012
124	LC-246	LC	A	STATCON	18.01.2013	1	3	2	17		RDSO/SPN/1 65/2012
125	IBH-247 (BTE-DUM)	IBH	A	STATCON	10.09.2008	1	3	2	17	2K804353	RDSO/SPN/1 65/2012
126	DUM	Station	A	STATCON	29.05.2010	2	6	4	44	2K806416	RDSO/SPN/1 65/2012
127	JJA	Station	A	STATCON	09.10.2010	2	6	4	44	2K9096784 1	RDSO/SPN/1 65/2012

POWER SUPPLY DETAILS										ANNEXURE - C	
S. No.	Station	LOC	ROUTE	Make	Date of Installation	No. of CVT	No. of SMR	No. of Inverter	No. of DC-DC Converter	IPS Serial No.	Specification No.
128	IBS-258 (JJA-MSRP)	IBH	A	STATCON	17.01.2009	1	3	2	17	2K810681	RDSO/SPN/165/2012
129	MSRP	Station	A	STATCON	23.12.2013	2	6	4	44	12CO2623 H-1	RDSO/SPN/165/2012
130	IBS-265 (MSRP-MTJ)	IBH	A	HBL-NIFE	28.02.2017	1	3	3	13		RDSO/SPN/165/2012
	Total	130				191	421	301	2937		

IMPORTAT-BRIDGES:**ANNEXURE -D**

The Site includes the following Important Bridges:

Sr. No.	Br. No.		Location	Type of Structure			No. of Span	Size of Span	No. of Span	Size of Span	No. of Span	Size of Span	Width (m)
				Foundation	Sub Structure	Super Structure							
1	34	UP	0746/23-01	Open	MCC	PG	10	18.29	0	0.00	0	0.00	6.10
2	34	DN	0746/24-02	Open	SM-LM	PG	10	18.29	0	0.00	0	0.00	4.72
3	41	UP	0760/07-15	Open	MCC	Composit	13	18.30	0	0.00	0	0.00	6.10
4	41	DN	0760/06-16	Open	SM-LM	PG	10	18.29	2	24.38	0	0.00	4.72
5	147	UP	0865/01-07	Open	MCC	PG	2	5.27	10	9.77	0	0.00	6.10
6	147	DN	0865/02-08	Open	SM-LM	Arch	12	9.14	0	0.00	0	0.00	5.00
7	149	DN	0867/04-16	Open	SM-LM	Arch	16	9.14	0	0.00	0	0.00	6.44
8	149	UP	0867/05-15	Open	MCC	U-Slung	1	18.00	5	30.50	0	0.00	6.10
9	150	UP	0867/13-29	Open	MCC	Composit	10	18.30	0	0.00	0	0.00	6.10
10	180	UP	0896/27-31	Open	MCC	Composit	12	9.75	1	12.20	0	0.00	6.10
11	180	DN	0896/28-34	Open	SM-LM	Arch	13	9.14	0	0.00	0	0.00	4.57
12	211	UP	0922/27-11	Open	SM-LM	U-Slung	14	30.48	2	18.29	0	0.00	15.34
13	211	DN	0922/28-12	Open	SM-LM	PSC Girder	14	30.48	2	18.29	0	0.00	
14	250	UP	0979/13-23	Open	SM-LM	TOWG	2	24.38	3	30.48	0	0.00	7.16
15	250	DN	0979/12-20	Open & Pile	MCC	TOWG	5	30.50	0	0.00	0	0.00	8.53
16	343	UP	1054/17-27	Open & Well	SM-LM	U-Slung	3	45.72	5	12.19	1	18.29	4.88
17	343	DN	1054/18-28	Open & Well	SM-CM	TOWG	5	45.72	0	0.00	0	0.00	8.53
18	344	UP	1055/41-51	Open	SM-LM	Arch	13	9.15	0	0.00	0	0.00	2.74
19	344	DN	1055/42-52	Open	SM-CM	TOWG	4	30.48	1	9.15	0	0.00	6.10
20	356	UP	1069/19-37	Pile	MCC	Composit	16	18.00	0	0.00	0	0.00	12.30
21	356	DN	1069/20-38	Pile	MCC	Composit	16	18.00	0	0.00	0	0.00	
22	448	UP	1124/07-17	Well	MCC	U-Slung	5	30.48	0	0.00	0	0.00	6.10
23	448	DN	1124/08-18	Well	SM-LM	TOWG	5	30.48	0	0.00	0	0.00	4.88
24	494	UP	1158/07-17	Well	SM-CM	PG	15	18.29	0	0.00	0	0.00	6.10
25	494	DN	1158/08-18	Well	SM-CM	PG	15	18.29	0	0.00	0	0.00	6.10

DETAILS OF MAJOR BRIDGES													ANNEXURE - D	
Sr. No.	Block Section	Br. No.		Location	Type of Structure			No. of Span	Size of Span	No. of Span	Size of Span	No. of Span	Size of Span	Width (m)
					Foundation	Sub Structure	Super Structure							
1	NAD-RLK	4	UP	0698/21-23	Open	MCC	RCC Slab	3	6.10	0	0.00	0	0.00	6.10
2	NAD-RLK	4	DN	0698/22-24	Open	SM-LM	RCC Slab	3	6.10	0	0.00	0	0.00	4.88
3	NKH-SVA	44	UP	0765/13-15	Open	MCC	PG	3	12.20	0	0.00	0	0.00	6.10
4	NKH-SVA	44	DN	0765/14-16	Open	SM-LM	PG	3	12.19	0	0.00	0	0.00	4.88
5	GOH-KRLS	82	UP	0803/23-25	Open	MCC	RCC Slab	4	6.10	0	0.00	0	0.00	6.10
6	GOH-KRLS	82	DN	0803/24-26	Open	SM-LM	PSC Slab	4	6.10	0	0.00	0	0.00	4.88
7	KRLS-BWM	97	UP	0816/03-05	Open	SM-LM	PSC Slab	4	6.10	0	0.00	0	0.00	6.10
8	KRLS-BWM	97	DN	0816/04-06	Open	MCC	RCC Slab	4	6.10	0	0.00	0	0.00	6.10
9	KRLS-BWM	99	UP	0818/21-23	Open	SM-LM	PSC Slab	3	6.10	0	0.00	0	0.00	4.88
10	KRLS-BWM	99	DN	0818/22-24	Open	MCC	RCC Slab	3	6.10	0	0.00	0	0.00	6.10
11	BWM-DKRA	105	UP	0824/15-17	Open	MCC	PSC Slab	4	9.14	0	0.00	0	0.00	6.10
12	BWM-DKRA	105	DN	0824/16-18	Open	SM-LM	PG	4	9.14	0	0.00	0	0.00	6.10
13	BWM-DKRA	110	UP	0829/03-05	Open	MCC	PG	3	12.19	0	0.00	0	0.00	6.10
14	BWM-DKRA	110	DN	0829/04-06	Open	SM-LM	PG	3	12.19	0	0.00	0	0.00	4.87
15	DKRA-JHW	118	UP	0833/05-07	Open	MCC	PSC Slab	3	9.14	0	0.00	0	0.00	6.10
16	DKRA-JHW	118	DN	0833/06-08	Open	SM-LM	PG	3	9.14	0	0.00	0	0.00	6.10
17	JHW-RMA	134	UP	0843/25-27	Open	MCC	PSC Slab	9	6.10	0	0.00	0	0.00	4.88
18	JHW-RMA	134	DN	0843/26-28	Open	SM-LM	PSC Slab	9	6.10	0	0.00	0	0.00	5.49
19	RMA-MKX	139	UP	0850/13-15	Open	SM-LM	RCC Slab	3	6.10	0	0.00	0	0.00	4.88

20	RMA-MKX	139	DN	0850/14-16	Open	RCC	RCC Box	2	5.97	1	5.85	0	0.00	6.10
21	MKX-KIW	143	UP	0857/27-29	Open	MCC	RCC Slab	5	6.10	0	0.00	0	0.00	6.10
22	MKX-KIW	143	DN	0857/28-30	Open	SM-LM	RCC Slab	5	6.10	0	0.00	0	0.00	6.10
23	KIW-DARA	151	UP	0869/13-15	Open	MCC	PG	2	9.35	0	0.00	0	0.00	7.05
24	KIW-DARA	151	DN	0869/14-16	Open	SM-LM	PSC Slab	2	9.14	0	0.00	0	0.00	4.88
25	DARA-RDT	160	UP	0875/05-09	Open	SM-CM	RCC Slab	12	6.10	0	0.00	0	0.00	6.10
26	DARA-RDT	160	DN	0875/06-10	Open	SM-LM	RCC Slab	12	6.10	0	0.00	0	0.00	4.89
27	RDT-ALNI	184	UP	0898/37-39	Open	SM-CM	RCC Slab	6	3.66	0	0.00	0	0.00	10.19
28	RDT-ALNI	184	DN	0898/32-34	Open	SM-LM	Arch	6	3.66	0	0.00	0	0.00	4.57
29	ALNI-DDV	186	UP	0900/05-07	Open	SM-CM	RCC Slab	5	3.66	0	0.00	0	0.00	6.44
30	ALNI-DDV	186	DN	0900/06-08	Open	SM-LM	RCC Slab	5	3.66	0	0.00	0	0.00	4.80
31	ALNI-DDV	191	UP	0904/17-25	Open	SM-CM	Arch	11	9.14	0	0.00	0	0.00	5.93
32	ALNI-DDV	191	DN	0904/18-24	Open	SM-LM	Arch	11	9.14	0	0.00	0	0.00	4.57
33	DDV-DKNT	197	UP	0908/15-17	Open	SM-CM	PSC Slab	9	6.10	0	0.00	0	0.00	6.90
34	DDV-DKNT	197	DN	0908/16-18	Open	SM-LM	PSC Slab	9	6.10	0	0.00	0	0.00	6.90
35	DDV-DKNT	198	UP	0909/21-23	Open	SM-CM	PSC Slab	3	9.14	0	0.00	0	0.00	6.10
36	DDV-DKNT	198	DN	0909/22-24	Open	SM-LM	Arch	3	9.14	0	0.00	0	0.00	4.57
37	DDV-DKNT	199	UP	0910/23-25	Open	SM-CM	PSC Slab	6	6.10	0	0.00	0	0.00	6.10
38	DDV-DKNT	199	DN	0910/24-26	Open	SM-LM	PSC Slab	6	6.10	0	0.00	0	0.00	6.10
39	DDV-DKNT	200	UP	0910/31-33	Open	SM-LM	PSC Slab	5	6.10	0	0.00	0	0.00	6.10
40	DDV-DKNT	200	DN	0910/32-34	Open	SM-LM	PSC Slab	5	6.10	0	0.00	0	0.00	6.10
41	DDV-DKNT	201	UP	0911/15-17	Open	SM-LM	RCC Slab	5	3.66	0	0.00	0	0.00	6.10
42	DDV-DKNT	201	DN	0911/14-	Open	SM-LM	RCC Slab	5	3.66	0	0.00	0	0.00	6.10

				16										
43	DKNT-KOTA	202	UP	0912/11-13	Open	SM-LM	RCC Slab	5	3.66	0	0.00	0	0.00	6.10
44	DKNT-KOTA	202	DN	0912/10-14	Open	SM-LM	RCC Slab	5	3.66	0	0.00	0	0.00	6.10
45	DKNT-KOTA	203	UP	0913/07-09	Open	SM-LM	RCC Slab	12	3.66	0	0.00	0	0.00	6.10
46	DKNT-KOTA	203	DN	0913/06-10	Open	SM-LM	RCC Slab	12	3.66	0	0.00	0	0.00	5.87
47	DKNT-KOTA	205A	UP	0914/17-19	Open	SM-CM	TOWG	1	76.20	0	0.00	0	0.00	9.14
48	DKNT-KOTA	205A	DN	0914/18-20	Open	RCC	RCC Box	7	5.38	0	0.00	0	0.00	6.09
49	KPZ-GKB	237	UP	0956/11-13	Open	RCC	RCC Box	4	3.40	1	3.66	0	0.00	5.32
50	KPZ-GKB	237	DN	0956/12-14	Open	SM-LM	PSC Slab	5	3.66	0	0.00	0	0.00	4.88
51	LKE-IDG	254	UP	0982/39-01	Open	SM-CM	PG	1	17.53	0	0.00	0	0.00	6.10
52	LKE-IDG	254	DN	0982/40-02	Open	SM-LM	PG	1	18.29	0	0.00	0	0.00	4.88
53	IDG-AMLI	271	UP	0994/01-05	Open	MCC	PG	2	9.14	3	12.20	0	0.00	6.10
54	IDG-AMLI	271	DN	0994/02-06	Open	SM-LM	PG	2	9.14	3	12.20	0	0.00	4.88
55	IDG-AMLI	283	UP	1002/01-05	Open	MCC	PG	2	12.20	4	18.30	0	0.00	6.10
56	IDG-AMLI	283	DN	1002/02-06	Open	SM-LM	PG	2	12.20	4	18.30	0	0.00	4.88
57	AMLI-RWJ	290	UP	1006/05-07	Open	MCC	PG	2	6.02	1	12.07	0	0.00	6.10
58	AMLI-RWJ	290	DN	1006/06-08	Open	SM-CM	PG	2	6.10	1	12.20	0	0.00	4.88
59	AMLI-RWJ	297	UP	1009/03-05	Open	MCC	PG	1	10.34	2	7.65	0	0.00	6.10
60	AMLI-RWJ	297	DN	1009/04-06	Open	SM-CM	PG	1	12.20	2	9.14	0	0.00	4.88
61	KTA-SWM	322	UP	1027/17-19	Open	SM-LM	PG	2	18.30	0	0.00	0	0.00	17.69
62	KTA-SWM	322	DN	1027/18-20	Open	SM-CM	PSC Girder	2	16.75	0	0.00	0	0.00	
63	RNT-MXL	332	UP	1041/05-07	Open	SM-CM	PG	4	12.20	0	0.00	0	0.00	6.10
64	RNT-MXL	332	DN	1041/06-08	Open	SM-LM	RCC Slab	4	12.20	0	0.00	0	0.00	6.10

65	NNW-LRU	362	UP	1073/15-17	Open	MCC	PG	3	12.19	0	0.00	0	0.00	6.10
66	NNW-LRU	362	DN	1073/16-18	Open	RCC	RCC Box	6	4.95	0	0.00	0	0.00	4.88
67	NNW-LRU	374	UP	1085/03-05	Well	SM-LM	PG	1	18.29	0	0.00	0	0.00	5.00
68	NNW-LRU	374	DN	1085/04-06	Well	MCC	PG	1	17.53	0	0.00	0	0.00	6.10
69	LRU-GGC	379	UP	1089/05-07	Well	MCC	PG	1	17.53	0	0.00	0	0.00	4.88
70	LRU-GGC	379	DN	1089/06-08	Well	SM-LM	PG	1	18.29	0	0.00	0	0.00	6.10
71	LRU-GGC	381	UP	1091/01-03	Well	MCC	PG	1	12.19	0	0.00	0	0.00	4.88
72	LRU-GGC	381	DN	1091/02-04	Well	SM-LM	PG	1	12.19	0	0.00	0	0.00	6.10
73	HAN-FSP	475	UP	1143/01-09	Open	SM-LM	PG	6	18.29	0	0.00	0	0.00	4.88
74	HAN-FSP	475	DN	1143/02-10	Open	SM-CM	PG	6	17.53	0	0.00	0	0.00	6.10
75	BXN-KEV	529	UP	1179/11-15	Open	MCC	PG	5	12.19	0	0.00	0	0.00	10.82
76	BXN-KEV	529	DN	1179/12-16	Open	MCC	PG	5	12.19	0	0.00	0	0.00	
77	BXN-KEV	530	UP	1180/11-13	Open	SM-LM	RCC Slab	4	6.10	0	0.00	0	0.00	6.10
78	BXN-KEV	530	DN	1180/12-14	Open	MCC	RCC Slab	4	6.10	0	0.00	0	0.00	6.10
79	KEV-PNGR	532	UP	1182/01-05	Open	SM-LM	RCC Slab	6	6.10	0	0.00	0	0.00	6.10
80	KEV-PNGR	532	DN	1182/02-06	Open	MCC	RCC Slab	6	6.10	0	0.00	0	0.00	6.10
81	KEV-PNGR	534	UP	1184/19-23	Open	MCC	PG	5	12.19	0	0.00	0	0.00	6.10
82	KEV-PNGR	534	DN	1184/20-24	Open	RCC	RCC Box	10	4.775	0	0.00	0	0.00	4.88
83	KEV-PNGR	535	UP	1186/01-05	Open	MCC	PG	5	12.19	0	0.00	0	0.00	6.10
84	KEV-PNGR	535	DN	1186/02-06	Open	SM-LM	PG	5	12.19	0	0.00	0	0.00	4.88
85	PNGR-SWAR	541	UP	1191/17-19	Open	MCC	PG	2	12.20	0	0.00	0	0.00	5.18
86	PNGR-SWAR	541	DN	1191/18-20	Open	SM-LM	RCC Box	4	4.775	0	0.00	0	0.00	6.10
87	SWAR-BTE	575A	UP	1213/27-	Open	MCC	PG	2	8.19	3	9.15	0	0.00	6.10

				29										
88	SWAR-BTE	575A	DN	1213/28-30	Open	SM-LM	PG	2	8.19	3	9.15	0	0.00	6.10
89	DUM-JJA	598A	UP	1224/27-29	Open	MCC	PG	3	8.64	0	0.00	0	0.00	10.21
90	DUM-JJA	598A	DN	1224/28-30	Open	MCC	PG	3	8.64	0	0.00	0	0.00	
91	JJA-MSRP	611	UP	1231/23-25	Open	SM-CM	TOWG	1	30.50	0	0.00	0	0.00	6.10
92	JJA-MSRP	611	DN	1231/24-26	Open	SM-CM	PG	2	11.51	0	0.00	0	0.00	4.88

MINOR BRIDGES								ANNEXURE - E				
Sr. No.	Block Section	Br. No.		Location	Type of Structure			No. of Span	Size of Span	No. of Span	Size of Span	Width (m)
					Foundation	Sub Structure	Super Structure					
1	RLK-MEP	5	UP	0702/17-19	Open	RCC	RCC Box	2	3.94	0	0.00	8.10
2	RLK-MEP	5	DN	0702/18-20	Open	SM-LM	RCC Slab	2	3.66	0	0.00	4.90
3	RLK-MEP	6	UP	0703/07-09	Open	RCC	RCC Box	2	6.10	0	0.00	8.02
4	RLK-MEP	6	DN	0703/08-10	Open	SM-LM	PSC Slab	2	6.10	0	0.00	4.88
5	RLK-MEP	7	UP	0706/15-17	Open	RCC	RCC Box	1	1.83	0	0.00	10.82
6	RLK-MEP	7	DN	0706/24-26	Open	RCC	RCC Box	1	1.83	0	0.00	
7	RLK-MEP	8	UP	0708/09-11	Open	MCC	RCC Slab	1	0.91	0	0.00	4.97
8	RLK-MEP	8	DN	0708/10-12	Open	SM-LM	RCC Slab	1	0.91	0	0.00	6.10
9	RLK-MEP	9	UP	0710/03-05	Open	MCC	RCC Slab	1	3.66	0	0.00	5.32
10	RLK-MEP	9	DN	0710/04-06	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
11	RLK-MEP	10	UP	0712/09-11	Open	SM-LM	Pipe	3	0.61	0	0.00	11.04
12	RLK-MEP	10	DN	0712/10-12	Open	SM-LM	Pipe	3	0.61	0	0.00	
13	MEP-LNR	11	UP	0713/23-25	Open	MCC	RCC Slab	1	0.91	0	0.00	15.79
14	MEP-LNR	11	DN	0713/24-26	Open	SM-LM	Arch	1	0.91	0	0.00	
15	MEP-LNR	12	UP	0715/00-01	Open	RCC	RCC Box	1	1.83	0	0.00	5.05
16	MEP-LNR	12	DN	0715/00-02	Open	SM-LM	RCC Slab	1	1.83	0	0.00	4.88
17	MEP-LNR	13	UP	0715/19-21	Open	RCC	RCC Box	1	1.83	0	0.00	5.05

18	MEP-LNR	13	DN	0715/20-22	Open	SM-LM	RCC Slab	1	1.83	0	0.00	4.88
19	MEP-LNR	14	UP	0716/15-17	Open	MCC	RCC Slab	1	0.91	0	0.00	4.71
20	MEP-LNR	14	DN	0716/16-18	Open	SM-LM	RCC Slab	1	0.91	0	0.00	5.50
21	MEP-LNR	15	UP	0717/15-17	Open	RCC	RCC Box	1	1.83	0	0.00	5.05
22	MEP-LNR	15	DN	0717/16-18	Open	SM-LM	RCC Slab	1	1.83	0	0.00	5.16
23	MEP-LNR	16	UP	0718/01-03	Open	MCC	RCC Slab	1	0.91	0	0.00	4.72
24	MEP-LNR	16	DN	0718/02-04	Open	SM-LM	RCC Slab	1	0.91	0	0.00	6.10
25	MEP-LNR	17	UP	0719/29-01	Open	RCC	RCC Box	1	1.83	0	0.00	5.05
26	MEP-LNR	17	DN	0719/30-02	Open	SM-LM	RCC Slab	1	1.83	0	0.00	5.16
27	MEP-LNR	18	UP	0721/19-21	Open	MCC	RCC Slab	1	1.83	0	0.00	5.32
28	MEP-LNR	18	DN	0721/20-22	Open	SM-LM	RCC Slab	1	1.83	0	0.00	4.88
29	MEP-LNR	19	UP	0722/19-21	Open	RCC	RCC Box	1	3.66	0	0.00	5.32
30	MEP-LNR	19	DN	0722/20-22	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
31	LNR-VMA	20	UP	0723/29-31	Open	RCC	RCC Box	1	1.83	0	0.00	5.05
32	LNR-VMA	20	DN	0723/28-30	Open	SM-LM	RCC Slab	1	1.83	0	0.00	4.88
33	LNR-VMA	21	UP	0725/19-21	Open	RCC	RCC Box	1	6.10	0	0.00	5.32
34	LNR-VMA	21	DN	0725/20-22	Open	SM-LM	RCC Slab	1	6.10	0	0.00	4.88
35	LNR-VMA	22	UP	0727/03-05	Open	MCC	RCC Slab	1	6.10	0	0.00	5.73
36	LNR-VMA	22	DN	0727/04-06	Open	SM-LM	PSC Slab	1	6.10	0	0.00	4.88
37	LNR-VMA	23	UP	0730/13-15	Open	MCC	PSC Slab	1	9.14	0	0.00	5.32
38	LNR-VMA	23	DN	0730/14-16	Open	SM-LM	PSC Slab	1	9.14	0	0.00	4.88
39	LNR-VMA	24	UP	0730/21-23	Open	MCC	RCC Slab	1	0.61	0	0.00	4.72
40	LNR-VMA	24	DN	0730/22-24	Open	SM-LM	RCC Slab	1	0.61	0	0.00	6.10
41	LNR-VMA	25	UP	0731/01-03	Open	MCC	RCC Slab	1	0.46	0	0.00	4.85
42	LNR-VMA	25	DN	0731/02-04	Open	SM-LM	RCC Slab	1	0.46	0	0.00	7.65
43	LNR-VMA	26	UP	0731/07-09	Open	RCC	RCC Box	1	2.44	0	0.00	5.19
44	LNR-VMA	26	DN	0731/08-10	Open	SM-LM	RCC Slab	2	0.91	0	0.00	5.62
45	LNR-VMA	27	UP	0732/05-07	Open	MCC	RCC Slab	2	3.66	0	0.00	6.10
46	LNR-VMA	27	DN	0732/06-08	Open	SM-LM	RCC Slab	2	3.66	0	0.00	4.88

47	LNR-VMA	28	UP	0733/13-15	Open	MCC	RCC Slab	1	1.83	0	0.00	5.32
48	LNR-VMA	28	DN	0733/14-16	Open	SM-LM	RCC Slab	1	1.83	0	0.00	4.88
49	LNR-VMA	29	UP	0734/25-27	Open	MCC	RCC Slab	1	1.83	0	0.00	5.64
50	LNR-VMA	29	DN	0734/26-28	Open	SM-LM	RCC Slab	1	1.83	0	0.00	5.36
51	LNR-VMA	30	UP	0735/15-17	Open	SM-LM	RCC Slab	1	3.66	0	0.00	20.70
52	LNR-VMA	30	DN	0735/16-18	Open	SM-LM	RCC Slab	1	3.66	0	0.00	
53	VMA-THUR	31	UP	735/33-736/1	Open	MCC	RCC Slab	1	0.91	0	0.00	20.27
54	VMA-THUR	31	DN	0736/00-02	Open	SM-LM	RCC Slab	1	0.91	0	0.00	
55	VMA-THUR	32	UP	0737/01-03	Open	MCC	RCC Slab	1	0.91	0	0.00	4.75
56	VMA-THUR	32	DN	0737/02-04	Open	SM-LM	RCC Slab	1	0.91	0	0.00	4.40
57	VMA-THUR	33	UP	0737/25-27	Open	MCC	Pipe	1	0.50	0	0.00	7.50
58	VMA-THUR	33	DN	0737/26-28	Open	SM-LM	RCC Slab	1	0.46	0	0.00	7.33
59	THUR-TLZ	34A	UP	0748/03-05	Open	MCC	RCC Slab	1	3.05	0	0.00	6.10
60	THUR-TLZ	35	UP	0750/01-03	Open	MCC	Pipe	2	0.91	0	0.00	10.06
61	THUR-TLZ	35	DN	0749/28-02	Open	SM-LM	RCC Slab	1	0.91	0	0.00	5.14
62	THUR-TLZ	36	UP	0752/01-03	Open	MCC	Pipe	1	0.91	0	0.00	8.75
63	THUR-TLZ	36	DN	0752/02-04	Open	RCC	RCC Box	1	0.91	0	0.00	8.45
64	THUR-TLZ	37	UP	0752/11-13	Open	MCC	RCC Slab	1	2.44	0	0.00	6.10
65	THUR-TLZ	37	DN	0752/12-14	Open	MCC	RCC Slab	1	0.91	0	0.00	6.10
66	THUR-TLZ	37A	UP	0752/25-27	Open	MCC	Pipe	1	0.91	0	0.00	8.75
67	TLZ-CMU	38	UP	0753/27-29	Open	MCC	RCC Slab	1	2.00	0	0.00	11.19
68	TLZ-CMU	38	DN	0753/28-30	Open	MCC	RCC Slab	1	1.83	0	0.00	
69	TLZ-CMU	39	UP	756/27-757/1	Open	MCC	RCC Slab	1	6.10	0	0.00	5.93
70	TLZ-CMU	39	DN	756/28-757/2	Open	SM-LM	PSC Slab	1	6.10	0	0.00	4.88
71	TLZ-CMU	39B	UP	0757/15-17	Open	RCC	RCC Box	1	4.00	0	0.00	12.25
72	TLZ-CMU	39B	DN	0757/16-18	Open	RCC	RCC Box	1	4.00	0	0.00	
73	TLZ-CMU	39A	UP	0757/21-23	Open	MCC	RCC Slab	1	0.90	0	0.00	5.70
74	TLZ-CMU	39A	DN	0757/22-24	Open	SM-LM	Pipe	2	0.30	0	0.00	5.35
75	CMU-NKH	40	UP	0759/13-15	Open	MCC	RCC Slab	2	4.57	0	0.00	17.85

76	CMU-NKH	40	DN	0759/12-14	Open	SM-LM	PSC Slab	1	9.14	0	0.00	6.10
77	CMU-NKH	42	UP	0763/01-03	Open	MCC	RCC Slab	1	2.00	0	0.00	6.10
78	CMU-NKH	42	DN	0763/02-04	Open	MCC	RCC Slab	1	0.91	0	0.00	6.10
79	CMU-NKH	43	UP	0764/21-23	Open	MCC	RCC Slab	1	3.66	0	0.00	9.05
80	CMU-NKH	43	DN	0764/22-24	Open	SM-LM	Arch	1	3.66	0	0.00	14.64
81	CMU-NKH	46	UP	0768/09-11	Open	MCC	RCC Slab	1	3.05	0	0.00	21.94
82	CMU-NKH	46	DN	0768/10-12	Open	SM-LM	RCC Slab	1	3.05	0	0.00	
83	NKH-SVA	47	UP	0769/05-07	Open	MCC	RCC Slab	1	0.91	0	0.00	6.10
84	NKH-SVA	47	DN	0769/06-08	Open	SM-LM	RCC Slab	1	0.91	0	0.00	6.10
85	NKH-SVA	48	UP	0770/15-17	Open	RCC	RCC Box	2	6.10	0	0.00	5.32
86	NKH-SVA	48	DN	0770/16-18	Open	SM-LM	PSC Slab	2	6.10	0	0.00	4.88
87	NKH-SVA	49	UP	0772/27-29	Open	RCC	RCC Box	1	1.83	0	0.00	5.32
88	NKH-SVA	49	DN	0772/28-30	Open	SM-LM	RCC Slab	1	1.83	0	0.00	4.88
89	NKH-SVA	50	UP	0773/05-07	Open	MCC	RCC Slab	1	2.44	0	0.00	4.71
90	NKH-SVA	50	DN	0773/06-08	Open	RCC	RCC Box	1	2.44	0	0.00	7.69
91	SVA-SGZ	51	UP	0774/25-27	Open	MCC	PSC Slab	2	6.10	0	0.00	10.82
92	SVA-SGZ	51	DN	0774/26-28	Open	SM-LM	PSC Slab	2	6.10	0	0.00	
93	SVA-SGZ	52	UP	0775/01-03	Open	MCC	Pipe	1	0.40	0	0.00	5.00
94	SVA-SGZ	52	DN	0775/02-04	Open	SM-LM	Stone Slab	1	0.46	0	0.00	8.84
95	SVA-SGZ	53	UP	0776/07-09	Open	MCC	RCC Slab	1	6.10	0	0.00	5.53
96	SVA-SGZ	53	DN	0776/08-10	Open	SM-LM	PSC Slab	1	6.10	0	0.00	4.88
97	SVA-SGZ	54	UP	0777/07-09	Open	MCC	RCC Slab	2	3.66	0	0.00	28.45
98	SVA-SGZ	54	DN	0777/08-10	Open	SM-LM	Arch	2	3.66	0	0.00	
99	SVA-SGZ	55	UP	0777/19-21	Open	MCC	RCC Slab	1	2.00	0	0.00	10.82
100	SVA-SGZ	55	DN	0777/20-22	Open	SM-LM	RCC Slab	1	2.00	0	0.00	
101	SVA-SGZ	56	UP	0777/27-01	Open	MCC	RCC Slab	1	3.30	0	0.00	10.82
102	SVA-SGZ	56	DN	0777/28-02	Open	MCC	RCC Slab	1	3.50	0	0.00	
103	SVA-SGZ	57	UP	0779/23-25	Open	RCC	RCC Box	1	4.00	0	0.00	5.08
104	SVA-SGZ	57	DN	0779/24-26	Open	RCC	RCC Box	1	4.00	0	0.00	5.63

105	SVA-SGZ	58	UP	0780/25-27	Open	SM-LM	Pipe	1	0.91	0	0.00	14.72
106	SVA-SGZ	58	DN	0780/26-28	Open	SM-LM	Pipe	1	0.91	0	0.00	
107	SVA-SGZ	59	UP	0782/05-07	Open	MCC	RCC Slab	1	1.83	0	0.00	5.49
108	SVA-SGZ	59	DN	0782/06-08	Open	SM-LM	RCC Slab	1	0.91	0	0.00	4.88
109	SVA-SGZ	60	UP	0782/23-25	Open	MCC	Pipe	2	0.90	0	0.00	30.00
110	SVA-SGZ	60	DN	0782/24-26	Open	SM-LM	Arch	1	1.83	0	0.00	4.88
111	SVA-SGZ	61	UP	0783/15-17	Open	MCC	RCC Slab	1	3.05	0	0.00	6.10
112	SVA-SGZ	61	DN	0783/16-18	Open	RCC	RCC Box	1	3.05	0	0.00	19.81
113	SVA-SGZ	63	UP	0784/19-21	Open	MCC	RCC Slab	1	1.83	0	0.00	6.69
114	SVA-SGZ	63	DN	0784/20-22	Open	SM-LM	RCC Slab	1	1.83	0	0.00	6.10
115	SVA-SGZ	64	UP	0785/17-19	Open	MCC	RCC Slab	1	2.00	0	0.00	5.80
116	SVA-SGZ	64	DN	0785/18-20	Open	MCC	RCC Slab	1	2.00	0	0.00	6.40
117	SVA-SGZ	65	UP	0786/13-15	Open	MCC	RCC Slab	1	0.91	0	0.00	4.75
118	SVA-SGZ	65	DN	0786/14-16	Open	SM-LM	RCC Slab	1	0.91	0	0.00	6.10
119	SVA-SGZ	66	UP	0786/39-01	Open	SM-LM	RCC Slab	1	0.91	0	0.00	20.73
120	SVA-SGZ	66	DN	0786/40-02	Open	SM-LM	RCC Slab	1	0.91	0	0.00	
121	SGZ-GOH	67	UP	0788/17-19	Open	SM-LM	RCC Slab	1	3.66	0	0.00	5.31
122	SGZ-GOH	67	DN	0788/18-20	Open	RCC	RCC Box	1	3.66	0	0.00	4.88
123	SGZ-GOH	68	UP	0790/01-03	Open	SM-LM	RCC Slab	1	3.66	0	0.00	5.32
124	SGZ-GOH	68	DN	0790/02-04	Open	RCC	RCC Box	1	3.66	0	0.00	4.88
125	SGZ-GOH	69	UP	0791/23-25	Open	RCC	RCC Box	1	2.00	0	0.00	13.96
126	SGZ-GOH	69	DN	0791/24-26	Open	RCC	RCC Box	1	1.94	0	0.00	
127	SGZ-GOH	70	UP	0792/17-19	Open	MCC	RCC Slab	1	2.00	0	0.00	2.14
128	SGZ-GOH	70	DN	0792/18-20	Open	SM-LM	Arch	1	1.83	0	0.00	9.76
129	SGZ-GOH	71	UP	0793/21-23	Open	RCC	RCC Box	1	1.94	0	0.00	14.97
130	SGZ-GOH	71	DN	0793/22-24	Open	RCC	RCC Box	1	1.94	0	0.00	
131	SGZ-GOH	72	UP	0796/03-05	Open	MCC	Pipe	1	0.91	0	0.00	6.10
132	SGZ-GOH	72	DN	0796/04-06	Open	SM-LM	Arch	1	0.91	0	0.00	12.70
133	SGZ-GOH	73	UP	0797/03-05	Open	MCC	RCC Slab	1	2.00	0	0.00	3.58

134	SGZ-GOH	73	DN	0797/04-06	Open	SM-LM	Arch	1	1.83	0	0.00	12.00
135	SGZ-GOH	74	UP	0797/07-09	Open	MCC	Pipe	1	0.40	0	0.00	5.00
136	SGZ-GOH	74	DN	0797/08-10	Open	SM-LM	RCC Slab	1	0.30	0	0.00	6.10
137	GOH-KRLS	75	UP	0799/01-03	Open	MCC	RCC Slab	1	0.91	0	0.00	5.18
138	GOH-KRLS	75	DN	0799/02-04	Open	SM-LM	RCC Slab	1	0.91	0	0.00	5.63
139	GOH-KRLS	76	UP	0800/03-05	Open	MCC	RCC Slab	1	1.83	0	0.00	5.21
140	GOH-KRLS	76	DN	0800/04-06	Open	SM-LM	RCC Slab	1	1.83	0	0.00	5.64
141	GOH-KRLS	77	UP	0800/27-01	Open	RCC	RCC Box	1	1.83	0	0.00	5.33
142	GOH-KRLS	77	DN	0800/28-02	Open	RCC	RCC Box	1	1.83	0	0.00	4.88
143	GOH-KRLS	78	UP	0801/23-25	Open	MCC	RCC Slab	1	3.26	1	4.78	5.19
144	GOH-KRLS	78	DN	0801/24-26	Open	MCC	RCC Slab	1	3.10	1	4.60	5.62
145	GOH-KRLS	79	UP	0802/15-17	Open	MCC	RCC Slab	1	2.00	0	0.00	5.19
146	GOH-KRLS	79	DN	0802/16-18	Open	SM-LM	RCC Slab	1	0.91	0	0.00	5.62
147	GOH-KRLS	80	UP	0802/25-27	Open	MCC	RCC Slab	1	2.00	0	0.00	5.19
148	GOH-KRLS	80	DN	0802/26-28	Open	RCC	RCC Box	1	2.00	0	0.00	5.63
149	GOH-KRLS	81	UP	0803/05-07	Open	MCC	Pipe	1	0.61	0	0.00	5.00
150	GOH-KRLS	81	DN	0803/06-08	Open	SM-LM	Stone Slab	1	0.61	0	0.00	8.20
151	GOH-KRLS	83	UP	0804/11-13	Open	RCC	RCC Box	1	3.05	0	0.00	12.31
152	GOH-KRLS	83	DN	0804/10-12	Open	RCC	RCC Box	3	0.91	0	0.00	15.39
153	GOH-KRLS	84	UP	0804/21-23	Open	MCC	RCC Slab	1	2.00	0	0.00	6.10
154	GOH-KRLS	84	DN	0804/22-24	Open	RCC	RCC Box	1	0.91	0	0.00	9.13
155	GOH-KRLS	85	UP	0806/07-09	Open	MCC	RCC Slab	1	2.00	0	0.00	6.10
156	GOH-KRLS	85	DN	0806/08-10	Open	SM-LM	RCC Slab	1	0.91	0	0.00	6.10
157	GOH-KRLS	86	UP	0807/03-05	Open	RCC	RCC Box	4	4.00	0	0.00	4.72
158	GOH-KRLS	86	DN	0807/04-06	Open	SM-LM	Arch	4	3.66	0	0.00	7.72
159	GOH-KRLS	87	UP	0807/13-15	Open	RCC	RCC Box	1	4.57	0	0.00	9.82
160	GOH-KRLS	87	DN	0807/14-16	Open	SM-LM	Arch	1	4.57	0	0.00	7.10
161	GOH-KRLS	88	UP	0808/03-05	Open	MCC	RCC Slab	1	0.91	0	0.00	4.64
162	GOH-KRLS	88	DN	0808/04-06	Open	SM-LM	Stone Slab	1	0.91	0	0.00	6.00

