

Arctic Geophysics Inc.



Geophysical Surveys • Prospecting • Consulting

www.arctic-geophysics.com

Box 747, Dawson City Y.T., Y0B-1G0, Canada

Phone: 867-993-3671 (Cell), info@arctic-geophysics.com

Geophysical Survey with 2D Resistivity for Placer Investigation, Tenderfoot Creek 2013

Placer Claims P 48911

LOCATION

N63° 18' 50" W139° 10' 02"

FOR

H.C. Mining Ltd.

Box 1244

Dawson City, YT

Y01 1G0

AUTHOR

Philipp Moll

WORK PERFORMED

Oct 25th 2013

DATE OF REPORT

Dec 19th 2013

Table of Contents

1	Introduction	3
2	Placer Tenures	3
3	Location	3
4	Access	3
5	Goal	3
6	Geophysical Methods	3
7	Use of Geophysical Methods	5
7.1	Instrumentation	5
7.2	Data Acquisition	5
7.3	Processing	5
7.4	Interpretation	6
8	Profile image	6
9	Resistivity Survey	6
9.1	Survey Map	7
9.2	Profile: Interpretation, Recommendation	8
10	References	11
10.1	Literature	11
10.2	Maps	11
11	Qualification	12
12	Confirmation	12
13	Addendum	13
13.1	Cost	13
13.2	GPS-Data	14

1 Introduction

This geophysical investigation was done for H.C. Mining Ltd. The survey, using 2D Resistivity, was conducted to prospect the placer tenure listed below for the localisation of possible targets for commercial placer gold. The ground was tested with one 2D measuring line with a length of 117,5m; the depth of investigation is 20m.

2 Placer Tenures

Grant Number	Name	Owner
P 48911	Tenderfoot 37	H.C. Mining Ltd.

3 Location

The placer claim property is located app. 85km south of Dawson City, map number 115006.

4 Access

The exploration site was accessed by helicopter from Dawson City.

5 Goal

The survey was focussed on measuring and interpreting the following subsurface characteristics:

1. Depth and topography of bedrock
 - Paleochannels
 - Bedrock benches
2. Sedimentary stratification
3. Permafrost conditions
4. Groundwater table
5. Mining/prospecting history

6 Geophysical Methods

Resistivity is not a time domain geophysical method such as Ground Penetrating Radar or Seismic.

Resistivity measures a material property. In the Resistivity model the different underground zones are material-dependently differentiated according to their electrical conductivity. Thus, Resistivity promises good chances in respect of measuring the kind and character of the subsurface materials as well as the groundwater distribution, which would be of interest for placer mining. The equipment used (see below) allows for measuring of layer interfaces in depths from 0.5m to 100m by varying the electrode spacing. – Therefore, this prospecting concept is based on the use of 2D Resistivity.

Induced Polarization (IP): IP data are simultaneously taken when measuring Resistivity, with the same equipment and line staking. So these data are automatically at hand when using Resistivity. The IP model serves as basis for the interpretation of the mineral and petrologic conditions in hardrock. Thus, IP is an industry proven standard method for the detection of primary mineral deposits. However, the IP model can also support the interpretation of the Resistivity profile.



Figure 1: 2D Resistivity measurement, Stefan Ostermaier, Arctic Geophysics Inc., Yukon 2009

7 Use of Geophysical Methods

7.1 Instrumentation

For this survey a lightweight, custom-built 2D RESISTIVITY and INDUCED POLARIZATION (IP) imaging system with rapid data acquisition was used. The system includes:

- “4 POINT LIGHT” EARTH RESISTIVITY METER¹
- 64 ELECTRODE CONTROL MODULES²
- 64 STAINLESS STEEL ELECTRODES³
- 320m MULTICORE CABLE: CONNECTOR SPACING: 5m⁴

This system weighs approximately 150 kg which is about one third of regular standard equipment. It can be run with a 12V lead battery. The equipment facilitates high mobility and rapid data acquisition with a small crew.

7.2 Data Acquisition

Resistivity

The data acquisition is carried out by the automatic activation of 4-point-electrodes. Thus several thousand measurements are taken, one every 1-2 seconds. The AC transmitter current of 0.26 to 30 Hz is amplified by the electrode control modules, up to a maximum of 100mA and 400V peak to peak. The voltage measured at the receiver electrodes (M, N) is also amplified.

