

DGPS SURVEY REPORT

FOR

**Rehabilitation & Upgrading of Panduka Jatmay
Ghatarani Gaydabari Madeli Mudagaon Road,**

GARIABAND FOREST DIVISION

AREA : 24.569 Ha.



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To
DIVISIONAL FOREST OFFICER
GAREIYABAND FOREST DIVISION

INTRODUCTION TO DGPS

WHAT IS DGPS AND WHY USE IT?

- **Differential Global Positioning System (DGPS)** is an enhancement to Global Positioning System that provides improved location accuracy, from the 15-meter nominal GPS accuracy to about 10 cm in case of the best implementations.
 - DGPS refers to using a combination of receivers and satellites to
 - reduce/eliminate common receiver based and satellite based errors
 - reduce orbit errors
 - reduce ionospheric and tropospheric errors
 - reduce effects of SA
 - eliminate satellite and receiver clock errors
 - improve accuracy significantly 100's of metres to metres to centimetres to millimetres
1. DGPS uses one or several (network) fixed ground based reference stations (in known locations).
 2. The base station compares its own known location, to that computed from a GPS receiver.
 3. Any difference is then broadcast as a correction to the user.

Correction signals can be broadcast either from ground stations, or via additional satellites. These services are privately owned and usually require a user subscription.

Examples:

- Satellite Based Augmentation System (SBAS),
- Wide Area Augmentation System (WAAS),
- Local Area Augmentation System (LAAS),
- European Geostationary Navigation Overlay Service (EGNOS),
- Omni STAR
- Coast guard beacon service.

Why do we Need Differential GPS?

By using DGPS we can improve our positional accuracy from around 1.5m with standard GPS to around 40cm with DGPS, without the need for post processing.

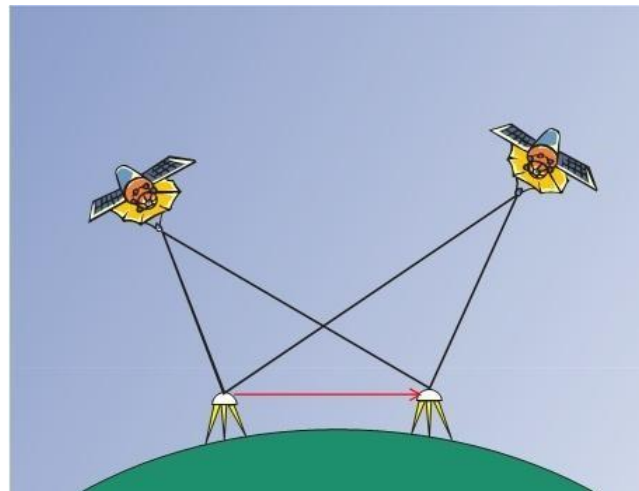
In the case of the road survey van (top right), users can measure the amount of road wear and judge whether the road should be resurfaced just

by driving over it. Just one day's driving can replace a month's manual work using traditional methods.

There are many other applications like this. The labour saving is immense but at the same time, previously impossible tasks are made possible such as the prediction of earthquakes before they occur.

DGPS Summary

- Term refers to simple C/A code differential
- Available on GPS receivers from low cost to high cost
- Produces accuracies from sub-metre to metres
- Many real-time DGPS correction providers - Coast guard, EGNOS, OmniSTAR
- Used for many different applications including marine navigation, precision farming and vehicle testing applications.



What is RTK?

Real Time Kinematic is an advanced form of DGPS which uses the satellites carrier wave to compare 2 observations from different receivers

within the system, to fine tune the satellite and receiver clock errors, thus improving positional accuracy.

Real Time Kinematic (RTK)

The GPS signal is made up of 3 distinct components:

- Carrier wave
- GPS Code
- Navigation message

Typical GPS receivers will use the GPS navigation message to calculate its position. RTK uses the carrier wave of the GPS signal, which is 19.02cm long. By counting the number of cycles (and phase of the carrier), the travel time and distance can be measured more accurately.

RTK Summary

- Similar technique as DGPS that uses the carrier phase to provide more accurate positioning
- Cost is higher compared to DGPS receivers
- Produces accuracies from 20 cm to sub-centimetres
- RTK corrections provided via a local base station or by a private correction provider - OmniSTAR, Leica, Trimble

- Used for many different applications including machine control (construction, container ports, farming), vehicle testing applications, surveying (land, marine, hydrographic, aerial)

RINEX FILE

The first proposal for the ***Receiver Independent Exchange Format*** **RINEX** was developed by the Astronomical Institute of the University of Berne for the easy exchange of the Global.