163	KRLS-BWM	89	UP	0809/11-13	Open	MCC	RCC Slab	1	3.50	0	0.00	14.84
164	KRLS-BWM	89	DN	0809/12-14	Open	SM-LM	Arch	1	3.66	0	0.00	
165	KRLS-BWM	90	UP	0810/11-13	Open	RCC	RCC Box	1	3.66	0	0.00	5.60
166	KRLS-BWM	90	DN	0810/12-14	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
167	KRLS-BWM	92	UP	0811/21-23	Open	MCC	Pipe	2	0.60	0	0.00	6.10
168	KRLS-BWM	92	DN	0811/20-22	Open	SM-LM	RCC Slab	1	0.91	0	0.00	4.88
169	KRLS-BWM	93	UP	0812/15-17	Open	MCC	RCC Girder	1	7.50	0	0.00	6.10
170	KRLS-BWM	93	DN	0812/16-18	Open	SM-LM	RCC Slab	2	3.66	0	0.00	4.88
171	KRLS-BWM	94	UP	0813/01-03	Open	MCC	RCC Slab	1	2.00	0	0.00	6.10
172	KRLS-BWM	94	DN	0813/02-04	Open	SM-LM	Stone Slab	1	0.91	0	0.00	7.77
173	KRLS-BWM	95	UP	0813/13-15	Open	MCC	Pipe	2	0.91	0	0.00	6.10
174	KRLS-BWM	95	DN	0813/14-16	Open	SM-LM	Pipe	2	0.91	0	0.00	6.10
175	KRLS-BWM	96	UP	0815/13-15	Open	SM-LM	Stone Slab	1	0.91	0	0.00	13.79
176	KRLS-BWM	96	DN	0815/14-16	Open	RCC	RCC Box	1	2.00	0	0.00	8.01
177	KRLS-BWM	98	UP	0816/17-19	Open	SM-LM	Arch	1	4.57	0	0.00	6.10
178	KRLS-BWM	98	DN	0816/18-20	Open	RCC	RCC Box	1	5.00	0	0.00	7.18
179	KRLS-BWM	100	UP	0819/09-11	Open	SM-LM	RCC Slab	3	3.66	0	0.00	4.88
180	KRLS-BWM	100	DN	0819/10-12	Open	MCC	RCC Slab	3	3.66	0	0.00	6.10
181	KRLS-BWM	101	UP	0820/07-09	Open	SM-LM	Stone Slab	3	0.91	0	0.00	20.25
182	KRLS-BWM	101	DN	0820/06-08	Open	MCC	RCC Slab	1	3.50	0	0.00	6.10
183	BWM-DKRA	102	UP	0821/19-21	Open	MCC	RCC Slab	1	0.91	0	0.00	6.10
184	BWM-DKRA	102	DN	0821/20-22	Open	SM-LM	Pipe	1	0.91	0	0.00	6.10
185	BWM-DKRA	103	UP	0822/29-31	Open	MCC	RCC Slab	1	3.66	0	0.00	6.10
186	BWM-DKRA	103	DN	0822/30-32	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
187	BWM-DKRA	104	UP	0823/11-13	Open	MCC	RCC Slab	1	3.66	0	0.00	6.10
188	BWM-DKRA	104	DN	0823/12-14	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
189	BWM-DKRA	106	UP	0824/23-25	Open	MCC	RCC Slab	1	1.83	0	0.00	6.10
190	BWM-DKRA	106	DN	0824/24-26	Open	SM-LM	Arch	1	1.85	0	0.00	9.18
191	BWM-DKRA	107	UP	0825/07-09	Open	MCC	RCC Slab	1	1.83	0	0.00	6.10

192	BWM-DKRA	107	DN	0825/08-10	Open	SM-LM	RCC Slab	1	1.83	0	0.00	4.87
193	BWM-DKRA	108	UP	0826/17-19	Open	MCC	Pipe	3	0.91	0	0.00	6.25
194	BWM-DKRA	108	DN	0826/18-20	Open	SM-LM	RCC Slab	2	0.91	0	0.00	6.10
195	BWM-DKRA	109	UP	0827/17-19	Open	MCC	RCC Slab	1	1.83	0	0.00	6.10
196	BWM-DKRA	109	DN	0827/18-20	Open	SM-LM	RCC Slab	1	1.83	0	0.00	6.10
197	BWM-DKRA	111	UP	0829/23-25	Open	MCC	RCC Slab	2	3.66	0	0.00	6.10
198	BWM-DKRA	111	DN	0829/24-26	Open	SM-LM	RCC Slab	2	3.66	0	0.00	4.88
199	BWM-DKRA	112	UP	0830/09-11	Open	MCC	RCC Slab	1	1.83	0	0.00	6.10
200	BWM-DKRA	112	DN	0830/10-12	Open	SM-LM	RCC Slab	1	1.83	0	0.00	4.88
201	BWM-DKRA	113	UP	0830/19-21	Open	MCC	Pipe	1	0.40	0	0.00	31.00
202	BWM-DKRA	113	DN	0830/20-22	Open	SM-LM	Pipe	1	0.38	0	0.00	
203	DKRA-JHW	114	UP	0830/31-01	Open	MCC	Pipe	1	0.40	0	0.00	22.58
204	DKRA-JHW	114	DN	0830/32-02	Open	SM-LM	Pipe	1	0.30	0	0.00	
205	DKRA-JHW	115	UP	0831/01-03	Open	MCC	RCC Slab	1	2.00	0	0.00	5.18
206	DKRA-JHW	115	DN	0831/02-04	Open	SM-LM	RCC Slab	1	0.91	0	0.00	19.06
207	DKRA-JHW	116	UP	0831/01-03	Open	MCC	Pipe	1	0.40	0	0.00	23.66
208	DKRA-JHW	116	DN	0831/02-04	Open	SM-LM	Pipe	1	0.30	0	0.00	
209	DKRA-JHW	117	UP	0832/17-19	Open	MCC	Pipe	1	0.40	0	0.00	6.10
210	DKRA-JHW	117	DN	0832/18-20	Open	SM-LM	Stone Slab	1	0.30	0	0.00	6.10
211	DKRA-JHW	119	UP	0833/15-17	Open	MCC	RCC Slab	2	3.66	0	0.00	6.10
212	DKRA-JHW	119	DN	0833/16-18	Open	SM-LM	RCC Slab	2	3.66	0	0.00	4.88
213	DKRA-JHW	120	UP	0834/01-03	Open	MCC	RCC Slab	1	1.83	0	0.00	6.10
214	DKRA-JHW	120	DN	0834/02-04	Open	SM-LM	RCC Slab	1	1.83	0	0.00	4.88
215	DKRA-JHW	121	UP	0834/13-15	Open	MCC	RCC Slab	1	3.66	0	0.00	6.10
216	DKRA-JHW	121	DN	0834/14-16	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
217	DKRA-JHW	122	UP	0835/05-07	Open	MCC	RCC Slab	4	3.66	0	0.00	6.10
218	DKRA-JHW	122	DN	0835/06-08	Open	SM-LM	RCC Slab	4	3.66	0	0.00	2.44
219	DKRA-JHW	123	UP	0836/03-05	Open	MCC	RCC Slab	1	2.00	0	0.00	7.58
220	DKRA-JHW	123	DN	0836/04-06	Open	RCC	RCC Box	1	2.00	0	0.00	9.91

221	JHW-RMA	124	UP	0838/19-21	Open	MCC	RCC Slab	2	3.66	0	0.00	5.32
222	JHW-RMA	124	DN	0838/20-22	Open	SM-LM	RCC Slab	2	3.66	0	0.00	4.87
223	JHW-RMA	125	UP	0838/21-23	Open	RCC	RCC Box	1	3.66	0	0.00	5.32
224	JHW-RMA	125	DN	0838/22-24	Open	RCC	RCC Box	1	3.66	0	0.00	4.88
225	JHW-RMA	126	UP	0839/29-01	Open	MCC	RCC Slab	1	0.91	0	0.00	4.71
226	JHW-RMA	126	DN	0839/30-02	Open	SM-LM	RCC Slab	1	0.91	0	0.00	6.10
227	JHW-RMA	127	UP	0840/05-07	Open	MCC	RCC Slab	1	1.83	0	0.00	4.71
228	JHW-RMA	127	DN	0840/06-08	Open	SM-LM	RCC Slab	1	1.83	0	0.00	6.10
229	JHW-RMA	128	UP	0840/13-15	Open	MCC	RCC Slab	1	0.91	0	0.00	4.71
230	JHW-RMA	128	DN	0840/14-16	Open	SM-LM	RCC Slab	1	0.91	0	0.00	6.10
231	JHW-RMA	129	UP	0840/21-23	Open	MCC	RCC Slab	1	3.05	0	0.00	4.72
232	JHW-RMA	129	DN	0840/22-24	Open	SM-LM	Stone Slab	3	0.91	0	0.00	7.32
233	JHW-RMA	130	UP	0840/27-01	Open	MCC	RCC Slab	1	0.91	0	0.00	4.71
234	JHW-RMA	130	DN	0840/28-02	Open	SM-LM	RCC Slab	1	0.91	0	0.00	6.10
235	JHW-RMA	131	UP	0841/09-11	Open	MCC	RCC Slab	1	0.91	0	0.00	5.17
236	JHW-RMA	131	DN	0841/10-12	Open	SM-LM	RCC Slab	1	0.91	0	0.00	6.10
237	JHW-RMA	132	UP	0841/15-17	Open	MCC	RCC Slab	1	0.91	0	0.00	4.71
238	JHW-RMA	132	DN	0841/16-18	Open	SM-LM	RCC Slab	1	0.91	0	0.00	6.10
239	JHW-RMA	133	UP	0842/09-11	Open	RCC	RCC Box	1	2.44	0	0.00	5.18
240	JHW-RMA	133	DN	0842/10-12	Open	SM-LM	Stone Slab	2	0.91	0	0.00	6.54
241	JHW-RMA	135	UP	0845/15-17	Open	MCC	RCC Slab	1	0.91	0	0.00	4.72
242	JHW-RMA	135	DN	0845/16-18	Open	SM-LM	RCC Slab	1	0.91	0	0.00	6.10
243	JHW-RMA	136	UP	0847/01-03	Open	MCC	RCC Slab	1	2.44	0	0.00	4.72
244	JHW-RMA	136	DN	0847/02-04	Open	SM-LM	RCC Slab	1	2.44	0	0.00	6.10
245	JHW-RMA	137	UP	0847/21-23	Open	MCC	Pipe	1	0.91	0	0.00	12.50
246	JHW-RMA	137	DN	0847/22-24	Open	RCC	Pipe	1	0.91	0	0.00	
247	JHW-RMA	138	UP	0848/03-05	Open	RCC	RCC Box	2	3.66	0	0.00	5.49
248	JHW-RMA	138	DN	0848/04-06	Open	RCC	RCC Box	2	3.66	0	0.00	5.32
249	RMA-MKX	140	UP	0853/21-23	Open	SM-LM	RCC Slab	4	3.66	0	0.00	4.88

250	RMA-MKX	140	DN	0853/22-24	Open	RCC	RCC Box	4	3.92	0	0.00	5.15
251	MKX-KIW	141	UP	0856/23-25	Open	SM-LM	RCC Slab	2	0.91	0	0.00	6.10
252	MKX-KIW	141	DN	0856/24-26	Open	RCC	RCC Box	1	2.44	0	0.00	5.57
253	MKX-KIW	142	UP	0856/29-01	Open	SM-LM	Stone Slab	1	0.30	0	0.00	17.47
254	MKX-KIW	142	DN	0856/30-02	Open	MCC	RCC Slab	1	0.30	0	0.00	
255	MKX-KIW	144	UP	0859/19-21	Open	SM-LM	RCC Slab	4	0.91	0	0.00	11.10
256	MKX-KIW	144	DN	0859/20-22	Open	MCC	RCC Slab	4	0.91	0	0.00	
257	MKX-KIW	145	UP	0860/17-19	Open	MCC	RCC Slab	1	3.05	0	0.00	5.90
258	MKX-KIW	145	DN	0860/18-20	Open	MCC	RCC Slab	1	3.05	0	0.00	5.19
259	MKX-KIW	146	UP	0861/03-05	Open	MCC	RCC Slab	1	2.58	0	0.00	7.17
260	MKX-KIW	146	DN	0861/04-06	Open	MCC	RCC Slab	1	2.58	0	0.00	5.00
261	KIW-DARA	150	DN	0868/02-04	Open	SM-LM	Arch	2	6.10	0	0.00	4.88
262	KIW-DARA	152	UP	0869/27-29	Open	MCC	Pipe	3	0.40	0	0.00	6.65
263	KIW-DARA	152	DN	0869/28-30	Open	SM-LM	Pipe	3	0.30	0	0.00	5.48
264	KIW-DARA	153	UP	0869/39-41	Open	MCC	RCC Slab	2	3.66	0	0.00	5.90
265	KIW-DARA	153	DN	0869/40-42	Open	SM-LM	RCC Slab	2	3.66	0	0.00	5.52
266	KIW-DARA	154	UP	0871/35-37	Open	SM-CM	RCC Slab	1	1.83	0	0.00	6.16
267	KIW-DARA	154	DN	0871/36-38	Open	SM-LM	RCC Slab	1	1.83	0	0.00	4.58
268	KIW-DARA	155	UP	0872/01-03	Open	RCC	RCC Box	1	4.50	0	0.00	6.16
269	KIW-DARA	155	DN	0872/02-04	Open	SM-LM	Arch	2	1.83	0	0.00	4.58
270	KIW-DARA	156	UP	0872/25-27	Open	SM-CM	RCC Slab	1	0.91	0	0.00	4.32
271	KIW-DARA	156	DN	0872/26-28	Open	SM-LM	Stone Slab	1	0.91	0	0.00	8.26
272	KIW-DARA	157	UP	0872/51-53	Open	SM-LM	Stone Slab	5	0.91	0	0.00	4.68
273	KIW-DARA	157	DN	0872/52-54	Open	SM-CM	Stone Slab	5	0.91	0	0.00	5.06
274	DARA-RDT	158	UP	0874/11-13	Open	SM-CM	RCC Slab	4	3.66	0	0.00	7.85
275	DARA-RDT	158	DN	0874/12-14	Open	SM-LM	RCC Slab	4	3.66	0	0.00	13.98
276	DARA-RDT	159	UP	0874/31-33	Open	SM-CM	RCC Slab	1	2.58	0	0.00	7.49
277	DARA-RDT	159	DN	0874/32-34	Open	SM-LM	RCC Slab	2	0.91	0	0.00	8.22
278	DARA-RDT	161	UP	0876/15-17	Open	SM-CM	RCC Slab	1	1.83	0	0.00	5.47

279	DARA-RDT	161	DN	0876/16-18	Open	SM-LM	RCC Slab	1	1.83	0	0.00	4.58
280	DARA-RDT	162	UP	0877/01-03	Open	SM-CM	RCC Slab	1	6.10	0	0.00	6.10
281	DARA-RDT	162	DN	0877/02-04	Open	SM-LM	Stone Slab	5	0.61	0	0.00	4.57
282	DARA-RDT	163	UP	0877/17-19	Open	SM-CM	RCC Slab	2	4.11	0	0.00	5.47
283	DARA-RDT	163	DN	0877/18-20	Open	SM-LM	Stone Slab	8	0.61	0	0.00	4.58
284	DARA-RDT	164	UP	0878/13-15	Open	SM-CM	RCC Slab	2	4.11	0	0.00	5.47
285	DARA-RDT	164	DN	0878/14-16	Open	SM-LM	Stone Slab	8	0.61	0	0.00	4.58
286	DARA-RDT	165	UP	0879/03-05	Open	SM-CM	RCC Slab	1	4.57	0	0.00	5.47
287	DARA-RDT	165	DN	0879/04-06	Open	SM-LM	Arch	2	1.83	0	0.00	4.58
288	DARA-RDT	166	UP	0879/29-01	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.47
289	DARA-RDT	166	DN	0879/30-02	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.58
290	DARA-RDT	167	UP	0880/19-21	Open	SM-CM	RCC Slab	8	0.61	0	0.00	5.47
291	DARA-RDT	167	DN	0880/20-22	Open	SM-LM	Stone Slab	8	0.61	0	0.00	4.57
292	DARA-RDT	168	UP	0881/29-01	Open	SM-CM	RCC Slab	1	1.83	0	0.00	5.47
293	DARA-RDT	168	DN	0882/00-02	Open	SM-LM	Arch	1	1.83	0	0.00	4.58
294	DARA-RDT	169	UP	0883/09-11	Open	SM-CM	RCC Slab	3	3.66	0	0.00	5.47
295	DARA-RDT	169	DN	0883/10-12	Open	SM-LM	Arch	3	3.66	0	0.00	4.57
296	DARA-RDT	170	UP	0885/01-03	Open	SM-CM	RCC Slab	1	3.05	0	0.00	6.10
297	DARA-RDT	170	DN	0885/02-04	Open	SM-LM	Arch	1	3.05	0	0.00	4.57
298	DARA-RDT	171	UP	0885/31-33	Open	SM-CM	RCC Slab	1	6.10	0	0.00	7.86
299	DARA-RDT	171	DN	0885/32-34	Open	SM-LM	Arch	2	2.44	0	0.00	21.28
300	RDT-ALNI	172	UP	0887/17-19	Open	SM-CM	RCC Slab	1	1.22	0	0.00	6.10
301	RDT-ALNI	172	DN	0887/18-20	Open	SM-LM	Arch	1	1.22	0	0.00	4.57
302	RDT-ALNI	173	UP	0888/27-01	Open	SM-CM	RCC Slab	2	6.10	0	0.00	6.10
303	RDT-ALNI	173	DN	0888/28-02	Open	SM-LM	Arch	2	6.10	0	0.00	4.57
304	RDT-ALNI	174	UP	0889/27-01	Open	SM-CM	RCC Slab	1	2.90	1	1.68	6.10
305	RDT-ALNI	174	DN	0889/28-02	Open	SM-LM	Stone Slab	5	0.61	0	0.00	4.88
306	RDT-ALNI	175	UP	0892/03-05	Open	SM-CM	RCC Slab	4	3.66	0	0.00	6.10
307	RDT-ALNI	175	DN	0892/04-06	Open	SM-LM	Arch	4	3.66	0	0.00	4.57

308	RDT-ALNI	176	UP	0893/03-05	Open	SM-CM	RCC Slab	2	2.42	2	2.35	6.10
309	RDT-ALNI	176	DN	0893/04-06	Open	SM-LM	Arch	8	1.83	0	0.00	4.57
310	RDT-ALNI	177	UP	0894/07-09	Open	SM-CM	RCC Slab	2	1.79	5	1.76	6.10
311	RDT-ALNI	177	DN	0894/08-10	Open	SM-LM	Arch	7	1.83	0	0.00	4.57
312	RDT-ALNI	178	UP	0894/27-01	Open	SM-CM	RCC Slab	3	3.66	0	0.00	6.10
313	RDT-ALNI	178	DN	0894/28-02	Open	SM-LM	RCC Slab	3	3.66	0	0.00	6.10
314	RDT-ALNI	179	UP	0895/19-21	Open	SM-CM	RCC Slab	1	1.83	0	0.00	6.10
315	RDT-ALNI	179	DN	0895/20-22	Open	SM-LM	RCC Slab	1	1.83	0	0.00	6.10
316	RDT-ALNI	181	UP	0897/27-29	Open	SM-CM	RCC Slab	3	1.83	0	0.00	7.30
317	RDT-ALNI	181	DN	0897/28-30	Open	SM-LM	Arch	3	1.83	0	0.00	15.24
318	RDT-ALNI	182	UP	0898/11-13	Open	SM-CM	RCC Slab	2	3.12	3	3.05	6.10
319	RDT-ALNI	182	DN	0898/12-14	Open	SM-LM	Arch	10	1.22	0	0.00	4.57
320	RDT-ALNI	183	UP	0898/31-33	Open	SM-CM	RCC Slab	3	3.66	0	0.00	10.19
321	RDT-ALNI	183	DN	0898/32-34	Open	SM-CM	RCC Slab	3	3.66	3	0.00	4.57
322	ALNI-DDV	185	UP	0899/15-17	Open	SM-CM	RCC Slab	1	3.66	0	0.00	6.54
323	ALNI-DDV	185	DN	0899/16-18	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.57
324	ALNI-DDV	187	UP	0902/01-03	Open	SM-CM	RCC Slab	2	4.42	1	4.34	5.63
325	ALNI-DDV	187	DN	0902/02-04	Open	SM-LM	Arch	6	1.83	0	0.00	4.57
326	ALNI-DDV	188	UP	0902/27-29	Open	SM-CM	RCC Slab	3	3.66	0	0.00	5.48
327	ALNI-DDV	188	DN	0902/28-30	Open	SM-LM	Arch	3	3.66	0	0.00	4.57
328	ALNI-DDV	189	UP	0903/07-09	Open	SM-CM	RCC Slab	1	1.83	0	0.00	3.94
329	ALNI-DDV	189	DN	0903/08-10	Open	SM-LM	Arch	1	1.83	0	0.00	13.10
330	ALNI-DDV	190	UP	0904/03-05	Open	SM-CM	RCC Slab	3	3.05	0	0.00	12.73
331	ALNI-DDV	190	DN	0904/04-06	Open	SM-LM	Arch	3	3.05	0	0.00	
332	DDV-DKNT	192	UP	0905/15-17	Open	SM-CM	RCC Slab	2	1.68	2	1.52	9.29
333	DDV-DKNT	192	DN	0905/16-18	Open	SM-LM	Stone Slab	8	0.61	0	0.00	11.37
334	DDV-DKNT	193	UP	0906/09-11	Open	SM-LM	Arch	6	1.22	0	0.00	4.57
335	DDV-DKNT	193	DN	0906/10-12	Open	SM-LM	RCC Slab	6	1.22	0	0.00	9.75
336	DDV-DKNT	194	UP	0906/29-01	Open	SM-CM	RCC Slab	1	1.68	1	2.90	5.47

337	DDV-DKNT	194	DN	0906/30-02	Open	SM-LM	Stone Slab	5	0.61	0	0.00	9.41
338	DDV-DKNT	195	UP	0907/27-29	Open	SM-CM	RCC Slab	2	2.44	0	0.00	6.98
339	DDV-DKNT	195	DN	0907/28-30	Open	SM-LM	Arch	2	2.44	0	0.00	6.00
340	DDV-DKNT	196	UP	0908/07-09	Open	SM-CM	RCC Slab	3	3.66	0	0.00	8.52
341	DDV-DKNT	196	DN	0908/08-10	Open	SM-LM	RCC Slab	3	3.66	0	0.00	4.58
342	DDV-DKNT	200A	UP	0911/03-05	Open	SM-LM	RCC Box	2	4.70	0	0.00	9.28
343	DDV-DKNT	200A	DN	0911/04-06	Open	SM-LM	RCC Box	2	4.70	0	0.00	9.28
344	DKNT-KOTA	204	UP	0913/21-23	Open	SM-CM	RCC Slab	3	3.66	0	0.00	6.10
345	DKNT-KOTA	204	DN	0913/20-22	Open	SM-LM	RCC Slab	3	3.66	0	0.00	6.10
346	DKNT-KOTA	205	UP	0914/11-13	Open	SM-CM	RCC Slab	1	6.10	0	0.00	6.10
347	DKNT-KOTA	205	DN	0914/10-12	Open	SM-LM	RCC Slab	1	6.10	0	0.00	4.57
348	DKNT-KOTA	206	UP	0914/29-31	Open	SM-CM	RCC Slab	2	6.10	0	0.00	6.10
349	DKNT-KOTA	206	DN	0914/30-32	Open	SM-LM	RCC Slab	2	6.10	0	0.00	4.80
350	DKNT-KOTA	207	UP	0915/27-29	Open	RCC	RCC Box	3	3.66	0	0.00	6.10
351	DKNT-KOTA	207	DN	0915/28-30	Open	SM-LM	RCC Slab	3	3.66	0	0.00	5.38
352	DKNT-KOTA	208	UP	0916/07-09	Open	SM-CM	Pipe	1	0.46	0	0.00	5.58
353	DKNT-KOTA	208	DN	0916/08-10	Open	SM-CM	Pipe	1	0.46	0	0.00	11.10
354	DKNT-KOTA	209	UP	0916/07-09	Open	SM-CM	Pipe	1	0.46	0	0.00	5.97
355	DKNT-KOTA	209	DN	0916/08-10	Open	SM-LM	Pipe	1	0.46	0	0.00	10.36
356	DKNT-KOTA	210	UP	0917/33-35	Open	MCC	RCC Slab	1	6.10	0	0.00	20.30
357	DKNT-KOTA	210	DN	0917/34-36	Open	MCC	RCC Slab	1	6.10	0	0.00	
358	DKNT-KOTA	210A	UP	0918/29-31	Open	SM-LM	Pipe	2	0.91	0	0.00	16.00
359	DKNT-KOTA	210A	DN	0918/30-32	Open	SM-LM	Pipe	2	0.91	0	0.00	
360	KOTA-GQL	212	UP	0923/33-35	Open	SM-LM	PSC Slab	1	6.10	0	0.00	5.58
361	KOTA-GQL	212	DN	0923/34-36	Open	SM-LM	PSC Slab	1	6.10	0	0.00	5.12
362	KOTA-GQL	212A	UP	0924/05-07	Open	MCC	Pipe	2	1.22	0	0.00	12.20
363	KOTA-GQL	212A	DN	0924/06-08	Open	MCC	Pipe	2	1.22	0	0.00	
364	KOTA-GQL	212B	UP	0924/25-27	Open	MCC	RCC Slab	1	4.57	0	0.00	11.05
365	KOTA-GQL	212B	DN	0924/26-28	Open	MCC	RCC Slab	1	4.57	0	0.00	

366	KOTA-GQL	213	UP	0925/03-05	Open	MCC	RCC Slab	2	0.91	0	0.00	4.71
367	KOTA-GQL	213	DN	0925/04-06	Open	SM-LM	Stone Slab	2	0.91	0	0.00	6.10
368	GQL-KPTN	214	UP	0928/05-07	Open	MCC	RCC Slab	1	2.59	0	0.00	4.71
369	GQL-KPTN	214	DN	0928/06-08	Open	SM-LM	Stone Slab	2	0.91	0	0.00	6.10
370	GQL-KPTN	215	UP	0928/29-01	Open	RCC	RCC Box	2	1.83	0	0.00	6.10
371	GQL-KPTN	215	DN	0928/30-02	Open	SM-LM	RCC Slab	2	1.83	0	0.00	6.10
372	GQL-KPTN	216	UP	0930/13-15	Open	MCC	Pipe	3	0.46	0	0.00	12.85
373	GQL-KPTN	216	DN	0930/14-16	Open	SM-LM	Pipe	3	0.46	0	0.00	
374	GQL-KPTN	217	UP	0931/21-23	Open	MCC	RCC Slab	1	2.59	0	0.00	3.79
375	GQL-KPTN	217	DN	0931/22-24	Open	SM-LM	Stone Slab	2	0.91	0	0.00	7.16
376	GQL-KPTN	218	UP	0932/05-07	Open	MCC	RCC Slab	2	1.83	0	0.00	5.75
377	GQL-KPTN	218	DN	0932/06-08	Open	SM-LM	RCC Slab	2	1.83	0	0.00	4.88
378	GQL-KPTN	219	UP	0932/25-27	Open	MCC	RCC Slab	1	1.52	0	0.00	4.72
379	GQL-KPTN	219	DN	0932/26-28	Open	SM-LM	Stone Slab	2	0.46	0	0.00	6.10
380	GQL-KPTN	220	UP	0933/15-17	Open	MCC	RCC Slab	1	2.59	0	0.00	4.72
381	GQL-KPTN	220	DN	0933/16-18	Open	SM-LM	Stone Slab	2	0.91	0	0.00	6.10
382	GQL-KPTN	221	UP	0933/25-27	Open	SM-LM	Pipe	2	0.91	0	0.00	4.50
383	GQL-KPTN	221	DN	0933/26-28	Open	SM-LM	RCC Slab	2	0.91	0	0.00	5.23
384	KPTN-ARE	222	UP	0935/07-09	Open	SM-LM	RCC Slab	3	1.83	0	0.00	6.10
385	KPTN-ARE	222	DN	0935/08-10	Open	SM-LM	RCC Slab	3	1.83	0	0.00	4.24
386	KPTN-ARE	223	UP	0936/01-03	Open	RCC	RCC Box	2	3.66	0	0.00	5.23
387	KPTN-ARE	223	DN	0936/02-04	Open	SM-LM	RCC Slab	2	3.66	0	0.00	5.06
388	KPTN-ARE	224	UP	0941/25-27	Open	RCC	RCC Box	2	1.98	0	0.00	5.17
389	KPTN-ARE	224	DN	0941/26-28	Open	SM-LM	RCC Slab	2	1.83	0	0.00	5.18
390	KPTN-ARE	225	UP	0943/03-05	Open	MCC	RCC Slab	1	0.91	0	0.00	4.66
391	KPTN-ARE	225	DN	0943/04-06	Open	SM-LM	Stone Slab	1	0.91	0	0.00	6.24
392	KPTN-ARE	226	UP	0943/11-13	Open	MCC	RCC Slab	1	0.46	0	0.00	4.72
393	KPTN-ARE	226	DN	0943/12-14	Open	SM-LM	Stone Slab	1	0.46	0	0.00	6.10
394	KPTN-ARE	227	UP	0943/15-17	Open	MCC	Pipe	1	0.46	0	0.00	5.72

395	KPTN-ARE	227	DN	0943/16-18	Open	SM-LM	Stone Slab	1	0.46	0	0.00	6.86
396	KPTN-ARE	228	UP	0944/17-19	Open	MCC	RCC Slab	1	0.91	0	0.00	4.68
397	KPTN-ARE	228	DN	0944/18-20	Open	SM-LM	RCC Slab	1	0.91	0	0.00	6.16
398	ARE-KPZ	229	UP	0946/13-15	Open	MCC	RCC Slab	1	1.83	0	0.00	4.72
399	ARE-KPZ	229	DN	0946/14-16	Open	SM-LM	RCC Slab	1	1.83	0	0.00	6.10
400	ARE-KPZ	230	UP	0947/09-11	Open	MCC	RCC Slab	1	0.91	0	0.00	4.72
401	ARE-KPZ	230	DN	0947/10-12	Open	SM-LM	Stone Slab	1	0.91	0	0.00	6.10
402	ARE-KPZ	231	UP	0947/25-27	Open	MCC	RCC Slab	1	0.46	0	0.00	4.72
403	ARE-KPZ	231	DN	0947/26-28	Open	SM-LM	Stone Slab	1	0.46	0	0.00	6.10
404	ARE-KPZ	232	UP	0950/27-01	Open	RCC	RCC Box	1	4.42	0	0.00	5.18
405	ARE-KPZ	232	DN	0950/28-02	Open	SM-LM	PSC Slab	2	1.83	0	0.00	5.64
406	ARE-KPZ	233	UP	0953/25-29	Open	RCC	RCC Box	1	1.83	0	0.00	5.80
407	ARE-KPZ	233	DN	0953/26-28	Open	SM-LM	PSC Slab	1	1.83	0	0.00	5.48
408	ARE-KPZ	234	UP	0954/21-23	Open	SM-LM	PSC Slab	2	1.83	0	0.00	10.82
409	ARE-KPZ	234	DN	0954/22-24	Open	SM-LM	PSC Slab	2	1.83	0	0.00	
410	KPZ-GKB	235	UP	0955/11-13	Open	SM-LM	Pipe	3	0.46	0	0.00	3.66
411	KPZ-GKB	235	DN	0955/12-14	Open	SM-LM	Pipe	3	0.46	0	0.00	10.82
412	KPZ-GKB	236	UP	0955/21-23	Open	MCC	Pipe	3	0.46	0	0.00	3.66
413	KPZ-GKB	236	DN	0955/22-24	Open	SM-LM	Pipe	3	0.46	0	0.00	10.82
414	KPZ-GKB	238	UP	0957/11-13	Open	MCC	Pipe	3	0.46	0	0.00	3.66
415	KPZ-GKB	238	DN	0957/12-14	Open	SM-LM	Pipe	3	0.46	0	0.00	12.00
416	KPZ-GKB	239	UP	0958/05-07	Open	RCC	RCC Box	2	3.66	0	0.00	5.00
417	KPZ-GKB	239	DN	0958/06-08	Open	SM-LM	RCC Slab	2	3.66	0	0.00	4.88
418	KPZ-GKB	240	UP	0959/01-03	Open	RCC	RCC Slab	1	3.66	0	0.00	5.32
419	KPZ-GKB	240	DN	0959/02-04	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
420	KPZ-GKB	241	UP	0960/17-19	Open	MCC	Pipe	3	0.46	0	0.00	3.66
421	KPZ-GKB	241	DN	0960/18-20	Open	SM-LM	Pipe	3	0.46	0	0.00	6.78
422	KPZ-GKB	242	UP	0963/23-25	Open	RCC	RCC Box	1	3.66	0	0.00	5.60
423	KPZ-GKB	242	DN	0963/24-26	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88

424	GKB-LBN	243	UP	0966/05-07	Open	RCC	RCC Box	1	3.66	0	0.00	5.60
425	GKB-LBN	243	DN	0966/06-08	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
426	GKB-LBN	244	UP	0970/05-07	Open	RCC	RCC Box	1	6.10	0	0.00	5.72
427	GKB-LBN	244	DN	0970/06-08	Open	SM-LM	PSC Slab	1	6.10	0	0.00	4.88
428	GKB-LBN	245	UP	0972/09-11	Open	RCC	RCC Box	2	3.47	0	0.00	7.33
429	GKB-LBN	245	DN	0972/10-12	Open	RCC	RCC Box	2	4.27	0	0.00	13.40
430	GKB-LBN	246	UP	0973/09-11	Open	RCC	RCC Box	1	3.66	0	0.00	5.60
431	GKB-LBN	246	DN	0973/10-12	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
432	LBN-LKE	247	UP	0975/07-09	Open	RCC	RCC Box	1	3.66	0	0.00	5.60
433	LBN-LKE	247	DN	0975/08-10	Open	RCC	RCC Box	1	3.66	0	0.00	4.88
434	LBN-LKE	248	UP	0977/09-11	Open	SM-LM	Stone Slab	1	0.91	0	0.00	6.10
435	LBN-LKE	248	DN	0977/10-12	Open	MCC	RCC Slab	1	0.91	0	0.00	3.53
436	LBN-LKE	249	UP	0978/13-15	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
437	LBN-LKE	249	DN	0978/14-16	Open	MCC	RCC Slab	1	3.66	0	0.00	6.10
438	LBN-LKE	251	UP	0980/15-17	Open	SM-LM	Arch	1	5.79	0	0.00	17.80
439	LBN-LKE	251	DN	0980/16-18	Open	MCC	RCC Slab	1	5.79	0	0.00	
440	LKE-IDG	253	UP	0982/11-13	Open	MCC	RCC Slab	1	3.66	0	0.00	6.10
441	LKE-IDG	253	DN	0982/12-14	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
442	LKE-IDG	255	UP	0983/05-07	Open	SM-CM	RCC Slab	2	6.10	0	0.00	11.88
443	LKE-IDG	255	DN	0983/06-08	Open	SM-LM	Arch	2	6.10	0	0.00	13.30
444	LKE-IDG	256	UP	0983/29-31	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.89
445	LKE-IDG	256	DN	0983/30-32	Open	SM-LM	Arch	1	3.66	0	0.00	6.62
446	LKE-IDG	257	UP	0984/13-15	Open	SM-CM	RCC Slab	1	6.10	0	0.00	6.17
447	LKE-IDG	257	DN	0984/14-16	Open	SM-LM	Arch	1	6.10	0	0.00	12.90
448	LKE-IDG	258	UP	0984/25-27	Open	SM-CM	RCC Slab	2	3.66	0	0.00	21.44
449	LKE-IDG	258	DN	0984/26-28	Open	SM-LM	Arch	2	3.66	0	0.00	
450	LKE-IDG	259	UP	0985/19-21	Open	SM-CM	RCC Slab	1	3.66	0	0.00	6.10
451	LKE-IDG	259	DN	0985/20-22	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.90
452	LKE-IDG	260	UP	0985/31-33	Open	SM-CM	PSC Slab	1	9.14	0	0.00	6.10

453	LKE-IDG	260	DN	0985/32-34	Open	SM-LM	PSC Slab	1	9.14	0	0.00	4.88
454	LKE-IDG	261	UP	0986/07-09	Open	SM-CM	RCC Slab	1	1.83	0	0.00	8.53
455	LKE-IDG	261	DN	0986/08-10	Open	SM-LM	Arch	1	1.83	0	0.00	9.24
456	LKE-IDG	262	UP	0986/17-19	Open	SM-CM	PSC Slab	1	9.14	0	0.00	6.10
457	LKE-IDG	262	DN	0986/18-20	Open	SM-LM	PSC Slab	1	9.14	0	0.00	4.80
458	LKE-IDG	263	UP	0986/27-01	Open	SM-CM	RCC Slab	1	3.66	0	0.00	6.10
459	LKE-IDG	263	DN	0986/28-02	Open	SM-LM	RCC Slab	3	0.91	0	0.00	6.10
460	LKE-IDG	264	UP	0987/19-21	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.93
461	LKE-IDG	264	DN	0987/20-22	Open	SM-LM	Arch	1	3.66	0	0.00	8.84
462	LKE-IDG	265	UP	0987/29-31	Open	MCC	RCC Slab	2	3.66	0	0.00	5.33
463	LKE-IDG	265	DN	0987/30-32	Open	SM-LM	PSC Slab	2	3.66	0	0.00	4.88
464	LKE-IDG	266	UP	0988/13-15	Open	SM-CM	RCC Slab	2	1.83	0	0.00	5.49
465	LKE-IDG	266	DN	0988/14-16	Open	SM-LM	Arch	2	1.83	0	0.00	8.64
466	LKE-IDG	267	UP	0989/03-05	Open	SM-CM	RCC Slab	3	3.66	0	0.00	6.33
467	LKE-IDG	267	DN	0989/04-06	Open	SM-LM	Arch	3	3.66	0	0.00	6.25
468	LKE-IDG	268	UP	0989/21-23	Open	SM-CM	RCC Slab	2	3.66	0	0.00	5.64
469	LKE-IDG	268	DN	0989/22-24	Open	SM-LM	Arch	2	3.66	0	0.00	16.77
470	LKE-IDG	269	UP	0990/25-27	Open	SM-CM	RCC Slab	1	0.91	0	0.00	4.26
471	LKE-IDG	269	DN	0990/26-28	Open	SM-LM	RCC Slab	1	0.91	0	0.00	8.23
472	IDG-AMLI	269A	UP	0993/01-03	Open	SM-CM	Pipe	1	1.20	0	0.00	10.17
473	IDG-AMLI	269A	DN	0993/02-04	Open	SM-CM	Pipe	1	1.20	0	0.00	
474	IDG-AMLI	270	UP	0993/07-09	Open	SM-CM	RCC Slab	1	3.66	0	0.00	6.10
475	IDG-AMLI	270	DN	0993/08-10	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
476	IDG-AMLI	272	UP	0994/11-13	Open	SM-CM	RCC Slab	1	1.83	0	0.00	11.53
477	IDG-AMLI	272	DN	0994/12-14	Open	SM-LM	Arch	1	1.83	0	0.00	40.25
478	IDG-AMLI	273	UP	0994/25-27	Open	SM-LM	RCC Slab	1	1.67	0	0.00	4.72
479	IDG-AMLI	273	DN	0994/26-28	Open	SM-LM	RCC Slab	1	1.67	0	0.00	6.10
480	IDG-AMLI	274	UP	0995/19-21	Open	SM-CM	RCC Slab	3	3.66	0	0.00	5.18
481	IDG-AMLI	274	DN	0995/20-22	Open	SM-LM	RCC Slab	3	3.66	0	0.00	4.88