In this geoelectrical survey the Schlumberger-array was used. This array is appropriate to image horizontal layers as is needed for placer prospecting.

The 2D Resistivity imaging system, used for this survey, allows measurements with a depth of up to 100m. With a depth to bedrock of more than 6m, an electrode spacing of 5m can be used for placer surveys. This allows the measuring of large profile lengths in short time with a horizontal measuring resolution of 2.5m. This system has proven itself to be reliable in the determination of the bedrock topography and sedimentary arrangement for placer investigation at the most environmental conditions.

7.3 Processing

Resistivity

The measured Resistivity data were processed with the RES2DINV inversion program⁵.

¹ Constructed and produced by LGM (Germany)

² Ditto

³ Constructed and produced by GEOANALYSIS.DE (Germany)

⁴ Ditto

⁵ Produced by GEOTOMO SOFTWARE SDN. BHD (Malaysia)

7.4 Interpretation

The interpretation of the profile should be verified by physical prospecting methods such as digging test holes/trenches, drilling, or shafting.

8 Profile image

The 2D Resistivity profile is providing a model of the electrical resistivity of the different ground materials/zones.

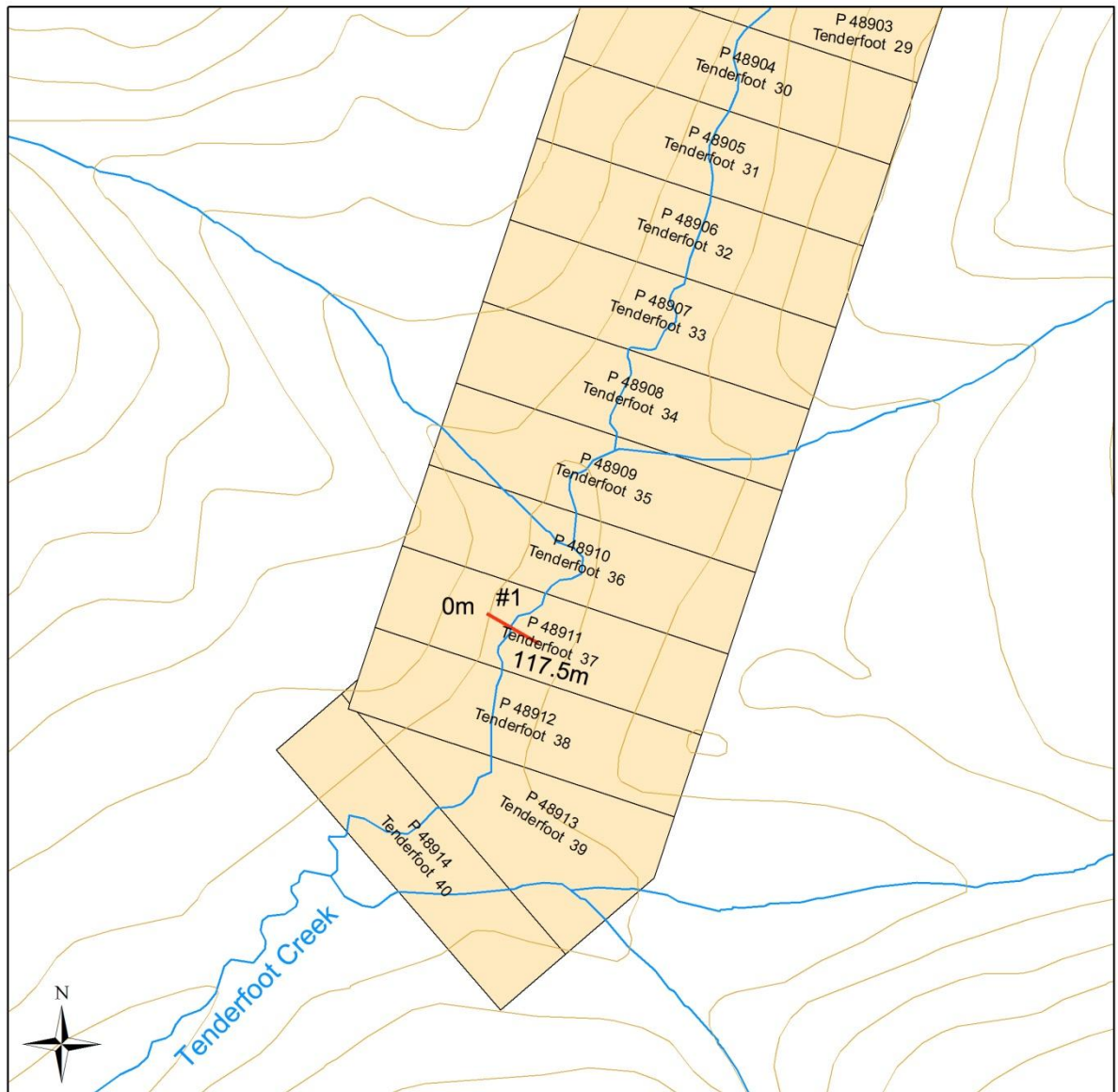
In the Resistivity profile the interpreted bedrock interface is marked with a black line. The dotted black line seen in the profile represents alternative interpretations of the bedrock interface.