Positioning System (GPS) data to be collected during the first large European GPS campaign

EUREF 89, which involved more than 60 GPS receivers of 4 different manufacturers. The governing aspect during the development was the following fact:

Most geodetic processing software for GPS data use a well-defined set of observables:

- The carrier-phase measurement at one or both carriers (actually being a measurement on the beat frequency between the received carrier of the satellite signal and a receiver-generated reference frequency).
- The pseudorange (code) measurement, equivalent to the difference of the time of reception (expressed in the time frame of the receiver) and the time of transmission (expressed in the time frame of the satellite) of a distinct satellite signal.
- The observation time being the reading of the receiver clock at the instant of validity of the carrier-phase and/or the code measurements. Usually the

software assumes that the observation time is valid for both the phase **and** the code measurements, **and** for all satellites observed. Consequently all these programs do not need most of the information that is usually stored by the receivers: They need phase, code, and time in the above mentioned definitions, and some stationrelated information like station name, antenna height, etc. Up till now two major format versions have been developed and published:

- The original RINEX Version 1 presented at and accepted by the 5th International Geodetic Symposium on Satellite Positioning in Las Cruces, 1989. [Gurtner et al. 1989],[Evans 1989]
- RINEX Version 2 presented at and accepted by the Second International Symposium of Precise Positioning with the Global Positioning system in Ottawa, 1990, mainly adding the possibility to include tracking data from different satellite systems (GLONASS, SBAS). [Gurtner and Mader 1990a, 1990b], [Gurtner 1994]. Several subversions of RINEX Version 2 have been defined:
- Version 2.10: Among other minor changes allowing for sampling rates other than integer seconds and including raw signal strengths as new observables. [Gurtner 2002]
- Version 2.11: Includes the definition of a two-character observation code for L2C pseudoranges and some modifications in the GEO NAV MESS files [Gurtner and Estey 2005]
- Version 2.20: Unofficial version used for the exchange of tracking data from spaceborne receivers within the IGS LEO pilot project [Gurtner and Estey 2002]. As spin-offs of this idea of a receiver-independent GPS

exchange format other RINEX-like exchange file formats have been defined, mainly used by the International GNSS Service IGS:

- Exchange format for **satellite and receiver clock offsets** determined by processing data of a GNSS tracking network [Ray and Gurtner 1999]
- Exchange format for the complete **broadcast data of spacebased augmentation systems** SBAS. [Suard et al. 2004]
- IONEX: Exchange format for **ionosphere models** determined by processing data of a GNSS tracking network [Schaer et al. 1998]
- ANTEX: Exchange format for **phase center variations** of geodetic GNSS antennae [Rothacher and Schmid 2005].

The upcoming European Navigation Satellite System Galileo and the enhanced GPS with new frequencies and observation types, especially the possibility to track frequencies on different channels, ask for a more flexible and more detailed definition of the observation codes. To improve the handling of the data files in case of "mixed" files, i.e. files containing tracking data of more than one satellite system, each one with different observation types, the record structure of the data record has been modified significantly and, following several requests, the limitation to 80 characters length has been removed. As the changes are quite significant, they lead to a new RINEX Version 3. The new version also includes the unofficial Version 2.20 definitions for space-borne receivers. The major change asking for a version 3.01 was the requirement to generate consistent phase observations across different tracking modes or channels, i.e. to apply $\frac{1}{4}$ -cycle shifts prior to RINEX file generation, if necessary, to facilitate the processing of such data.

The RINEX version 3.00 format consists of three ASCII file types:

1. Observation data File
2. Navigation message File
3. Meteorological data File

Each file type consists of a header section and a data section. The header section contains global information for the entire file and is placed at the beginning of the file. The header section contains **header labels in columns 61-80** for each line contained in the header section. These labels are mandatory and must appear exactly as given in these descriptions and examples. The format has been optimized for minimum space requirements independent from the number of different observation

types of a specific receiver or satellite system by indicating in the header the types of observations to be stored for this receiver and the satellite systems having been observed. In computer systems allowing variable record lengths the observation records may be kept as short as possible. Trailing blanks can be removed from the records. There is no maximum record length limitation for the observation records.