482	IDG-AMLI	275	UP	0996/09-11	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.69
483	IDG-AMLI	275	DN	0996/10-12	Open	SM-LM	Arch	1	3.66	0	0.00	7.62
484	IDG-AMLI	276	UP	0996/17-19	Open	SM-CM	RCC Slab	1	1.83	0	0.00	5.72
485	IDG-AMLI	276	DN	0996/18-20	Open	SM-LM	Arch	1	1.83	0	0.00	11.28
486	IDG-AMLI	277	UP	0996/23-25	Open	MCC	RCC Slab	1	0.76	0	0.00	4.72
487	IDG-AMLI	277	DN	0996/24-26	Open	SM-LM	RCC Slab	1	0.76	0	0.00	6.10
488	IDG-AMLI	278	DN	0997/10-12	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
489	IDG-AMLI	278	UP	0997/09-11	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.32
490	IDG-AMLI	279	UP	0998/21-23	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.33
491	IDG-AMLI	279	DN	0998/22-24	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
492	IDG-AMLI	280	UP	0999/17-19	Open	SM-CM	Arch	1	0.91	0	0.00	4.80
493	IDG-AMLI	280	DN	0999/18-20	Open	SM-LM	Arch	1	0.91	0	0.00	4.80
494	AMLI-RWJ	281	UP	1000/07-90	Open	SM-CM	RCC Slab	1	1.83	0	0.00	4.80
495	AMLI-RWJ	281	DN	1000/08-10	Open	SM-LM	Arch	1	1.83	0	0.00	4.80
496	AMLI-RWJ	282	UP	1000/17-19	Open	SM-CM	RCC Slab	1	0.91	0	0.00	6.10
497	AMLI-RWJ	282	DN	1000/18-20	Open	SM-LM	Arch	1	0.91	0	0.00	6.10
498	AMLI-RWJ	284	UP	1002/27-29	Open	SM-CM	RCC Slab	1	3.66	0	0.00	15.02
499	AMLI-RWJ	284	DN	1002/28-30	Open	SM-LM	Arch	1	3.66	0	0.00	25.70
500	AMLI-RWJ	285	UP	1002/39-41	Open	SM-CM	RCC Slab	1	0.91	0	0.00	6.40
501	AMLI-RWJ	285	DN	1002/40-42	Open	SM-LM	Arch	1	0.91	0	0.00	11.28
502	AMLI-RWJ	286	UP	1003/13-15	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.41
503	AMLI-RWJ	286	DN	1003/14-16	Open	SM-LM	Arch	1	3.66	0	0.00	13.54
504	AMLI-RWJ	287	UP	1003/31-33	Open	SM-CM	RCC Slab	1	3.66	0	0.00	6.10
505	AMLI-RWJ	287	DN	1003/32-34	Open	SM-LM	Arch	1	3.66	0	0.00	15.54
506	AMLI-RWJ	288	UP	1004/11-14	Open	SM-CM	RCC Slab	1	1.83	0	0.00	6.10
507	AMLI-RWJ	288	DN	1004/12-14	Open	SM-LM	Arch	2	0.91	0	0.00	4.80
508	AMLI-RWJ	289	UP	1004/23-25	Open	SM-CM	RCC Slab	1	1.83	0	0.00	6.10
509	AMLI-RWJ	289	DN	1004/24-26	Open	SM-LM	Arch	1	1.83	0	0.00	4.80
510	AMLI-RWJ	291	UP	1006/23-25	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.79

511	AMLI-RWJ	291	DN	1006/24-26	Open	SM-LM	Arch	1	3.66	0	0.00	26.01
512	AMLI-RWJ	292	UP	1007/03-05	Open	SM-CM	RCC Slab	1	1.83	0	0.00	5.95
513	AMLI-RWJ	292	DN	1007/04-06	Open	SM-LM	Arch	1	1.83	0	0.00	6.10
514	AMLI-RWJ	293	UP	1007/09-11	Open	SM-CM	RCC Slab	2	3.66	0	0.00	5.74
515	AMLI-RWJ	293	DN	1007/10-12	Open	SM-LM	Arch	2	3.66	0	0.00	16.25
516	AMLI-RWJ	294	UP	1008/01-03	Open	SM-CM	RCC Slab	1	1.83	0	0.00	5.49
517	AMLI-RWJ	294	DN	1008/02-04	Open	SM-LM	Arch	1	1.83	0	0.00	15.24
518	AMLI-RWJ	295	UP	1008/05-07	Open	SM-CM	RCC Slab	1	1.83	0	0.00	5.95
519	AMLI-RWJ	295	DN	1008/06-08	Open	SM-LM	Arch	1	1.83	0	0.00	10.82
520	AMLI-RWJ	296	UP	1008/19-21	Open	SM-CM	RCC Slab	1	3.66	0	0.00	4.32
521	AMLI-RWJ	296	DN	1008/20-22	Open	SM-LM	Arch	1	3.66	0	0.00	21.23
522	AMLI-RWJ	298	UP	1009/25-27	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.95
523	AMLI-RWJ	298	DN	1009/26-28	Open	SM-LM	Arch	1	3.66	0	0.00	10.06
524	AMLI-RWJ	299	UP	1011/05-07	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.69
525	AMLI-RWJ	299	DN	1011/06-08	Open	SM-LM	Arch	1	3.66	0	0.00	10.57
526	AMLI-RWJ	300	UP	1011/17-19	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.95
527	AMLI-RWJ	300	DN	1011/18-20	Open	SM-LM	Arch	1	3.66	0	0.00	8.33
528	AMLI-RWJ	301	UP	1011/25-27	Open	SM-CM	RCC Slab	1	0.91	0	0.00	4.34
529	AMLI-RWJ	301	DN	1011/26-28	Open	SM-LM	Arch	1	0.91	0	0.00	10.06
530	AMLI-RWJ	302	UP	1011/31-33	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.33
531	AMLI-RWJ	302	DN	1012/00-02	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
532	AMLI-RWJ	303	UP	1012/09-11	Open	SM-LM	RCC Slab	1	2.59	0	0.00	10.90
533	AMLI-RWJ	303	DN	1012/10-12	Open	SM-LM	RCC Slab	1	2.59	0	0.00	
534	AMLI-RWJ	304	UP	1012/29-31	Open	SM-LM	PSC Slab	1	3.66	0	0.00	5.33
535	AMLI-RWJ	304	DN	1012/30-32	Open	SM-LM	PSC Slab	1	3.66	0	0.00	4.88
536	AMLI-RWJ	305	DN	1013/30-02	Open	SM-LM	Pipe	3	0.46	0	0.00	13.57
537	AMLI-RWJ	305	UP	1013/31-01	Open	SM-LM	Pipe	3	0.46	0	0.00	
538	RWJ-KTA	306	UP	1014/29-31	Open	SM-LM	RCC Slab	2	3.05	0	0.00	5.38
539	RWJ-KTA	306	DN	1014/30-32	Open	SM-LM	Arch	2	3.05	0	0.00	16.46

540	RWJ-KTA	307	UP	1016/17-19	Open	SM-LM	RCC Slab	2	2.84	2	2.90	5.64
541	RWJ-KTA	307	DN	1016/18-20	Open	SM-LM	Arch	4	2.78	0	0.00	10.36
542	RWJ-KTA	308	UP	1017/17-19	Open	SM-LM	Pipe	3	0.46	0	0.00	15.40
543	RWJ-KTA	308	DN	1017/18-20	Open	SM-LM	Pipe	3	0.46	0	0.00	
544	RWJ-KTA	309	UP	1017/23-25	Open	SM-LM	RCC Slab	2	3.72	1	4.01	4.72
545	RWJ-KTA	309	DN	1017/24-26	Open	SM-LM	PSC Slab	3	3.66	0	0.00	6.10
546	RWJ-KTA	310	UP	1018/03-05	Open	SM-LM	RCC Slab	1	0.91	0	0.00	6.40
547	RWJ-KTA	310	DN	1018/04-06	Open	SM-LM	Arch	1	0.91	0	0.00	9.14
548	RWJ-KTA	311	UP	1018/09-11	Open	SM-LM	RCC Slab	2	2.85	2	2.93	9.22
549	RWJ-KTA	311	DN	1018/10-12	Open	SM-LM	Arch	4	2.78	0	0.00	14.02
550	RWJ-KTA	312	UP	1019/13-15	Open	SM-CM	PSC Slab	2	5.54	0	0.00	6.10
551	RWJ-KTA	312	DN	1019/14-16	Open	SM-LM	PSC Slab	4	2.78	0	0.00	10.36
552	RWJ-KTA	313	UP	1020/19-21	Open	SM-CM	PSC Slab	2	1.83	0	0.00	5.18
553	RWJ-KTA	313	DN	1020-20-22	Open	SM-LM	PSC Slab	2	1.83	0	0.00	5.18
554	RWJ-KTA	314	UP	1021/09-11	Open	SM-LM	Stone Slab	4	0.91	0	0.00	9.60
555	RWJ-KTA	314	DN	1021/10-12	Open	SM-LM	Stone Slab	4	0.83	0	0.00	
556	KTA-SWM	315	UP	1022/23-25	Open	SM-CM	RCC Slab	1	3.66	0	0.00	3.58
557	KTA-SWM	315	DN	1022/24-26	Open	SM-LM	Arch	1	3.66	0	0.00	11.38
558	KTA-SWM	316	UP	1023/23-25	Open	SM-CM	RCC Slab	2	0.91	0	0.00	4.72
559	KTA-SWM	316	DN	1023/24-26	Open	SM-LM	Stone Slab	2	0.91	0	0.00	6.10
560	KTA-SWM	317	UP	1024/09-11	Open	SM-CM	RCC Slab	1	0.91	0	0.00	4.72
561	KTA-SWM	317	DN	1024/10-12	Open	SM-LM	Stone Slab	1	0.91	0	0.00	6.10
562	KTA-SWM	318	UP	1025/01-03	Open	SM-CM	RCC Slab	3	0.91	0	0.00	4.72
563	KTA-SWM	318	DN	1025/02-04	Open	SM-LM	Stone Slab	3	0.91	0	0.00	6.10
564	KTA-SWM	319	UP	1026/03-05	Open	SM-CM	RCC Slab	1	1.83	0	0.00	5.53
565	KTA-SWM	319	DN	1026/04-06	Open	SM-LM	Arch	1	1.83	0	0.00	11.02
566	KTA-SWM	320	UP	1026/23-25	Open	SM-CM	RCC Slab	1	1.83	0	0.00	8.81
567	KTA-SWM	320	DN	1026/24-26	Open	SM-LM	Arch	1	1.83	0	0.00	17.83
568	KTA-SWM	321	UP	1026/31-01	Open	SM-LM	Stone Slab	1	0.23	0	0.00	33.23

569	KTA-SWM	321	DN	1026/32-02	Open	SM-LM	Stone Slab	1	0.23	0	0.00	
570	SWM-RNT	324	UP	1029/05-07	Open	SM-LM	Arch	1	1.83	0	0.00	9.60
571	SWM-RNT	324	DN	1029/06-08	Open	SM-LM	Arch	1	1.83	0	0.00	
572	SWM-RNT	326	UP	1030/27-29	Open	SM-CM	RCC Slab	5	2.97	0	0.00	24.69
573	SWM-RNT	326	DN	1030/28-30	Open	SM-CM	RCC Slab	5	2.97	0	0.00	
574	SWM-RNT	328	UP	1031/13-15	Open	SM-LM	Arch	2	1.83	0	0.00	11.97
575	SWM-RNT	328	DN	1031/14-16	Open	SM-LM	Arch	2	1.83	0	0.00	
576	SWM-RNT	329	UP	1032/13-15	Open	RCC	RCC Box	4	3.44	0	0.00	5.33
577	SWM-RNT	329	DN	1032/14-16	Open	SM-LM	Arch	4	2.97	0	0.00	4.88
578	SWM-RNT	330	UP	1035/27-29	Open	RCC	RCC Box	4	3.44	0	0.00	5.33
579	SWM-RNT	330	DN	1035/28-30	Open	SM-LM	Arch	4	2.97	0	0.00	4.88
580	RNT-MXL	331	UP	1040/01-03	Open	RCC	RCC Box	1	4.42	0	0.00	5.48
581	RNT-MXL	331	DN	1040/02-04	Open	SM-LM	Arch	1	4.57	0	0.00	4.60
582	RNT-MXL	333	UP	1042/13-15	Open	SM-CM	RCC Slab	1	0.23	0	0.00	20.17
583	RNT-MXL	333	DN	1042/14-16	Open	SM-LM	Stone Slab	1	0.23	0	0.00	
584	RNT-MXL	334	UP	1043/09-11	Open	SM-CM	RCC Slab	1	1.83	0	0.00	4.73
585	RNT-MXL	334	DN	1043/10-12	Open	SM-LM	Arch	1	1.83	0	0.00	6.10
586	RNT-MXL	335	UP	1043/33-01	Open	SM-CM	RCC Slab	1	0.23	0	0.00	5.49
587	RNT-MXL	335	DN	1043/34-02	Open	SM-LM	Stone Slab	1	0.23	0	0.00	16.00
588	RNT-MXL	336	UP	1046/01-03	Open	SM-CM	RCC Slab	1	0.91	0	0.00	6.04
589	RNT-MXL	336	DN	1046/02-04	Open	SM-LM	Arch	1	0.91	0	0.00	6.10
590	RNT-MXL	337	UP	1046/19-21	Open	SM-CM	RCC Slab	1	0.91	0	0.00	4.72
591	RNT-MXL	337	DN	1046/20-22	Open	SM-LM	Arch	1	0.91	0	0.00	6.10
592	MXL-MLZ	338	UP	1048/27-29	Open	SM-CM	RCC Slab	1	0.91	0	0.00	6.10
593	MXL-MLZ	338	DN	1048/28-30	Open	SM-LM	Stone Slab	1	0.91	0	0.00	4.88
594	MXL-MLZ	339	UP	1049/19-21	Open	SM-CM	RCC Slab	1	1.83	0	0.00	5.33
595	MXL-MLZ	339	DN	1049/20-22	Open	SM-LM	Arch	1	1.83	0	0.00	4.88
596	MXL-MLZ	340	UP	1050/25-27	Open	SM-CM	RCC Slab	1	1.83	0	0.00	6.20
597	MXL-MLZ	340	DN	1050/26-28	Open	SM-LM	Arch	1	1.83	0	0.00	6.25

598	MXL-MLZ	341	UP	1051/11-13	Open	SM-CM	RCC Slab	1	1.83	0	0.00	6.63
599	MXL-MLZ	341	DN	1051/12-14	Open	SM-LM	Arch	1	1.83	0	0.00	4.88
600	MXL-MLZ	342	UP	1052/27-29	Open	SM-CM	RCC Slab	1	1.83	0	0.00	5.49
601	MXL-MLZ	342	DN	1052/28-30	Open	SM-LM	Arch	1	1.83	0	0.00	10.06
602	MXL-MLZ	345	UP	1057/09-11	Open	SM-LM	Arch	3	1.83	0	0.00	6.10
603	MXL-MLZ	345	DN	1057/10-12	Open	SM-LM	RCC Slab	3	1.83	0	0.00	6.55
604	MXL-MLZ	346	UP	1057/21-23	Open	SM-LM	RCC Slab	2	2.30	2	2.13	6.10
605	MXL-MLZ	346	DN	1057/22-24	Open	SM-CM	RCC Slab	2	2.30	2	2.13	6.63
606	MLZ-NMD	347	UP	1059/21-23	Open	SM-CM	RCC Slab	1	6.10	0	0.00	19.51
607	MLZ-NMD	347	DN	1059/22-24	Open	SM-LM	Arch	1	6.10	0	0.00	6.10
608	MLZ-NMD	348	UP	1060/01-03	Open	SM-CM	RCC Slab	1	1.83	0	0.00	5.95
609	MLZ-NMD	348	DN	1060/02-04	Open	SM-LM	Arch	1	1.83	0	0.00	8.93
610	MLZ-NMD	349	UP	1061/13-15	Open	RCC	RCC Box	1	3.05	0	0.00	5.34
611	MLZ-NMD	349	DN	1061/14-16	Open	SM-LM	Arch	1	3.05	0	0.00	4.88
612	MLZ-NMD	350	UP	1062/07-09	Open	RCC	RCC Box	1	3.05	0	0.00	5.33
613	MLZ-NMD	350	DN	1062/08-10	Open	RCC	RCC Box	1	3.05	0	0.00	4.88
614	MLZ-NMD	350A	UP	1063/03-05	Open	SM-CM	Pipe	2	0.20	0	0.00	10.90
615	MLZ-NMD	350A	DN	1063/04-06	Open	SM-LM	Pipe	2	0.20	0	0.00	
616	MLZ-NMD	351	UP	1064/01-03	Open	SM-CM	RCC Slab	1	1.83	0	0.00	5.64
617	MLZ-NMD	351	DN	1064/02-04	Open	SM-LM	Arch	1	1.83	0	0.00	12.55
618	MLZ-NMD	352	UP	1065/07-09	Open	SM-CM	RCC Slab	1	3.66	0	0.00	6.02
619	MLZ-NMD	352	DN	1065/08-10	Open	SM-LM	Arch	1	3.66	0	0.00	16.66
620	NMD-NNW	353	UP	1066/31-01	Open	SM-CM	RCC Slab	1	3.66	0	0.00	16.77
621	NMD-NNW	353	DN	1066/32-02	Open	SM-LM	Arch	1	3.66	0	0.00	
622	NMD-NNW	354	UP	1067/11-13	Open	SM-CM	RCC Slab	1	3.66	0	0.00	52.99
623	NMD-NNW	354	DN	1067/12-14	Open	SM-LM	Arch	1	3.66	0	0.00	
624	NMD-NNW	355	UP	1068/11-13	Open	SM-CM	RCC Slab	2	1.83	0	0.00	11.25
625	NMD-NNW	355	DN	1068/12-14	Open	SM-CM	RCC Box	2	1.83	0	0.00	
626	NMD-NNW	357	UP	1071/15-17	Open	SM-CM	RCC Slab	1	3.66	0	0.00	28.34

627	NMD-NNW	357	DN	1071/16-18	Open	SM-LM	Arch	1	3.66	0	0.00	
628	NMD-NNW	358	UP	1071/23-25	Open	SM-CM	RCC Slab	1	1.83	0	0.00	15.88
629	NMD-NNW	358	DN	1071/24-26	Open	SM-LM	Arch	1	1.83	0	0.00	
630	NNW-LRU	359	UP	1072/03-05	Open	SM-CM	RCC Slab	1	3.66	0	0.00	17.53
631	NNW-LRU	359	DN	1072/04-06	Open	SM-LM	Arch	1	3.66	0	0.00	
632	NNW-LRU	360	UP	1072/15-17	Open	SM-CM	RCC Slab	1	1.83	0	0.00	5.60
633	NNW-LRU	360	DN	1072/16-18	Open	SM-LM	Arch	1	1.83	0	0.00	20.94
634	NNW-LRU	361	UP	1072/29-31	Open	SM-CM	RCC Slab	1	6.10	0	0.00	5.40
635	NNW-LRU	361	DN	1072/30-32	Open	SM-LM	Arch	1	6.10	0	0.00	14.63
636	NNW-LRU	363	UP	1074/11-13	Open	SM-CM	RCC Slab	1	1.83	0	0.00	5.64
637	NNW-LRU	363	DN	1074/12-14	Open	SM-LM	Arch	1	1.83	0	0.00	9.15
638	NNW-LRU	364	UP	1074/21-23	Open	SM-CM	RCC Slab	1	3.66	0	0.00	4.83
639	NNW-LRU	364	DN	1074/22-24	Open	SM-LM	Arch	1	3.66	0	0.00	15.55
640	NNW-LRU	365	UP	1076/07-09	Open	SM-CM	Arch	1	3.66	0	0.00	23.16
641	NNW-LRU	365	DN	1076/08-10	Open	SM-LM	Arch	1	3.66	0	0.00	
642	NNW-LRU	366	UP	1076/11-13	Open	SM-LM	RCC Slab	1	0.23	0	0.00	13.82
643	NNW-LRU	366	DN	1076/12-14	Open	SM-LM	RCC Slab	1	0.23	0	0.00	
644	NNW-LRU	367	UP	1076/25-27	Open	SM-LM	RCC Slab	1	0.23	0	0.00	13.82
645	NNW-LRU	367	DN	1076/26-28	Open	SM-LM	RCC Slab	1	0.23	0	0.00	
646	NNW-LRU	368	UP	1076/27-29	Open	SM-CM	RCC Slab	1	3.66	0	0.00	4.28
647	NNW-LRU	368	DN	1076/28-30	Open	SM-LM	Arch	1	3.66	0	0.00	11.64
648	NNW-LRU	369	UP	1077/11-13	Open	SM-CM	RCC Slab	1	4.57	0	0.00	6.10
649	NNW-LRU	369	DN	1077/12-14	Open	SM-LM	Arch	1	4.57	0	0.00	4.88
650	NNW-LRU	370	UP	1078/21-23	Open	SM-CM	RCC Slab	1	6.10	0	0.00	6.10
651	NNW-LRU	370	DN	1078/22-24	Open	SM-LM	Arch	1	6.10	0	0.00	4.88
652	NNW-LRU	371	UP	1080/25-27	Open	SM-CM	RCC Slab	2	3.05	0	0.00	5.99
653	NNW-LRU	371	DN	1080/26-28	Open	SM-LM	Arch	2	3.05	0	0.00	30.48
654	NNW-LRU	372	UP	1082/11-13	Open	SM-CM	RCC Slab	2	3.05	0	0.00	6.55
655	NNW-LRU	372	DN	1082/12-14	Open	SM-LM	Arch	2	3.05	0	0.00	40.24

656	NNW-LRU	373	UP	1083/29-01	Open	SM-CM	RCC Slab	1	2.44	0	0.00	4.83
657	NNW-LRU	373	DN	1083/30-02	Open	SM-LM	Arch	2	0.91	0	0.00	13.11
658	NNW-LRU	374A	UP	1086/21-23	Open	SM-CM	RCC Slab	2	0.91	0	0.00	4.73
659	NNW-LRU	374A	DN	1086/22-24	Open	SM-LM	RCC Slab	2	0.91	0	0.00	6.10
660	LRU-GGC	375	UP	1087/07-09	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.18
661	LRU-GGC	375	DN	1087/08-10	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
662	LRU-GGC	376	UP	1087/27-01	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.34
663	LRU-GGC	376	DN	1087/28-02	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
664	LRU-GGC	377	UP	1088/05-07	Open	SM-CM	RCC Slab	1	2.44	0	0.00	9.35
665	LRU-GGC	377	DN	1088/06-08	Open	SM-LM	RCC Slab	2	0.91	0	0.00	
666	LRU-GGC	378	UP	1088/11-13	Open	SM-CM	RCC Slab	1	2.44	0	0.00	10.82
667	LRU-GGC	378	DN	1088/12-14	Open	SM-LM	RCC Slab	2	0.91	0	0.00	
668	LRU-GGC	380	UP	1089/25-27	Open	SM-CM	RCC Slab	1	0.91	0	0.00	4.73
669	LRU-GGC	380	DN	1089/26-28	Open	SM-LM	RCC Slab	1	0.91	0	0.00	6.10
670	LRU-GGC	382	UP	1092/25-27	Open	SM-LM	RCC Slab	1	3.66	0	0.00	6.10
671	LRU-GGC	382	DN	1092/26-28	Open	SM-LM	PSC Slab	1	3.66	0	0.00	6.10
672	GGC-COO	384	UP	1094/05-07	Open	SM-CM	RCC Slab	1	3.66	0	0.00	15.84
673	GGC-COO	384	DN	1094/06-08	Open	SM-LM	RCC Slab	1	3.66	0	0.00	
674	GGC-COO	385	UP	1094/33-35	Open	SM-CM	Pipe	1	0.46	0	0.00	4.88
675	GGC-COO	385	DN	1094/34-36	Open	SM-LM	Pipe	1	0.30	0	0.00	7.47
676	GGC-COO	386	UP	1095/11-13	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.34
677	GGC-COO	386	DN	1095/12-14	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
678	GGC-COO	387	UP	1095/19-21	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.18
679	GGC-COO	387	DN	1095/20-22	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
680	GGC-COO	388	UP	1097/05-07	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.34
681	GGC-COO	388	DN	1097/06-08	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
682	GGC-COO	389	UP	1097/19-21	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.34
683	GGC-COO	389	DN	1097/20-22	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
684	GGC-COO	390	UP	1098/19-21	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.34

685	GGC-COO	390	DN	1098/20-24	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
686	GGC-COO	391	UP	1098/25-27	Open	SM-CM	RCC Slab	2	3.66	0	0.00	5.34
687	GGC-COO	391	DN	1098/26-28	Open	SM-LM	RCC Slab	2	3.66	0	0.00	4.88
688	GGC-COO	392	UP	1099/13-15	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.34
689	GGC-COO	392	DN	1099/14-16	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
690	GGC-COO	393	UP	1100/17-19	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.34
691	GGC-COO	393	DN	1100/18-20	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
692	GGC-COO	394	UP	1101/05-07	Open	SM-CM	RCC Slab	1	0.91	0	0.00	4.57
693	GGC-COO	394	DN	1101/06-08	Open	SM-LM	RCC Slab	1	0.91	0	0.00	8.23
694	GGC-COO	395	UP	1101/17-19	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.34
695	GGC-COO	395	DN	1101/18-20	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
696	GGC-COO	396	UP	1101/27-29	Open	SM-CM	Pipe	1	0.46	0	0.00	4.88
697	GGC-COO	396	DN	1101/28-30	Open	SM-LM	Pipe	1	0.30	0	0.00	8.64
698	GGC-COO	397	UP	1101/27-29	Open	SM-CM	RCC Slab	1	0.91	0	0.00	3.81
699	GGC-COO	397	DN	1101/28-30	Open	SM-LM	RCC Slab	1	0.91	0	0.00	9.15
700	GGC-COO	398	UP	1102/01-03	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.34
701	GGC-COO	398	DN	1102/02-04	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
702	GGC-COO	399	UP	1102/07-09	Open	SM-CM	Pipe	1	0.46	0	0.00	4.88
703	GGC-COO	399	DN	1102/08-10	Open	SM-LM	Pipe	1	0.46	0	0.00	8.84
704	GGC-COO	400	UP	1102/11-13	Open	SM-CM	Pipe	1	0.46	0	0.00	4.88
705	GGC-COO	400	DN	1102/12-14	Open	SM-LM	Pipe	1	0.46	0	0.00	9.15
706	GGC-COO	401	UP	1102/17-19	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.34
707	GGC-COO	401	DN	1102/18-20	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
708	GGC-COO	402	UP	1102/23-25	Open	SM-CM	RCC Slab	1	6.10	0	0.00	5.34
709	GGC-COO	402	DN	1102/24-26	Open	SM-LM	RCC Slab	1	6.10	0	0.00	4.88
710	GGC-COO	403	UP	1103/03-05	Open	SM-CM	Pipe	1	0.46	0	0.00	4.88
711	GGC-COO	403	DN	1103/04-06	Open	SM-LM	Pipe	1	0.46	0	0.00	8.08
712	GGC-COO	404	UP	1103/09-11	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.18
713	GGC-COO	404	DN	1103/10-12	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88

714	GGC-COO	405	UP	1103/17-19	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.34
715	GGC-COO	405	DN	1103/18-20	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
716	GGC-COO	406	UP	1103/25-27	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.64
717	GGC-COO	406	DN	1103/26-28	Open	SM-LM	RCC Slab	1	3.66	0	0.00	9.15
718	GGC-COO	407	UP	1104/03-05	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.18
719	GGC-COO	407	DN	1104/04-06	Open	SM-LM	RCC Slab	1	3.66	0	0.00	5.18
720	COO-PDZ	408	UP	1106/17-19	Open	SM-CM	Pipe	1	0.46	0	0.00	4.88
721	COO-PDZ	408	DN	1106/18-20	Open	SM-LM	Pipe	1	0.46	0	0.00	6.86
722	COO-PDZ	409	UP	1107/13-15	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.34
723	COO-PDZ	409	DN	1107/14-16	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
724	COO-PDZ	410	UP	1107/21-23	Open	SM-CM	Pipe	1	0.46	0	0.00	4.88
725	COO-PDZ	410	DN	1107/22-24	Open	SM-LM	Pipe	1	0.46	0	0.00	9.91
726	COO-PDZ	411	UP	1108/23-25	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.34
727	COO-PDZ	411	DN	1108/24-28A	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
728	COO-PDZ	412	UP	1109/03-05	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.34
729	COO-PDZ	412	DN	1109/04-06	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
730	COO-PDZ	413	UP	1109/13-15	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.34
731	COO-PDZ	413	DN	1109/14-16	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
732	COO-PDZ	414	UP	1109/19-20	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.34
733	COO-PDZ	414	DN	1109/20-22	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
734	COO-PDZ	415	UP	1109/23-25	Open	SM-CM	Pipe	1	0.46	0	0.00	14.08
735	COO-PDZ	415	DN	1109/24-26	Open	SM-LM	Pipe	1	0.46	0	0.00	
736	COO-PDZ	416	UP	1109/27-01	Open	SM-CM	Pipe	1	0.46	0	0.00	15.29
737	COO-PDZ	416	DN	1109/28-02	Open	SM-LM	Pipe	1	0.46	0	0.00	
738	COO-PDZ	417	UP	1110/01-03	Open	SM-CM	Pipe	1	0.46	0	0.00	23.19
739	COO-PDZ	417	DN	1110/02-04	Open	SM-LM	Pipe	1	0.46	0	0.00	
740	COO-PDZ	418	UP	1110/05-07	Open	SM-CM	RCC Slab	1	0.91	0	0.00	4.04
741	COO-PDZ	418	DN	1110/06-08	Open	SM-LM	Stone Slab	1	0.91	0	0.00	14.02
742	COO-PDZ	418A	UP	1110/05-07	Open	RCC	RCC Box	1	1.82	0	0.00	12.98

743	COO-PDZ	418A	DN	1110/06-08	Open	RCC	RCC Box	1	1.82	0	0.00	
744	COO-PDZ	419	UP	1110/11-13	Open	SM-CM	RCC Slab	1	1.83	0	0.00	5.34
745	COO-PDZ	419	DN	1110/12-14	Open	SM-LM	Arch	1	1.83	0	0.00	4.88
746	COO-PDZ	420	UP	1110/15-17	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.34
747	COO-PDZ	420	DN	1110/16-18	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
748	COO-PDZ	421	UP	1110/17-19	Open	SM-CM	Pipe	1	0.46	0	0.00	4.88
749	COO-PDZ	421	DN	1110/18-20	Open	SM-LM	Pipe	1	0.46	0	0.00	12.85
750	COO-PDZ	422	UP	1110/21-23	Open	SM-CM	RCC Slab	1	0.91	0	0.00	4.55
751	COO-PDZ	422	DN	1110/22-24	Open	SM-LM	Stone Slab	1	0.91	0	0.00	10.02
752	COO-PDZ	423	UP	1110/25-27	Open	SM-CM	Pipe	1	0.46	0	0.00	4.88
753	COO-PDZ	423	DN	1110/26-28	Open	SM-LM	Pipe	1	0.46	0	0.00	12.24
754	COO-PDZ	424	UP	1111/01-03	Open	SM-CM	Pipe	1	0.46	0	0.00	4.88
755	COO-PDZ	424	DN	1111/02-04	Open	SM-LM	Pipe	1	0.46	0	0.00	12.24
756	COO-PDZ	425	UP	1111/05-07	Open	SM-CM	RCC Slab	2	3.66	0	0.00	5.34
757	COO-PDZ	425	DN	1111/06-08	Open	SM-LM	RCC Slab	2	3.66	0	0.00	4.88
758	COO-PDZ	426	UP	1111/19-21	Open	SM-CM	Pipe	1	0.46	0	0.00	4.88
759	COO-PDZ	426	DN	1111/20-22	Open	SM-LM	Pipe	1	0.46	0	0.00	7.98
760	COO-PDZ	427	UP	1111/27-29	Open	SM-CM	Pipe	1	0.46	0	0.00	4.88
761	COO-PDZ	427	DN	1111/28-30	Open	SM-LM	Pipe	1	0.46	0	0.00	7.98
762	COO-PDZ	427A	UP	1112/11-13	Open	SM-CM	RCC Slab	2	1.83	0	0.00	5.74
763	COO-PDZ	427A	DN	1112/12-14	Open	SM-LM	RCC Slab	2	1.83	0	0.00	6.10
764	COO-PDZ	428	UP	1112/17-19	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.32
765	COO-PDZ	428	DN	1112/18-20	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
766	COO-PDZ	429	UP	1113/11-13	Open	SM-CM	Stone Slab	1	0.91	0	0.00	17.09
767	COO-PDZ	429	DN	1113/12-14	Open	SM-LM	Stone Slab	1	0.91	0	0.00	
768	PDZ-SMVJ	430	UP	1114/15-17	Open	SM-CM	RCC Slab	2	0.91	0	0.00	4.73
769	PDZ-SMVJ	430	DN	1114/16-18	Open	SM-LM	RCC Slab	2	0.91	0	0.00	6.10
770	PDZ-SMVJ	431	UP	1114/19-21	Open	SM-CM	Pipe	1	0.46	0	0.00	4.88
771	PDZ-SMVJ	431	DN	1114/20-22	Open	SM-LM	Pipe	1	0.46	0	0.00	9.15

772	PDZ-SMVJ	432	UP	1114/21-23	Open	SM-CM	RCC Slab	2	0.91	0	0.00	4.73
773	PDZ-SMVJ	432	DN	1114/22-24	Open	SM-LM	RCC Slab	2	0.91	0	0.00	6.10
774	PDZ-SMVJ	433	UP	1115/09-11	Open	SM-CM	RCC Slab	2	0.91	0	0.00	4.73
775	PDZ-SMVJ	433	DN	1115/10-12	Open	SM-LM	RCC Slab	2	0.91	0	0.00	6.10
776	PDZ-SMVJ	434	UP	1115/13-15	Open	SM-CM	RCC Slab	1	0.91	0	0.00	4.73
777	PDZ-SMVJ	434	DN	1115/14-16	Open	SM-LM	RCC Slab	1	0.91	0	0.00	6.10
778	PDZ-SMVJ	435	UP	1116/01-03	Open	SM-CM	RCC Slab	1	0.91	0	0.00	4.73
779	PDZ-SMVJ	435	DN	1116/02-04	Open	SM-LM	RCC Slab	1	0.91	0	0.00	6.10
780	PDZ-SMVJ	436	UP	1116/07-09	Open	SM-CM	RCC Slab	1	0.91	0	0.00	4.73
781	PDZ-SMVJ	436	DN	1116/08-10	Open	SM-LM	RCC Slab	1	0.91	0	0.00	6.10
782	PDZ-SMVJ	437	UP	1117/03-05	Open	SM-CM	RCC Slab	1	0.91	0	0.00	4.73
783	PDZ-SMVJ	437	DN	1117/04-06	Open	SM-LM	RCC Slab	1	0.91	0	0.00	6.10
784	PDZ-SMVJ	437A	UP	1117/07-09	Open	RCC	RCC Box	1	1.82	0	0.00	20.30
785	PDZ-SMVJ	437A	DN	1117/08-10	Open	RCC	RCC Box	1	1.82	0	0.00	
786	PDZ-SMVJ	438	UP	1117/17-19	Open	SM-CM	RCC Slab	1	0.91	0	0.00	4.73
787	PDZ-SMVJ	438	DN	1117/18-20	Open	SM-LM	RCC Slab	1	0.91	0	0.00	6.10
788	PDZ-SMVJ	439	UP	1117/23-25	Open	SM-CM	RCC Slab	1	0.91	0	0.00	3.25
789	PDZ-SMVJ	439	DN	1117/24-26	Open	SM-LM	RCC Slab	1	0.91	0	0.00	9.04
790	PDZ-SMVJ	440	UP	1118/05-07	Open	SM-CM	RCC Slab	1	0.91	0	0.00	4.73
791	PDZ-SMVJ	440	DN	1118/06-08	Open	SM-LM	RCC Slab	1	0.91	0	0.00	6.10
792	PDZ-SMVJ	441	UP	1118/21-23	Open	SM-CM	RCC Slab	1	0.91	0	0.00	4.73
793	PDZ-SMVJ	441	DN	1118/22-24	Open	SM-LM	RCC Slab	1	0.91	0	0.00	6.10
794	PDZ-SMVJ	442	UP	1120/01-03	Open	SM-CM	Stone Slab	2	0.91	0	0.00	4.54
795	PDZ-SMVJ	442	DN	1120/02-04	Open	SM-LM	RCC Slab	2	0.91	0	0.00	13.13
796	PDZ-SMVJ	443	UP	1120/25-27	Open	SM-CM	Pipe	1	0.46	0	0.00	4.88
797	PDZ-SMVJ	443	DN	1120/26-28	Open	SM-LM	Pipe	1	0.46	0	0.00	6.63
798	PDZ-SMVJ	444	UP	1121/17-19	Open	SM-CM	Pipe	1	0.46	0	0.00	4.88
799	PDZ-SMVJ	444	DN	1121/18-20	Open	SM-LM	Pipe	1	0.46	0	0.00	7.82
800	PDZ-SMVJ	445	UP	1121/29-01	Open	SM-CM	RCC Slab	2	2.74	0	0.00	4.57