9 Resistivity Survey












Preliminary Note!

The subsurface information of this study is an interpretation and cannot be guaranteed.

9.1 Survey Map⁶



Legend

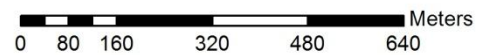
	measuring line		placer claims
	contour line		Active
	watercourse		Expired
	road		
	trail		
	cut line		
	waterbody		
	wetland		

Survey Map

115006 (Stewart River)

Universal Transverse Mercator Zone7
North America Datum 1983

Scale 1:10,000



⁶ Government of Canada, Natural Resources Canada, Centre for Topographic Information
<ftp://ftp.geomaticsukon.ca/Mining>

9.2 Profile: Interpretation, Recommendation

Line 01

2D Resistivity, Schlumberger array
48 Electrodes: spacing 2.5m, Horizontal resolution 1.25m
Horizontal and vertical measure in [meter], Iteration error in [%]
Vertical exaggeration in model section display: RES 1.0
Data acquisition: Stefan Ostermaier, 25th Oct 2013
Processing: Stefan Ostermaier, 25th Oct 2013

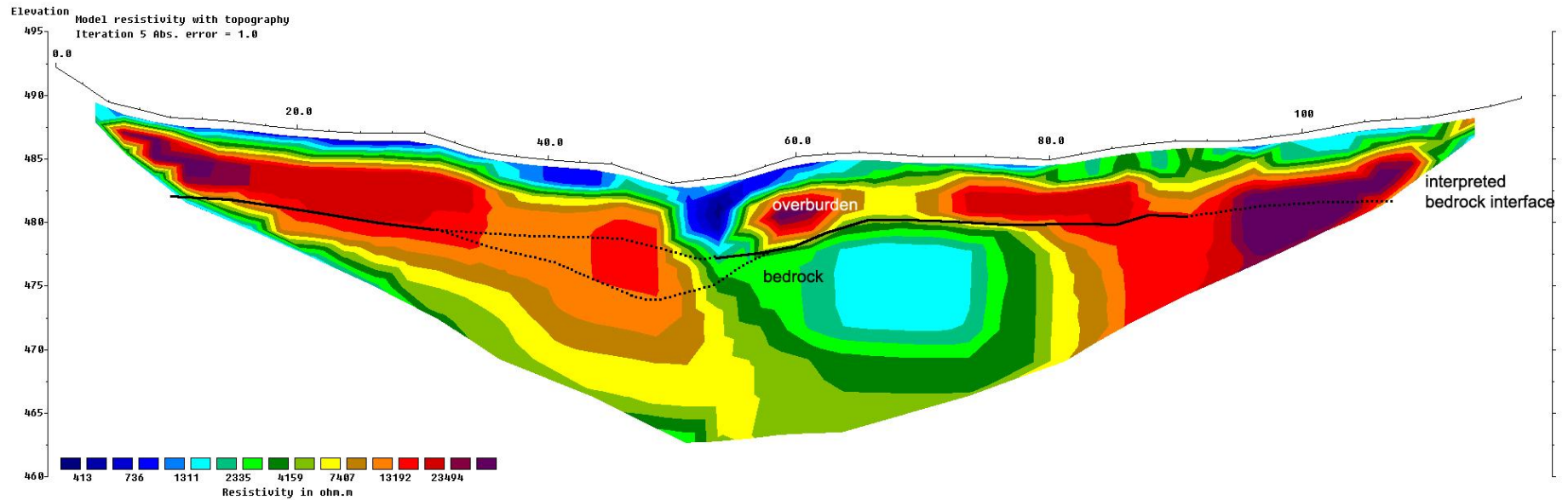
Arctic Geophysics Inc.