Each Observation file and each Meteorological Data file basically contain the data from one site and one session. Starting with Version 2 RINEX also allows including observation data from more than one site subsequently occupied by a roving receiver in rapid static or kinematic applications. Although Version 2 and higher allow to insert header records into the data section it is not recommended to concatenate data of more than one receiver (or antenna) into the same file, even if the data do not overlap in

time. If data from more than one receiver have to be exchanged, it would not be economical to include the identical satellite navigation messages collected by the different receivers several times. Therefore the navigation message file from one receiver may be exchanged or a composite navigation message file created containing non-redundant information from several receivers in order to make the most complete file. The format of the data records of the RINEX Version 1 navigation message file was identical to the former NGS exchange format. RINEX version 3 navigation message files may contain navigation messages of more than one satellite system (GPS, GLONASS, Galileo, Quasi Zenith Satellite System (QZSS), BeiDou System (BDS) and SBAS).

The actual format descriptions as well as examples are given in the Appendix Tables at the end of the document.

BASIC DEFINITIONS

Time:

The time of the measurement is the receiver time of the received signals. It is identical for the phase and range measurements and is identical for all satellites observed at that epoch. For single-system data files it is by default expressed in the time system of the respective satellite system. Otherwise the actual time can (for mixed files must) be indicated in the Start Time header record.

Pseudo-Range:

The pseudo-range (PR) is the distance from the receiver antenna to the satellite antenna including receiver and satellite clock offsets (and other

biases, such as atmospheric delays): $PR = \text{distance} + c * (\text{receiver clock offset} - \text{satellite clock offset} + \text{other biases})$

so that the pseudo-range reflects the actual behaviour of the receiver and satellite clocks. The pseudo-range is stored in units of meters.

Phase:

The phase is the carrier-phase measured in whole cycles. The halfcycles measured by squaring type receivers must be converted to whole cycles and flagged by the respective observation code.

The phase changes in the same sense as the range (negative doppler). The phase observations between epochs must be connected by including the integer number of cycles. The observables are not corrected for external effects like atmospheric refraction, satellite clock offsets, etc. If necessary phase observations are corrected for phase shifts needed to guarantee consistency between phases of the same frequency and satellite system based on different signal channels.

If the receiver or the converter software adjusts the measurements using the real-time-derived receiver clock offsets $dT(r)$, the consistency of the 3

quantities phase / pseudo-range / epoch must be maintained, i.e. the receiver clock correction should be applied to all 3 observables:

$$1 \text{ Time (corr)} = \text{Time}(r) - dT(r)$$

$$2 \text{ PR (corr)} = \text{PR}(r) - dT(r) * c \quad 3 \quad \text{phase}$$

$$(\text{corr}) = \text{phase}(r) - dT(r) * \text{freq}$$

Doppler:

The sign of the doppler shift as additional observable is defined as usual:
Positive for approaching satellites.

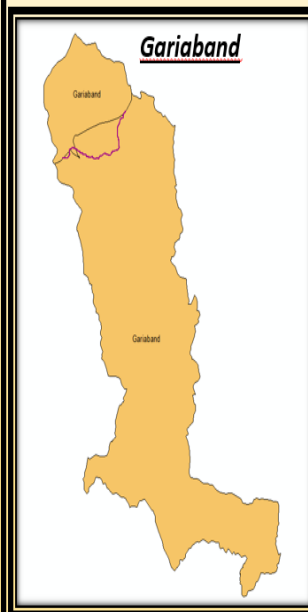
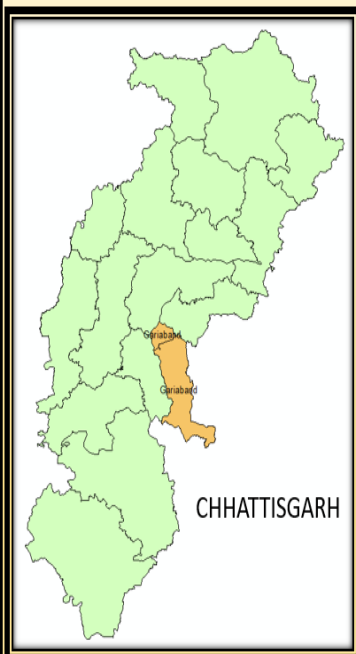
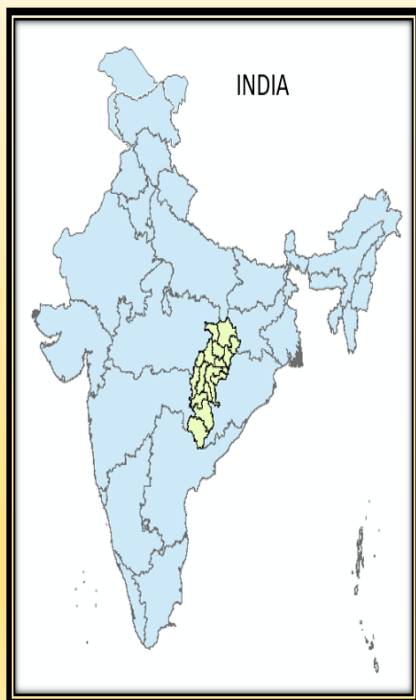
Satellite numbers:

Starting with RINEX Version 2 the former two-digit satellite numbers **nn** are preceded by a one-character system identifier **s**. The same satellite system identifiers are also used in all header records when appropriate.