801	PDZ-SMVJ	445	DN	1121/30-02	Open	SM-LM	Stone Slab	2	2.74	0	0.00	9.35
802	PDZ-SMVJ	446	UP	1122/01-03	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.34
803	PDZ-SMVJ	446	DN	1122/02-04	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
804	PDZ-SMVJ	447	UP	1122/21-23	Open	RCC	RCC Box	1	6.10	0	0.00	6.10
805	PDZ-SMVJ	447	DN	1122/22-24	Open	SM-LM	RCC Slab	1	6.10	0	0.00	4.88
806	PDZ-SMVJ	451	UP	1125/17-19	Open	SM-CM	Pipe	1	0.46	0	0.00	20.63
807	PDZ-SMVJ	451	DN	1125/18-20	Open	SM-LM	Pipe	1	0.46	0	0.00	
808	SMVJ-HAN	452	UP	1126/35-37	Open	SM-CM	RCC Slab	1	3.66	0	0.00	15.55
809	SMVJ-HAN	452	DN	1126/36-38	Open	SM-CM	RCC Slab	1	3.66	0	0.00	
810	SMVJ-HAN	453	UP	1127/05-07	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.34
811	SMVJ-HAN	453	DN	1127/06-08	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
812	SMVJ-HAN	454	UP	1127/09-11	Open	SM-CM	Pipe	1	0.46	0	0.00	4.88
813	SMVJ-HAN	454	DN	1127/10-12	Open	SM-LM	Pipe	1	0.46	0	0.00	10.98
814	SMVJ-HAN	455	UP	1127/13-15	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.20
815	SMVJ-HAN	455	DN	1127/14-16	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
816	SMVJ-HAN	456	UP	1127/19-21	Open	SM-CM	Pipe	1	0.46	0	0.00	4.88
817	SMVJ-HAN	456	DN	1127/20-22	Open	SM-LM	Pipe	1	0.46	0	0.00	8.53
818	SMVJ-HAN	457	UP	1127/25-27	Open	SM-CM	Pipe	1	0.46	0	0.00	4.88
819	SMVJ-HAN	457	DN	1127/26-28	Open	SM-LM	Pipe	1	0.46	0	0.00	6.10
820	SMVJ-HAN	458	UP	1127/27-29	Open	SM-CM	Pipe	1	0.46	0	0.00	4.88
821	SMVJ-HAN	458	DN	1127/28-30	Open	SM-LM	Pipe	1	0.46	0	0.00	8.54
822	SMVJ-HAN	459	UP	1127/31-01	Open	SM-CM	Pipe	1	0.46	0	0.00	4.88
823	SMVJ-HAN	459	DN	1127/32-02	Open	SM-LM	Pipe	1	0.46	0	0.00	6.71
824	SMVJ-HAN	460	UP	1128/01-03	Open	SM-CM	Pipe	1	0.46	0	0.00	4.88
825	SMVJ-HAN	460	DN	1128/02-04	Open	SM-LM	Pipe	1	0.46	0	0.00	9.80
826	SMVJ-HAN	461	UP	1128/05-07	Open	SM-CM	Pipe	1	0.46	0	0.00	4.88
827	SMVJ-HAN	461	DN	1128/06-08	Open	SM-LM	Pipe	1	0.46	0	0.00	8.59
828	SMVJ-HAN	462	UP	1128/11-13	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.33
829	SMVJ-HAN	462	DN	1128/12-14	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88

830	SMVJ-HAN	463	UP	1129/17-19	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.33
831	SMVJ-HAN	463	DN	1129/18-20	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
832	SMVJ-HAN	464	UP	1130/00-01	Open	SM-CM	RCC Slab	1	0.91	0	0.00	4.50
833	SMVJ-HAN	464	DN	1130/00-02	Open	SM-LM	RCC Slab	1	0.91	0	0.00	9.85
834	SMVJ-HAN	465	UP	1130/15-17	Open	SM-CM	RCC Slab	1	1.83	0	0.00	5.72
835	SMVJ-HAN	465	DN	1130/16-18	Open	SM-LM	Arch	1	1.83	0	0.00	14.48
836	SMVJ-HAN	466	UP	1130/27-29	Open	RCC	RCC Box	2	2.90	0	0.00	5.38
837	SMVJ-HAN	466	DN	1130/28-30	Open	SM-LM	RCC Slab	2	3.66	0	0.00	4.88
838	SMVJ-HAN	467	UP	1131/21-23	Open	SM-CM	Pipe	1	0.46	0	0.00	12.49
839	SMVJ-HAN	467	DN	1131/22-24	Open	SM-LM	Pipe	1	0.46	0	0.00	
840	SMVJ-HAN	468	UP	1131/23-25	Open	SM-CM	Pipe	1	0.46	0	0.00	14.35
841	SMVJ-HAN	468	DN	1131/24-26	Open	SM-LM	Pipe	1	0.46	0	0.00	
842	SMVJ-HAN	469	UP	1132/07-09	Open	SM-CM	RCC Slab	1	0.91	0	0.00	4.50
843	SMVJ-HAN	469	DN	1132/08-10	Open	SM-LM	RCC Slab	1	0.91	0	0.00	8.84
844	SMVJ-HAN	470	UP	1132/21-23	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.17
845	SMVJ-HAN	470	DN	1132/22-24	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
846	HAN-FSP	474	UP	1139/05-07	Open	SM-CM	RCC Slab	1	0.91	0	0.00	3.73
847	HAN-FSP	474	DN	1139/06-08	Open	SM-LM	RCC Slab	1	0.91	0	0.00	8.07
848	HAN-FSP	476	UP	1143/27-29	Open	SM-CM	RCC Slab	1	1.83	0	0.00	5.23
849	HAN-FSP	476	DN	1143/28-30	Open	SM-LM	Arch	1	1.83	0	0.00	11.00
850	HAN-FSP	476A	UP	1144/05-07	Open	SM-CM	Pipe	2	0.50	0	0.00	10.82
851	HAN-FSP	476A	DN	1144/06-08	Open	SM-LM	Pipe	2	0.50	0	0.00	
852	HAN-FSP	477	UP	1145/17-19	Open	RCC	RCC Box	2	3.51	0	0.00	5.32
853	HAN-FSP	477	DN	1145/18-20	Open	SM-LM	RCC Slab	2	3.66	0	0.00	4.88
854	HAN-FSP	477A	UP	1147/07-09	Open	SM-CM	Pipe	2	0.61	0	0.00	4.88
855	HAN-FSP	477A	DN	1147/08-10	Open	SM-LM	Pipe	2	0.61	0	0.00	7.31
856	HAN-FSP	478	UP	1148/05-07	Open	SM-CM	RCC Slab	1	1.83	0	0.00	6.17
857	HAN-FSP	478	DN	1148/06-08	Open	SM-LM	Arch	1	1.83	0	0.00	4.88
858	HAN-FSP	479	UP	1148/19-21	Open	SM-CM	RCC Slab	1	1.83	0	0.00	4.46

859	HAN-FSP	479	DN	1148/20-22	Open	SM-LM	Arch	1	1.83	0	0.00	11.68
860	HAN-FSP	480	UP	1149/09-11	Open	SM-CM	RCC Slab	1	1.83	0	0.00	5.32
861	HAN-FSP	480	DN	1149/10-12	Open	SM-LM	Arch	1	1.83	0	0.00	4.88
862	FSP-DY	481	UP	1151/09-11	Open	SM-CM	Pipe	1	0.38	0	0.00	11.30
863	FSP-DY	481	DN	1151/10-12	Open	SM-LM	Pipe	1	0.30	0	0.00	
864	FSP-DY	482	UP	1151/15-17	Open	SM-CM	Pipe	1	0.38	0	0.00	13.30
865	FSP-DY	482	DN	1151/16-18	Open	SM-LM	Pipe	1	0.30	0	0.00	
866	FSP-DY	483	UP	1152/07-09	Open	SM-CM	RCC Slab	1	1.83	0	0.00	24.38
867	FSP-DY	483	DN	1152/08-10	Open	SM-LM	Arch	1	1.83	0	0.00	
868	FSP-DY	484	UP	1153/05-07	Open	SM-CM	RCC Slab	2	0.91	0	0.00	4.88
869	FSP-DY	484	DN	1153/06-08	Open	SM-LM	RCC Slab	2	0.91	0	0.00	6.10
870	FSP-DY	485	UP	1153/23-25	Open	SM-CM	Pipe	1	0.38	0	0.00	12.10
871	FSP-DY	485	DN	1153/24-25	Open	SM-LM	Pipe	1	0.30	0	0.00	
872	FSP-DY	486	UP	1155/03-05	Open	SM-CM	RCC Slab	1	1.83	0	0.00	30.20
873	FSP-DY	486	DN	1155/04-06	Open	SM-LM	Arch	1	1.83	0	0.00	
874	FSP-DY	487	UP	1155/13-15	Open	SM-CM	RCC Slab	1	1.83	0	0.00	27.10
875	FSP-DY	487	DN	1155/14-16	Open	SM-LM	Arch	1	1.83	0	0.00	
876	FSP-DY	488	UP	1155/21-23	Open	SM-CM	RCC Slab	1	0.91	0	0.00	19.94
877	FSP-DY	488	DN	1155/22-24	Open	SM-LM	Arch	1	0.91	0	0.00	
878	FSP-DY	489	UP	1156/15-17	Open	SM-CM	RCC Slab	1	1.83	0	0.00	21.23
879	FSP-DY	489	DN	1156/16-18	Open	SM-LM	Arch	1	1.83	0	0.00	
880	FSP-DY	490	UP	1156/25-27	Open	SM-CM	RCC Slab	1	1.83	0	0.00	15.14
881	FSP-DY	490	DN	1156/26-28	Open	SM-LM	Arch	1	1.83	0	0.00	
882	FSP-DY	491	UP	1157/03-05	Open	SM-CM	Pipe	1	0.46	0	0.00	20.73
883	FSP-DY	491	DN	1157/04-06	Open	SM-LM	Pipe	1	0.30	0	0.00	
884	FSP-DY	492	UP	1157/11-13	Open	SM-CM	Pipe	1	0.60	0	0.00	31.62
885	FSP-DY	492	DN	1157/12-14	Open	SM-LM	Pipe	1	0.30	0	0.00	
886	FSP-DY	493	UP	1157/23-25	Open	SM-CM	RCC Slab	1	3.66	0	0.00	14.34
887	FSP-DY	493	DN	1157/24-26	Open	SM-LM	RCC Box	1	3.66	0	0.00	10.36

888	FSP-DY	495	UP	1159/07-09	Open	SM-CM	RCC Slab	2	6.10	0	0.00	6.10
889	FSP-DY	495	DN	1159/08-10	Open	SM-LM	RCC Slab	2	6.10	0	0.00	4.88
890	FSP-DY	496	UP	1159/15-17	Open	SM-CM	RCC Slab	1	1.83	0	0.00	5.56
891	FSP-DY	496	DN	1159/16-18	Open	SM-LM	Arch	1	1.83	0	0.00	8.23
892	DY-BXN	497	UP	1160/29-31	Open	SM-CM	RCC Slab	1	3.66	0	0.00	5.33
893	DY-BXN	497	DN	1160/30-32	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
894	DY-BXN	498	UP	1162/03-05	Open	SM-CM	RCC Slab	2	6.10	0	0.00	6.10
895	DY-BXN	498	DN	1162/04-06	Open	SM-LM	RCC Slab	2	6.10	0	0.00	4.88
896	DY-BXN	499	UP	1163/07-09	Open	SM-CM	RCC Slab	1	0.91	0	0.00	3.74
897	DY-BXN	499	DN	1163/08-10	Open	SM-LM	RCC Slab	1	0.91	0	0.00	8.23
898	DY-BXN	500	UP	1164/05-07	Open	SM-CM	RCC Slab	1	3.66	0	0.00	4.05
899	DY-BXN	500	DN	1164/06-08	Open	SM-LM	Arch	1	3.66	0	0.00	10.82
900	DY-BXN	501	UP	1165/19-21	Open	SM-CM	RCC Slab	2	0.91	0	0.00	4.72
901	DY-BXN	501	DN	1165/20-22	Open	SM-LM	RCC Slab	2	0.91	0	0.00	6.10
902	DY-BXN	502	UP	1165/21-23	Open	SM-CM	Pipe	1	0.38	0	0.00	11.35
903	DY-BXN	502	DN	1165/22-24	Open	SM-LM	Pipe	1	0.30	0	0.00	
904	DY-BXN	503	UP	1166/11-13	Open	SM-CM	RCC Slab	1	3.66	0	0.00	6.10
905	DY-BXN	503	DN	1166/12-14	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
906	DY-BXN	504	UP	1166/23-25	Open	SM-CM	Pipe	1	0.38	0	0.00	10.36
907	DY-BXN	504	DN	1166/24-26	Open	SM-LM	Pipe	1	0.30	0	0.00	
908	DY-BXN	505	UP	1166/29-01	Open	SM-CM	RCC Slab	1	3.66	0	0.00	6.10
909	DY-BXN	505	DN	1166/30-02	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
910	DY-BXN	506	UP	1167/05-07	Open	MCC	Pipe	1	0.38	0	0.00	11.58
911	DY-BXN	506	DN	1167/06-08	Open	MCC	Pipe	1	0.30	0	0.00	
912	DY-BXN	507	UP	1167/07-09	Open	SM-CM	RCC Slab	1	6.10	0	0.00	6.10
913	DY-BXN	507	DN	1167/08-10	Open	SM-CM	RCC Slab	1	6.10	0	0.00	4.88
914	DY-BXN	508	UP	1167/23-25	Open	SM-CM	Pipe	1	0.38	0	0.00	13.41
915	DY-BXN	508	DN	1167/24-26	Open	SM-LM	Pipe	1	0.30	0	0.00	
916	DY-BXN	509	UP	1167/25-27	Open	SM-CM	RCC Slab	1	0.91	0	0.00	4.57

917	DY-BXN	509	DN	1167/26-28	Open	SM-LM	Stone Slab	1	0.91	0	0.00	11.27
918	DY-BXN	510	UP	1168/03-05	Open	SM-CM	Pipe	1	0.38	0	0.00	11.02
919	DY-BXN	510	DN	1168/02-04	Open	SM-LM	Pipe	1	0.30	0	0.00	
920	DY-BXN	511	UP	1168/05-07	Open	SM-CM	RCC Slab	1	0.91	0	0.00	26.79
921	DY-BXN	511	DN	1168/06-08	Open	SM-LM	Arch	1	0.91	0	0.00	
922	DY-BXN	512	UP	1168/21-23	Open	SM-CM	RCC Slab	1	3.66	0	0.00	6.10
923	DY-BXN	512	DN	1168/22-24	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
924	BXN-KEV	514	UP	1170/23-25	Open	MCC	RCC Slab	1	3.66	0	0.00	4.88
925	BXN-KEV	514	DN	1170/24-26	Open	MCC	RCC Slab	1	3.66	0	0.00	6.10
926	BXN-KEV	515	UP	1170/33-35	Open	MCC	RCC Slab	1	1.83	0	0.00	4.88
927	BXN-KEV	515	DN	1170/34-36	Open	MCC	RCC Slab	1	1.83	0	0.00	6.10
928	BXN-KEV	516	UP	1171/15-17	Open	MCC	RCC Slab	1	3.66	0	0.00	11.88
929	BXN-KEV	516	DN	1171/16-18	Open	MCC	RCC Slab	1	3.66	0	0.00	
930	BXN-KEV	517	UP	1171/25-27	Open	MCC	RCC Slab	2	3.66	0	0.00	10.90
931	BXN-KEV	517	DN	1171/26-28	Open	MCC	RCC Slab	2	3.66	0	0.00	
932	BXN-KEV	518	UP	1172/09-11	Open	MCC	RCC Slab	2	3.66	0	0.00	10.82
933	BXN-KEV	518	DN	1172/10-12	Open	MCC	RCC Slab	2	3.66	0	0.00	
934	BXN-KEV	519	UP	1172/21-23	Open	MCC	Stone Slab	2	0.91	0	0.00	6.10
935	BXN-KEV	519	DN	1172/22-24	Open	MCC	Pipe	2	0.91	0	0.00	4.88
936	BXN-KEV	520	UP	1173/07-09	Open	RCC	RCC Box	1	1.83	0	0.00	17.08
937	BXN-KEV	520	DN	1173/08-10	Open	RCC	RCC Box	1	1.83	0	0.00	
938	BXN-KEV	531	UP	1181/19-21	Open	MCC	RCC Slab	1	3.05	0	0.00	10.82
939	BXN-KEV	531	DN	1181/20-22	Open	MCC	RCC Slab	1	3.05	0	0.00	10.00
940	KEV-PNGR	533	UP	1182/17-19	Open	SM-LM	Stone Slab	1	0.61	0	0.00	13.00
941	KEV-PNGR	533	DN	1182/18-20	Open	MCC	RCC Slab	1	0.61	0	0.00	9.28
942	KEV-PNGR	536	DN	1186/30-02	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
943	KEV-PNGR	536	UP	1186/29-01	Open	RCC	RCC Box	1	3.66	0	0.00	5.32
944	KEV-PNGR	537	UP	1187/07-09	Open	MCC	RCC Slab	1	0.61	0	0.00	5.71
945	KEV-PNGR	537	DN	1187/08-10	Open	SM-LM	Stone Slab	1	0.61	0	0.00	11.78

946	KEV-PNGR	538	UP	1187/15-17	Open	MCC	Arch	1	0.61	0	0.00	18.25
947	KEV-PNGR	538	DN	1187/16-18	Open	SM-LM	Arch	1	0.61	0	0.00	
948	KEV-PNGR	539	UP	1187/21-23	Open	MCC	RCC Box	1	3.66	0	0.00	5.32
949	KEV-PNGR	539	DN	1187/22-24	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
950	KEV-PNGR	539A	UP	1188/03-05	Open	MCC	RCC Slab	2	3.66	0	0.00	5.18
951	KEV-PNGR	539A	DN	1188/04-06	Open	SM-LM	RCC Slab	2	3.66	0	0.00	5.65
952	KEV-PNGR	540	UP	1189/23-25	Open	MCC	RCC Slab	1	2.46	0	0.00	3.74
953	KEV-PNGR	540	DN	1189/24-26	Open	SM-CM	Stone Slab	2	0.91	0	0.00	8.04
954	PNGR-SWAR	542	UP	1193/17-19	Open	MCC	RCC Slab	1	2.46	0	0.00	5.16
955	PNGR-SWAR	542	DN	1193/18-20	Open	SM-CM	Stone Slab	2	0.91	0	0.00	7.41
956	PNGR-SWAR	543	UP	1194/03-05	Open	MCC	RCC Slab	1	3.95	0	0.00	5.16
957	PNGR-SWAR	543	DN	1194/04-06	Open	SM-CM	Stone Slab	3	0.91	0	0.00	7.41
958	PNGR-SWAR	544	UP	1194/09-11	Open	MCC	Arch	1	0.61	0	0.00	11.20
959	PNGR-SWAR	544	DN	1194/10-12	Open	SM-LM	Arch	1	0.61	0	0.00	
960	PNGR-SWAR	545	UP	1194/27-29	Open	MCC	Arch	2	0.61	0	0.00	11.21
961	PNGR-SWAR	545	DN	1194/28-30	Open	SM-CM	Arch	2	0.61	0	0.00	
962	PNGR-SWAR	546	UP	1194/29-01	Open	MCC	RCC Slab	1	2.46	0	0.00	5.41
963	PNGR-SWAR	546	DN	1194/30-02	Open	SM-LM	Stone Slab	2	0.91	0	0.00	8.18
964	PNGR-SWAR	547	UP	1195/01-03	Open	MCC	Arch	1	0.61	0	0.00	11.20
965	PNGR-SWAR	547	DN	1195/02-04	Open	SM-CM	Arch	1	0.61	0	0.00	
966	PNGR-SWAR	548	UP	1195/11-13	Open	MCC	Arch	1	0.61	0	0.00	11.20
967	PNGR-SWAR	548	DN	1195/12-14	Open	SM-CM	Arch	1	0.61	0	0.00	
968	PNGR-SWAR	549	UP	1196/05-07	Open	MCC	RCC Slab	1	2.46	0	0.00	5.16
969	PNGR-SWAR	549	DN	1196/06-08	Open	SM-LM	Stone Slab	2	0.91	0	0.00	6.62
970	PNGR-SWAR	550	UP	1197/05-07	Open	MCC	RCC Slab	1	2.46	0	0.00	4.71
971	PNGR-SWAR	550	DN	1197/06-08	Open	SM-LM	Stone Slab	2	0.91	0	0.00	7.23
972	PNGR-SWAR	551	UP	1198/01-03	Open	MCC	RCC Slab	1	2.46	0	0.00	5.16
973	PNGR-SWAR	551	DN	1198/02-04	Open	SM-LM	Stone Slab	2	0.91	0	0.00	7.46
974	PNGR-SWAR	552	UP	1198/13-15	Open	RCC	RCC Box	1	3.66	0	0.00	5.32

975	PNGR-SWAR	552	DN	1198/14-16	Open	SM-CM	RCC Slab	1	3.66	0	0.00	4.88
976	PNGR-SWAR	553	UP	1198/21-23	Open	MCC	RCC Slab	1	2.46	0	0.00	5.16
977	PNGR-SWAR	553	DN	1198/22-24	Open	SM-CM	Stone Slab	2	0.91	0	0.00	6.65
978	PNGR-SWAR	554	UP	1199/25-27	Open	MCC	RCC Slab	1	2.46	0	0.00	5.16
979	PNGR-SWAR	554	DN	1199/26-28	Open	SM-CM	Stone Slab	2	0.91	0	0.00	6.60
980	PNGR-SWAR	555	UP	1199/27-01	Open	MCC	Arch	1	0.61	0	0.00	11.20
981	PNGR-SWAR	555	DN	1199/28-02	Open	SM-CM	Arch	1	0.61	0	0.00	
982	SWAR-BTE	557	UP	1202/09-11	Open	MCC	RCC Slab	1	2.46	0	0.00	3.81
983	SWAR-BTE	557	DN	1202/10-12	Open	SM-CM	Stone Slab	2	0.91	0	0.00	8.08
984	SWAR-BTE	558	UP	1202/15-17	Open	MCC	Arch	1	0.61	0	0.00	11.20
985	SWAR-BTE	558	DN	1202/16-18	Open	SM-CM	Arch	1	0.61	0	0.00	
986	SWAR-BTE	559	UP	1202/17-19	Open	MCC	Arch	1	0.61	0	0.00	11.20
987	SWAR-BTE	559	DN	1202/18-20	Open	SM-CM	Arch	1	0.61	0	0.00	
988	SWAR-BTE	560	UP	1202/23-25	Open	MCC	Arch	1	0.61	0	0.00	11.20
989	SWAR-BTE	560	DN	1202/24-26	Open	SM-CM	Arch	1	0.61	0	0.00	
990	SWAR-BTE	561	UP	1202/31-33	Open	MCC	Arch	1	0.61	0	0.00	11.90
991	SWAR-BTE	561	DN	1202/32-34	Open	SM-CM	Arch	1	0.61	0	0.00	
992	SWAR-BTE	562	UP	1202/33-35	Open	MCC	RCC Slab	3	3.66	0	0.00	5.34
993	SWAR-BTE	562	DN	1202/34-36	Open	SM-CM	RCC Slab	3	3.66	0	0.00	4.88
994	SWAR-BTE	563	UP	1203/05-07	Open	MCC	Arch	1	0.61	0	0.00	16.20
995	SWAR-BTE	563	DN	1203/06-08	Open	SM-CM	Arch	1	0.61	0	0.00	
996	SWAR-BTE	564	UP	1203/29-01	Open	MCC	RCC Box	1	3.66	0	0.00	5.32
997	SWAR-BTE	564	DN	1203/30-02	Open	SM-CM	RCC Slab	1	3.66	0	0.00	4.88
998	SWAR-BTE	565	UP	1204/23-25	Open	MCC	RCC Slab	1	2.46	0	0.00	13.38
999	SWAR-BTE	565	DN	1204/24-26	Open	SM-CM	Stone Slab	2	0.91	0	0.00	
1000	SWAR-BTE	566	UP	1205/09-11	Open	MCC	Arch	1	0.61	0	0.00	14.84
1001	SWAR-BTE	566	DN	1205/10-12	Open	SM-LM	Arch	1	0.61	0	0.00	
1002	SWAR-BTE	567	UP	1205/27-29	Open	MCC	RCC Slab	1	0.91	0	0.00	5.37
1003	SWAR-BTE	567	DN	1205/28-30	Open	SM-LM	Stone Slab	1	0.91	0	0.00	9.76

1004	SWAR-BTE	568	UP	1206/11-13	Open	MCC	RCC Slab	1	2.46	0	0.00	5.17
1005	SWAR-BTE	568	DN	1206/12-14	Open	SM-LM	Stone Slab	2	0.91	0	0.00	6.72
1006	SWAR-BTE	569	UP	1206/23-25	Open	MCC	RCC Slab	1	2.46	0	0.00	5.15
1007	SWAR-BTE	569	DN	1206/24-26	Open	SM-LM	Stone Slab	2	0.91	0	0.00	6.76
1008	SWAR-BTE	570	UP	1207/13-15	Open	MCC	RCC Slab	1	2.46	0	0.00	5.00
1009	SWAR-BTE	570	DN	1207/14-16	Open	SM-LM	Stone Slab	2	0.91	0	0.00	6.90
1010	SWAR-BTE	571	UP	1207/17-19	Open	MCC	RCC Slab	1	2.36	0	0.00	5.14
1011	SWAR-BTE	571	DN	1207/18-20	Open	SM-LM	Stone Slab	2	0.91	0	0.00	6.76
1012	SWAR-BTE	572	UP	1208/01-03	Open	MCC	RCC Slab	1	2.46	0	0.00	5.25
1013	SWAR-BTE	572	DN	1208/02-04	Open	SM-LM	Stone Slab	2	0.91	0	0.00	6.54
1014	SWAR-BTE	572A	UP	1208/23-25	Open	MCC	RCC Slab	7	0.91	0	0.00	6.10
1015	SWAR-BTE	572A	DN	1208/24-26	Open	MCC	RCC Slab	7	0.91	0	0.00	6.10
1016	SWAR-BTE	573	UP	1209/39-01	Open	MCC	RCC Box	2	3.66	0	0.00	10.69
1017	SWAR-BTE	573	DN	1209/40-02	Open	MCC	RCC Box	2	3.66	0	0.00	
1018	BTE-DUM	574	UP	1211/21-23	Open	MCC	RCC Slab	1	0.91	0	0.00	23.76
1019	BTE-DUM	574	DN	1211/22-24	Open	SM-CM	Arch	1	0.91	0	0.00	
1020	BTE-DUM	575	UP	1212/25-27	Open	MCC	RCC Slab	2	1.82	1	3.64	11.08
1021	BTE-DUM	575	DN	1212/26-28	Open	SM-CM	RCC Slab	2	1.83	1	3.66	
1022	BTE-DUM	576	UP	1213/29-31	Open	MCC	RCC Slab	1	2.46	0	0.00	5.18
1023	BTE-DUM	576	DN	1213/30-32	Open	SM-LM	Stone Slab	2	0.91	0	0.00	6.63
1024	BTE-DUM	578	UP	1215/17-19	Open	MCC	Arch	1	0.61	0	0.00	4.87
1025	BTE-DUM	578	DN	1215/18-20	Open	SM-CM	Stone Slab	1	0.61	0	0.00	7.32
1026	BTE-DUM	578A	UP	1215/25-27	Open	MCC	Pipe	3	0.90	0	0.00	24.41
1027	BTE-DUM	578A	DN	1215/26-28	Open	MCC	Pipe	3	0.90	0	0.00	
1028	BTE-DUM	578B	UP	1216/09-11	Open	MCC	Pipe	3	0.90	0	0.00	15.00
1029	BTE-DUM	578B	DN	1216/10-12	Open	MCC	Pipe	3	0.90	0	0.00	
1030	BTE-DUM	579	UP	1216/13-15	Open	MCC	Arch	1	0.61	0	0.00	13.27
1031	BTE-DUM	579	DN	1216/14-16	Open	SM-CM	Arch	1	0.61	0	0.00	
1032	BTE-DUM	580	UP	1216/17-19	Open	RCC	RCC Box	3	3.66	0	0.00	5.32

1033	BTE-DUM	580	DN	1216/18-20	Open	SM-CM	RCC Slab	1	3.66	0	0.00	4.88
1034	BTE-DUM	581	UP	1216/23-25	Open	MCC	Arch	1	0.61	0	0.00	5.88
1035	BTE-DUM	581	DN	1216/24-26	Open	SM-CM	Stone Slab	1	0.61	0	0.00	5.66
1036	BTE-DUM	582	UP	1217/19-21	Open	MCC	RCC Slab	1	2.46	0	0.00	3.53
1037	BTE-DUM	582	DN	1217/20-22	Open	SM-CM	Stone Slab	2	0.91	0	0.00	7.06
1038	BTE-DUM	583	UP	1219/19-21	Open	MCC	RCC Slab	1	2.44	0	0.00	5.33
1039	BTE-DUM	583	DN	1219/20-22	Open	SM-CM	Stone Slab	2	0.91	0	0.00	11.53
1040	DUM-JJA	585	UP	1219/25-27	Open	MCC	Arch	1	0.61	0	0.00	16.72
1041	DUM-JJA	585	DN	1219/26-28	Open	SM-CM	Arch	1	0.61	0	0.00	
1042	DUM-JJA	586	UP	1219/31-01	Open	MCC	Arch	1	0.61	0	0.00	11.52
1043	DUM-JJA	586	DN	1219/32-02	Open	SM-LM	Arch	1	0.61	0	0.00	
1044	DUM-JJA	587	UP	1220/17-19	Open	MCC	RCC Slab	1	2.46	0	0.00	5.29
1045	DUM-JJA	587	DN	1220/18-20	Open	SM-CM	Stone Slab	2	0.91	0	0.00	6.02
1046	DUM-JJA	588	UP	1220/25-27	Open	MCC	Arch	1	0.61	0	0.00	11.58
1047	DUM-JJA	588	DN	1220/26-28	Open	SM-LM	Arch	1	0.61	0	0.00	
1048	DUM-JJA	589	UP	1221/01-03	Open	MCC	Arch	1	0.61	0	0.00	11.73
1049	DUM-JJA	589	DN	1221/02-04	Open	SM-LM	Arch	1	0.61	0	0.00	
1050	DUM-JJA	590	UP	1221/05-07	Open	MCC	Arch	1	0.61	0	0.00	11.58
1051	DUM-JJA	590	DN	1221/06-08	Open	SM-CM	Arch	1	0.61	0	0.00	
1052	DUM-JJA	591	UP	1221/07-09	Open	MCC	Arch	1	0.61	0	0.00	11.58
1053	DUM-JJA	591	DN	1221/08-10	Open	SM-CM	Arch	1	0.61	0	0.00	
1054	DUM-JJA	592	UP	1222/01-03	Open	MCC	RCC Slab	3	3.66	0	0.00	5.32
1055	DUM-JJA	592	DN	1222/02-04	Open	SM-CM	RCC Slab	1	3.66	0	0.00	4.88
1056	DUM-JJA	593	UP	1223/01-03	Open	MCC	Arch	1	0.61	0	0.00	11.20
1057	DUM-JJA	593	DN	1223/02-04	Open	SM-CM	Arch	1	0.61	0	0.00	
1058	DUM-JJA	594	UP	1223/11-13	Open	MCC	RCC Box	1	3.66	0	0.00	5.32
1059	DUM-JJA	594	DN	1223/12-14	Open	SM-CM	RCC Slab	1	3.66	0	0.00	4.88
1060	DUM-JJA	595	UP	1223/19-21	Open	MCC	Arch	1	0.61	0	0.00	12.66
1061	DUM-JJA	595	DN	1223/20-22	Open	SM-LM	Arch	1	0.61	0	0.00	

1062	DUM-JJA	596	UP	1223/29-01	Open	MCC	Arch	1	0.61	0	0.00	11.20
1063	DUM-JJA	596	DN	1223/30-02	Open	SM-LM	Arch	1	0.61	0	0.00	
1064	DUM-JJA	597	UP	1224/11-13	Open	MCC	Arch	1	0.61	0	0.00	15.83
1065	DUM-JJA	597	DN	1224/12-14	Open	SM-CM	Arch	1	0.61	0	0.00	
1066	DUM-JJA	598	UP	1224/15-17	Open	MCC	RCC Box	1	3.66	0	0.00	5.32
1067	DUM-JJA	598	DN	1224/16-18	Open	SM-CM	RCC Slab	1	3.66	0	0.00	4.88
1068	DUM-JJA	600	UP	1225/09-11	Open	MCC	RCC Box	2	6.48	0	0.00	5.20
1069	DUM-JJA	600	DN	1225/10-12	Open	SM-CM	RCC Slab	2	6.10	0	0.00	5.02
1070	DUM-JJA	601	UP	1225/19-21	Open	MCC	Arch	1	0.61	0	0.00	21.34
1071	DUM-JJA	601	DN	1225/20-22	Open	SM-CM	Arch	1	0.61	0	0.00	
1072	DUM-JJA	602	UP	1225/23-25	Open	MCC	Arch	1	0.61	0	0.00	21.45
1073	DUM-JJA	602	DN	1225/24-26	Open	SM-CM	Arch	1	0.61	0	0.00	
1074	DUM-JJA	603	UP	1225/25-27	Open	MCC	RCC Box	1	3.66	0	0.00	5.32
1075	DUM-JJA	603	DN	1225/26-28	Open	SM-CM	RCC Slab	1	3.66	0	0.00	4.88
1076	DUM-JJA	604	UP	1226/03-05	Open	MCC	RCC Slab	1	0.61	0	0.00	6.04
1077	DUM-JJA	604	DN	1226/04-06	Open	SM-CM	Stone Slab	1	0.61	0	0.00	10.28
1078	DUM-JJA	604A	UP	1227/03-05	Open	MCC	RCC Slab	1	1.22	0	0.00	4.72
1079	DUM-JJA	604A	DN	1227/04-06	Open	SM-CM	Stone Slab	1	1.22	0	0.00	6.10
1080	JJA-MSRP	605	UP	1228/17-19	Open	MCC	RCC Slab	1	3.66	0	0.00	5.05
1081	JJA-MSRP	605	DN	1228/18-20	Open	SM-CM	RCC Slab	1	3.66	0	0.00	4.87
1082	JJA-MSRP	606	UP	1229/09-11	Open	MCC	RCC Slab	1	0.61	0	0.00	15.96
1083	JJA-MSRP	606	DN	1229/10-12	Open	SM-CM	Stone Slab	1	0.61	0	0.00	
1084	JJA-MSRP	607	UP	1230/03-05	Open	MCC	RCC Slab	1	0.61	0	0.00	5.99
1085	JJA-MSRP	607	DN	1230/04-06	Open	SM-CM	Stone Slab	1	0.61	0	0.00	9.55
1086	JJA-MSRP	608	UP	1230/11-13	Open	MCC	RCC Slab	1	3.66	0	0.00	7.32
1087	JJA-MSRP	608	DN	1230/12-14	Open	SM-LM	RCC Slab	1	3.66	0	0.00	5.48
1088	JJA-MSRP	609	UP	1230/21-23	Open	MCC	RCC Slab	1	0.61	0	0.00	8.50
1089	JJA-MSRP	609	DN	1230/22-24	Open	SM-CM	Stone Slab	1	0.61	0	0.00	9.60
1090	JJA-MSRP	610	UP	1231/09-11	Open	MCC	RCC Slab	1	0.91	0	0.00	9.48

1091	JJA-MSRP	610	DN	1231/10-12	Open	SM-CM	Stone Slab	1	0.91	0	0.00	10.44
1092	JJA-MSRP	612	UP	1231/25-27	Open	SM-CM	RCC Slab	1	1.83	0	0.00	11.22
1093	JJA-MSRP	612	DN	1231/26-28	Open	SM-LM	Arch	1	1.83	0	0.00	10.89
1094	JJA-MSRP	613	UP	1231/29-31	Open	SM-CM	RCC Slab	1	0.61	0	0.00	9.91
1095	JJA-MSRP	613	DN	1231/30-32	Open	SM-LM	Stone Slab	1	0.61	0	0.00	12.78
1096	JJA-MSRP	614	UP	1232/07-09	Open	MCC	Arch	1	0.61	0	0.00	9.27
1097	JJA-MSRP	614	DN	1232/08-10	Open	SM-LM	Arch	1	0.61	0	0.00	10.60
1098	JJA-MSRP	615	UP	1232/17-19	Open	MCC	Arch	1	0.61	0	0.00	7.02
1099	JJA-MSRP	615	DN	1232/18-20	Open	SM-CM	Arch	1	0.61	0	0.00	9.66
1100	JJA-MSRP	616	UP	1233/11-13	Open	MCC	Arch	1	0.61	0	0.00	5.12
1101	JJA-MSRP	616	DN	1233/12-14	Open	SM-CM	Arch	1	0.61	0	0.00	7.10
1102	JJA-MSRP	617	UP	1233/15-17	Open	MCC	Arch	1	0.61	0	0.00	5.08
1103	JJA-MSRP	617	DN	1233/16-18	Open	SM-CM	Arch	1	0.61	0	0.00	8.00
1104	JJA-MSRP	618	UP	1233/19-21	Open	MCC	Arch	1	0.61	0	0.00	24.00
1105	JJA-MSRP	618	DN	1233/20-22	Open	SM-CM	Arch	1	0.61	0	0.00	
1106	JJA-MSRP	619	UP	1233/25-27	Open	MCC	Arch	1	0.61	0	0.00	
1107	JJA-MSRP	619	DN	1233/26-28	Open	SM-CM	Arch	1	0.61	0	0.00	23.79
1108	JJA-MSRP	620	UP	1234/05-07	Open	MCC	Arch	1	0.61	0	0.00	
1109	JJA-MSRP	620	DN	1234/06-08	Open	SM-CM	Arch	1	0.61	0	0.00	
1110	JJA-MSRP	621	UP	1234/07-09	Open	MCC	Arch	1	0.61	0	0.00	5.53
1111	JJA-MSRP	621	DN	1234/08-10	Open	SM-CM	Arch	1	0.61	0	0.00	9.86
1112	JJA-MSRP	622	UP	1234/19-21	Open	MCC	RCC Box	1	3.66	0	0.00	5.32
1113	JJA-MSRP	622	DN	1234/20-22	Open	SM-CM	RCC Slab	1	3.66	0	0.00	4.88
1114	JJA-MSRP	623	UP	1234/19-21	Open	MCC	RCC Box	1	3.66	0	0.00	5.32
1115	JJA-MSRP	623	DN	1234/20-22	Open	SM-CM	RCC Slab	1	3.66	0	0.00	4.88
1116	JJA-MSRP	624	UP	1234/23-25	Open	MCC	Arch	1	0.61	0	0.00	5.39
1117	JJA-MSRP	624	DN	1234/24-26	Open	SM-CM	Arch	1	0.61	0	0.00	9.76
1118	JJA-MSRP	625	UP	1235/01-03	Open	MCC	RCC Slab	1	2.46	0	0.00	3.39
1119	JJA-MSRP	625	DN	1235/02-04	Open	SM-CM	Stone Slab	2	0.91	0	0.00	11.66