Geophysical Surveys • Prospecting • Consulting

www.arctic-geophysics.com
Box 747, Dawson City, Yukon Territory, Y0B 1G0, Canada
Phone: 867-993-3671 (Cell), info@arctic-geophysics.com

Interpretation



The profile might show the ground-layers up to approximately 15% thicker than they are in reality.

This 2D Resistivity measuring result is an interpretation of geophysical data. We recommend the verification of the profile by drilling or trenching.

Line 01

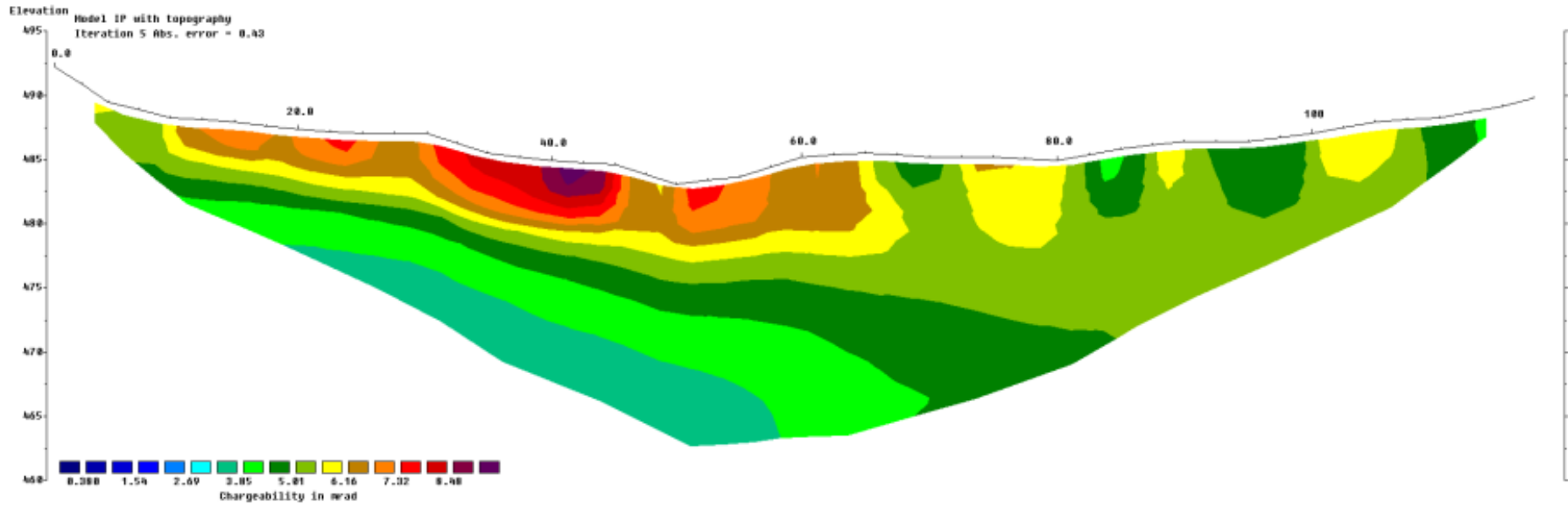
2D Induced Polarity, Schlumberger array
48 Electrodes: spacing 2.5m, Horizontal resolution 1.25m
Horizontal and vertical measure in [meter], Iteration error in [%]
Vertical exaggeration in model section display: RES 1.0
Data acquisition: Stefan Ostermaier, 25th Oct 2013
Processing: Stefan Ostermaier, 25th Oct 2013

Arctic Geophysics Inc.



Geophysical Surveys • Prospecting • Consulting

www.arctic-geophysics.com
Box 747, Dawson City, Yukon Territory, Y0B 1G0, Canada
Phone: 867-993-3671 (Cell), info@arctic-geophysics.com



The profile might show the ground-layers up to approximately 15% thicker than they are in reality.

This 2D Resistivity measuring result is an interpretation of geophysical data. We recommend the verification of the profile by drilling or trenching.

Interpretation

Resistivity profile_01 suggests 5-7m of overburden on top of bedrock.

The uppermost resistivity layer 1-2m thick and up to 5m below the creek shows low resistivity values (blue-green) and is interpreted as **overburden**, most likely thawed gravel possibly with some black muck. The second resistivity layer shows high resistivity values (yellow-red) and is interpreted as frozen overburden most likely alluvial gravel.