THE EXCHANGE OF RINEX FILES:

The original RINEX file naming convention was implemented in the MSDOS era when file names were restricted to 8.3 characters. Modern operating systems typically support 255 character file names. The goal of the new file naming convention is to be more: descriptive, flexible and extensible than the RINEX 2.11 file naming convention. All elements are fixed length and are separated by an underscore "_" except for the: file type and compression fields that uses a period "." separator. Fields must be padded with zeros to fill the field width. The file compression field is optional. In order to further reduce the size of observation files Yuki Hatanaka developed a compression scheme that takes advantage of the structure of the RINEX observation data by forming higher order differences in time between observations of the same type and satellite. This compressed file is also an ASCII file that is subsequently compressed again using the above mentioned standard compression programs

Location Plan



Name of work : Rehabilitation and Upgrading of Panduka – Mudagaon Road.

DETAILS OF FOREST LAND

SR NO.	FOREST DIVISION	RANGE	COMPARTMENT NO.	FOREST TYPE	AREA IN HECTARES
1	GARIYABAND	PANDUKA	76	PF	2.655
			119	RF	2.484
			118	RF	0.214
			119	RF	0.973
			117	PF	1.067
			114	RF	1.641
			116	RF	0.654
			115	RF	1.968
			113	PF	2.433
			111	PF	1.600
			109	RF	1.025
			90	RF	0.644
			94	PF	2.033
				Total	19.391

DETAILS OF REVENUE FOREST LAND

SR No	DISTRICT	TEHSIL	VILLAGE	KHASRA No.	AREA IN HECTARES
1	GARIYABAND	CHHURA	KURUD	745	0.014
				725	0.128
				746	0.012
				724	0.004
				722	0.045
				710	0.042
				709	0.024
2	GARIYABAND	CHHURA	GADAGHAT	547	0.077
				548	0.168
				550	0.012
				552	0.120
				829	0.183
				831	0.026
				833	0.052
				834	0.010
				835	0.146
3	GARIYABAND	CHHURA	SANKRA	86	0.115

				835	0.146
3	GARIYABAND	CHHURA	SANKRA	86	0.115
				245	0.329
4	GARIYABAND	CHHURA	TAURENGA	104	0.088
5	GARIYABAND	CHHURA	MADELI	1752	0.054
				1781	0.012
6	GARIYABAND	CHHURA	PIPARCHEDI	2	1.398
				12	0.152
				234	0.256
				426	0.436
				448	0.761
				454	0.194
				468	0.320
				Total	5.178

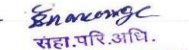
RESERVED FOREST : 9.603
 PROTECTED FOREST : 9.788
 REVENUE FOREST : 5.178
TOTAL FOREST AREA : 24.569 HA.

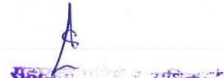
वन संरक्षक
 सह प्रभारी वनमण्डलाधिकारी
 गरियाबंद वनमण्डल, गरियाबंद


 Project Manager
 ADB Project PWD
 C.G.R.D.P. RAIPUR


 S.D.O.
 Rajim


 ज.फ.अ. अधिकारी
 पाण्डुका


 सहा.परि.अधि.
 जसरायव परि पाण्डुका


 सह.परि.अधि.
 जसरायव परि पाण्डुका


 वन परिक्षेत्र अधिकारी
 पाण्डुका

Gariaband Forest Division **Panduka Range**

Compartment no-OA 50, RF 52, & PF 86

Date of Survey Feb. 22th to 25th 2018 Time 09:20 to 18:03

Description	Latitude (DMS)	Longitude (DMS)
Base 115	N20°48'05.77"	E82°04'59.94"
Base116	N20°47'29.88"	E82°03'34.77"
Base119	N20°47'41.19"	E82°01'51.40"
Base76	N20°47'59.14"	E82°00'55.98"
BASE111	N20°48'08.48"	E82°06'41.48"
BASE90	N20°48'39.41"	E82°07'51.10"
BASE94	N20°48'25.85"	E82°07'01.67"