1120	JJA-MSRP	626	UP	1235/09-11	Open	MCC	RCC Slab	1	0.61	0	0.00	2.59
1121	JJA-MSRP	626	DN	1235/10-12	Open	SM-CM	Stone Slab	1	0.61	0	0.00	10.34
1122	JJA-MSRP	627	UP	1235/21-23	Open	MCC	RCC Slab	1	0.61	0	0.00	17.82
1123	JJA-MSRP	627	DN	1235/22-24	Open	SM-CM	Stone Slab	1	0.61	0	0.00	
1124	JJA-MSRP	628	UP	1235/27-29	Open	MCC	RCC Slab	2	2.46	0	Kota0.00	14.94
1125	JJA-MSRP	628	DN	1235/28-30	Open	SM-LM	Stone Slab	2	0.91	0	0.00	
1126	JJA-MSRP	629	UP	1235/31-01	Open	MCC	Arch	1	0.61	0	0.00	20.00
1127	JJA-MSRP	629	DN	1235/32-02	Open	SM-LM	Arch	1	0.61	0	0.00	
1128	JJA-MSRP	630	UP	1236/01-03	Open	MCC	RCC Slab	1	0.61	0	0.00	6.10
1129	JJA-MSRP	630	DN	1236/02-04	Open	SM-LM	Stone Slab	1	0.61	0	0.00	4.88
1130	MSRP-MTJ	631	UP	1236/19-21	Open	MCC	RCC Slab	1	2.46	0	0.00	3.77
1131	MSRP-MTJ	631	DN	1236/20-22	Open	SM-LM	Stone Slab	2	0.91	0	0.00	10.53
1132	MSRP-MTJ	632	UP	1237/07-09	Open	MCC	RCC Slab	1	2.46	0	0.00	3.89
1133	MSRP-MTJ	632	DN	1237/08-10	Open	SM-LM	Stone Slab	2	0.91	0	0.00	12.90
1134	MSRP-MTJ	633	UP	1237/17-19	Open	MCC	RCC Slab	1	0.61	0	0.00	3.51
1135	MSRP-MTJ	633	DN	1237/18-20	Open	SM-LM	Stone Slab	1	0.61	0	0.00	11.52
1136	MSRP-MTJ	634	UP	1237/27-29	Open	MCC	RCC Slab	1	0.61	0	0.00	4.35
1137	MSRP-MTJ	634	DN	1237/28-30	Open	SM-LM	Stone Slab	1	0.61	0	0.00	10.32
1138	MSRP-MTJ	635	UP	1238/01-03	Open	MCC	Arch	1	0.61	0	0.00	12.49
1139	MSRP-MTJ	635	DN	1238/02-04	Open	SM-LM	Arch	1	0.61	0	0.00	
1140	MSRP-MTJ	636	UP	1238/05-07	Open	MCC	RCC Slab	1	0.61	0	0.00	3.80
1141	MSRP-MTJ	636	DN	1238/06-08	Open	SM-LM	Stone Slab	1	0.61	0	0.00	10.70
4.69	MSRP-MTJ	637	UP	1238/07-09	Open	MCC	RCC Slab	1	2.46	0	0.00	4.69
1143	MSRP-MTJ	637	DN	1238/08-10	Open	SM-LM	Stone Slab	2	0.91	0	0.00	10.56
1144	MSRP-MTJ	638	UP	1238/13-15	Open	MCC	RCC Slab	1	0.61	0	0.00	5.41
1145	MSRP-MTJ	638	DN	1238/14-16	Open	SM-LM	Stone Slab	1	0.61	0	0.00	10.44
1146	MSRP-MTJ	639	UP	1238/19-21	Open	MCC	RCC Slab	1	0.61	0	0.00	4.76
1147	MSRP-MTJ	639	DN	1238/20-22	Open	SM-LM	Stone Slab	1	0.61	0	0.00	10.30
1148	MSRP-MTJ	640	UP	1238/25-27	Open	MCC	RCC Slab	1	3.66	0	0.00	5.35

1149	MSRP-MTJ	640	DN	1238/26-28	Open	SM-LM	RCC Slab	1	3.66	0	0.00	4.88
1150	MSRP-MTJ	641	UP	1238/27-29	Open	MCC	Arch	1	0.61	0	0.00	13.73
1151	MSRP-MTJ	641	DN	1238/28-30	Open	SM-LM	Arch	1	0.61	0	0.00	
1152	MSRP-MTJ	642	UP	1239/15-17	Open	MCC	RCC Slab	1	2.46	0	0.00	3.71
1153	MSRP-MTJ	642	DN	1239/16-18	Open	SM-LM	Stone Slab	2	0.91	0	0.00	8.10
1154	MSRP-MTJ	643	UP	1239/19-21	Open	MCC	Arch	1	0.61	0	0.00	10.95
1155	MSRP-MTJ	643	DN	1239/20-22	Open	SM-LM	Arch	1	0.61	0	0.00	
1156	MSRP-MTJ	644	UP	1239/21-23	Open	MCC	RCC Slab	1	0.61	0	0.00	3.23
1157	MSRP-MTJ	644	DN	1239/22-24	Open	SM-LM	Stone Slab	1	0.61	0	0.00	9.06
1158	MSRP-MTJ	645	UP	1240/15-17	Open	MCC	Stone Slab	2	0.91	0	0.00	8.10
1159	MSRP-MTJ	645	DN	1240/16-18	Open	SM-CM	RCC Slab	1	2.46	0	0.00	3.74
1160	MSRP-MTJ	646	UP	1240/25-27	Open	MCC	Arch	1	0.61	0	0.00	11.58
1161	MSRP-MTJ	646	DN	1240/26-28	Open	SM-CM	Arch	1	2.00	0	0.00	
1162	MSRP-MTJ	647	UP	1242/01-03	Open	MCC	Stone Slab	2	0.91	0	0.00	12.02
1163	MSRP-MTJ	647	DN	1242/02-04	Open	SM-CM	Stone Slab	1	2.46	0	0.00	
1164	MSRP-MTJ	648	UP	1242/13-15	Open	MCC	Arch	1	0.61	0	0.00	11.62
1165	MSRP-MTJ	648	DN	1242/14-16	Open	SM-CM	Arch	1	0.61	0	0.00	
1166	MSRP-MTJ	649	UP	1242/17-19	Open	MCC	Stone Slab	1	2.46	0	0.00	13.38
1167	MSRP-MTJ	649	DN	1242/18-20	Open	SM-CM	Stone Slab	2	0.90	0	0.00	

DETAILS OF ROBs

ANNEXURE - F

S No.	Block Section	Bridge No		Location	Type of Structures			Span		Width(m)/ Height(m)
					Foundation	Sub-structures	Super-structures	Nos.	Length	
1.	JHW-RMA	136A	DN	0847/08-10	OPEN	RCC	RCC Box	1	4.00	4.35
2.	RMA-MKX	138A	UP	0849/13-15	OPEN	RCC	RCC Box	2	3.50	2.85
3.	RMA-MKX	138A	DN	0849/14-16	OPEN	RCC	RCC Box	1	6.00	2.85
4.	RMA-MKX	138B	DN/ UP	0849/14-16	OPEN	RCC	PSC	1	34.50	7.50/ 7.30
5.	RMA-MKX	139A	UP	0850/25-27	OPEN	RCC	RCC Box	1	4.00	2.75
6.	RMA-MKX	139A	DN	0850/26-28	OPEN	RCC	RCC Box	1	4.00	2.75
7.	RMA-MKX	143A	DN/ UP	0857/29-858/01	OPEN	RCC	PSC	1	35.87	7.50/ 7.30
8.	KIW YARD	146A	UP	0864/15-17	OPEN	RCC	RCC Box	1	4.00	3.60
9.	KIW YARD	146A	DN	0864/16-18	OPEN	RCC	RCC Box	1	4.00	3.60
10.	KIW-DARA	148	UP	0865/27-29	OPEN	RCC	RCC Box	1	6.10	7.07
11.	KIW-DARA	148	DN	0865/28-30	OPEN	RCC	RCC Box	1	6.10	5.90
12.	DARA-RDT	159A	DN/ UP	0874/47-49	OPEN	RCC	PSC	1	18.50	7.50/ 6.36
13.	DARA-RDT	167A	UP	0881/13-15	OPEN	RCC	RCC Box	1	4.00	2.85
14.	DARA-RDT	167A	DN	0881/14-16	OPEN	RCC	RCC Box	1	4.00	2.85
15.	RDT-ALNI	176A	UP	0893/07-09	OPEN	RCC	RCC Box	1	5.00	3.85
16.	RDT-ALNI	176A	DN	0893/08-10	OPEN	RCC	RCC Box	1	5.00	3.85
17.	DDV-DKNT	194A	DN/ UP	0907/07-09	OPEN	RCC	CSG	1	41.38	18.50/ 7.30
18.	DDV-DKNT	198A	DN/ UP	0909/25-27	OPEN	RCC	PSC	1	42.20	15.00/ 6.80
19.	DKNT-KOTA	203A	DN/ UP	0913/19-21	OPEN	RCC	PSC	1	21.90	15.00/ 7.60
20.	DKNT-KOTA	208A	DN/ UP	0916/09-11	OPEN	RCC	PSC	1	18.87	19.60/ 5.90
21.	DKNT-KOTA	210/1A	DN/ UP	0918/01-02	OPEN	RCC	CSG	1	36.00+30.00	7.50/ 7.30
22.	KOTA-GQL	210B	DN/ UP	0921/11-13	OPEN	RCC	PSC	4	46.35+21.38	7.50/ 6.97
23.	KOTA-GQL	213A	DN/ UP	0927/07-09	OPEN	RCC	CSG	1	34.84	10.50/ 7.30
24.	SWM YARD	323A	DN/ UP	1028/07-09	OPEN	RR	CSG	1	20.80	7.32/ 6.80
25.	MXL-MLZ	346A	DN/ UP	1058/15-17	OPEN	CR	CSG	1	18.29	8.23/ 5.40
26.	NMD-NNW	355A	DN/ UP	1065/19-21	OPEN	CR	CSG	1	12.19	3.66/ 5.58
27.	GGC-COO	387A	DN/ UP	1096/08-10	OPEN	RCC	PSC	1	19.83	7.50/ 7.30
28.	SMBJ-HAN	453A	DN/ UP	1127/8-10	OPEN	RCC	CSG	1	35.87	7.50/ 7.30
29.	HAN YARD	471A	DN/ UP	1136/09-11	OPEN	RCC	CSG	1	22.61	15.00/ 7.30
30.	SWAR-BTE	559A	DN/ UP	1202/21-23	OPEN	RR	PSC	1	17.56	7.70+ 6.30
31.	SWAR-BTE	559B	DN/ UP	1202/21-23	OPEN	RCC	PSC	1	23.00	11.00+ 6.30
32.	SWAR-BTE	573A	DN/ UP	1209/14-16	OPEN	RCC	PSC	1	20.40	7.50/ 7.30
33.	BTE-DUM	574A	DN/ UP	1211/25-27	OPEN	RCC	CSG	1	45.42	7.50/ 5.43
34.	DUM-JJA	592A	DN/ UP	1222/06-08	OPEN	RCC	PSC	1	30.50	7.50/ 6.70
35.	MSRP-MTJ	649A	DN/ UP	1242/27-29	OPEN	RR	CSG	1	9.15	6.00/ 5.74

DETAILS OF RUBs & LHS

ANNEXURE - G

S No.	Block Section	Bridge No		Location	Type of Structures			Span		Width(m)/ Height(m)
					Foundation	Sub-structures	Super-structures	Nos.	Length	
1.	RLK-MEP	4A	UP	0699/03-05	OPEN	RCC	RCC Box	1	4.00	3.85
2.	RLK-MEP	4A	DN	0699/04-06	OPEN	RCC	RCC Box	1	4.00	3.85
3.	RLK-MEP	4B	UP	0702/11-13	OPEN	RCC	RCC Box	1	4.00	3.85
4.	RLK-MEP	4B	DN	0702/12-14	OPEN	RCC	RCC Box	1	4.00	3.85
5.	RLK-MEP	9A	UP	0710/21-23	OPEN	RCC	RCC Box	1	5.00	3.85
6.	RLK-MEP	9A	DN	0710/22-24	OPEN	RCC	RCC Box	1	5.00	3.85
7.	MEP-LNR	11A	UP	0714/07-09	OPEN	RCC	RCC Box	1	4.00	3.85
8.	MEP-LNR	11A	DN	0714/08-10	OPEN	RCC	RCC Box	1	4.00	3.85
9.	LNR-VMA	12A	UP	0715/17-19	OPEN	RCC	RCC Box	1	4.00	3.85
10.	LNR-VMA	12A	DN	0715/18-20	OPEN	RCC	RCC Box	1	4.00	3.85
11.	LNR-VMA	18A	UP	0722/15-17	OPEN	RCC	RCC Box	1	4.00	2.85
12.	LNR-VMA	18A	DN	0722/16-18	OPEN	RCC	RCC Box	1	4.00	2.85
13.	LNR-VMA	21A	UP	0726/03-05	OPEN	RCC	RCC Box	1	4.00	3.85
14.	LNR-VMA	21A	DN	0726/04-06	OPEN	RCC	RCC Box	1	4.00	3.85
15.	LNR-VMA	22A	UP	0727/25-27	OPEN	RCC	RCC Box	1	4.00	3.85
16.	LNR-VMA	22A	DN	0727/26-28	OPEN	RCC	RCC Box	1	4.00	3.85
17.	LNR-VMA	24A	UP	0730/25-27	OPEN	RCC	RCC Box	1	4.00	4.35
18.	LNR-VMA	24A	DN	0730/26-28	OPEN	RCC	RCC Box	1	4.00	4.35
19.	LNR-VMA	28A	UP	0734/11-13	OPEN	RCC	RCC Box	1	4.00	3.85
20.	LNR-VMA	28A	DN	0734/12-14	OPEN	RCC	RCC Box	1	4.00	3.85
21.	THUR-TLZ	33A	UP	0745/11-13	OPEN	RCC	RCC Box	1	4.00	4.35
22.	THUR-TLZ	33A	DN	0745/12-14	OPEN	RCC	RCC Box	1	4.00	4.35
23.	THUR-TLZ	34B	UP	0748/09-11	OPEN	RCC	RCC Box	1	4.00	3.85
24.	THUR-TLZ	34B	DN	0748/10-12	OPEN	RCC	RCC Box	1	4.00	3.85
25.	THUR-TLZ	37B	UP	0752/23-25	OPEN	RCC	RCC Box	1	4.00	3.85
26.	THUR-TLZ	37B	DN	0752/28-30	OPEN	RCC	RCC Box	1	4.00	3.85
27.	TLZ-CMU	38A	UP	0756/19-21	OPEN	RCC	RCC Box	1	4.00	3.85
28.	TLZ-CMU	38A	DN	0756/20-22	OPEN	RCC	RCC Box	1	4.00	3.85
29.	CMU-NKH	40A	UP	0759/27-29	OPEN	RCC	RCC Box	1	4.00	3.60
30.	CMU-NKH	40A	DN	0759/28-30	OPEN	RCC	RCC Box	1	4.00	3.60
31.	CMU-NKH	41A	UP	0760/27-29	OPEN	RCC	RCC Box	1	4.00	3.85
32.	CMU-NKH	41A	DN	0760/28-30	OPEN	RCC	RCC Box	1	4.00	3.85
33.	THUR-TLZ	44A	UP	0765/23-25	OPEN	RCC	RCC Box	1	4.00	3.85
34.	THUR-TLZ	44A	DN	0765/24-26	OPEN	RCC	RCC Box	1	4.00	3.85
35.	NKH-SVA	48A	UP	0770/19-21	OPEN	RCC	RCC Box	1	4.00	4.35
36.	NKH-SVA	48A	DN	0770/20-22	OPEN	RCC	RCC Box	1	4.00	4.35
37.	SVA-HNU	53A	UP	0777/01-03	OPEN	RCC	RCC Box	1	4.00	3.85
38.	SVA-HNU	53A	DN	0777/02-04	OPEN	RCC	RCC Box	1	4.00	3.85
39.	HNU-SGZ	61A	UP	0783/21-23	OPEN	RCC	RCC Box	1	4.00	3.35
40.	HNU-SGZ	61A	DN	0783/22-24	OPEN	RCC	RCC Box	1	4.00	3.35
41.	SGZ-GOH	67A	UP	0789/25-27	OPEN	RCC	RCC Box	1	4.00	4.35
42.	SGZ-GOH	67A	DN	0789/26-28	OPEN	RCC	RCC Box	1	4.00	4.35
43.	SGZ-GOH	69A	UP	0792/15-17	OPEN	RCC	RCC Box	1	4.00	3.85
44.	SGZ-GOH	69A	DN	0792/16-18	OPEN	RCC	RCC Box	1	4.00	3.85
45.	SGZ-GOH	70A	UP	0793/15-17	OPEN	RCC	RCC Box	1	4.00	3.85

46.	SGZ-GOH	70A	DN	0793/16-18	OPEN	RCC	RCC Box	1	4.00	3.85
47.	SGZ-GOH	74A	UP	0797/07-09	OPEN	RCC	RCC Box	1	4.00	4.35
48.	SGZ-GOH	74A	DN	0797/08-10	OPEN	RCC	RCC Box	1	4.00	4.35
49.	GOH-KRLS	78A	UP	0801/25-27	OPEN	RCC	RCC Box	1	4.00	2.85
50.	GOH-KRLS	78A	DN	0801/26-28	OPEN	RCC	RCC Box	1	4.00	2.85
51.	GOH-KRLS	81A	UP	0803/15-17	OPEN	RCC	RCC Box	1	4.00	4.35
52.	GOH-KRLS	81A	DN	0803/16-18	OPEN	RCC	RCC Box	1	4.00	4.35
53.	KRLS-BWM	89A	UP	0810/03-05	OPEN	RCC	RCC Box	1	4.00	4.35
54.	KRLS-BWM	89A	DN	0810/04-06	OPEN	RCC	RCC Box	1	4.00	4.35
55.	KRLS-BWM	98A	UP	0817/05-07	OPEN	RCC	RCC Box	1	4.00	4.35
56.	KRLS-BWM	98A	DN	0817/06-08	OPEN	RCC	RCC Box	1	4.00	4.35
57.	KRLS-BWM	98B	UP	817/27-818/01	OPEN	RCC	RCC Box	1	4.00	4.35
58.	KRLS-BWM	98B	DN	817/28-818/02	OPEN	RCC	RCC Box	1	4.00	4.35
59.	BWM-DKRA	102A	UP	0822/25-27	OPEN	RCC	RCC Box	1	4.00	3.85
60.	BWM-DKRA	102A	DN	0822/26-28	OPEN	RCC	RCC Box	1	4.00	3.85
61.	BWM-DKRA	104A	UP	0824/11-13	OPEN	RCC	RCC Box	1	4.00	4.35
62.	BWM-DKRA	104A	DN	0824/12-14	OPEN	RCC	RCC Box	1	4.00	4.35
63.	BWM-DKRA	109A	UP	0828/25-27	OPEN	RCC	RCC Box	1	4.00	4.35
64.	BWM-DKRA	109A	DN	0828/26-28	OPEN	RCC	RCC Box	1	4.00	4.35
65.	BWM-DKRA	119A	UP	0833/17-19	OPEN	RCC	RCC Box	1	4.00	3.85
66.	BWM-DKRA	119A	DN	0833/18-20	OPEN	RCC	RCC Box	1	4.00	3.85
67.	JHW-RMA	133A	UP	0842/23-25	OPEN	RCC	RCC Box	1	4.00	3.85
68.	JHW-RMA	133A	DN	0842/24-26	OPEN	RCC	RCC Box	1	4.00	3.85
69.	JHW-RMA	134A	UP	0844/09-11	OPEN	RCC	RCC Box	1	4.00	3.85
70.	JHW-RMA	134A	DN	0844/10-12	OPEN	RCC	RCC Box	1	4.00	3.85
71.	JHW-RMA	136A	UP	0847/07-09	OPEN	RCC	RCC Box	1	4.00	4.35
72.	JHW-RMA	136A	DN	0847/08-10	OPEN	RCC	RCC Box	1	4.00	4.35
73.	RMA-MKX	138A	UP	0849/13-15	OPEN	RCC	RCC Box	2	3.50	2.85
74.	RMA-MKX	138A	DN	0849/14-16	OPEN	RCC	RCC Box	1	6.00	2.85
75.	RMA-MKX	139A	UP	0850/25-27	OPEN	RCC	RCC Box	1	4.00	2.75
76.	RMA-MKX	139A	DN	0850/26-28	OPEN	RCC	RCC Box	1	4.00	2.75
77.	KIW YARD	146A	UP	0864/15-17	OPEN	RCC	RCC Box	1	4.00	3.60
78.	KIW YARD	146A	DN	0864/16-18	OPEN	RCC	RCC Box	1	4.00	3.60
79.	KIW-DARA	148	UP	0865/27-29	OPEN	RCC	RCC Box	1	6.10	7.07
80.	KIW-DARA	148	DN	0865/28-30	OPEN	RCC	RCC Box	1	6.10	5.90
81.	DARA-RDT	167A	UP	0881/13-15	OPEN	RCC	RCC Box	1	4.00	2.85
82.	DARA-RDT	167A	DN	0881/14-16	OPEN	RCC	RCC Box	1	4.00	2.85
83.	RDT-ALNI	176A	UP	0893/07-09	OPEN	RCC	RCC Box	1	5.00	3.85
84.	RDT-ALNI	176A	DN	0893/08-10	OPEN	RCC	RCC Box	1	5.00	3.85
85.	DKNT-KOTA	210B	UP	0920/17-17A	OPEN	RCC	RCC Box	2	4.15	2.70
86.	DKNT-KOTA	210B	DN	920/16A-18A	OPEN	RCC	RCC Box	2	4.15	2.70
87.	KPZ-GKB	239A	UP	0958/09-11	OPEN	RCC	RCC Box	1	4.00	3.85
88.	KPZ-GKB	239A	DN	0958/10-12	OPEN	RCC	RCC Box	1	4.00	3.85
89.	LKE-IDG	253A	UP	0982/15-17	OPEN	RCC	RCC Box	1	4.00	4.35
90.	LKE-IDG	253A	DN	0982/16-18	OPEN	RCC	RCC Box	1	4.00	4.35
91.	IDG-AMLI	272A	UP	0994/23-25	OPEN	RCC	RCC Box	1	4.00	3.85
92.	IDG-AMLI	272A	DN	0994/24-26	OPEN	RCC	RCC Box	1	4.00	3.85

93.	IDG-AMLI	277A	UP	0997/00-01	OPEN	RCC	RCC Box	1	5.00	3.35
94.	IDG-AMLI	277A	DN	0997/00-02	OPEN	RCC	RCC Box	1	5.00	3.35
95.	IDG-AMLI	279A	UP	0999/03-05	OPEN	RCC	RCC Box	1	5.00	3.85
96.	IDG-AMLI	279A	DN	0999/04-06	OPEN	RCC	RCC Box	1	5.00	3.85
97.	IDG-AMLI	285A	UP	1003/11-13	OPEN	RCC	RCC Box	1	4.00	4.35
98.	IDG-AMLI	285A	DN	1003/12-14	OPEN	RCC	RCC Box	1	4.00	4.35
99.	IDG-AMLI	289A	UP	1005/31-33	OPEN	RCC	RCC Box	1	5.00	3.85
100.	IDG-AMLI	289A	DN	1005/32-34	OPEN	RCC	RCC Box	1	5.00	3.85
101.	RWJ-KTA	305A	UP	1014/07-09	OPEN	RCC	RCC Box	1	4.00	3.85
102.	RWJ-KTA	305A	DN	1014/08-10	OPEN	RCC	RCC Box	1	4.00	3.85
103.	RWJ-KTA	306A	UP	1015/27-29	OPEN	RCC	RCC Box	1	5.00	3.85
104.	RWJ-KTA	306A	DN	1015/28-30	OPEN	RCC	RCC Box	1	5.00	3.85
105.	RWJ-KTA	307A	UP	1016/21-13	OPEN	RCC	RCC Box	1	4.00	3.85
106.	RWJ-KTA	307A	DN	1016/22-24	OPEN	RCC	RCC Box	1	4.00	3.85
107.	RWJ-KTA	311A	UP	1019/07-09	OPEN	RCC	RCC Box	1	5.00	3.85
108.	RWJ-KTA	311A	DN	1019/08-10	OPEN	RCC	RCC Box	1	5.00	3.85
109.	KTA-SWM	314A	UP	1022/13-15	OPEN	RCC	RCC Box	1	5.00	3.85
110.	KTA-SWM	314A	DN	1022/14-16	OPEN	RCC	RCC Box	1	5.00	3.85
111.	KTA-SWM	320A	UP	1026/25-27	OPEN	RCC	RCC Box	1	4.00	3.85
112.	KTA-SWM	320A	DN	1026/26-28	OPEN	RCC	RCC Box	1	4.00	3.85
113.	SWM-RNT	328A	UP	1032/01-03	OPEN	RCC	RCC Box	1	5.00	3.85
114.	SWM-RNT	328A	DN	1032/02-04	OPEN	RCC	RCC Box	1	5.00	3.85
115.	SWM-RNT	329A	UP	1034/09-11	OPEN	RCC	RCC Box	1	5.00	3.85
116.	SWM-RNT	329A	DN	1034/10-12	OPEN	RCC	RCC Box	1	5.00	3.85
117.	RWJ-KTA	330A	UP	1036/03-05	OPEN	RCC	RCC Box	1	5.00	4.35
118.	RWJ-KTA	330A	DN	1036/04-06	OPEN	RCC	RCC Box	1	5.00	4.35
119.	RNT-MXL	332A	UP	1042/05-07	OPEN	RCC	RCC Box	1	4.00	3.85
120.	RNT-MXL	332A	DN	1042/06-08	OPEN	RCC	RCC Box	1	4.00	3.85
121.	RNT-MXL	333A	UP	1042/21-23	OPEN	RCC	RCC Box	1	4.00	3.85
122.	RNT-MXL	333A	DN	1042/22-24	OPEN	RCC	RCC Box	1	4.00	3.85
123.	RNT-MXL	335A	UP	1045/21-23	OPEN	RCC	RCC Box	1	4.00	3.85
124.	RNT-MXL	335A	DN	1045/22-24	OPEN	RCC	RCC Box	1	4.00	3.85
125.	RNT-MXL	337A	UP	1048/23-25	OPEN	RCC	RCC Box	1	5.00	3.35
126.	RNT-MXL	337A	DN	1048/24-26	OPEN	RCC	RCC Box	1	5.00	3.35
127.	MXL-MLZ	344A	UP	1056/03-05	OPEN	RCC	RCC Box	1	4.00	3.05
128.	MXL-MLZ	344A	DN	1056/04-06	OPEN	RCC	RCC Box	1	4.00	3.05
129.	MLZ-NMD	348A	UP	1060/03-05	OPEN	RCC	RCC Box	1	5.00	3.85
130.	MLZ-NMD	348A	DN	1060/04-06	OPEN	RCC	RCC Box	1	5.00	3.85
131.	MLZ-NMD	351A	UP	1065/01-03	OPEN	RCC	RCC Box	1	5.00	4.00
132.	MLZ-NMD	351A	DN	1065/02-04	OPEN	RCC	RCC Box	1	5.00	4.00
133.	NMD-NNW	352A	UP	1066/21-23	OPEN	RCC	RCC Box	1	4.00	3.85
134.	NMD-NNW	352A	DN	1066/22-24	OPEN	RCC	RCC Box	1	4.00	3.85
135.	NMD-NNW	356A	UP	1071/13-15	OPEN	RCC	RCC Box	1	6.00	4.35
136.	NMD-NNW	356A	DN	1071/14-16	OPEN	RCC	RCC Box	1	6.00	4.35
137.	LRU-GGC	376A	UP	1088/01-03	OPEN	RCC	RCC Box	1	5.00	3.85
138.	LRU-GGC	376A	DN	1088/02-04	OPEN	RCC	RCC Box	1	5.00	3.85
139.	GGC-COO	389A	UP	1098/09-11	OPEN	RCC	RCC Box	1	4.00	2.50
140.	GGC-COO	389A	DN	1098/10-12	OPEN	RCC	RCC Box	1	4.00	2.50
141.	GGC-COO	392A	UP	1099/17-19	OPEN	RCC	RCC Box	1	4.00	2.35
142.	GGC-COO	392A	DN	1099/18-20	OPEN	RCC	RCC Box	1	4.00	2.35

143.	COO-PDZ	411A	UP	1108/27-29	OPEN	RCC	RCC Box	1	4.00	2.35
144.	COO-PDZ	411A	DN	1108/28-30	OPEN	RCC	RCC Box	1	4.00	2.35
145.	COO-PDZ	414A	UP	1109/21-23	OPEN	RCC	RCC Box	1	4.00	2.35
146.	COO-PDZ	414A	DN	1109/22-24	OPEN	RCC	RCC Box	1	4.00	2.35
147.	PDZ-SMBJ	447A	UP	1122/29-31	OPEN	RCC	RCC Box	1	4.00	3.85
148.	PDZ-SMBJ	447A	DN	1122/30-32	OPEN	RCC	RCC Box	1	4.00	3.85
149.	SMBJ-HAN	451A	UP	1126/35-37	OPEN	RCC	RCC Box	1	4.00	3.85
150.	SMBJ-HAN	451A	DN	1126/36-38	OPEN	RCC	RCC Box	1	4.00	3.85
151.	HAN-FSP	474A	UP	1141/21-23	OPEN	RCC	RCC Box	1	4.00	3.85
152.	HAN-FSP	474A	DN	1141/22-24	OPEN	RCC	RCC Box	1	4.00	3.85
153.	FSP-YARD	480A	UP	1151/13-15	OPEN	RCC	RCC Box	1	5.00	2.85
154.	FSP-YARD	480A	DN	1151/14-16	OPEN	RCC	RCC Box	1	5.00	2.85
155.	FSP-DY	481A	UP	1151/13-15	OPEN	RCC	RCC Box	1	5.00	3.85
156.	FSP-DY	481A	DN	1151/14-16	OPEN	RCC	RCC Box	1	5.00	3.85
157.	FSP-DY	483A	UP	1152/15-17	OPEN	RCC	RCC Box	1	5.00	3.85
158.	FSP-DY	483A	DN	1152/16-18	OPEN	RCC	RCC Box	1	5.00	3.85
159.	FSP-DY	488A	UP	1155/21-23	OPEN	RCC	RCC Box	1	4.00	3.05
160.	FSP-DY	488A	DN	1155/22-24	OPEN	RCC	RCC Box	1	4.00	3.05
161.	DY-BXN	509A	UP	1167/25-27	OPEN	RCC	RCC Box	1	6.00	3.85
162.	DY-BXN	509A	DN	1167/26-28	OPEN	RCC	RCC Box	1	6.00	3.85
163.	BXN-YARD	512A	UP	1170/15-17	OPEN	RCC	RCC Box	1	6.00	2.85
164.	BXN-YARD	512A	DN	1170/16-18	OPEN	RCC	RCC Box	1	6.00	2.85
165.	BXN-KEV	517A	UP	1172/01-03	OPEN	RCC	RCC Box	1	4.00	3.85
166.	BXN-KEV	517A	DN	1172/02-04	OPEN	RCC	RCC Box	1	4.00	3.85
167.	BXN-KEV	520B	UP	1173/27-99	OPEN	RCC	RCC Box	1	6.00	4.35
168.	BXN-KEV	520B	DN	1173/28-30	OPEN	RCC	RCC Box	1	6.00	4.35
169.	BXN-KEV	520A	UP	1174/01-03	OPEN	RCC	RCC Box	1	4.00	3.85
170.	BXN-KEV	520A	DN	1174/02-04	OPEN	RCC	RCC Box	1	4.00	3.85
171.	BXN-KEV	530A	UP	1180/13-15	OPEN	RCC	RCC Box	1	4.00	3.85
172.	BXN-KEV	530A	DN	1180/14-16	OPEN	RCC	RCC Box	1	4.00	3.85
173.	KEV-PNGR	533A	UP	1183/05-07	OPEN	RCC	RCC Box	1	6.00	4.35
174.	KEV-PNGR	533A	DN	1183/06-08	OPEN	RCC	RCC Box	1	6.00	4.35
175.	KEV-PNGR	535A	UP	1186/13-15	OPEN	RCC	RCC Box	1	4.00	3.85
176.	KEV-PNGR	535A	DN	1186/14-16	OPEN	RCC	RCC Box	1	4.00	3.85
177.	KEV-PNGR	537A	UP	1187/13-15	OPEN	RCC	RCC Box	1	4.00	3.85
178.	KEV-PNGR	537A	DN	1187/14-16	OPEN	RCC	RCC Box	1	4.00	3.85
179.	PNGR-SWAR	549A	UP	1196/11-13	OPEN	RCC	RCC Box	1	5.00	3.85
180.	PNGR-SWAR	549A	DN	1196/12-14	OPEN	RCC	RCC Box	1	5.00	3.85
181.	PNGR-SWAR	550A	UP	1197/29-1198/01	OPEN	RCC	RCC Box	1	4.00	3.85
182.	PNGR-SWAR	550A	DN	1197/30-1198/02	OPEN	RCC	RCC Box	1	4.00	3.85
183.	PNGR-SWAR	555A	UP	1200/01-03	OPEN	RCC	RCC Box	1	4.00	3.85
184.	PNGR-SWAR	555A	DN	1200/02-04	OPEN	RCC	RCC Box	1	4.00	3.85
185.	BTE-DUM	578AX	UP	1216/00-02	OPEN	RCC	RCC Box	1	4.00	3.85
186.	BTE-DUM	578AX	DN	1216/00-02	OPEN	RCC	RCC Box	1	4.00	3.85
187.	DUM-JJA	591A	UP	1221/25-27	OPEN	RCC	RCC Box	1	4.00	3.85
188.	DUM-JJA	591A	DN	1221/26-28	OPEN	RCC	RCC Box	1	4.00	3.85
189.	DUM-JJA	595A	UP	1223/25-27	OPEN	RCC	RCC Box	1	6.00	4.35
190.	DUM-JJA	555A	DN	1223/26-28	OPEN	RCC	RCC Box	1	6.00	4.35
191.	JJA-MSRP	615A	UP	1232/27-29	OPEN	RCC	RCC Box	1	5.00	2.85

192.	JJA-MSRP	615A	DN	1232/28-30	OPEN	RCC	RCC Box	1	5.00	2.85
193.	MSRP YARD	631A	UP	1236/23-25	OPEN	RCC	RCC Box	1	5.00	2.85
194.	MSRP YARD	631A	DN	1236/24-26	OPEN	RCC	RCC Box	1	5.00	2.85
195.	MSRP-MTJ	634A	UP	1237/29-1238/01	OPEN	RCC	RCC Box	1	5.00	4.35
196.	MSRP-MTJ	634A	DN	1237/30-1238/02	OPEN	RCC	RCC Box	1	6.00	4.35

DETAILS OF ROR Bridges								ANNEXURE - H	
S. No.	Block Section	Bridge No	Location (Km)	Type of Structure			Span (Nos. × length)	Width (m)	
				Foundation	Sub-structure	Super-structure			
1	SWAR-BTE	572-A	1209.020	Under Agra Division (North Central Railway)					

The Site includes the following transmission lines crossing the Right of Way:

Transmission Lines Crossing The Right of Way						ANNEXURE - I				
Sr. No.	Block Section	Location/ Chanage	HT/LT (Specify KV)	OH/UG	Height Above RL in mtrs					
1	MEP-RLK	711/23-25	33	OH	UP- 16.10 DN - 15.90					
2	VMA-LNR	733/11-13	33	OH	UP 16.10 DN 16.10					
3	VMA-LNR	733/17-19	132	OH	UP 18.10 DN 18.05					
4	VMA-THUR	738/15-17	132	OH	UP 15.30 DN 15.30					
5	VMA-LNR	734/7-9	33	OH	UP 15.40 DN 15.40					
6	NKH-SVA	772/3-5	220	OH	UP 22.05 DN 22.05					
7	HNU-SVA	774/15-17	33	OH	UP 14.65 DN 14.65					
8	HNU-SVA	775/15-17	33	OH	UP 14.80 DN 14.80					
9	HNU-SVA	775/17-19	33	OH	UP 14.45 DN 14.45					
10	HNU-SVA	775/19-21	132	OH	UP 14.60 DN 14.60					

11	HNU-SGZ	785/25-27	11	OH	UP 15.25	DN 15.25
12	SGZ-GOH	791/19-21	220	OH	UP 19.65	DN 19.50
13	GOH-KRLS	799/19-21	33	OH	UP 14.10	DN 14.10
14	GOH-KRLS	806/23-25	220	OH	UP 15.90	DN 15.90
15	KRLS-BWM	819/19-21	33	OH	UP 10.35	DN 10.35
16	JHW-RMA	842/19-21	400	OH	UP 22.60	DN 22.60
17	RMA-MKX	856/17-19	132	OH	UP 16.40	DN 16.40
18	RMA-MKX	856/19-21	132	OH	UP 12.70	DN 12.70
19	RMA-MKX	856/27-29	220	OH	UP 19.10	DN 19.10
20	MKX-KIW	863/13-15	11	OH	UP 08.40	DN 09.40
21	KIW-DARA	871/29-31	11	OH	UP 10.65	DN 11.20
22	RMA-JLF	005/1-2	132	OH	Single Line	20.50
23	RMA-JLF	005/3-4	220	OH	Single Line	20.50
24	JLF-JLWC	015/12-13	220	OH	Single Line	16.08
25	JLF-JLWC	024/7-8	220	OH	Single line	16.00
26	JLF-JLWC	024/15-16	220	OH	Single line	16.60
27	JLF-JLWC	024/16-25/1	132	OH	Single line	17.51
28	JLWC-KTP	KTP-3/1-2	400	OH	Single line	24.50
29	RDT-ALNI	890/33-891/1	220	OH	UP 15.40	DN 15.40
30	DDV-DKNT	908/3-5	132	OH	UP 14.50	DN 14.50
31	DDV-DKNT	910/11-13	33	OH	UP 11.50	DN 11.50
32	DDV-DKNT	910/15-17	132	OH	14.40	DN 14.40
33	DKNT-KTSC	913/35-37	11	OH	UP 11.80	DN 12.20
34	KOTA-GQL	923/23-25	132	OH	UP 15.40	DN 15.40
35	GQL-KPTN	930/3-5	220	OH	UP 15.40	DN 15.40
36	GQL-KPTN	930/23-25	220	OH	UP 15.40	DN 15.40
37	KPTN-ARE	935/39-936/1	400	OH	UP 14.40	DN 14.40
38	DDV-DKNT	910/5-7	132	OH	UP 14.50	DN 14.50

39	KPTN-ARE	935/21-23	400	OH	UP 21.30 DN 21.30
40	KPTN-GQL	933/23-25, 24-24B	132	OH	UP 21.80 DN 21.80
41	LKE-IDG	985/25-27	132	OH	UP 15.70 DN 15.90
42	LKE-IDG	989/5-7	220	OH	UP 16.29 DN 16.31
43	IDG-AMLI	998/1-3	765	OH	UP 28.10 DN 28-10
44	IDG-AMLI	998/13-15	765	OH	UP 28-10 DN 28-10
45	RNT-MXL	1046/3-5	11	OH	UP 10.95 DN 10.95
46	AMLI-RWJ	1011/11-13	11	OH	UP 13.55 DN 13.55
47	SWM-RNT	1028/7-9	11	OH	UP 10.35 DN 10.35
48	KTA-SWM	1027/1-3	33	OH	UP 11.60 DN 11.60
49	KTA-SWM	1026/31-1027/1	33	OH	UP 11.40 DN 11.40
50	KTA-SWM	1026/23-25	132	OH	UP 16.40 DN 16.40
51	LRU-NNW	1080/17-19	132	OH	UP 25.0 DN 25.00
52	GGC-COO	1095/9-11	33	OH	UP 14.10 DN 14.10
53	GGC-COO	1096/9-11	33	OH	UP 14.10 DN 14.10
54	GGC-COO	1096/11-13	11	OH	UP 11.70 DN 11.70
55	GGC-COO	1101/23-25	765	OH	UP 28.30 DN 28.30
56	PDZ-COO	1106/9-11	765	OH	UP 23.60 DN 23.60
57	PDZ-COO	1112/9-11	132	OH	UP 15.80 DN 15.80
58	PDZ-SMBJ	1118/5-7	400	OH	UP 20.10 DN 20.10
59	SMBJ-HAN	1127/21-23	33	OH	UP 14.60 DN 14.60
60	SMBJ-HAN	1133/21-23	132	OH	UP 14.60 DN 14.60
61	SMBJ-HAN	1134/9-11	33	OH	UP 15.50 DN 15.50
62	SMBJ-HAN	1134/23-25	33	OH	UP 15.60 DN 15.60
63	SMBJ-HAN	1134/25-27	33	OH	UP 15.60 DN 15.60
64	HAN-FSP	1138/15-17	132	OH	UP 17.00 DN 17.00
65	HAN-FSP	1146/15-17	400	OH	UP 17.90 DN 17.90
66	HAN-FSP	1147/5-7	33	OH	UP 14.45 DN 14.45

67	BXN-KEV	1170/19-21	132	OH	UP 16.10 DN 16.10
68	BXN-KEV	1173/5-7	33	OH	UP 12.40 DN 12.40
69	BXN-KEV	1177/1-3	11	OH	UP 13.60 DN 13.60
70	KEV-PNGR	1188/13-15	400	OH	UP 20.50 DN 20.50
71	KEV-PNGR	1189/15-17	400	OH	UP 18.50 DN 18.50
72	SWAR-BTE	1209/20-22	33	OH	UP 12.00 DN 12.00
73	BTE-DUM	1210/18-20	33	OH	UP 12.00 DN 12.00
74	BTE-DUM	1210/20-22	132	OH	UP 15.50 DN 15.50
75	BTE-DUM	1210/22-24	132	OH	UP 16.00 DN 16.00
76	BTE-DUM	1213/32-34	33	OH	UP 10.50 DN 10.50
77	BTE-DUM	1214/12-14	132	OH	UP 14.00 DN 14.00
78	BTE-DUM	1214/20-22	132	OH	UP 15.00 DN 15.00
79	BTE-DUM	1214/24-26	220	OH	UP 14.00 DN 14.00
80	BTE-DUM	1215/14-16	132	OH	UP 14.70 DN 14.70
81	BTE-DUM	1217/24-26	400	OH	UP 25.04 DN 25.04
82	DUM-JJA	1221/10-12	33	OH	UP 14.00 DN 14.00
83	DUM-JJA	1221/20-22	400	OH	UP 21.00 DN 21.00
84	JJA-MSRP	1229/5-7	765	OH	UP 20.50 DN 20.50
85	MSRP-MTJ	1238/21-23	400	OH	UP 15.00 DN 15.00
86	MSRP-MTJ	1239/20-22	132	OH	UP 15.00 DN 15.00
87	MSRP-MTJ	1241/24-26	33	OH	UP 09.25 DN 09.18

Sufficient clearance as per IR SOD was ensured at the time of commissioning. Exact height is not available in depot records.