COMPARTMENT NO PF 76						
PILLAR ID	Latitude (DMS)	Longitude (DMS)		PILLAR ID	Latitude (DMS)	Longitude (DMS)
L1	N20°48'21.05"	E82°00'04.39"		L21	N20°47'59.19"	E82°00'56.19"
L2	N20°48'19.28"	E82°00'05.78"		L22	N20°47'59.85"	E82°00'59.54"
L3	N20°48'17.62"	E82°00'07.81"		L23	N20°48'00.91"	E82°01'02.80"
L4	N20°48'15.98"	E82°00'10.02"		L24	N20°48'01.99"	E82°01'06.08"
L5	N20°48'13.98"	E82°00'12.72"		L25	N20°48'02.82"	E82°01'10.16"
L6	N20°48'12.08"	E82°00'15.29"		L26	N20°48'03.41"	E82°01'13.66"
L7	N20°48'11.09"	E82°00'16.95"		L27	N20°48'03.14"	E82°01'17.11"
L8	N20°48'11.16"	E82°00'18.37"		L28	N20°48'01.76"	E82°01'20.22"
L9	N20°48'11.58"	E82°00'21.83"		L29	N20°47'59.32"	E82°01'22.18"
L10	N20°48'11.18"	E82°00'25.25"		L30	N20°47'56.35"	E82°01'23.39"
L11	N20°48'10.77"	E82°00'28.68"		R21	N20°47'58.73"	E82°00'56.23"
L12	N20°48'10.62"	E82°00'32.08"		R22	N20°47'59.40"	E82°00'59.65"
L13	N20°48'10.73"	E82°00'36.26"		R23	N20°48'00.48"	E82°01'02.94"
L14	N20°48'08.28"	E82°00'38.74"		R24	N20°48'01.55"	E82°01'06.20"
L15	N20°48'05.49"	E82°00'40.56"		R25	N20°48'02.37"	E82°01'10.24"
L16	N20°48'02.53"	E82°00'40.97"		R26	N20°48'02.96"	E82°01'13.75"
L17	N20°48'01.63"	E82°00'43.60"		R27	N20°48'02.70"	E82°01'16.97"
L18	N20°48'00.59"	E82°00'46.88"		R28	N20°48'01.34"	E82°01'20.03"
L19	N20°47'59.45"	E82°00'50.81"		R29	N20°47'59.18"	E82°01'21.71"
L20	N20°47'59.12"	E82°00'53.48"		R30	N20°47'56.14"	E82°01'22.96"
COMPARTMENT NO RF119						
L31	N20°47'53.42"	E82°01'24.60"		R31	N20°47'53.38"	E82°01'24.09"

L32	N20°47'50.53"	E82°01'25.85"	R32	N20°47'50.31"	E82°01'25.42"
L33	N20°47'47.75"	E82°01'28.62"	R33	N20°47'47.48"	E82°01'28.23"
L34	N20°47'45.47"	E82°01'30.94"	R34	N20°47'45.04"	E82°01'30.75"
L35	N20°47'45.57"	E82°01'33.58"	R35	N20°47'45.10"	E82°01'33.42"
L36	N20°47'45.71"	E82°01'37.04"	R36	N20°47'45.27"	E82°01'36.87"
L37	N20°47'45.94"	E82°01'40.24"	R37	N20°47'45.50"	E82°01'40.36"
L38	N20°47'46.06"	E82°01'43.66"	R38	N20°47'45.61"	E82°01'43.60"
L39	N20°47'45.81"	E82°01'47.08"	R39	N20°47'45.38"	E82°01'46.89"
L40	N20°47'43.78"	E82°01'49.68"	R40	N20°47'43.52"	E82°01'49.27"
L41	N20°47'41.01"	E82°01'51.24"	R41	N20°47'40.65"	E82°01'50.93"
L42	N20°47'39.24"	E82°01'54.35"	R42	N20°47'38.81"	E82°01'54.20"
L43	N20°47'39.08"	E82°01'57.51"	R43	N20°47'38.62"	E82°01'57.53"
L44	N20°47'39.05"	E82°02'01.02"	R44	N20°47'38.60"	E82°02'00.98"
L45	N20°47'38.97"	E82°02'03.17"	R45	N20°47'38.53"	E82°02'03.02"
L46	N20°47'38.21"	E82°02'06.39"	R46	N20°47'37.77"	E82°02'06.26"
L47	N20°47'37.14"	E82°02'11.07"	R47	N20°47'36.69"	E82°02'10.99"
L48	N20°47'36.99"	E82°02'14.47"	R48	N20°47'36.53"	E82°02'14.45"
L51	N20°47'38.79"	E82°02'24.58"	R51	N20°47'38.37"	E82°02'24.75"
L52	N20°47'40.65"	E82°02'27.22"	R52	N20°47'40.34"	E82°02'27.57"
L53	N20°47'42.20"	E82°02'30.37"	R53	N20°47'41.78"	E82°02'30.55"
L54	N20°47'43.39"	E82°02'34.14"	R54	N20°47'42.94"	E82°02'34.27"
L55	N20°47'44.74"	E82°02'37.29"	R55	N20°47'44.35"	E82°02'37.53"
L56	N20°47'45.67"	E82°02'40.31"	R56	N20°47'45.22"	E82°02'40.36"
COMPARTMENT NO RF118					
L49	N20°47'37.49"	E82°02'17.84"	R49	N20°47'37.05"	E82°02'17.96"
L50	N20°47'38.28"	E82°02'21.17"	R50	N20°47'37.82"	E82°02'21.18"
COMPARTMENT NO RF117					
L57	N20°47'45.00"	E82°02'43.87"	R57	N20°47'44.74"	E82°02'43.46"
L58	N20°47'42.89"	E82°02'45.54"	R58	N20°47'42.62"	E82°02'45.15"
L59	N20°47'40.51"	E82°02'47.79"	R59	N20°47'40.18"	E82°02'47.45"
L60	N20°47'37.99"	E82°02'50.02"	R60	N20°47'37.71"	E82°02'49.64"
L61	N20°47'33.99"	E82°02'53.38"	R61	N20°47'33.61"	E82°02'53.11"
L62	N20°47'32.45"	E82°02'56.41"	R62	N20°47'32.04"	E82°02'56.19"
L63	N20°47'31.29"	E82°02'59.54"	R63	N20°47'30.87"	E82°02'59.34"
L64	N20°47'30.24"	E82°03'02.81"	R64	N20°47'29.80"	E82°03'02.69"
COMPARTMENT NO RF114					
L65	N20°47'29.20"	E82°03'06.12"	R65	N20°47'28.75"	E82°03'06.03"
L66	N20°47'29.34"	E82°03'09.71"	R66	N20°47'28.88"	E82°03'09.74"
L67	N20°47'28.77"	E82°03'12.90"	R67	N20°47'28.33"	E82°03'12.79"
L68	N20°47'27.65"	E82°03'16.20"	R68	N20°47'27.27"	E82°03'15.93"
L69	N20°47'26.13"	E82°03'19.18"	R69	N20°47'25.70"	E82°03'19.02"
L70	N20°47'25.31"	E82°03'22.44"	R70	N20°47'24.86"	E82°03'22.35"
L71	N20°47'24.82"	E82°03'26.51"	R71	N20°47'24.37"	E82°03'26.62"