ANNEXURE - J					
TRANSMISSION LINES CROSSING THE SITE					
S.No.	Block Section	Chainage/TRD Mast No.	System Voltage in KV	Distance of structure from c/l of track in Mtr. from UP track	Distance of structure from c/l of track in Mtr. from DN track
1	MSRP-MTJ	1241/24-26	33		
2	DUM-JJA	1221/10-12	33		
3	BTE-DUM	1213/32-34	33		
4	MEP-RLK	711/23-25	33		
5	VMA-LNR	733/11-13	33		
6	VMA-LNR	734/7-9	33		
7	HNU-SVA	774/15-17	33		
8	HNU-SV	775/15-17	33		
9	HNU-SVA	775/17-19	33		
10	GOH-KRLS	799/19-21	33		
11	KRLS-BWM	819/19-21	33		
12	DDV-DKNT	910/11-13	33		
13	KTA-SWM	1027/1-3	33		
14	KTA-SWM	1026/31	33		
15	GGC-COO	1095/9-11	33		
16	GGC-COO	1096/9-11	33		
17	SMBJ-HAN	1127/21-23	33		
18	SMBJ-HAN	1134/9-11	33		
19	SMBJ/HAN	1134/23-25	33		
20	SMBJ-HAN	1134/25-27	33		
21	HAN-FSP	1147/5-7	33		

22	BXN-KEV	1173/5-7	33		
23	SWAR-BTE	1209/20-22	33		
24	BTE-DUM	1210/18-20	33		
25	HNU-SGZ	785/25-27	11		
26	MKX-KIW	863/13-15	11		
27	KIW-DARA	871/29-31	11		
28	DKNT-KTSC	913/35-37	11		
29	RNT-MXL	1046/3-5	11		
30	AMLI-RWJ	1011/11-13	11		
31	SWM-RNT	1028/7-9	11		
32	GGC-COO	1096/11-13	11		
33	BXN-KEV	1177/1-3	11		
34	MSRP-MTJ	1242/30-32	11		

PART-B

RSSI Survey Report

ANNEXURE – K

Provided in separate attachment

Details of Section Gradients

ANNEXURE - L

GRADIENT LIST OF ND-MTJ SECTION (DN LINE)							
Sr. No.	BLOCK SECTION	KMF	KMT	RISE / FALL FROM NAGDA	GRADIENT		LENGTH (in Kms)
1	NAD - RLK	698.220	699.130	LEVEL		LEVEL	0.910
2	NAD - RLK	699.130	701.164	RISE	1 IN	200	2.034
3	NAD - RLK	701.164	702.364	FALL	1 IN	200	1.200
4	NAD - RLK	702.364	702.964	LEVEL		LEVEL	0.600
5	NAD - RLK	702.964	705.685	RISE	1 IN	200	2.721
6	NAD - RLK	705.685	706.130	RISE	1 IN	400	0.445
7	NAD - RLK & RLK - MEP	706.130	706.782	FALL	1 IN	568	0.652
8	RLK - MEP	706.782	708.150	RISE	1 IN	200	1.368
9	RLK - MEP	708.150	709.823	FALL	1 IN	250	1.673
10	RLK - MEP	709.823	710.654	LEVEL		LEVEL	0.831
11	RLK - MEP	710.654	711.265	FALL	1 IN	1000	0.611
12	RLK - MEP	711.265	712.134	FALL	1 IN	200	0.869
13	RLK - MEP	712.134	712.829	FALL	1 IN	400	0.695
14	MEP - LNR	712.829	713.912	FALL	1 IN	1000	1.083
15	MEP - LNR	713.912	715.571	FALL	1 IN	275	1.659
16	MEP - LNR	715.571	718.025	FALL	1 IN	500	2.454
17	MEP - LNR	718.025	719.570	FALL	1 IN	300	1.545
18	MEP - LNR	719.570	720.490	FALL	1 IN	1000	0.920
19	MEP - LNR	720.490	720.792	LEVEL		LEVEL	0.302
20	MEP - LNR	720.792	721.375	FALL	1 IN	400	0.583
21	MEP - LNR & LNR - VMA	721.375	724.250	LEVEL		LEVEL	2.875
22	LNR - VMA	724.250	725.492	FALL	1 IN	200	1.242
23	LNR - VMA	725.492	726.042	FALL	1 IN	300	0.550
24	LNR - VMA	726.042	727.264	FALL	1 IN	1000	1.222
25	LNR - VMA	727.264	727.874	RISE	1 IN	1000	0.610
26	LNR - VMA	727.874	728.790	LEVEL		LEVEL	0.916
27	LNR - VMA	728.790	730.682	FALL	1 IN	200	1.892
28	LNR - VMA	730.682	731.414	FALL	1 IN	800	0.732
29	LNR - VMA	731.414	731.872	FALL	1 IN	300	0.458
30	LNR - VMA	731.872	732.355	LEVEL		LEVEL	0.483
31	LNR - VMA	732.355	733.410	RISE	1 IN	700	1.055
32	LNR - VMA	733.410	735.060	FALL	1 IN	200	1.650
33	LNR - VMA & VMA - THUR	735.060	736.650	FALL	1 IN	1000	1.590

34	VMA - THUR	736.650	738.080	FALL	1 IN	200	1.430
35	VMA - THUR	738.080	739.000	FALL	1 IN	600	0.920
36	VMA - THUR	739.000	739.640	FALL	1 IN	300	0.640
37	VMA - THUR	739.640	740.840	FALL	1 IN	1000	1.200
38	VMA - THUR	740.840	741.905	LEVEL		LEVEL	1.065
39	VMA - THUR	741.905	743.727	FALL	1 IN	1500	1.822
40	VMA - THUR & THUR - TLZ	743.727	745.148	LEVEL		LEVEL	1.421
41	THUR - TLZ	745.148	745.865	FALL	1 IN	600	0.717
42	THUR - TLZ	745.865	747.120	LEVEL		LEVEL	1.255
43	THUR - TLZ	747.120	751.344	RISE	1 IN	200	4.224
44	THUR - TLZ	751.344	752.511	FALL	1 IN	250	1.167
45	THUR - TLZ	752.511	753.760	FALL	1 IN	400	1.249
46	THUR - TLZ & TLZ - CMU	753.760	754.410	LEVEL		LEVEL	0.650
47	TLZ - CMU	754.410	754.754	FALL	1 IN	800	0.344
48	TLZ - CMU	754.754	757.741	FALL	1 IN	200	2.987
49	TLZ - CMU & CMU - NKH	757.741	758.672	FALL	1 IN	400	0.931
50	CMU - NKH	758.672	759.078	LEVEL		LEVEL	0.406
51	CMU - NKH	759.078	759.217	FALL	1 IN	869	0.139
52	CMU - NKH	759.217	759.528	LEVEL		LEVEL	0.311
53	CMU - NKH	759.528	760.096	FALL	1 IN	250	0.568
54	CMU - NKH	760.096	760.447	LEVEL		LEVEL	0.351
55	CMU - NKH	760.447	762.075	RISE	1 IN	200	1.628
56	CMU - NKH	762.075	763.060	RISE	1 IN	222	0.985
57	CMU - NKH	763.060	763.630	LEVEL		LEVEL	0.570
58	CMU - NKH	763.630	765.250	FALL	1 IN	200	1.620
59	CMU - NKH	765.250	765.738	LEVEL		LEVEL	0.488
60	CMU - NKH	765.738	767.594	RISE	1 IN	200	1.856
61	CMU - NKH & NKH - SVA	767.594	768.691	RISE	1 IN	400	1.097
62	NKH - SVA	768.691	769.087	RISE	1 IN	255	0.396
63	NKH - SVA	769.087	770.032	RISE	1 IN	250	0.945
64	NKH - SVA	770.032	770.298	LEVEL		LEVEL	0.266
65	NKH - SVA	770.298	771.895	RISE	1 IN	200	1.597
66	NKH - SVA	771.895	772.534	FALL	1 IN	350	0.639
67	NKH - SVA	772.534	772.749	LEVEL		LEVEL	0.215
68	NKH - SVA	772.749	772.975	FALL	1 IN	2000	0.226
69	NKH - SVA	772.975	773.128	RISE	1 IN	419	0.153
70	NKH - SVA	773.128	773.500	FALL	1 IN	960	0.372
71	NKH - SVA & SVA - HNU	773.500	774.398	FALL	1 IN	7645	0.898
72	SVA - HNU	774.398	774.457	LEVEL		LEVEL	0.059

73	SVA - HNU	774.457	774.915	LEVEL		LEVEL	0.458
74	SVA - HNU	774.915	775.378	RISE	1 IN	250	0.463
75	SVA - HNU	775.378	775.680	RISE	1 IN	500	0.302
76	SVA - HNU	775.680	777.031	FALL	1 IN	500	1.351
77	SVA - HNU	777.031	779.914	RISE	1 IN	200	2.883
78	SVA - HNU & HNU - SGZ	779.914	781.159	RISE	1 IN	400	1.245
79	HNU - SGZ	781.159	783.168	FALL	1 IN	200	2.009
80	HNU - SGZ	783.168	785.474	LEVEL		LEVEL	2.306
81	HNU - SGZ	785.474	785.644	RISE	1 IN	1000	0.170
82	HNU - SGZ	785.644	786.294	FALL	1 IN	508	0.650
83	HNU - SGZ	786.294	786.950	FALL	1 IN	500	0.656
84	HNU - SGZ	786.950	787.350	FALL	1 IN	2100	0.400
85	HNU - SGZ & SGZ - GOH	787.350	788.500	LEVEL		LEVEL	1.150
86	SGZ - GOH	788.500	789.149	RISE	1 IN	3180	0.649
87	SGZ - GOH	789.149	789.647	FALL	1 IN	855	0.498
88	SGZ - GOH	789.647	790.050	FALL	1 IN	310	0.403
89	SGZ - GOH	790.050	790.250	FALL	1 IN	200	0.200
90	SGZ - GOH	790.250	790.750	FALL	1 IN	226	0.500
91	SGZ - GOH	790.750	792.750	FALL	1 IN	200	2.000
92	SGZ - GOH	792.750	795.000	LEVEL		LEVEL	2.250
93	SGZ - GOH	795.000	797.000	FALL	1 IN	400	2.000
94	SGZ - GOH & GOH - KRLS	797.000	798.850	LEVEL		LEVEL	1.850
95	GOH - KRLS	798.850	800.994	FALL	1 IN	250	2.144
96	GOH - KRLS	800.994	803.993	FALL	1 IN	200	2.999
97	GOH - KRLS	803.993	804.730	RISE	1 IN	300	0.737
98	GOH - KRLS	804.730	805.828	RISE	1 IN	1000	1.098
99	GOH - KRLS	805.828	806.194	FALL	1 IN	200	0.366
100	GOH - KRLS	806.194	806.944	FALL	1 IN	239	0.750
101	GOH - KRLS	806.944	807.508	FALL	1 IN	463	0.564
102	GOH - KRLS & KRLS - BWM	807.508	807.988	RISE	1 IN	4800	0.480
103	KRLS - BWM	807.988	808.288	RISE	1 IN	833	0.300
104	KRLS - BWM	808.288	808.882	FALL	1 IN	230	0.594
105	KRLS - BWM	808.882	815.144	FALL	1 IN	200	6.262
106	KRLS - BWM	815.144	815.550	FALL	1 IN	218	0.406
107	KRLS - BWM	815.550	816.094	FALL	1 IN	260	0.544
108	KRLS - BWM	816.094	816.470	FALL	1 IN	405	0.376
109	KRLS - BWM	816.470	816.850	LEVEL		LEVEL	0.380
110	KRLS - BWM	816.850	817.256	FALL	1 IN	535	0.406

111	KRLS - BWM	817.256	817.597	FALL	1 IN	305	0.341
112	KRLS - BWM	817.597	817.949	FALL	1 IN	800	0.352
113	KRLS - BWM	817.949	818.499	FALL	1 IN	1310	0.550
114	KRLS - BWM	818.499	819.268	LEVEL		LEVEL	0.769
115	KRLS - BWM	819.268	819.716	RISE	1 IN	268	0.448
116	KRLS - BWM	819.716	820.548	RISE	1 IN	400	0.832
117	KRLS - BWM & BWM - DKRA	820.548	821.349	RISE	1 IN	940	0.801
118	BWM - DKRA	821.349	821.650	FALL	1 IN	455	0.301
119	BWM - DKRA	821.650	824.550	FALL	1 IN	200	2.900
120	BWM - DKRA	824.550	824.850	LEVEL		LEVEL	0.300
121	BWM - DKRA	824.850	825.825	RISE	1 IN	640	0.975
122	BWM - DKRA	825.825	826.750	RISE	1 IN	1500	0.925
123	BWM - DKRA	826.750	828.900	FALL	1 IN	200	2.150
124	BWM - DKRA	828.900	829.700	LEVEL		LEVEL	0.800
125	BWM - DKRA & DKRA - JHW	829.700	831.030	RISE	1 IN	1000	1.330
126	DKRA - JHW	831.030	831.950	FALL	1 IN	1500	0.920
127	DKRA - JHW	831.950	833.050	FALL	1 IN	200	1.100
128	DKRA - JHW	833.050	835.070	LEVEL		LEVEL	2.020
129	DKRA - JHW	835.070	836.500	RISE	1 IN	200	1.430
130	DKRA - JHW	836.500	836.815	RISE	1 IN	400	0.315
131	DKRA - JHW & JHW-RMA	836.815	837.167	RISE	1 IN	945	0.352
132	JHW-RMA	837.167	837.444	LEVEL		LEVEL	0.277
133	JHW-RMA	837.444	837.724	FALL	1 IN	1235	0.280
134	JHW-RMA	837.724	837.935	FALL	1 IN	400	0.211
135	JHW-RMA	837.935	838.591	FALL	1 IN	200	0.656
136	JHW-RMA	838.591	841.278	LEVEL		LEVEL	2.687
137	JHW-RMA	841.278	843.452	FALL	1 IN	200	2.174
138	JHW-RMA	843.452	844.300	LEVEL		LEVEL	0.848
139	JHW-RMA	844.300	846.550	RISE	1 IN	200	2.250
140	JHW-RMA & RMA-MKX	846.550	849.362	LEVEL		LEVEL	2.812
141	RMA-MKX	849.362	850.323	FALL	1 IN	200	0.961
142	RMA-MKX	850.323	851.046	LEVEL		LEVEL	0.723
143	RMA-MKX	851.046	851.976	RISE	1 IN	200	0.930
144	RMA-MKX	851.976	852.450	FALL	1 IN	1250	0.474
145	RMA-MKX	852.450	853.613	FALL	1 IN	200	1.163
146	RMA-MKX	853.613	854.025	FALL	1 IN	240	0.412
147	RMA-MKX	854.025	856.565	FALL	1 IN	200	2.540
148	RMA-MKX	856.565	856.795	FALL	1 IN	230	0.230

149	RMA-MKX	856.795	857.452	FALL	1 IN	200	0.657
150	RMA-MKX	857.452	858.115	RISE	1 IN	500	0.663
151	RMA-MKX	858.115	858.580	RISE	1 IN	410	0.465
152	RMA-MKX & MKX-KIW	858.580	858.960	RISE	1 IN	857	0.380
153	MKX-KIW	858.960	859.605	RISE	1 IN	400	0.645
154	MKX-KIW	859.605	860.421	RISE	1 IN	200	0.816
155	MKX-KIW	860.421	860.704	LEVEL		LEVEL	0.283
156	MKX-KIW	860.704	860.890	FALL	1 IN	300	0.186
157	MKX-KIW	860.890	861.386	LEVEL		LEVEL	0.496
158	MKX-KIW	861.386	862.070	FALL	1 IN	200	0.684
159	MKX-KIW	862.070	862.420	FALL	1 IN	213	0.350
160	MKX-KIW	862.420	863.810	FALL	1 IN	200	1.390
161	MKX-KIW	863.810	864.281	FALL	1 IN	400	0.471
162	MKX-KIW & KIW-DARA	864.281	864.712	LEVEL		LEVEL	0.431
163	KIW-DARA	864.712	865.204	RISE	1 IN	400	0.492
164	KIW-DARA	865.204	868.665	RISE	1 IN	200	3.461
165	KIW-DARA	868.665	869.169	RISE	1 IN	294	0.504
166	KIW-DARA	869.169	869.429	RISE	1 IN	200	0.260
167	KIW-DARA	869.429	870.159	RISE	1 IN	305	0.730
168	KIW-DARA	870.159	870.711	RISE	1 IN	200	0.552
169	KIW-DARA	870.711	871.176	RISE	1 IN	294	0.465
170	KIW-DARA	871.176	871.316	LEVEL		LEVEL	0.140
171	KIW-DARA & DARA-RDT	871.316	874.385	FALL	1 IN	1000	3.069
172	DARA-RDT	874.385	874.560	LEVEL		LEVEL	0.175
173	DARA-RDT	874.560	874.810	RISE	1 IN	600	0.250
174	DARA-RDT	874.810	875.971	RISE	1 IN	300	1.161
175	DARA-RDT	875.971	876.600	RISE	1 IN	2000	0.629
176	DARA-RDT	876.600	878.383	RISE	1 IN	450	1.783
177	DARA-RDT	878.383	879.097	RISE	1 IN	200	0.714
178	DARA-RDT	879.097	879.402	RISE	1 IN	250	0.305
179	DARA-RDT	879.402	880.504	RISE	1 IN	200	1.102
180	DARA-RDT	880.504	881.432	LEVEL		LEVEL	0.928
181	DARA-RDT	881.432	885.530	FALL	1 IN	2000	4.098
182	DARA-RDT	885.530	885.870	FALL	1 IN	435	0.340
183	DARA-RDT & RDT-ALNI	885.870	886.896	LEVEL		LEVEL	1.026
184	RDT-ALNI	886.896	889.160	FALL	1 IN	200	2.264
185	RDT-ALNI	889.160	892.070	FALL	1 IN	300	2.910
186	RDT-ALNI	892.070	893.150	FALL	1 IN	400	1.080
187	RDT-ALNI	893.150	893.685	FALL	1 IN	200	0.535

188	RDT-ALNI	893.685	895.520	FALL	1 IN	300	1.835
189	RDT-ALNI	895.520	896.410	FALL	1 IN	200	0.890
190	RDT-ALNI	896.410	897.150	LEVEL		LEVEL	0.740
191	RDT-ALNI	897.150	897.500	RISE	1 IN	200	0.350
192	RDT-ALNI & ALNI-DDV	897.500	898.350	FALL	1 IN	500	0.850
193	ALNI-DDV	898.350	898.570	FALL	1 IN	400	0.220
194	ALNI-DDV	898.570	899.220	FALL	1 IN	500	0.650
195	ALNI-DDV	899.220	899.570	LEVEL		LEVEL	0.350
196	ALNI-DDV	899.570	904.400	FALL	1 IN	200	4.830
197	ALNI-DDV & DDV-DKNT	904.400	904.950	FALL	1 IN	400	0.550
198	DDV-DKNT	904.950	905.550	FALL	1 IN	540	0.600
199	DDV-DKNT	905.550	906.050	FALL	1 IN	260	0.500
200	DDV-DKNT	906.050	908.371	FALL	1 IN	200	2.321
201	DDV-DKNT	908.371	908.607	LEVEL		LEVEL	0.236
202	DDV-DKNT	908.607	909.656	FALL	1 IN	166	1.049
203	DDV-DKNT	909.656	911.080	FALL	1 IN	200	1.424
204	DDV-DKNT	911.080	911.377	FALL	1 IN	166	0.297
205	DDV-DKNT & DKNT-KOTA	911.377	912.377	FALL	1 IN	260	1.000
206	DKNT-KOTA	912.377	913.106	FALL	1 IN	166	0.729
207	DKNT-KOTA	913.106	915.826	FALL	1 IN	200	2.720
208	DKNT-KOTA	915.826	919.740	LEVEL		LEVEL	3.914
209	DKNT-KOTA	919.740	920.190	RISE	1 IN	1000	0.450
210	DKNT-KOTA	920.190	920.496	RISE	1 IN	2000	0.306
211	DKNT-KOTA & KOTA-GQL	920.496	921.802	LEVEL		LEVEL	1.306
212	KOTA-GQL	921.802	922.543	RISE	1 IN	400	0.741
213	KOTA-GQL	922.543	923.438	LEVEL		LEVEL	0.895
214	KOTA-GQL	923.438	924.491	FALL	1 IN	325	1.053
215	KOTA-GQL	924.491	924.900	FALL	1 IN	870	0.409
216	KOTA-GQL	924.900	925.815	FALL	1 IN	1000	0.915
217	KOTA-GQL	925.815	926.276	LEVEL		LEVEL	0.461
218	KOTA-GQL & GQL-KPTN	926.276	927.487	FALL	1 IN	1000	1.211
219	GQL-KPTN	927.487	929.466	LEVEL		LEVEL	1.979
220	GQL-KPTN	929.466	930.686	FALL	1 IN	2000	1.220
221	GQL-KPTN	930.686	933.441	FALL	1 IN	800	2.755
222	GQL-KPTN	933.441	933.957	FALL	1 IN	2000	0.516
223	GQL-KPTN & KPTN-ARE	933.957	934.872	FALL	1 IN	1000	0.915
224	KPTN-ARE	934.872	936.410	LEVEL		LEVEL	1.538
225	KPTN-ARE	936.410	939.119	FALL	1 IN	1000	2.709
226	KPTN-ARE & ARE-KPZ	939.119	945.840	FALL	1 IN	2000	6.721

227	ARE-KPZ	945.840	947.040	LEVEL		LEVEL	1.200
228	ARE-KPZ	947.040	947.950	FALL	1 IN	2174	0.910
229	ARE-KPZ	947.950	948.262	FALL	1 IN	1000	0.312
230	ARE-KPZ	948.262	949.754	FALL	1 IN	2000	1.492
231	ARE-KPZ	949.754	951.311	LEVEL		LEVEL	1.557
232	ARE-KPZ	951.311	954.049	FALL	1 IN	3000	2.738
233	ARE-KPZ & KPZ-GKB	954.049	956.800	FALL	1 IN	2000	2.751
234	KPZ-GKB	956.800	960.752	LEVEL		LEVEL	3.952
235	KPZ-GKB	960.752	962.579	FALL	1 IN	1500	1.827
236	KPZ-GKB	962.579	963.190	LEVEL		LEVEL	0.611
237	KPZ-GKB & GKB-LBN	963.190	967.740	FALL	1 IN	3000	4.550
238	GKB-LBN	967.740	968.990	FALL	1 IN	2000	1.250
239	GKB-LBN	968.990	970.789	FALL	1 IN	1500	1.799
240	GKB-LBN	970.789	972.015	FALL	1 IN	2000	1.226
241	GKB-LBN	972.015	972.724	LEVEL		LEVEL	0.709
242	GKB-LBN	972.724	973.334	FALL	1 IN	2000	0.610
243	GKB-LBN & LBN-LKE	973.334	976.122	LEVEL		LEVEL	2.788
244	LBN-LKE	976.122	976.930	FALL	1 IN	2000	0.808
245	LBN-LKE	976.930	977.788	FALL	1 IN	220	0.858
246	LBN-LKE	977.788	979.000	FALL	1 IN	200	1.212
247	LBN-LKE	979.000	979.843	LEVEL		LEVEL	0.843
248	LBN-LKE	979.843	980.556	RISE	1 IN	200	0.713
249	LBN-LKE	980.556	981.520	RISE	1 IN	400	0.964
250	LBN-LKE & LKE-IDG	981.520	981.875	RISE	1 IN	500	0.355
251	LKE-IDG	981.875	982.296	RISE	1 IN	400	0.421
252	LKE-IDG	982.296	983.150	FALL	1 IN	200	0.854
253	LKE-IDG	983.150	983.462	LEVEL		LEVEL	0.312
254	LKE-IDG	983.462	985.348	RISE	1 IN	200	1.886
255	LKE-IDG	985.348	985.881	LEVEL	1 IN	LEVEL	0.533
256	LKE-IDG	985.881	988.210	RISE	1 IN	200	2.329
257	LKE-IDG	988.210	988.394	LEVEL		LEVEL	0.184
258	LKE-IDG	988.394	989.170	FALL	1 IN	300	0.776
259	LKE-IDG	989.170	989.887	LEVEL		LEVEL	0.717
260	LKE-IDG	989.887	991.105	RISE	1 IN	200	1.218
261	LKE-IDG	991.105	991.516	RISE	1 IN	300	0.411
262	LKE-IDG	991.516	992.155	RISE	1 IN	700	0.639
263	LKE-IDG	992.155	992.353	LEVEL		LEVEL	0.198
264	LKE-IDG & IDG-AMLI	992.353	992.871	FALL	1 IN	400	0.518
265	IDG-AMLI	992.871	993.970	FALL	1 IN	200	1.099

266	IDG-AMLI	993.970	994.188	LEVEL		LEVEL	0.218
267	IDG-AMLI	994.188	994.480	RISE	1 IN	450	0.292
268	IDG-AMLI	994.480	995.150	LEVEL		LEVEL	0.670
269	IDG-AMLI	995.150	996.857	FALL	1 IN	900	1.707
270	IDG-AMLI	996.857	997.472	LEVEL		LEVEL	0.615
271	IDG-AMLI	997.472	998.386	FALL	1 IN	500	0.914
272	IDG-AMLI	998.386	998.843	FALL	1 IN	750	0.457
273	IDG-AMLI	998.843	1000.214	FALL	1 IN	1000	1.371
274	IDG-AMLI	1000.214	1000.244	LEVEL		LEVEL	0.030
275	IDG-AMLI	1000.244	1001.991	FALL	1 IN	400	1.747
276	IDG-AMLI	1001.991	1002.682	LEVEL		LEVEL	0.691
277	IDG-AMLI	1002.682	1003.108	RISE	1 IN	400	0.426
278	IDG-AMLI	1003.108	1003.474	RISE	1 IN	240	0.366
279	IDG-AMLI	1003.474	1003.901	RISE	1 IN	200	0.427
280	IDG-AMLI	1003.901	1004.266	RISE	1 IN	300	0.365
281	IDG-AMLI	1004.266	1004.769	RISE	1 IN	200	0.503
282	IDG-AMLI	1004.769	1005.180	RISE	1 IN	400	0.411
283	IDG-AMLI & AMLI-RWJ	1005.180	1005.744	RISE	1 IN	900	0.564
284	AMLI-RWJ	1005.744	1005.952	RISE	1 IN	400	0.208
285	AMLI-RWJ	1005.952	1006.361	LEVEL		LEVEL	0.409
286	AMLI-RWJ	1006.361	1008.015	RISE	1 IN	200	1.654
287	AMLI-RWJ	1008.015	1008.175	LEVEL		LEVEL	0.160
288	AMLI-RWJ	1008.175	1008.960	RISE	1 IN	500	0.785
289	AMLI-RWJ	1008.960	1009.203	LEVEL		LEVEL	0.243
290	AMLI-RWJ	1009.203	1012.707	RISE	1 IN	200	3.504
291	AMLI-RWJ	1012.707	1012.851	RISE	1 IN	400	0.144
292	AMLI-RWJ	1012.851	1013.012	RISE	1 IN	700	0.161
293	AMLI-RWJ & RWJ-KTA	1013.012	1013.972	RISE	1 IN	1000	0.960
294	RWJ-KTA	1013.972	1014.035	FALL	1 IN	250	0.063
295	RWJ-KTA	1014.035	1014.695	FALL	1 IN	500	0.660
296	RWJ-KTA	1014.695	1015.232	LEVEL		LEVEL	0.537
297	RWJ-KTA	1015.232	1015.798	RISE	1 IN	225	0.566
298	RWJ-KTA	1015.798	1017.821	LEVEL		LEVEL	2.023
299	RWJ-KTA	1017.821	1019.341	RISE	1 IN	200	1.520
300	RWJ-KTA	1019.341	1019.509	LEVEL		LEVEL	0.168
301	RWJ-KTA	1019.509	1019.996	RISE	1 IN	400	0.487
302	RWJ-KTA	1019.996	1020.812	RISE	1 IN	200	0.816
303	RWJ-KTA	1020.812	1020.964	RISE	1 IN	833	0.152
304	RWJ-KTA & KTA-SWM	1020.964	1022.095	LEVEL		LEVEL	1.131

305	KTA-SWM	1022.095	1022.918	FALL	1 IN	300	0.823
306	KTA-SWM	1022.918	1024.809	LEVEL		LEVEL	1.891
307	KTA-SWM	1024.809	1027.309	FALL	1 IN	200	2.500
308	KTA-SWM & SWM-RNT	1027.309	1029.626	LEVEL		LEVEL	2.317
309	SWM-RNT	1029.626	1030.662	FALL	1 IN	400	1.036
310	SWM-RNT	1030.662	1031.864	LEVEL		LEVEL	1.202
311	SWM-RNT	1031.864	1032.887	FALL	1 IN	900	1.023
312	SWM-RNT	1032.887	1034.116	FALL	1 IN	620	1.229
313	SWM-RNT	1034.116	1035.691	FALL	1 IN	333.33	1.575
314	SWM-RNT	1035.691	1036.301	LEVEL		LEVEL	0.610
315	SWM-RNT	1036.301	1037.856	FALL	1 IN	300	1.555
316	SWM-RNT	1037.856	1038.436	FALL	1 IN	442	0.580
317	SWM-RNT & RNT-MXL	1038.436	1040.767	FALL	1 IN	750	2.331
318	RNT-MXL	1040.767	1041.300	LEVEL		LEVEL	0.533
319	RNT-MXL	1041.300	1042.215	FALL	1 IN	1000	0.915
320	RNT-MXL	1042.215	1042.558	FALL	1 IN	1500	0.343
321	RNT-MXL	1042.558	1043.708	LEVEL		LEVEL	1.150
322	RNT-MXL	1043.708	1043.982	FALL	1 IN	1000	0.274
323	RNT-MXL	1043.982	1045.811	LEVEL		LEVEL	1.829
324	RNT-MXL	1045.811	1047.274	FALL	1 IN	1000	1.463
325	RNT-MXL	1047.274	1047.754	FALL	1 IN	1500	0.480
326	RNT-MXL & MXL-MLZ	1047.754	1049.133	LEVEL		LEVEL	1.379
327	MXL-MLZ	1049.133	1050.581	FALL	1 IN	1000	1.448
328	MXL-MLZ	1050.581	1051.922	LEVEL		LEVEL	1.341
329	MXL-MLZ	1051.922	1054.224	FALL	1 IN	200	2.302
330	MXL-MLZ	1054.224	1055.153	LEVEL		LEVEL	0.929
331	MXL-MLZ	1055.153	1055.656	FALL	1 IN	200	0.503
332	MXL-MLZ	1055.656	1056.418	LEVEL		LEVEL	0.762
333	MXL-MLZ	1056.418	1057.241	RISE	1 IN	200	0.823
334	MXL-MLZ	1057.241	1057.424	RISE	1 IN	300	0.183
335	MXL-MLZ	1057.424	1058.247	RISE	1 IN	200	0.823
336	MXL-MLZ	1058.247	1058.674	RISE	1 IN	400	0.427
337	MXL-MLZ	1058.674	1058.727	LEVEL		LEVEL	0.053
338	MXL-MLZ & MLZ-NMD	1058.727	1059.712	FALL	1 IN	500	0.985
339	MLZ-NMD	1059.712	1059.955	RISE	1 IN	400	0.243
340	MLZ-NMD	1059.955	1060.732	RISE	1 IN	200	0.777
341	MLZ-NMD	1060.732	1061.356	LEVEL		LEVEL	0.624
342	MLZ-NMD	1061.356	1061.966	FALL	1 IN	1000	0.610
343	MLZ-NMD	1061.966	1063.836	LEVEL		LEVEL	1.870

344	MLZ-NMD	1063.836	1064.659	FALL	1 IN	400	0.823
345	MLZ-NMD	1064.659	1064.960	FALL	1 IN	500	0.301
346	MLZ-NMD & NMD-NNW	1064.960	1065.856	RISE	1 IN	590	0.896
347	NMD-NNW	1065.856	1066.176	LEVEL		LEVEL	0.320
348	NMD-NNW	1066.176	1066.800	FALL	1 IN	1000	0.624
349	NMD-NNW	1066.800	1067.300	FALL	1 IN	400	0.500
350	NMD-NNW	1067.300	1068.080	FALL	1 IN	300	0.780
351	NMD-NNW	1068.080	1068.520	RISE	1 IN	500	0.440
352	NMD-NNW	1068.520	1068.710	LEVEL		LEVEL	0.190
353	NMD-NNW	1068.710	1069.240	FALL	1 IN	300	0.530
354	NMD-NNW	1069.240	1070.220	LEVEL		LEVEL	0.980
355	NMD-NNW	1070.220	1070.590	RISE	1 IN	200	0.370
356	NMD-NNW	1070.590	1070.920	LEVEL		LEVEL	0.330
357	NMD-NNW	1070.920	1071.310	RISE	1 IN	400	0.390
358	NMD-NNW	1071.310	1071.750	RISE	1 IN	600	0.440
359	NMD-NNW	1071.750	1072.600	RISE	1 IN	335	0.850
360	NMD-NNW	1072.600	1072.800	RISE	1 IN	400	0.200
361	NMD-NNW	1072.800	1074.800	RISE	1 IN	200	2.000
362	NMD-NNW & NNW-LRU	1074.800	1075.500	RISE	1 IN	400	0.700
363	NNW-LRU	1075.500	1076.275	LEVEL		LEVEL	0.775
364	NNW-LRU	1076.275	1081.903	RISE	1 IN	200	5.628
365	NNW-LRU	1081.903	1082.813	LEVEL		LEVEL	0.910
366	NNW-LRU	1082.813	1084.002	RISE	1 IN	600	1.189
367	NNW-LRU	1084.002	1084.441	LEVEL		LEVEL	0.439
368	NNW-LRU	1084.441	1084.898	FALL	1 IN	200	0.457
369	NNW-LRU	1084.898	1085.333	LEVEL		LEVEL	0.435
370	NNW-LRU	1085.333	1085.808	FALL	1 IN	600	0.475
371	NNW-LRU & LRU-GGC	1085.808	1087.296	LEVEL		LEVEL	1.488
372	LRU-GGC	1087.296	1088.820	FALL	1 IN	1000	1.524
373	LRU-GGC	1088.820	1089.566	LEVEL		LEVEL	0.746
374	LRU-GGC	1089.566	1091.273	FALL	1 IN	400	1.707
375	LRU-GGC & GGC-COO	1091.273	1093.102	FALL	1 IN	1000	1.829
376	GGC-COO	1093.102	1095.844	FALL	1 IN	700	2.742
377	GGC-COO	1095.844	1097.910	FALL	1 IN	1100	2.066
378	GGC-COO	1097.910	1100.674	FALL	1 IN	1000	2.764
379	GGC-COO	1100.674	1101.019	LEVEL		LEVEL	0.345
380	GGC-COO	1101.019	1101.598	FALL	1 IN	1000	0.579
381	GGC-COO	1101.598	1101.995	LEVEL		LEVEL	0.397
382	GGC-COO	1101.995	1102.086	FALL	1 IN	1000	0.091

383	GGC-COO	1102.086	1102.604	LEVEL		LEVEL	0.518
384	GGC-COO	1102.604	1102.826	FALL	1 IN	1000	0.222
385	GGC-COO	1102.826	1104.383	LEVEL		LEVEL	1.557
386	GGC-COO & COO-PDZ	1104.383	1105.757	RISE	1 IN	500	1.374
387	COO-PDZ	1105.757	1106.441	LEVEL		LEVEL	0.684
388	COO-PDZ	1106.441	1107.645	FALL	1 IN	300	1.204
389	COO-PDZ	1107.645	1109.292	FALL	1 IN	200	1.647
390	COO-PDZ	1109.292	1110.525	LEVEL		LEVEL	1.233
391	COO-PDZ	1110.525	1111.749	FALL	1 IN	500	1.224
392	COO-PDZ & PDZ-SMBJ	1111.749	1119.074	LEVEL		LEVEL	7.325
393	PDZ-SMBJ	1119.074	1120.293	FALL	1 IN	1000	1.219
394	PDZ-SMBJ	1120.293	1122.673	LEVEL		LEVEL	2.380
395	PDZ-SMBJ	1122.673	1123.530	FALL	1 IN	300	0.857
396	PDZ-SMBJ	1123.530	1124.867	LEVEL		LEVEL	1.337
397	PDZ-SMBJ	1124.867	1125.065	RISE	1 IN	200	0.198
398	PDZ-SMBJ	1125.065	1125.499	LEVEL		LEVEL	0.434
399	PDZ-SMBJ & SMBJ-HAN	1125.499	1126.719	FALL	1 IN	500	1.220
400	SMBJ-HAN	1126.719	1128.229	LEVEL		LEVEL	1.510
401	SMBJ-HAN	1128.229	1129.443	FALL	1 IN	2000	1.214
402	SMBJ-HAN	1129.443	1133.108	FALL	1 IN	666.66	3.665
403	SMBJ-HAN	1133.108	1134.331	FALL	1 IN	500	1.223
404	SMBJ-HAN	1134.331	1135.552	LEVEL		LEVEL	1.221
405	SMBJ-HAN & HAN-FSP	1135.552	1137.488	FALL	1 IN	630	1.936
406	HAN-FSP	1137.488	1139.613	FALL	1 IN	1000	2.125
407	HAN-FSP	1139.613	1142.000	FALL	1 IN	500	2.387
408	HAN-FSP	1142.000	1143.298	LEVEL		LEVEL	1.298
409	HAN-FSP	1143.298	1144.386	RISE	1 IN	300	1.088
410	HAN-FSP	1144.386	1144.816	LEVEL		LEVEL	0.430
411	HAN-FSP	1144.816	1146.034	FALL	1 IN	2000	1.218
412	HAN-FSP	1146.034	1147.558	RISE	1 IN	1000	1.524
413	HAN-FSP	1147.558	1148.457	FALL	1 IN	1000	0.899
414	HAN-FSP & FSP-DY	1148.457	1150.508	LEVEL		LEVEL	2.051
415	FSP-DY	1150.508	1151.222	FALL	1 IN	3000	0.714
416	FSP-DY	1151.222	1152.868	FALL	1 IN	300	1.646
417	FSP-DY	1152.868	1153.817	LEVEL		LEVEL	0.949
418	FSP-DY	1153.817	1154.565	FALL	1 IN	500	0.748
419	FSP-DY	1154.565	1157.015	FALL	1 IN	250	2.450
420	FSP-DY	1157.015	1157.746	RISE	1 IN	2100	0.731
421	FSP-DY	1157.746	1158.255	RISE	1 IN	223.78	0.509

422	FSP-DY	1158.255	1158.800	LEVEL		LEVEL	0.545
423	FSP-DY	1158.800	1159.431	FALL	1 IN	370	0.631
424	FSP-DY	1159.431	1159.827	RISE	1 IN	200	0.396
425	FSP-DY	1159.827	1160.339	RISE	1 IN	400	0.512
426	FSP-DY	1160.339	1160.489	LEVEL		LEVEL	0.150
427	FSP-DY & DY-BXN	1160.489	1160.864	RISE	1 IN	2000	0.375
428	DY-BXN	1160.864	1161.195	LEVEL		LEVEL	0.331
429	DY-BXN	1161.195	1162.020	FALL	1 IN	300	0.825
430	DY-BXN	1162.020	1162.202	LEVEL		LEVEL	0.182
431	DY-BXN	1162.202	1163.112	RISE	1 IN	300	0.910
432	DY-BXN	1163.112	1163.460	LEVEL		LEVEL	0.348
433	DY-BXN	1163.460	1167.131	FALL	1 IN	297.5	3.671
434	DY-BXN	1167.131	1167.822	FALL	1 IN	800	0.691
435	DY-BXN & BXN-KEV	1167.822	1170.577	LEVEL		LEVEL	2.755
436	BXN-KEV	1170.577	1171.665	FALL	1 IN	700	1.088
437	BXN-KEV	1171.665	1172.415	LEVEL		LEVEL	0.750
438	BXN-KEV	1172.415	1172.705	FALL	1 IN	250	0.290
439	BXN-KEV	1172.705	1174.630	LEVEL		LEVEL	1.925
440	BXN-KEV	1174.630	1174.740	FALL	1 IN	1000	0.110
441	BXN-KEV	1174.740	1175.440	LEVEL		LEVEL	0.700
442	BXN-KEV	1175.440	1175.740	FALL	1 IN	1000	0.300
443	BXN-KEV	1175.740	1178.870	LEVEL		LEVEL	3.130
444	BXN-KEV	1178.870	1179.510	RISE	1 IN	700	0.640
445	BXN-KEV	1179.510	1180.300	FALL	1 IN	1000	0.790
446	BXN-KEV & KEV-PNGR	1180.300	1181.750	LEVEL		LEVEL	1.450
447	KEV-PNGR	1181.750	1182.160	RISE	1 IN	2000	0.410
448	KEV-PNGR	1182.160	1182.500	FALL	1 IN	750	0.340
449	KEV-PNGR	1182.500	1183.370	LEVEL		LEVEL	0.870
450	KEV-PNGR	1183.370	1184.230	RISE	1 IN	1000	0.860
451	KEV-PNGR	1184.230	1184.883	LEVEL		LEVEL	0.653
452	KEV-PNGR	1184.883	1185.800	FALL	1 IN	1000	0.917
453	KEV-PNGR	1185.800	1186.613	LEVEL		LEVEL	0.813
454	KEV-PNGR	1186.613	1187.340	FALL	1 IN	300	0.727
455	KEV-PNGR	1187.340	1189.471	FALL	1 IN	1000	2.131
456	KEV-PNGR & PNGR-SWAR	1189.471	1191.238	LEVEL		LEVEL	1.767
457	PNGR-SWAR	1191.238	1191.545	RISE	1 IN	500	0.307
458	PNGR-SWAR	1191.545	1191.616	LEVEL		LEVEL	0.071
459	PNGR-SWAR	1191.616	1191.941	FALL	1 IN	500	0.325
460	PNGR-SWAR	1191.941	1192.857	FALL	1 IN	1000	0.916

461	PNGR-SWAR	1192.857	1193.680	LEVEL		LEVEL	0.823
462	PNGR-SWAR	1193.680	1194.900	FALL	1 IN	1000	1.220
463	PNGR-SWAR	1194.900	1196.122	FALL	1 IN	2000	1.222
464	PNGR-SWAR	1196.122	1199.172	FALL	1 IN	1000	3.050
465	PNGR-SWAR	1199.172	1199.781	LEVEL		LEVEL	0.609
466	PNGR-SWAR & SWAR-BTE	1199.781	1202.157	FALL	1 IN	1000	2.376
467	SWAR-BTE	1202.157	1204.634	LEVEL		LEVEL	2.477
468	SWAR-BTE	1204.634	1205.200	FALL	1 IN	1000	0.566
469	SWAR-BTE	1205.200	1205.986	LEVEL		LEVEL	0.786
470	SWAR-BTE	1205.986	1206.703	FALL	1 IN	500	0.717
471	SWAR-BTE	1206.703	1208.582	FALL	1 IN	1000	1.879
472	SWAR-BTE	1208.582	1208.822	RISE	1 IN	421	0.240
473	SWAR-BTE	1208.822	1209.022	FALL	1 IN	166	0.200
474	SWAR-BTE	1209.022	1209.062	FALL	1 IN	250	0.040
475	SWAR-BTE	1209.062	1209.382	RISE	1 IN	500	0.320
476	SWAR-BTE	1209.382	1209.902	RISE	1 IN	2000	0.520
477	SWAR-BTE	1209.902	1210.382	LEVEL		LEVEL	0.480
478	SWAR-BTE	1210.382	1210.982	FALL	1 IN	400	0.600
479	SWAR-BTE & BTE-DUM	1210.982	1212.270	FALL	1 IN	3500	1.288
480	BTE-DUM	1212.270	1212.750	RISE	1 IN	400	0.480
481	BTE-DUM	1212.750	1213.610	RISE	1 IN	3000	0.860
482	BTE-DUM	1213.610	1213.711	LEVEL		LEVEL	0.101
483	BTE-DUM	1213.711	1214.085	FALL	1 IN	700	0.374
484	BTE-DUM	1214.085	1218.211	LEVEL		LEVEL	4.126
485	BTE-DUM	1218.211	1219.045	RISE	1 IN	1000	0.834
486	BTE-DUM & DUM-JJA	1219.045	1222.033	LEVEL		LEVEL	2.988
487	DUM-JJA	1222.033	1222.645	FALL	1 IN	500	0.612
488	DUM-JJA	1222.645	1224.565	LEVEL		LEVEL	1.920
489	DUM-JJA	1224.565	1224.920	RISE	1 IN	300	0.355
490	DUM-JJA	1224.920	1224.985	LEVEL		LEVEL	0.065
491	DUM-JJA	1224.985	1225.289	FALL	1 IN	323	0.304
492	DUM-JJA	1225.289	1225.367	LEVEL		LEVEL	0.078
493	DUM-JJA	1225.367	1226.445	RISE	1 IN	500	1.078
494	DUM-JJA & JJA-MSRP	1226.445	1230.697	LEVEL		LEVEL	4.252
495	JJA-MSRP	1230.697	1231.579	RISE	1 IN	600	0.882
496	JJA-MSRP	1231.579	1231.885	LEVEL		LEVEL	0.306
497	JJA-MSRP	1231.885	1232.800	FALL	1 IN	600	0.915
498	JJA-MSRP & MSRP-MTJ	1232.800	1240.170	LEVEL		LEVEL	7.370
499	MSRP-MTJ	1240.170	1240.240	FALL	1 IN	500	0.070

500	MSRP-MTJ	1240.240	1242.040	LEVEL		LEVEL	1.800
501	MSRP-MTJ	1242.040	1242.240	RISE	1 IN	2000	0.200
502	MSRP-MTJ	1242.240	1242.347	LEVEL		LEVEL	0.107
503	MSRP-MTJ	1242.347	1242.627	FALL	1 IN	2000	0.280
504	MSRP-MTJ	1242.627	1242.807	FALL	1 IN	660	0.180
505	MSRP-MTJ	1242.807	1242.967	FALL	1 IN	600	0.160
506	MSRP-MTJ	1242.967	1243.000	FALL	1 IN	800	0.033

GRADIENT LIST OF NAD-MTJ SECTION (UP LINE)

Sr. No.	BLOCK SECTION	KMF	KMT	RISE/ FALL FROM NAGDA	GRADIENT		LENGTH (in Kms)
1	NAD - RLK	698.220	698.320	RISE	1 IN	260	0.100
2	NAD - RLK	698.320	698.500	FALL	1 IN	200	0.180
3	NAD - RLK	698.500	698.600	LEVEL		LEVEL	0.100
4	NAD - RLK	698.600	698.895	RISE	1 IN	200	0.295
5	NAD - RLK	698.895	699.100	LEVEL		LEVEL	0.205
6	NAD - RLK	699.100	699.688	RISE	1 IN	400	0.588
7	NAD - RLK	699.688	701.150	RISE	1 IN	210	1.462
8	NAD - RLK	701.150	702.500	FALL	1 IN	365	1.350
9	NAD - RLK	702.500	702.750	RISE	1 IN	200	0.250
10	NAD - RLK	702.750	703.300	RISE	1 IN	380	0.550
11	NAD - RLK	703.300	703.500	FALL	1 IN	300	0.200
12	NAD - RLK	703.500	705.650	RISE	1 IN	200	2.150
13	NAD - RLK	705.650	706.250	RISE	1 IN	400	0.600
14	NAD - RLK & RLK - MEP	706.250	706.900	FALL	1 IN	1100	0.650
15	RLK - MEP	706.900	707.200	RISE	1 IN	220	0.300
16	RLK - MEP	707.200	708.300	RISE	1 IN	200	1.100
17	RLK - MEP	708.300	708.759	FALL	1 IN	203	0.459
18	RLK - MEP	708.759	709.280	FALL	1 IN	265	0.521
19	RLK - MEP	709.280	709.880	RISE	1 IN	250	0.600
20	RLK - MEP	709.880	710.200	RISE	1 IN	360	0.320
21	RLK - MEP	710.200	710.750	FALL	1 IN	628	0.550
22	RLK - MEP	710.750	711.250	RISE	1 IN	4310	0.500
23	RLK - MEP	711.250	711.950	FALL	1 IN	215	0.700
24	RLK - MEP	711.950	712.750	FALL	1 IN	400	0.800
25	RLK - MEP & MEP-LNR	712.750	713.700	FALL	1 IN	762	0.950

26	MEP - LNR	713.700	714.500	FALL	1 IN	338	0.800
27	MEP - LNR	714.500	715.550	FALL	1 IN	300	1.050
28	MEP - LNR	715.550	716.382	FALL	1 IN	600	0.832
29	MEP - LNR	716.382	716.500	LEVEL		LEVEL	0.118
30	MEP - LNR	716.500	716.650	FALL	1 IN	333	0.150
31	MEP - LNR	716.650	717.241	FALL	1 IN	325	0.591
32	MEP - LNR	717.241	717.550	FALL	1 IN	560	0.309
33	MEP - LNR	717.550	718.000	FALL	1 IN	530	0.450
34	MEP - LNR	718.000	718.100	LEVEL		LEVEL	0.100
35	MEP - LNR	718.100	718.800	FALL	1 IN	274	0.700
36	MEP - LNR	718.800	719.150	FALL	1 IN	220	0.350
37	MEP - LNR	719.150	719.650	FALL	1 IN	425	0.500
38	MEP - LNR	719.650	720.100	FALL	1 IN	4410	0.450
39	MEP - LNR	720.100	720.550	FALL	1 IN	505	0.450
40	MEP - LNR	720.550	720.850	FALL	1 IN	1260	0.300
41	MEP - LNR	720.850	721.268	FALL	1 IN	460	0.418
42	MEP - LNR	721.268	721.675	RISE	1 IN	900	0.407
43	MEP - LNR	721.675	722.300	FALL	1 IN	815	0.625
44	MEP - LNR	722.300	722.520	RISE	1 IN	600	0.220
45	MEP - LNR	722.520	723.350	LEVEL		LEVEL	0.830
46	LNR - VMA	723.350	724.243	FALL	1 IN	2300	0.893
47	LNR - VMA	724.243	724.575	FALL	1 IN	250	0.332
48	LNR - VMA	724.575	725.500	FALL	1 IN	200	0.925
49	LNR - VMA	725.500	726.050	FALL	1 IN	300	0.550
50	LNR - VMA	726.050	726.550	FALL	1 IN	1100	0.500
51	LNR - VMA	726.550	727.040	FALL	1 IN	700	0.490
52	LNR - VMA	727.040	727.700	LEVEL		LEVEL	0.660
53	LNR - VMA	727.700	727.995	RISE	1 IN	725	0.295
54	LNR - VMA	727.995	728.600	LEVEL		LEVEL	0.605
55	LNR - VMA	728.600	729.150	FALL	1 IN	260	0.550
56	LNR - VMA	729.150	730.400	FALL	1 IN	205	1.250
57	LNR - VMA	730.400	730.700	FALL		1300	0.300
58	LNR - VMA	730.700	730.900	FALL	1 IN	200	0.200
59	LNR - VMA	730.900	731.300	RISE	1 IN	3000	0.400
60	LNR - VMA	731.300	731.800	FALL	1 IN	230	0.500
61	LNR - VMA	731.800	732.150	RISE	1 IN	650	0.350
62	LNR - VMA	732.150	732.500	LEVEL		LEVEL	0.350
63	LNR - VMA	732.500	733.200	RISE	1 IN	3790	0.700
64	LNR - VMA	733.200	733.470	RISE	1 IN	880	0.270

65	LNR - VMA	733.470	735.077	FALL	1 IN	200	1.607
66	LNR - VMA & VMA - THUR	735.077	736.275	FALL	1 IN	1075	1.198
67	VMA - THUR	736.275	736.750	FALL	1 IN	500	0.475
68	VMA - THUR	736.750	736.965	FALL	1 IN	250	0.215
69	VMA - THUR	736.965	738.225	FALL	1 IN	218	1.260
70	VMA - THUR	738.225	739.521	FALL	1 IN	377	1.296
71	VMA - THUR	739.521	740.400	FALL	1 IN	950	0.879
72	VMA - THUR	740.400	741.292	FALL	1 IN	1000	0.892
73	VMA - THUR	741.292	741.850	LEVEL		LEVEL	0.558
74	VMA - THUR	741.850	742.950	FALL	1 IN	1600	1.100
75	VMA - THUR	742.950	743.600	FALL	1 IN	3330	0.650
76	VMA - THUR	743.600	744.196	LEVEL		LEVEL	0.596
77	THUR - TLZ	744.196	744.950	FALL	1 IN	2240	0.754
78	THUR - TLZ	744.950	745.450	LEVEL		LEVEL	0.500
79	THUR - TLZ	745.450	746.550	FALL	1 IN	3160	1.100
80	THUR - TLZ	746.550	746.950	LEVEL		LEVEL	0.400
81	THUR - TLZ	746.950	747.950	RISE	1 IN	376	1.000
82	THUR - TLZ	747.950	748.700	RISE	1 IN	220	0.750
83	THUR - TLZ	748.700	750.750	RISE	1 IN	200	2.050
84	THUR - TLZ	750.750	751.450	RISE	1 IN	220	0.700
85	THUR - TLZ	751.450	752.150	FALL	1 IN	422	0.700
86	THUR - TLZ	752.150	752.801	FALL	1 IN	200	0.651
87	THUR - TLZ	752.801	753.656	FALL	1 IN	400	0.855
88	THUR - TLZ & TLZ - CMU	753.656	754.400	LEVEL		LEVEL	0.744
89	TLZ - CMU	754.400	754.754	FALL	1 IN	800	0.354
90	TLZ - CMU	754.754	757.265	FALL	1 IN	210	2.511
91	TLZ - CMU	757.265	757.741	FALL	1 IN	200	0.476
92	TLZ - CMU & CMU - NKH	757.741	758.672	FALL	1 IN	400	0.931
93	CMU - NKH	758.672	759.035	LEVEL		LEVEL	0.363
94	CMU - NKH	759.035	759.937	RISE	1 IN	243	0.902
95	CMU - NKH	759.937	760.450	LEVEL		LEVEL	0.513
96	CMU - NKH	760.450	762.064	RISE	1 IN	224	1.614
97	CMU - NKH	762.064	763.700	FALL	1 IN	790	1.636
98	CMU - NKH	763.700	764.300	FALL	1 IN	210	0.600
99	CMU - NKH	764.300	764.950	FALL	1 IN	200	0.650
100	CMU - NKH	764.950	765.400	FALL	1 IN	1367	0.450
101	CMU - NKH	765.400	765.600	LEVEL		LEVEL	0.200
102	CMU - NKH	765.600	765.850	FALL	1 IN	560	0.250

103	CMU - NKH	765.850	767.400	RISE	1 IN	200	1.550
104	CMU - NKH & NKH - SVA	767.400	768.680	RISE	1 IN	385	1.280
105	NKH - SVA	768.680	769.261	RISE	1 IN	200	0.581
106	NKH - SVA	769.261	770.350	RISE	1 IN	400	1.089
107	NKH - SVA	770.350	770.650	RISE	1 IN	200	0.300
108	NKH - SVA	770.650	771.187	RISE	1 IN	230	0.537
109	NKH - SVA	771.187	771.900	RISE	1 IN	240	0.713
110	NKH - SVA	771.900	772.550	FALL	1 IN	460	0.650
111	NKH - SVA	772.550	772.800	LEVEL		LEVEL	0.250
112	NKH - SVA	772.800	773.000	RISE	1 IN	350	0.200
113	NKH - SVA	773.000	773.500	FALL	1 IN	960	0.500
114	NKH - SVA & SVA - HNU	773.500	774.398	FALL	1 IN	7645	0.898
115	SVA - HNU	774.398	774.950	LEVEL		LEVEL	0.552
116	SVA - HNU	774.950	775.400	RISE	1 IN	275	0.450
117	SVA - HNU	775.400	775.728	RISE	1 IN	1210	0.328
118	SVA - HNU	775.728	779.128	RISE	1 IN	872	3.400
119	SVA - HNU	779.128	779.848	RISE	1 IN	200	0.720
120	SVA - HNU & HNU - SGZ	779.848	781.127	RISE	1 IN	400	1.279
121	HNU - SGZ	781.127	782.170	FALL	1 IN	280	1.043
122	HNU - SGZ	782.170	783.417	FALL	1 IN	200	1.247
123	HNU - SGZ	783.417	783.990	FALL	1 IN	5656	0.573
124	HNU - SGZ	783.990	784.450	RISE	1 IN	990	0.460
125	HNU - SGZ	784.450	784.722	RISE	1 IN	200	0.272
126	HNU - SGZ	784.722	785.634	FALL	1 IN	3257	0.912
127	HNU - SGZ	785.634	786.284	FALL	1 IN	290	0.650
128	HNU - SGZ	786.284	786.940	FALL	1 IN	560	0.656
129	HNU - SGZ & SGZ - GOH	786.940	788.490	LEVEL		LEVEL	1.550
130	SGZ - GOH	788.490	789.716	FALL	1 IN	2010	1.226
131	SGZ - GOH	789.716	790.800	FALL	1 IN	228	1.084
132	SGZ - GOH	790.800	792.520	FALL	1 IN	200	1.720
133	SGZ - GOH	792.520	792.950	VERTICAL CURVE			0.430
134	SGZ - GOH	792.950	794.200	RISE	1 IN	4230	1.250
135	SGZ - GOH	794.200	794.400	RISE	1 IN	475	0.200
136	SGZ - GOH	794.400	795.150	FALL	1 IN	1500	0.750
137	SGZ - GOH	795.150	795.510	FALL	1 IN	475	0.360
138	SGZ - GOH	795.510	795.800	FALL	1 IN	340	0.290
139	SGZ - GOH	795.800	796.800	FALL	1 IN	445	1.000

140	SGZ - GOH	796.800	797.200	VERTICAL CURVE			0.400
141	SGZ - GOH & GOH - KRLS	797.200	798.512	LEVEL		LEVEL	1.312
142	GOH - KRLS	798.512	799.150	FALL	1 IN	1140	0.638
143	GOH - KRLS	799.150	799.950	FALL	1 IN	222	0.800
144	GOH - KRLS	799.950	800.400	FALL	1 IN	200	0.450
145	GOH - KRLS	800.400	800.980	FALL	1 IN	270	0.580
146	GOH - KRLS	800.980	801.860	FALL	1 IN	216	0.880
147	GOH - KRLS	801.860	803.384	FALL	1 IN	200	1.524
148	GOH - KRLS	803.384	803.785	FALL	1 IN	1543	0.401
149	GOH - KRLS	803.785	804.268	FALL	1 IN	819	0.483
150	GOH - KRLS	804.268	804.606	RISE	1 IN	2410	0.338
151	GOH - KRLS	804.606	805.085	RISE	1 IN	904	0.479
152	GOH - KRLS	805.085	805.738	RISE	1 IN	760	0.653
153	GOH - KRLS	805.738	806.313	FALL	1 IN	282	0.575
154	GOH - KRLS	806.313	806.948	FALL	1 IN	218	0.635
155	GOH - KRLS	806.948	807.508	FALL	1 IN	463	0.560
156	GOH - KRLS & KRLS - BWM	807.508	807.988	RISE	1 IN	4800	0.480
157	KRLS - BWM	807.988	808.288	RISE	1 IN	833	0.300
158	KRLS - BWM	808.288	808.787	FALL	1 IN	246	0.499
159	KRLS - BWM	808.787	811.028	FALL	1 IN	200	2.241
160	KRLS - BWM	811.028	811.602	FALL	1 IN	252	0.574
161	KRLS - BWM	811.602	815.106	FALL	1 IN	200	3.504
162	KRLS - BWM	815.106	816.093	FALL	1 IN	215	0.987
163	KRLS - BWM	816.093	816.927	LEVEL		LEVEL	0.834
164	KRLS - BWM	816.927	817.975	FALL	1 IN	416	1.048
165	KRLS - BWM	817.975	818.681	FALL	1 IN	350	0.706
166	KRLS - BWM	818.681	819.300	LEVEL		LEVEL	0.619
167	KRLS - BWM	819.300	819.716	RISE	1 IN	200	0.416
168	KRLS - BWM	819.716	820.548	RISE	1 IN	400	0.832
169	KRLS - BWM & BWM - DKRA	820.548	821.349	RISE	1 IN	960	0.801
170	BWM - DKRA	821.349	821.504	FALL	1 IN	1033	0.155
171	BWM - DKRA	821.504	821.824	FALL	1 IN	200	0.320
172	BWM - DKRA	821.824	822.482	FALL	1 IN	231	0.658
173	BWM - DKRA	822.482	823.242	FALL	1 IN	200	0.760
174	BWM - DKRA	823.242	823.544	FALL	1 IN	290	0.302
175	BWM - DKRA	823.544	824.692	FALL	1 IN	210	1.148
176	BWM - DKRA	824.692	825.028	RISE	1 IN	1820	0.336
177	BWM - DKRA	825.028	825.428	RISE	1 IN	800	0.400

178	BWM - DKRA	825.428	825.785	RISE	1 IN	566	0.357
179	BWM - DKRA	825.785	826.285	FALL	1 IN	1000	0.500
180	BWM - DKRA	826.285	826.706	LEVEL		LEVEL	0.421
181	BWM - DKRA	826.706	827.800	FALL	1 IN	200	1.094
182	BWM - DKRA	827.800	828.051	FALL		220	0.251
183	BWM - DKRA	828.051	828.747	FALL	1 IN	200	0.696
184	BWM - DKRA	828.747	829.165	RISE	1 IN	709	0.418
185	BWM - DKRA	829.165	829.951	FALL	1 IN	1172	0.786
186	BWM - DKRA	829.951	830.311	RISE	1 IN	550	0.360
187	BWM - DKRA	830.311	830.624	RISE	1 IN	1425	0.313
188	BWM - DKRA & DKRA - JHW	830.624	830.850	RISE	1 IN	1130	0.226
189	DKRA - JHW	830.850	831.114	RISE	1 IN	400	0.264
190	DKRA - JHW	831.114	831.994	FALL	1 IN	564	0.880
191	DKRA - JHW	831.994	832.345	FALL	1 IN	260	0.351
192	DKRA - JHW	832.345	832.645	FALL	1 IN	200	0.300
193	DKRA - JHW	832.645	833.393	RISE	1 IN	2670	0.748
194	DKRA - JHW	833.393	833.890	FALL	1 IN	355	0.497
195	DKRA - JHW	833.890	834.091	RISE	1 IN	265	0.201
196	DKRA - JHW	834.091	834.380	LEVEL		LEVEL	0.289
197	DKRA - JHW	834.380	834.700	RISE	1 IN	640	0.320
198	DKRA - JHW	834.700	835.299	RISE	1 IN	810	0.599
199	DKRA - JHW	835.299	835.600	RISE	1 IN	390	0.301
200	DKRA - JHW	835.600	836.490	RISE	1 IN	200	0.890
201	DKRA - JHW	836.490	836.818	RISE	1 IN	400	0.328
202	DKRA - JHW & JHW-RMA	836.818	837.167	RISE	1 IN	945	0.349
203	JHW-RMA	837.167	837.440	LEVEL		LEVEL	0.273
204	JHW-RMA	837.440	837.724	FALL	1 IN	1235	0.284
205	JHW-RMA	837.724	837.935	FALL	1 IN	320	0.211
206	JHW-RMA	837.935	838.591	FALL	1 IN	200	0.656
207	JHW-RMA	838.591	839.900	LEVEL		LEVEL	1.309
208	JHW-RMA	839.900	840.250	RISE	1 IN	454	0.350
209	JHW-RMA	840.250	840.550	FALL	1 IN	353	0.300
210	JHW-RMA	840.550	841.050	RISE	1 IN	1000	0.500
211	JHW-RMA	841.050	841.278	FALL	1 IN	424	0.228
212	JHW-RMA	841.278	843.356	FALL	1 IN	200	2.078
213	JHW-RMA	843.356	843.750	RISE	1 IN	1000	0.394
214	JHW-RMA	843.750	843.850	RISE	1 IN	255	0.100
215	JHW-RMA	843.850	844.050	LEVEL		LEVEL	0.200

216	JHW-RMA	844.050	844.150	FALL	1 IN	345	0.100
217	JHW-RMA	844.150	844.400	FALL	1 IN	1000	0.250
218	JHW-RMA	844.400	845.668	RISE	1 IN	200	1.268
219	JHW-RMA	845.668	846.751	RISE	1 IN	250	1.083
220	JHW-RMA	846.751	847.101	LEVEL		LEVEL	0.350
221	JHW-RMA	847.101	847.700	FALL	1 IN	1332	0.599
222	JHW-RMA & RMA-MKX	847.700	849.411	LEVEL		LEVEL	1.711
223	RMA-MKX	849.411	850.389	FALL	1 IN	200	0.978
224	RMA-MKX	850.389	851.075	LEVEL		LEVEL	0.686
225	RMA-MKX	851.075	851.894	RISE	1 IN	200	0.819
226	RMA-MKX	851.894	852.435	LEVEL		LEVEL	0.541
227	RMA-MKX	852.435	857.450	FALL	1 IN	200	5.015
228	RMA-MKX	857.450	858.120	RISE	1 IN	300	0.670
229	RMA-MKX	858.120	858.550	RISE	1 IN	400	0.430
230	RMA-MKX & MKX-KIW	858.550	858.930	RISE	1 IN	717	0.380
231	MKX-KIW	858.930	859.605	RISE	1 IN	400	0.675
232	MKX-KIW	859.605	860.354	RISE	1 IN	226	0.749
233	MKX-KIW	860.354	860.485	LEVEL		LEVEL	0.131
234	MKX-KIW	860.485	860.639	RISE	1 IN	200	0.154
235	MKX-KIW	860.639	860.749	LEVEL		LEVEL	0.110
236	MKX-KIW	860.749	860.935	FALL	1 IN	300	0.186
237	MKX-KIW	860.935	861.387	LEVEL		LEVEL	0.452
238	MKX-KIW	861.387	862.025	FALL	1 IN	200	0.638
239	MKX-KIW	862.025	862.475	FALL	1 IN	213	0.450
240	MKX-KIW	862.475	863.805	FALL	1 IN	200	1.330
241	MKX-KIW	863.805	864.281	FALL	1 IN	400	0.476
242	MKX-KIW & KIW-DARA	864.281	864.712	LEVEL		LEVEL	0.431
243	KIW-DARA	864.712	865.204	RISE	1 IN	400	0.492
244	KIW-DARA	865.204	866.009	RISE	1 IN	230	0.805
245	KIW-DARA	866.009	867.124	RISE	1 IN	170	1.115
246	KIW-DARA	867.124	867.633	RISE	1 IN	380	0.509
247	KIW-DARA	867.633	869.177	RISE	1 IN	160	1.544
248	KIW-DARA	869.177	869.529	RISE	1 IN	270	0.352
249	KIW-DARA	869.529	870.284	RISE	1 IN	305	0.755
250	KIW-DARA	870.284	871.176	RISE	1 IN	225	0.892
251	KIW-DARA	871.176	871.526	FALL	1 IN	1000	0.350
252	KIW-DARA	871.526	871.884	FALL	1 IN	625	0.358
253	KIW-DARA	871.884	872.226	LEVEL		LEVEL	0.342

254	KIW-DARA	872.226	872.418	FALL	1 IN	300	0.192
255	KIW-DARA & DARA-RDT	872.418	874.560	FALL	1 IN	1000	2.142
256	DARA-RDT	874.560	875.035	RISE	1 IN	300	0.475
257	DARA-RDT	875.035	875.535	RISE	1 IN	280	0.500
258	DARA-RDT	875.535	875.875	RISE	1 IN	500	0.340
259	DARA-RDT	875.875	876.825	RISE	1 IN	900	0.950
260	DARA-RDT	876.825	877.325	RISE	1 IN	400	0.500
261	DARA-RDT	877.325	877.825	RISE	1 IN	350	0.500
262	DARA-RDT	877.825	878.360	RISE	1 IN	460	0.535
263	DARA-RDT	878.360	879.140	RISE	1 IN	220	0.780
264	DARA-RDT	879.140	880.430	RISE	1 IN	200	1.290
265	DARA-RDT	880.430	881.028	RISE	1 IN	1300	0.598
266	DARA-RDT	881.028	881.455	FALL	1 IN	1000	0.427
267	DARA-RDT	881.455	881.980	FALL	1 IN	2500	0.525
268	DARA-RDT	881.980	882.780	FALL	1 IN	4000	0.800
269	DARA-RDT	882.780	883.852	FALL	1 IN	1600	1.072
270	DARA-RDT	883.852	884.480	LEVEL		LEVEL	0.628
271	DARA-RDT	884.480	885.900	FALL	1 IN	1000	1.420
272	DARA-RDT & RDT-ALNI	885.900	886.894	LEVEL		LEVEL	0.994
273	RDT-ALNI	886.894	889.150	FALL	1 IN	200	2.256
274	RDT-ALNI	889.150	890.080	FALL	1 IN	300	0.930
275	RDT-ALNI	890.080	891.350	FALL	1 IN	400	1.270
276	RDT-ALNI	891.350	892.140	FALL	1 IN	280	0.790
277	RDT-ALNI	892.140	893.110	FALL	1 IN	400	0.970
278	RDT-ALNI	893.110	893.500	FALL	1 IN	225	0.390
279	RDT-ALNI	893.500	895.460	FALL	1 IN	300	1.960
280	RDT-ALNI	895.460	895.760	FALL	1 IN	800	0.300
281	RDT-ALNI	895.760	896.490	FALL	1 IN	225	0.730
282	RDT-ALNI	896.490	897.115	LEVEL		LEVEL	0.625
283	RDT-ALNI	897.115	897.484	RISE	1 IN	687.5	0.369
284	RDT-ALNI & ALNI-DDV	897.484	898.944	FALL	1 IN	500	1.460
285	ALNI-DDV	898.944	899.474	LEVEL		LEVEL	0.530
286	ALNI-DDV	899.474	900.475	FALL	1 IN	200	1.001
287	ALNI-DDV	900.475	901.025	FALL	1 IN	210	0.550
288	ALNI-DDV	901.025	904.050	FALL	1 IN	194	3.025
289	ALNI-DDV	904.050	904.400	FALL	1 IN	215	0.350
290	ALNI-DDV & DDV-DKNT	904.400	904.950	FALL	1 IN	400	0.550

291	DDV-DKNT	904.950	905.550	FALL	1 IN	540	0.600
292	DDV-DKNT	905.550	906.050	FALL	1 IN	260	0.500
293	DDV-DKNT	906.050	907.050	FALL	1 IN	200	1.000
294	DDV-DKNT	907.050	907.914	FALL	1 IN	215	0.864
295	DDV-DKNT	907.914	908.403	FALL	1 IN	230	0.489
296	DDV-DKNT	908.403	909.956	FALL	1 IN	205	1.553
297	DDV-DKNT	909.956	910.623	FALL	1 IN	215	0.667
298	DDV-DKNT	910.623	911.023	FALL	1 IN	180	0.400
299	DKNT-KOTA	911.023	911.383	FALL	1 IN	160	0.360
300	DDV-DKNT & DKNT-KOTA	911.383	912.383	FALL	1 IN	260	1.000
301	DKNT-KOTA	912.383	912.683	FALL	1 IN	170	0.300
302	DKNT-KOTA	912.683	913.073	FALL	1 IN	175	0.390
303	DKNT-KOTA	913.073	913.213	FALL	1 IN	160	0.140
304	DKNT-KOTA	913.213	913.856	FALL	1 IN	215	0.643
305	DKNT-KOTA	913.856	914.700	FALL	1 IN	194	0.844
306	DKNT-KOTA	914.700	915.900	FALL	1 IN	240	1.200
307	DKNT-KOTA	915.900	916.250	FALL	1 IN	250	0.350
308	DKNT-KOTA	916.250	916.690	FALL	1 IN	1000	0.440
309	DKNT-KOTA	916.690	918.290	LEVEL		LEVEL	1.600
310	DKNT-KOTA	918.290	918.635	FALL	1 IN	1000	0.345
311	DKNT-KOTA	918.635	919.565	LEVEL		LEVEL	0.930
312	DKNT-KOTA	919.565	920.360	RISE	1 IN	1000	0.795
313	DKNT-KOTA	920.360	920.870	FALL	1 IN	3000	0.510
314	DKNT-KOTA & KOTA-GQL	920.870	921.880	LEVEL		LEVEL	1.010
315	KOTA-GQL	921.880	922.543	RISE	1 IN	400	0.663
316	KOTA-GQL	922.543	923.410	LEVEL		LEVEL	0.867
317	KOTA-GQL	923.410	924.134	FALL	1 IN	300	0.724
318	KOTA-GQL	924.134	924.873	FALL	1 IN	500	0.739
319	KOTA-GQL	924.873	925.765	FALL	1 IN	660	0.892
320	KOTA-GQL	925.765	926.276	LEVEL		LEVEL	0.511
321	KOTA-GQL & GQL-KPTN	926.276	926.840	FALL	1 IN	1000	0.564
322	GQL-KPTN	926.840	927.370	LEVEL		LEVEL	0.530
323	GQL-KPTN	927.370	927.750	FALL	1 IN	800	0.380
324	GQL-KPTN	927.750	927.950	LEVEL		LEVEL	0.200
325	GQL-KPTN	927.950	928.250	RISE	1 IN	800	0.300
326	GQL-KPTN	928.250	928.850	FALL	1 IN	1500	0.600
327	GQL-KPTN	928.850	929.010	FALL	1 IN	365	0.160
328	GQL-KPTN	929.010	929.290	FALL	1 IN	750	0.280