L72	N20°47'26.54"	E82°03'30.10"		R72	N20°47'26.96"	E82°03'30.28"
L73	N20°47'26.44"	E82°03'25.43"		R73	N20°47'26.53"	E82°03'25.96"
L74	N20°47'28.90"	E82°03'30.75"		R74	N20°47'28.47"	E82°03'30.92"
COMPARTMENT NO RF116						
L75	N20°47'29.81"	E82°03'34.98"		R75	N20°47'29.35"	E82°03'35.01"
L76	N20°47'29.83"	E82°03'37.86"		R76	N20°47'29.38"	E82°03'37.82"
L77	N20°47'30.15"	E82°03'41.28"		R77	N20°47'29.70"	E82°03'41.35"
L78	N20°47'30.16"	E82°03'44.73"		R78	N20°47'29.70"	E82°03'44.75"
L79	N20°47'30.10"	E82°03'47.66"		R79	N20°47'29.64"	E82°03'47.71"
COMPARTMENT NO RF115						
L80	N20°47'29.99"	E82°03'50.23"		R80	N20°47'29.54"	E82°03'50.17"
L81	N20°47'29.36"	E82°03'56.47"		R81	N20°47'28.95"	E82°03'56.26"
L82	N20°47'27.61"	E82°03'58.98"		R82	N20°47'27.15"	E82°03'59.07"
L83	N20°47'29.08"	E82°04'02.54"		R83	N20°47'28.75"	E82°04'02.87"
L84	N20°47'31.56"	E82°04'04.72"		R84	N20°47'31.25"	E82°04'05.07"
L85	N20°47'33.87"	E82°04'07.12"		R85	N20°47'33.51"	E82°04'07.42"
L86	N20°47'36.21"	E82°04'09.44"		R86	N20°47'35.90"	E82°04'09.80"
L87	N20°47'38.55"	E82°04'11.79"		R87	N20°47'38.24"	E82°04'12.15"
L88	N20°47'40.89"	E82°04'14.19"		R88	N20°47'40.60"	E82°04'14.57"
L89	N20°47'43.31"	E82°04'16.41"		R89	N20°47'42.87"	E82°04'16.62"
L90	N20°47'45.84"	E82°04'18.54"		R90	N20°47'45.54"	E82°04'18.90"
L91	N20°47'47.39"	E82°04'21.62"		R91	N20°47'46.95"	E82°04'21.76"
L92	N20°47'48.93"	E82°04'24.81"		R92	N20°47'48.51"	E82°04'25.01"
COMPARTMENT NO PF113						
R105	N20°48'09.92"	E82°05'08.97"		L102	N20°48'05.63"	E82°05'00.46"
R106	N20°48'11.69"	E82°05'12.58"		L103	N20°48'08.17"	E82°05'04.88"
R107	N20°48'11.97"	E82°05'15.88"		L104	N20°48'09.69"	E82°05'07.53"
R108	N20°48'11.96"	E82°05'19.36"		R93	N20°47'49.80"	E82°04'27.82"
R109	N20°48'11.55"	E82°05'22.59"		R94	N20°47'50.40"	E82°04'31.22"
R110	N20°48'10.66"	E82°05'25.96"		R95	N20°47'50.48"	E82°04'34.50"
R111	N20°48'09.06"	E82°05'30.44"		R96	N20°47'50.89"	E82°04'38.16"
L93	N20°47'50.25"	E82°04'27.73"		R97	N20°47'52.00"	E82°04'41.31"
L94	N20°47'50.85"	E82°04'31.13"		R98	N20°47'53.86"	E82°04'44.95"
L95	N20°47'50.93"	E82°04'34.53"		R99	N20°47'55.66"	E82°04'48.72"
L96	N20°47'51.33"	E82°04'38.05"		R100	N20°47'58.98"	E82°04'52.91"
L97	N20°47'52.43"	E82°04'41.14"		R101	N20°48'02.46"	E82°04'56.57"
L98	N20°47'54.30"	E82°04'44.82"		R102	N20°48'05.26"	E82°05'00.75"
L99	N20°47'56.06"	E82°04'48.48"		R103	N20°48'07.78"	E82°05'05.12"
L100	N20°47'59.34"	E82°04'52.60"		R104	N20°48'09.26"	E82°05'07.71"
L101	N20°48'02.76"	E82°04'56.21"				
ARTMENT NO PF111						
L112	N20°47'57.06"	E82°06'25.19"		R112	N20°47'56.66"	E82°06'25.43"
L113	N20°47'58.46"	E82°06'27.40"		R113	N20°47'58.08"	E82°06'27.66"