329	GQL-KPTN	929.290	930.790	FALL	1 IN	2400	1.500
330	GQL-KPTN	930.790	931.950	FALL	1 IN	720	1.160
331	GQL-KPTN	931.950	932.450	FALL	1 IN	750	0.500
332	GQL-KPTN	932.450	932.900	LEVEL		LEVEL	0.450
333	GQL-KPTN	932.900	933.328	FALL	1 IN	350	0.428
334	GQL-KPTN & KPTN-ARE	933.328	934.614	FALL	1 IN	1600	1.286
335	KPTN-ARE	934.614	935.129	FALL	1 IN	1230	0.515
336	KPTN-ARE	935.129	935.433	LEVEL		LEVEL	0.304
337	KPTN-ARE	935.433	935.864	FALL	1 IN	1700	0.431
338	KPTN-ARE	935.864	936.054	RISE	1 IN	1000	0.190
339	KPTN-ARE	936.054	936.104	LEVEL		LEVEL	0.050
340	KPTN-ARE	936.104	936.584	FALL	1 IN	1000	0.480
341	KPTN-ARE	936.584	937.104	FALL	1 IN	2000	0.520
342	KPTN-ARE	937.104	938.024	FALL	1 IN	800	0.920
343	KPTN-ARE	938.024	938.986	FALL	1 IN	1250	0.962
344	KPTN-ARE	938.986	939.786	FALL	1 IN	2500	0.800
345	KPTN-ARE	939.786	940.666	FALL	1 IN	1600	0.880
346	KPTN-ARE	940.666	941.106	FALL	1 IN	4000	0.440
347	KPTN-ARE	941.106	941.666	FALL	1 IN	2000	0.560
348	KPTN-ARE	941.666	941.944	LEVEL		LEVEL	0.278
349	KPTN-ARE	941.944	942.144	FALL	1 IN	400	0.200
350	KPTN-ARE	942.144	942.464	FALL	1 IN	2000	0.320
351	KPTN-ARE	942.464	942.924	LEVEL		LEVEL	0.460
352	KPTN-ARE	942.924	943.154	RISE	1 IN	1600	0.230
353	KPTN-ARE	943.154	943.544	FALL	1 IN	1600	0.390
354	KPTN-ARE	943.544	943.904	FALL	1 IN	1800	0.360
355	KPTN-ARE	943.904	944.584	RISE	1 IN	400	0.680
356	KPTN-ARE	944.584	945.294	FALL	1 IN	1000	0.710
357	KPTN-ARE & ARE-KPZ	945.294	945.920	LEVEL		LEVEL	0.626
358	ARE-KPZ	945.920	946.262	FALL	1 IN	1200	0.342
359	ARE-KPZ	946.262	946.470	RISE	1 IN	1000	0.208
360	ARE-KPZ	946.470	947.370	FALL	1 IN	5000	0.900
361	ARE-KPZ	947.370	947.958	FALL	1 IN	1250	0.588
362	ARE-KPZ	947.958	949.754	FALL	1 IN	1900	1.796
363	ARE-KPZ	949.754	950.760	LEVEL		LEVEL	1.006
364	ARE-KPZ	950.760	952.440	FALL	1 IN	3500	1.680
365	ARE-KPZ	952.440	953.248	LEVEL		LEVEL	0.808
366	ARE-KPZ	953.248	954.220	FALL	1 IN	1500	0.972

367	ARE-KPZ & KPZ-GKB	954.220	955.060	FALL	1 IN	2400	0.840
368	KPZ-GKB	955.060	955.572	FALL	1 IN	1600	0.512
369	KPZ-GKB	955.572	956.472	LEVEL		LEVEL	0.900
370	KPZ-GKB	956.472	957.020	FALL	1 IN	750	0.548
371	KPZ-GKB	957.020	957.901	RISE	1 IN	3700	0.881
372	KPZ-GKB	957.901	959.020	LEVEL		LEVEL	1.119
373	KPZ-GKB	959.020	959.320	FALL	1 IN	5000	0.300
374	KPZ-GKB	959.320	960.520	LEVEL		LEVEL	1.200
375	KPZ-GKB	960.520	960.820	FALL	1 IN	1300	0.300
376	KPZ-GKB	960.820	962.617	FALL	1 IN	2170	1.797
377	KPZ-GKB	962.617	963.220	LEVEL		LEVEL	0.603
378	KPZ-GKB	963.220	964.331	FALL	1 IN	1400	1.111
379	KPZ-GKB & GKB-LBN	964.331	965.160	LEVEL		LEVEL	0.829
380	GKB-LBN	965.160	965.636	FALL	1 IN	1700	0.476
381	GKB-LBN	965.636	966.600	LEVEL		LEVEL	0.964
382	GKB-LBN	966.600	967.030	FALL	1 IN	1000	0.430
383	GKB-LBN	967.030	967.500	LEVEL		LEVEL	0.470
384	GKB-LBN	967.500	968.400	FALL	1 IN	1000	0.900
385	GKB-LBN	968.400	970.000	FALL	1 IN	2000	1.600
386	GKB-LBN	970.000	970.300	LEVEL		LEVEL	0.300
387	GKB-LBN	970.300	971.150	FALL	1 IN	1000	0.850
388	GKB-LBN	971.150	971.800	LEVEL		LEVEL	0.650
389	GKB-LBN	971.800	972.230	FALL	1 IN	3000	0.430
390	GKB-LBN	972.230	972.600	LEVEL		LEVEL	0.370
391	GKB-LBN	972.600	972.820	FALL	1 IN	1000	0.220
392	GKB-LBN	972.820	973.382	LEVEL		LEVEL	0.562
393	GKB-LBN	973.382	973.760	FALL	1 IN	1260	0.378
394	GKB-LBN & LBN-LKE	973.760	974.950	LEVEL		LEVEL	1.190
395	LBN-LKE	974.950	975.230	RISE	1 IN	1000	0.280
396	LBN-LKE	975.230	975.630	FALL	1 IN	1000	0.400
397	LBN-LKE	975.630	976.436	LEVEL		LEVEL	0.806
398	LBN-LKE	976.436	976.930	FALL	1 IN	1300	0.494
399	LBN-LKE	976.930	977.880	FALL	1 IN	217	0.950
400	LBN-LKE	977.880	978.930	FALL	1 IN	200	1.050
401	LBN-LKE	978.930	979.930	LEVEL		LEVEL	1.000
402	LBN-LKE	979.930	980.500	RISE	1 IN	200	0.570
403	LBN-LKE	980.500	981.520	RISE	1 IN	400	1.020
404	LBN-LKE & LKE-IDG	981.520	981.875	RISE	1 IN	500	0.355
405	LKE-IDG	981.875	982.296	FALL	1 IN	425	0.421

406	LKE-IDG	982.296	982.425	FALL	1 IN	400	0.129
407	LKE-IDG	982.425	983.226	FALL	1 IN	200	0.801
408	LKE-IDG	983.226	983.462	LEVEL		LEVEL	0.236
409	LKE-IDG	983.462	985.348	RISE	1 IN	200	1.886
410	LKE-IDG	985.348	985.881	LEVEL		LEVEL	0.533
411	LKE-IDG	985.881	988.210	RISE	1 IN	200	2.329
412	LKE-IDG	988.210	988.394	LEVEL		LEVEL	0.184
413	LKE-IDG	988.394	989.170	FALL	1 IN	300	0.776
414	LKE-IDG	989.170	989.887	LEVEL		LEVEL	0.717
415	LKE-IDG	989.887	991.105	RISE	1 IN	200	1.218
416	LKE-IDG	991.105	991.516	RISE	1 IN	300	0.411
417	LKE-IDG	991.516	992.155	RISE	1 IN	700	0.639
418	LKE-IDG	992.155	992.322	LEVEL		LEVEL	0.167
419	LKE-IDG & IDG-AMLI	992.322	993.007	FALL	1 IN	400	0.685
420	IDG-AMLI	993.007	994.015	FALL	1 IN	200	1.008
421	IDG-AMLI	994.015	994.188	LEVEL		LEVEL	0.173
422	IDG-AMLI	994.188	994.486	FALL	1 IN	450	0.298
423	IDG-AMLI	994.486	995.065	LEVEL		LEVEL	0.579
424	IDG-AMLI	995.065	995.860	FALL	1 IN	900	0.795
425	IDG-AMLI	995.860	996.675	LEVEL		LEVEL	0.815
426	IDG-AMLI	996.675	996.832	RISE	1 IN	300	0.157
427	IDG-AMLI	996.832	997.060	FALL	1 IN	500	0.228
428	IDG-AMLI	997.060	997.472	LEVEL		LEVEL	0.412
429	IDG-AMLI	997.472	998.386	FALL	1 IN	500	0.914
430	IDG-AMLI	998.386	998.843	FALL	1 IN	750	0.457
431	IDG-AMLI	998.843	1000.214	FALL	1 IN	1000	1.371
432	IDG-AMLI	1000.214	1000.244	LEVEL		LEVEL	0.030
433	IDG-AMLI	1000.244	1001.951	FALL	1 IN	400	1.707
434	IDG-AMLI	1001.951	1002.682	LEVEL		LEVEL	0.731
435	IDG-AMLI	1002.682	1003.108	RISE	1 IN	400	0.426
436	IDG-AMLI	1003.108	1003.474	RISE	1 IN	240	0.366
437	IDG-AMLI	1003.474	1003.900	RISE	1 IN	200	0.426
438	IDG-AMLI	1003.900	1004.266	RISE	1 IN	300	0.366
439	IDG-AMLI	1004.266	1004.769	RISE	1 IN	200	0.503
440	IDG-AMLI	1004.769	1005.180	RISE	1 IN	400	0.411
441	IDG-AMLI & AMLI-RWJ	1005.180	1005.775	RISE	1 IN	900	0.595
442	AMLI-RWJ	1005.775	1006.075	RISE	1 IN	400	0.300
443	AMLI-RWJ	1006.075	1006.400	LEVEL		LEVEL	0.325
444	AMLI-RWJ	1006.400	1008.015	RISE	1 IN	200	1.615

445	AMLI-RWJ	1008.015	1008.175	LEVEL		LEVEL	0.160
446	AMLI-RWJ	1008.175	1008.746	RISE	1 IN	500	0.571
447	AMLI-RWJ	1008.746	1008.990	RISE	1 IN	200	0.244
448	AMLI-RWJ	1008.990	1009.355	LEVEL		LEVEL	0.365
449	AMLI-RWJ	1009.355	1012.707	RISE	1 IN	200	3.352
450	AMLI-RWJ	1012.707	1013.012	RISE	1 IN	500	0.305
451	AMLI-RWJ & RWJ-KTA	1013.012	1013.972	RISE	1 IN	1000	0.960
452	RWJ-KTA	1013.972	1014.035	FALL	1 IN	250	0.063
453	RWJ-KTA	1014.035	1014.695	FALL	1 IN	500	0.660
454	RWJ-KTA	1014.695	1015.232	LEVEL		LEVEL	0.537
455	RWJ-KTA	1015.232	1015.798	RISE	1 IN	225	0.566
456	RWJ-KTA	1015.798	1017.821	LEVEL		LEVEL	2.023
457	RWJ-KTA	1017.821	1019.357	RISE	1 IN	200	1.536
458	RWJ-KTA	1019.357	1019.570	LEVEL		LEVEL	0.213
459	RWJ-KTA	1019.570	1019.875	RISE	1 IN	400	0.305
460	RWJ-KTA	1019.875	1020.788	RISE	1 IN	200	0.913
461	RWJ-KTA & KTA-SWM	1020.788	1022.187	LEVEL		LEVEL	1.399
462	KTA-SWM	1022.187	1022.370	FALL	1 IN	200	0.183
463	KTA-SWM	1022.370	1022.964	FALL	1 IN	300	0.594
464	KTA-SWM	1022.964	1024.138	LEVEL		LEVEL	1.174
465	KTA-SWM	1024.138	1024.291	RISE	1 IN	1000	0.153
466	KTA-SWM	1024.291	1024.809	LEVEL		LEVEL	0.518
467	KTA-SWM	1024.809	1027.309	FALL	1 IN	200	2.500
468	KTA-SWM	1027.309	1027.919	FALL	1 IN	400	0.610
469	KTA-SWM & SWM-RNT	1027.919	1029.626	LEVEL		LEVEL	1.707
470	SWM-RNT	1029.626	1030.662	FALL	1 IN	400	1.036
471	SWM-RNT	1030.662	1031.864	LEVEL		LEVEL	1.202
472	SWM-RNT	1031.864	1032.887	FALL	1 IN	900	1.023
473	SWM-RNT	1032.887	1034.110	FALL	1 IN	620	1.223
474	SWM-RNT	1034.110	1035.691	FALL	1 IN	333.33	1.581
475	SWM-RNT	1035.691	1036.301	LEVEL		LEVEL	0.610
476	SWM-RNT	1036.301	1037.856	FALL	1 IN	300	1.555
477	SWM-RNT	1037.856	1038.436	FALL	1 IN	442	0.580
478	SWM-RNT & RNT-MXL	1038.436	1040.767	FALL	1 IN	750	2.331
479	RNT-MXL	1040.767	1041.102	RISE	1 IN	200	0.335
480	RNT-MXL	1041.102	1041.300	LEVEL		LEVEL	0.198
481	RNT-MXL	1041.300	1041.788	FALL	1 IN	200	0.488
482	RNT-MXL	1041.788	1041.910	LEVEL		LEVEL	0.122
483	RNT-MXL	1041.910	1042.215	FALL	1 IN	1000	0.305

484	RNT-MXL	1042.215	1042.557	FALL	1 IN	1500	0.342
485	RNT-MXL	1042.557	1043.708	LEVEL		LEVEL	1.151
486	RNT-MXL	1043.708	1043.982	FALL	1 IN	1000	0.274
487	RNT-MXL	1043.982	1045.811	LEVEL		LEVEL	1.829
488	RNT-MXL	1045.811	1047.274	FALL	1 IN	1000	1.463
489	RNT-MXL	1047.274	1047.754	FALL	1 IN	1500	0.480
490	RNT-MXL & MXL-MLZ	1047.754	1049.133	LEVEL		LEVEL	1.379
491	MXL-MLZ	1049.133	1050.581	FALL	1 IN	1000	1.448
492	MXL-MLZ	1050.581	1051.922	LEVEL		LEVEL	1.341
493	MXL-MLZ	1051.922	1054.224	FALL	1 IN	200	2.302
494	MXL-MLZ	1054.224	1055.153	LEVEL		LEVEL	0.929
495	MXL-MLZ	1055.153	1055.656	FALL	1 IN	200	0.503
496	MXL-MLZ	1055.656	1056.418	LEVEL		LEVEL	0.762
497	MXL-MLZ	1056.418	1057.241	RISE	1 IN	200	0.823
498	MXL-MLZ	1057.241	1057.424	RISE	1 IN	300	0.183
499	MXL-MLZ	1057.424	1058.247	RISE	1 IN	200	0.823
500	MXL-MLZ	1058.247	1058.674	RISE	1 IN	400	0.427
501	MXL-MLZ	1058.674	1058.727	LEVEL		LEVEL	0.053
502	MXL-MLZ & MLZ-NMD	1058.727	1059.712	FALL	1 IN	500	0.985
503	MLZ-NMD	1059.712	1059.955	RISE	1 IN	400	0.243
504	MLZ-NMD	1059.955	1060.732	RISE	1 IN	200	0.777
505	MLZ-NMD	1060.732	1061.356	LEVEL		LEVEL	0.624
506	MLZ-NMD	1061.356	1061.966	FALL	1 IN	1000	0.610
507	MLZ-NMD	1061.966	1063.836	LEVEL		LEVEL	1.870
508	MLZ-NMD	1063.836	1064.659	FALL	1 IN	400	0.823
509	MLZ-NMD	1064.659	1064.960	FALL	1 IN	500	0.301
510	MLZ-NMD & NMD-NNW	1064.960	1065.856	RISE	1 IN	590	0.896
511	NMD-NNW	1065.856	1066.176	LEVEL		LEVEL	0.320
512	NMD-NNW	1066.176	1066.542	FALL	1 IN	1000	0.366
513	NMD-NNW	1066.542	1066.786	FALL	1 IN	400	0.244
514	NMD-NNW	1066.786	1067.548	FALL	1 IN	250	0.762
515	NMD-NNW	1067.548	1068.080	FALL	1 IN	300	0.532
516	NMD-NNW	1068.080	1068.520	RISE	1 IN	500	0.440
517	NMD-NNW	1068.520	1068.710	LEVEL		LEVEL	0.190
518	NMD-NNW	1068.710	1069.240	FALL	1 IN	300	0.530
519	NMD-NNW	1069.240	1070.220	LEVEL		LEVEL	0.980
520	NMD-NNW	1070.220	1070.590	RISE	1 IN	250	0.370
521	NMD-NNW	1070.590	1070.920	LEVEL		LEVEL	0.330
522	NMD-NNW	1070.920	1071.310	RISE	1 IN	400	0.390

523	NMD-NNW	1071.310	1071.680	RISE	1 IN	600	0.370
524	NMD-NNW	1071.680	1072.730	RISE	1 IN	400	1.050
525	NMD-NNW	1072.730	1074.840	RISE	1 IN	200	2.110
526	NMD-NNW & NNW-LRU	1074.840	1075.550	RISE	1 IN	400	0.710
527	NNW-LRU	1075.550	1076.275	LEVEL		LEVEL	0.725
528	NNW-LRU	1076.275	1081.903	RISE	1 IN	200	5.628
529	NNW-LRU	1081.903	1082.734	LEVEL		LEVEL	0.831
530	NNW-LRU	1082.734	1083.923	RISE	1 IN	600	1.189
531	NNW-LRU	1083.923	1084.441	LEVEL		LEVEL	0.518
532	NNW-LRU	1084.441	1084.871	FALL	1 IN	200	0.430
533	NNW-LRU	1084.871	1085.260	LEVEL		LEVEL	0.389
534	NNW-LRU	1085.260	1085.806	FALL	1 IN	600	0.546
535	NNW-LRU & LRU-GGC	1085.806	1087.294	LEVEL		LEVEL	1.488
536	LRU-GGC	1087.294	1088.093	FALL	1 IN	1000	0.799
537	LRU-GGC	1088.093	1088.157	RISE	1 IN	400	0.064
538	LRU-GGC	1088.157	1088.587	FALL	1 IN	1000	0.430
539	LRU-GGC	1088.587	1089.319	LEVEL		LEVEL	0.732
540	LRU-GGC	1089.319	1089.563	FALL	1 IN	500	0.244
541	LRU-GGC	1089.563	1090.933	FALL	1 IN	400	1.370
542	LRU-GGC	1090.933	1091.431	FALL	1 IN	500	0.498
543	LRU-GGC & GGC-COO	1091.431	1093.099	FALL	1 IN	1000	1.668
544	GGC-COO	1093.099	1094.744	FALL	1 IN	700	1.645
545	GGC-COO	1094.744	1094.912	LEVEL		LEVEL	0.168
546	GGC-COO	1094.912	1095.471	FALL	1 IN	700	0.559
547	GGC-COO	1095.471	1095.577	RISE	1 IN	1000	0.106
548	GGC-COO	1095.577	1095.844	LEVEL		LEVEL	0.267
549	GGC-COO	1095.844	1096.128	FALL	1 IN	300	0.284
550	GGC-COO	1096.128	1096.511	FALL	1 IN	1100	0.383
551	GGC-COO	1096.511	1096.922	FALL	1 IN	1000	0.411
552	GGC-COO	1096.922	1097.910	FALL	1 IN	1100	0.988
553	GGC-COO	1097.910	1099.025	FALL	1 IN	1000	1.115
554	GGC-COO	1099.025	1099.435	LEVEL		LEVEL	0.410
555	GGC-COO	1099.435	1099.611	FALL	1 IN	400	0.176
556	GGC-COO	1099.611	1099.908	FALL	1 IN	300	0.297
557	GGC-COO	1099.908	1100.597	FALL	1 IN	1000	0.689
558	GGC-COO	1100.597	1100.653	RISE	1 IN	400	0.056
559	GGC-COO	1100.653	1100.915	FALL	1 IN	400	0.262
560	GGC-COO	1100.915	1101.193	LEVEL		LEVEL	0.278

561	GGC-COO	1101.193	1101.949	FALL	1 IN	1000	0.756
562	GGC-COO	1101.949	1101.969	LEVEL		LEVEL	0.020
563	GGC-COO	1101.969	1102.110	RISE	1 IN	400	0.141
564	GGC-COO	1102.110	1102.265	FALL	1 IN	250	0.155
565	GGC-COO	1102.265	1102.498	FALL	1 IN	700	0.233
566	GGC-COO	1102.498	1102.600	RISE	1 IN	400	0.102
567	GGC-COO	1102.600	1102.744	FALL	1 IN	250	0.144
568	GGC-COO	1102.744	1103.152	LEVEL		LEVEL	0.408
569	GGC-COO	1103.152	1103.304	RISE	1 IN	500	0.152
570	GGC-COO	1103.304	1103.945	LEVEL		LEVEL	0.641
571	GGC-COO	1103.945	1104.097	FALL	1 IN	500	0.152
572	GGC-COO	1104.097	1104.362	LEVEL		LEVEL	0.265
573	GGC-COO & COO-PDZ	1104.362	1105.757	RISE	1 IN	500	1.395
574	COO-PDZ	1105.757	1106.451	LEVEL		LEVEL	0.694
575	COO-PDZ	1106.451	1107.274	FALL	1 IN	300	0.823
576	COO-PDZ	1107.274	1107.490	FALL	1 IN	500	0.216
577	COO-PDZ	1107.490	1109.061	FALL	1 IN	200	1.571
578	COO-PDZ	1109.061	1109.159	RISE	1 IN	400	0.098
579	COO-PDZ	1109.159	1109.328	FALL	1 IN	200	0.169
580	COO-PDZ	1109.328	1109.524	LEVEL		LEVEL	0.196
581	COO-PDZ	1109.524	1109.670	FALL	1 IN	250	0.146
582	COO-PDZ	1109.670	1110.519	LEVEL		LEVEL	0.849
583	COO-PDZ	1110.519	1111.739	FALL	1 IN	500	1.220
584	COO-PDZ & PDZ-SMBJ	1111.739	1119.088	LEVEL		LEVEL	7.349
585	PDZ-SMBJ	1119.088	1120.307	FALL	1 IN	1000	1.219
586	PDZ-SMBJ	1120.307	1122.687	LEVEL		LEVEL	2.380
587	PDZ-SMBJ	1122.687	1123.511	FALL	1 IN	300	0.824
588	PDZ-SMBJ	1123.511	1124.882	LEVEL		LEVEL	1.371
589	PDZ-SMBJ	1124.882	1125.065	RISE	1 IN	200	0.183
590	PDZ-SMBJ	1125.065	1125.499	LEVEL		LEVEL	0.434
591	PDZ-SMBJ & SMBJ-HAN	1125.499	1126.719	FALL	1 IN	500	1.220
592	SMBJ-HAN	1126.719	1127.268	LEVEL		LEVEL	0.549
593	SMBJ-HAN	1127.268	1127.424	RISE	1 IN	1000	0.156
594	SMBJ-HAN	1127.424	1127.579	FALL	1 IN	1000	0.155
595	SMBJ-HAN	1127.579	1128.232	LEVEL		LEVEL	0.653
596	SMBJ-HAN	1128.232	1129.451	FALL	1 IN	2000	1.219
597	SMBJ-HAN	1129.451	1133.110	FALL	1 IN	666.66	3.659
598	SMBJ-HAN	1133.110	1134.330	FALL	1 IN	500	1.220

599	SMBJ-HAN	1134.330	1135.550	LEVEL		LEVEL	1.220
600	SMBJ-HAN & HAN-FSP	1135.550	1137.451	FALL	1 IN	630	1.901
601	HAN-FSP	1137.451	1139.615	FALL	1 IN	1000	2.164
602	HAN-FSP	1139.615	1142	FALL	1 IN	500	2.385
603	HAN-FSP	1142.000	1143.236	LEVEL		LEVEL	1.236
604	HAN-FSP	1143.236	1144.365	RISE	1 IN	300	1.129
605	HAN-FSP	1144.365	1144.822	LEVEL		LEVEL	0.457
606	HAN-FSP	1144.822	1146.042	FALL	1 IN	2000	1.220
607	HAN-FSP	1146.042	1147.565	RISE	1 IN	1000	1.523
608	HAN-FSP	1147.565	1148.481	FALL	1 IN	1000	0.916
609	HAN-FSP & FSP-DY	1148.481	1150.508	LEVEL		LEVEL	2.027
610	FSP-DY	1150.508	1151.222	FALL	1 IN	2470	0.714
611	FSP-DY	1151.222	1152.890	FALL	1 IN	800	1.668
612	FSP-DY	1152.890	1153.169	RISE	1 IN	500	0.279
613	FSP-DY	1153.169	1153.413	FALL	1 IN	500	0.244
614	FSP-DY	1153.413	1153.824	LEVEL		LEVEL	0.411
615	FSP-DY	1153.824	1154.576	FALL	1 IN	500	0.752
616	FSP-DY	1154.576	1157.015	FALL	1 IN	250	2.439
617	FSP-DY	1157.015	1157.270	RISE	1 IN	270	0.255
618	FSP-DY	1157.270	1157.930	RISE	1 IN	450	0.660
619	FSP-DY	1157.930	1158.543	LEVEL		LEVEL	0.613
620	FSP-DY	1158.543	1158.970	FALL	1 IN	610	0.427
621	FSP-DY	1158.970	1159.244	FALL	1 IN	270	0.274
622	FSP-DY	1159.244	1159.827	RISE	1 IN	200	0.583
623	FSP-DY	1159.827	1160.339	RISE	1 IN	400	0.512
624	FSP-DY	1160.339	1160.489	LEVEL		LEVEL	0.150
625	FSP-DY & DY-BXN	1160.489	1160.890	RISE	1 IN	900	0.401
626	DY-BXN	1160.890	1161.165	LEVEL		LEVEL	0.275
627	DY-BXN	1161.165	1161.988	FALL	1 IN	300	0.823
628	DY-BXN	1161.988	1162.222	LEVEL		LEVEL	0.234
629	DY-BXN	1162.222	1163.137	RISE	1 IN	300	0.915
630	DY-BXN	1163.137	1163.472	LEVEL		LEVEL	0.335
631	DY-BXN	1163.472	1167.100	FALL	1 IN	297.5	3.628
632	DY-BXN	1167.100	1167.832	FALL	1 IN	800	0.732
633	DY-BXN & BXN-KEV	1167.832	1170.760	LEVEL		LEVEL	2.928
634	BXN-KEV	1170.760	1171.691	FALL	1 IN	700	0.931
635	BXN-KEV	1171.691	1172.400	LEVEL		LEVEL	0.709
636	BXN-KEV	1172.400	1172.512	FALL	1 IN	250	0.112
637	BXN-KEV	1172.512	1174.590	LEVEL		LEVEL	2.078

638	BXN-KEV	1174.590	1174.700	FALL	1 IN	1000	0.110
639	BXN-KEV	1174.700	1175.450	LEVEL		LEVEL	0.750
640	BXN-KEV	1175.450	1175.750	RISE	1 IN	1000	0.300
641	BXN-KEV	1175.750	1178.825	LEVEL		LEVEL	3.075
642	BXN-KEV	1178.825	1179.250	RISE	1 IN	1000	0.425
643	BXN-KEV	1179.250	1179.400	LEVEL		LEVEL	0.150
644	BXN-KEV	1179.400	1180.110	FALL	1 IN	400	0.710
645	BXN-KEV & KEV-PNGR	1180.110	1183.260	LEVEL		LEVEL	3.150
646	KEV-PNGR	1183.260	1184.350	RISE	1 IN	700	1.090
647	KEV-PNGR	1184.350	1184.858	LEVEL		LEVEL	0.508
648	KEV-PNGR	1184.858	1185.330	FALL	1 IN	400	0.472
649	KEV-PNGR	1185.330	1185.940	RISE	1 IN	1300	0.610
650	KEV-PNGR	1185.940	1186.060	LEVEL		LEVEL	0.120
651	KEV-PNGR	1186.060	1186.220	FALL	1 IN	250	0.160
652	KEV-PNGR	1186.220	1186.970	FALL	1 IN	700	0.750
653	KEV-PNGR	1186.970	1187.435	FALL	1 IN	300	0.465
654	KEV-PNGR	1187.435	1187.705	FALL	1 IN	2700	0.270
655	KEV-PNGR	1187.705	1188.580	FALL	1 IN	838	0.875
656	KEV-PNGR	1188.580	1189.460	FALL	1 IN	1000	0.880
657	KEV-PNGR & PNGR-SWAR	1189.460	1191.200	LEVEL		LEVEL	1.740
658	PNGR-SWAR	1191.200	1191.520	RISE	1 IN	500	0.320
659	PNGR-SWAR	1191.520	1191.640	LEVEL		LEVEL	0.120
660	PNGR-SWAR	1191.640	1192.960	FALL	1 IN	500	1.320
661	PNGR-SWAR	1192.960	1193.040	FALL	1 IN	1000	0.080
662	PNGR-SWAR	1193.040	1193.440	LEVEL		LEVEL	0.400
663	PNGR-SWAR	1193.440	1194.200	FALL	1 IN	2000	0.760
664	PNGR-SWAR	1194.200	1194.920	FALL	1 IN	1000	0.720
665	PNGR-SWAR	1194.920	1195.400	LEVEL		LEVEL	0.480
666	PNGR-SWAR	1195.400	1197.910	FALL	1 IN	1000	2.510
667	PNGR-SWAR	1197.910	1198.400	LEVEL		LEVEL	0.490
668	PNGR-SWAR	1198.400	1199.580	FALL	1 IN	1000	1.180
669	PNGR-SWAR	1199.580	1199.651	LEVEL		LEVEL	0.071
670	PNGR-SWAR & SWAR-BTE	1199.651	1202.000	FALL	1 IN	1000	2.349
671	SWAR-BTE	1202.000	1202.571	LEVEL		LEVEL	0.571
672	SWAR-BTE	1202.571	1202.879	RISE	1 IN	588	0.308
673	SWAR-BTE	1202.879	1202.939	LEVEL		LEVEL	0.060
674	SWAR-BTE	1202.939	1203.240	FALL	1 IN	518	0.301
675	SWAR-BTE	1203.240	1204.240	LEVEL		LEVEL	1.000

676	SWAR-BTE	1204.240	1204.553	FALL	1 IN	1200	0.313
677	SWAR-BTE	1204.553	1204.879	LEVEL		LEVEL	0.326
678	SWAR-BTE	1204.879	1205.269	FALL	1 IN	1000	0.390
679	SWAR-BTE	1205.269	1205.985	LEVEL		LEVEL	0.716
680	SWAR-BTE	1205.985	1206.119	FALL	1 IN	340	0.134
681	SWAR-BTE	1206.119	1206.654	FALL	1 IN	600	0.535
682	SWAR-BTE	1206.654	1206.824	LEVEL		LEVEL	0.170
683	SWAR-BTE	1206.824	1207.059	FALL	1 IN	470	0.235
684	SWAR-BTE	1207.059	1208.499	FALL	1 IN	940	1.440
685	SWAR-BTE	1208.499	1208.579	FALL	1 IN	1600	0.080
686	SWAR-BTE	1208.579	1208.822	RISE	1 IN	585	0.243
687	SWAR-BTE	1208.822	1209.022	FALL	1 IN	166	0.200
688	SWAR-BTE	1209.022	1209.062	FALL	1 IN	250	0.040
689	SWAR-BTE	1209.062	1209.902	RISE	1 IN	2000	0.840
690	SWAR-BTE	1209.902	1210.382	LEVEL		LEVEL	0.480
691	SWAR-BTE	1210.382	1211.070	FALL	1 IN	400	0.688
692	SWAR-BTE & BTE-DUM	1211.070	1211.480	LEVEL		LEVEL	0.410
693	BTE-DUM	1211.480	1211.560	RISE	1 IN	1000	0.080
694	BTE-DUM	1211.560	1211.800	FALL	1 IN	1000	0.240
695	BTE-DUM	1211.800	1212.270	LEVEL		LEVEL	0.470
696	BTE-DUM	1212.270	1212.750	RISE	1 IN	400	0.480
697	BTE-DUM	1212.750	1213.610	RISE	1 IN	3000	0.860
698	BTE-DUM	1213.610	1213.711	LEVEL		LEVEL	0.101
699	BTE-DUM	1213.711	1214.085	FALL	1 IN	700	0.374
700	BTE-DUM	1214.085	1214.385	LEVEL		LEVEL	0.300
701	BTE-DUM	1214.385	1214.553	FALL	1 IN	1400	0.168
702	BTE-DUM	1214.553	1215.995	LEVEL		LEVEL	1.442
703	BTE-DUM	1215.995	1216.565	RISE	1 IN	1200	0.570
704	BTE-DUM	1216.565	1216.705	LEVEL		LEVEL	0.140
705	BTE-DUM	1216.705	1217.245	FALL	1 IN	1500	0.540
706	BTE-DUM	1217.245	1218.225	LEVEL		LEVEL	0.980
707	BTE-DUM	1218.225	1219.005	RISE	1 IN	1000	0.780
708	BTE-DUM & DUM-JJA	1219.005	1221.915	LEVEL		LEVEL	2.910
709	DUM-JJA	1221.915	1222.033	RISE	1 IN	1000	0.118
710	DUM-JJA	1222.033	1222.175	LEVEL		LEVEL	0.142
711	DUM-JJA	1222.175	1222.325	FALL	1 IN	200	0.150
712	DUM-JJA	1222.325	1222.575	FALL	1 IN	500	0.250
713	DUM-JJA	1222.575	1223.225	LEVEL		LEVEL	0.650

714	DUM-JJA	1223.225	1223.375	RISE	1 IN	400	0.150
715	DUM-JJA	1223.375	1223.455	LEVEL		LEVEL	0.080
716	DUM-JJA	1223.455	1223.605	FALL	1 IN	300	0.150
717	DUM-JJA	1223.605	1224.105	LEVEL		LEVEL	0.500
718	DUM-JJA	1224.105	1224.525	RISE	1 IN	1000	0.420
719	DUM-JJA	1224.525	1224.605	LEVEL		LEVEL	0.080
720	DUM-JJA	1224.605	1224.825	RISE	1 IN	500	0.220
721	DUM-JJA	1224.825	1225.425	LEVEL		LEVEL	0.600
722	DUM-JJA	1225.425	1225.785	RISE	1 IN	600	0.360
723	DUM-JJA	1225.785	1225.950	LEVEL		LEVEL	0.165
724	DUM-JJA	1225.950	1226.450	RISE	1 IN	500	0.500
725	DUM-JJA & JJA-MSRP	1226.450	1228.320	LEVEL		LEVEL	1.870
726	JJA-MSRP	1228.320	1228.525	RISE	1 IN	2000	0.205
727	JJA-MSRP	1228.525	1229.580	LEVEL		LEVEL	1.055
728	JJA-MSRP	1229.580	1229.800	RISE	1 IN	2000	0.220
729	JJA-MSRP	1229.800	1230.700	LEVEL		LEVEL	0.900
730	JJA-MSRP	1230.700	1231.576	RISE	1 IN	600	0.876
731	JJA-MSRP	1231.576	1231.724	LEVEL		LEVEL	0.148
732	JJA-MSRP	1231.724	1232.520	FALL	1 IN	600	0.796
733	JJA-MSRP	1232.520	1233.000	LEVEL		LEVEL	0.480
734	JJA-MSRP	1233.000	1233.740	FALL	1 IN	2000	0.740
735	JJA-MSRP	1233.740	1235.260	LEVEL		LEVEL	1.520
736	JJA-MSRP	1235.260	1235.440	FALL	1 IN	2000	0.180
737	JJA-MSRP & MSRP-MTJ	1235.440	1236.640	LEVEL		LEVEL	1.200
738	MSRP-MTJ	1236.640	1236.840	RISE	1 IN	2000	0.200
739	MSRP-MTJ	1236.840	1238.640	LEVEL		LEVEL	1.800
740	MSRP-MTJ	1238.640	1238.840	RISE	1 IN	2000	0.200
741	MSRP-MTJ	1238.840	1238.940	LEVEL		LEVEL	0.100
742	MSRP-MTJ	1238.940	1239.060	FALL	1 IN	2000	0.120
743	MSRP-MTJ	1239.060	1240.170	LEVEL		LEVEL	1.110
744	MSRP-MTJ	1240.170	1240.240	FALL	1 IN	500	0.070
745	MSRP-MTJ	1240.240	1241.409	LEVEL		LEVEL	1.169
746	MSRP-MTJ	1241.409	1242.634	RISE	1 IN	7000	1.225
747	MSRP-MTJ	1242.634	1243.000	FALL	1 IN	680	0.366

Existing Signal Interlocking Plans (SIPs)**ANNEXURE - M**

Existing Signal Interlocking Plans (SIPs) of NAD-MTJ section are available in the office of Dy.CSTE (Project)/Kota

S. No.	Station	
1.	Rohalkhurd	
2.	Mehidpur Road	
3.	Luni Richha	
4.	Vikramgarh Alot	
5.	Thuria	
6.	Talavli	
7.	Chau Mahla	
8.	Nathu kheri	
9.	Suwasra	
10.	Shamgarh	
11.	Garoth	
12.	Kurlasi	
13.	Bhawani Mandi	
14.	Dhuankheri	
15.	Jhalawar Road	
16.	Ramganj Mandi	
17.	Morak	
18.	Kanwalpura	
19.	Dara	
20.	Ravtha Road	
21.	Alniya	

22.	Dadhdevi	
23.	Dakaniya Talav	
24.	Kota	
25.	Gurla	
26.	Keshorai Patan	
27.	Arnetha	
28.	Kapren	
29.	Ghat ka Varana	
30.	Laban	
31.	Lakheri	
32.	Indragarh Sumerganj Mandi	
33.	Amli	
34.	Rawanjna Dungar	
35.	Kushtala	
36.	Sawai Madhopur	
37.	Ranthambhor	
38.	Makholi	
39.	Malarna	
40.	Nimoda	
41.	Narayanpur Tatwara	
42.	Lalpur Umri	
43.	Gangapur City	
44.	Chhoti Odai	
45.	Piloda	
46.	Shri Mahaveerji	
47.	Hindaun City	

48.	Fatehsinghpura	
49.	Dumariya	
50.	Bayana	
51.	Keladivi	
52.	Pingora	
53.	Sewar	
54.	Bharatpur	
55.	Dhauormui Jaghina	
56.	Jajanpatti	
57.	murhehesirampur	

References:

- Raising of sectional speed to 160/200 Kmph on existing New Delhi-Mumbai route is a part of mission to achieve travel time of 12 Hours between New Delhi and Mumbai.
- [SIPs/SWRDs of all the station of the section.](#)
- [List of WCRs drawings](#)
- Detailed scope and specification for KAVACH: Nagda to Mathura section.
- List of WCR /RDSO/Railway Board drawing are attached separately. If any drawing is not available, they can be obtained from Dy CSTE/project office kota.
- RDSO/SPN/TC/99/2012, Rev. '2'
-
- RDSO specification RDSO/SPN/196/2012, Ver. 3.2 or latest
- Advisory Note STS/E/TAN/5001, Ver 1.0, dt. 20/06/2019
- RDSOSpecification No. RDSO/SPN/176/2008 or latest
- RDSO Specification No. RDSO/SPN/176/2005 (Ver- 2)
- IP-MPLS As per RDSO TAN NO STT/TAN/IP-MPLS/2020 or latest
- 48 fiber OFC Cable RDSO Spec. No. RDSO/SPN/ TC/110/2020 Revision-0 or latest
- 48 fibre OFC joint Enclosure:- TEC/GR/TX/OJC-002/03/APR-2010
- FDMS- RDSO Spec. No. RDSO/SPN/TC/37/2020 Rev.4 or latest
- HDPE Duct:- RDSO Spec. No. RDSO/SPN/TC/45/2013 Rev. 2 or latest
- **RDSO/SPN/TC/99/2012 or latest with compliance**
- cable laying practice of WCR/ guideline on signalling cable laying issued by RDSO