L114	N20°48'00.54"	E82°06'30.48"		R114	N20°48'00.16"	E82°06'30.76"
L115	N20°48'02.06"	E82°06'32.72"		R115	N20°48'01.65"	E82°06'32.95"
L116	N20°48'04.04"	E82°06'35.49"		R116	N20°48'03.65"	E82°06'35.75"
L117	N20°48'06.23"	E82°06'38.46"		R117	N20°48'05.89"	E82°06'38.78"
L118	N20°48'08.83"	E82°06'41.99"		R118	N20°48'08.48"	E82°06'42.30"
L119	N20°48'11.75"	E82°06'45.87"		R119	N20°48'11.44"	E82°06'46.23"
L120	N20°48'15.84"	E82°06'48.32"		R120	N20°48'15.75"	E82°06'48.79"
L121	N20°48'20.07"	E82°06'50.56"		R121	N20°48'19.74"	E82°06'50.89"
COMPARTMENT NO PF109						
L122	N20°48'22.80"	E82°06'53.36"		R122	N20°48'22.54"	E82°06'53.76"
L123	N20°48'25.29"	E82°06'55.70"		R123	N20°48'25.01"	E82°06'56.09"
L124	N20°48'27.63"	E82°06'58.60"		R124	N20°48'27.22"	E82°06'58.81"
L125	N20°48'25.86"	E82°07'01.21"		R125	N20°48'25.13"	E82°07'00.83"
L126	N20°48'28.03"	E82°07'00.50"		R126	N20°48'27.77"	E82°07'00.91"
L127	N20°48'27.58"	E82°07'01.93"		R127	N20°48'27.15"	E82°07'02.14"
L128	N20°48'27.68"	E82°07'07.05"		R128	N20°48'27.23"	E82°07'07.01"
COMPARTMENT NO RF90						
L129	N20°48'27.94"	E82°07'08.63"		R129	N20°48'27.54"	E82°07'08.87"
L130	N20°48'28.89"	E82°07'11.61"		R130	N20°48'28.46"	E82°07'11.75"
L131	N20°48'30.27"	E82°07'14.46"		R131	N20°48'29.88"	E82°07'14.72"
L132	N20°48'30.83"	E82°07'16.63"		R132	N20°48'30.39"	E82°07'16.76"
L133	N20°48'30.83"	E82°07'18.47"		R133	N20°48'30.37"	E82°07'18.52"
L134	N20°48'30.96"	E82°07'22.21"		R134	N20°48'30.51"	E82°07'22.29"
COMPARTMENT NO PF94						
L135	N20°48'38.53"	E82°07'41.01"		L153	N20°49'01.58"	E82°08'26.95"
L136	N20°48'38.97"	E82°07'43.15"		L154	N20°49'05.36"	E82°08'27.56"
L137	N20°48'39.36"	E82°07'46.53"		L155	N20°49'08.66"	E82°08'26.74"
L138	N20°48'39.75"	E82°07'49.88"		L156	N20°49'11.38"	E82°08'25.39"
L139	N20°48'39.98"	E82°07'53.37"		L157	N20°49'14.74"	E82°08'23.93"
L140	N20°48'39.38"	E82°07'56.75"		L158	N20°49'19.54"	E82°08'23.02"
L141	N20°48'39.75"	E82°08'00.14"		R135	N20°48'38.10"	E82°07'41.16"
L142	N20°48'39.74"	E82°08'03.57"		R136	N20°48'38.52"	E82°07'43.24"
L143	N20°48'39.67"	E82°08'07.07"		R137	N20°48'38.91"	E82°07'46.58"
L144	N20°48'39.82"	E82°08'08.35"		R138	N20°48'39.30"	E82°07'49.96"
L145	N20°48'40.73"	E82°08'10.87"		R139	N20°48'39.52"	E82°07'53.32"
L146	N20°48'48.27"	E82°08'14.27"		R140	N20°48'38.92"	E82°07'56.71"
L147	N20°48'49.96"	E82°08'17.20"		R141	N20°48'39.30"	E82°08'00.20"
L148	N20°48'51.39"	E82°08'20.34"		R142	N20°48'39.28"	E82°08'03.58"
L149	N20°48'52.49"	E82°08'21.96"		R143	N20°48'39.22"	E82°08'07.05"
L150	N20°48'53.30"	E82°08'22.71"		R144	N20°48'39.39"	E82°08'08.50"
L151	N20°48'56.25"	E82°08'24.46"		R145	N20°48'40.32"	E82°08'11.09"
L152	N20°48'59.18"	E82°08'25.93"				

L141	N20°48'39.75"	E82°08'00.14"
L142	N20°48'39.74"	E82°08'03.57"
L143	N20°48'39.67"	E82°08'07.07"
L144	N20°48'39.82"	E82°08'08.35"
L145	N20°48'40.73"	E82°08'10.87"
L146	N20°48'48.27"	E82°08'14.27"
L147	N20°48'49.96"	E82°08'17.20"
L148	N20°48'51.39"	E82°08'20.34"
L149	N20°48'52.49"	E82°08'21.96"
L150	N20°48'53.30"	E82°08'22.71"
L151	N20°48'56.25"	E82°08'24.46"
L152	N20°48'59.18"	E82°08'25.93"

R135	N20°48'38.10"	E82°07'41.16"
R136	N20°48'38.52"	E82°07'43.24"
R137	N20°48'38.91"	E82°07'46.58"
R138	N20°48'39.30"	E82°07'49.96"
R139	N20°48'39.52"	E82°07'53.32"
R140	N20°48'38.92"	E82°07'56.71"
R141	N20°48'39.30"	E82°08'00.20"
R142	N20°48'39.28"	E82°08'03.58"
R143	N20°48'39.22"	E82°08'07.05"
R144	N20°48'39.39"	E82°08'08.50"
R145	N20°48'40.32"	E82°08'11.09"

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