From 10-65m the IP profile shows a continuous anomaly at the surface, that is app. 5m thick and coincides with the interpreted overburden thickness in this section. This IP anomaly could indicate sulfides in this area and is considered as an indicator for potential placer gold deposits: gold placers can be associated with sulfide-rich accessory minerals.

The interpreted **bedrock** interface places the deepest part under the current creek at 40-60m in the profile, with a depth of 5-7m.

Recommendation

We recommend drilling the interpreted channel at 50m in the profile, right beside the creek, where bedrock is expected in 5m depth, or alternatively at 7m. If possible sampling with an excavator would be reasonable, especially in the IP anomaly at 40m in the profile. However it seems advisable to do a larger survey of the area prior to investing in the cost of transporting heavy equipment to this remote location.

10 References

10.1 Literature

Chesterman W. Ch. and Lowe K.E. Field Guide to Rocks and Minerals - North America, Chanticleer Press Inc. New York 2007

Evans A.M. Erzlagerstättenkunde, Ferdinand Enke Verlag Stuttgart (1992)

Griffiths, D.H., Turnbull, J. and Olayinka, A.I. Two dimensional resistivity mapping with a computer-controlled array, First Break 8: 121-129 (1990)

Griffiths, D.H. and Barker, R.D. Two-dimensional resistivity imaging and modeling in areas of complex geology. Journal of Applied Geophysics 29 : 211 - 226. (1993)

Keller, G.V. and Frischknecht, F.C. Electrical methods in geophysical prospecting. Oxford: Pergamon Press Inc. (1966)

Loke M.H. and Barker R.D. Rapid least-squares inversion of apparent resistivity pseudosections by a quasi-Newton method. Geophysical Prospecting 44: 131-152 (1996)

Press F., Siever R., Grotzinger J., Thomas H.J. Understanding Earth, W.H. Freeman and Company, New York (2004)

Robb L. Introducing to Ore-Forming Processes, Backwell Science Ltd., 2005

10.2 Maps

Government of Canada, Natural Resources Canada, Centre for Topographic Information

<ftp://ftp.geomaticsyukon.ca/Mining>

11 Qualification

Philipp Moll

Box 747, Dawson City, Yukon, Y0B 1G0

Phone: 001-867-993 3671 (Canada)

01149 (0)781 -9705893 (Germany)

E-mail: philipp.moll@arctic-geophysics.com

- Study of geology, University of Freiburg, Germany
- Visit of geophysical field courses, University of Karlsruhe, Germany
- Working for Arctic Geophysics Inc. since June 2007 (foundation)
Geophysical field surveys using 2D Resistivity, Induced Polarization, Magnetics: Data acquisition, processing, interpretation, documentation
- Geophysical surveying for Mining Exploration in the Yukon since 2005, and geological prospecting for precious metals and minerals in the Yukon, NWTs, and Alaska since 1989
- Publications:
 - a. Numerous Assessment Reports about geophysical surveys done for Yukon mining companies, filed at Yukon Mining Recorder
 - b. Geophysical survey (45 field days) for Yukon Government: Yukon Geological Survey,
 - c. <http://virtua.gov.yk.ca:8080/lib/item?id=chamo:164867&theme=emr> "2D resistivity / IP data release for placer mining and shallow quartz mining - Yukon 2010 : Los Angeles Creek, Wolf Creek, Ladue River, and Rice Creek ; Philipp Moll and Stefan Ostermaier"

12 Confirmation

I have prepared this report entitled "Geophysical Geophysical Survey with 2D Resistivity for Placer Investigation, Tenderfoot Creek 2013" for assessment credit, and have processed and interpreted the data. The survey was carried out by Arctic Geophysics Inc.

Schutterwald, Germany, 19th Dec 2013

"Signed" Philipp Moll

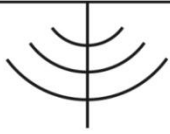


Philipp Moll

13 Addendum

13.1 Cost

Arctic Geophysics Inc.



Geophysical Surveys • Prospecting • Consulting

H.C. Mining Ltd.
Box 1244
Dawson City, YT
Y01 1G0

Arctic Geophysics Inc.
Box 747
Arctic Geophysics Inc.
Box 747
Dawson City, Yukon
Y0B 1G0, Canada
Phone: 867-993-3671 (Cell)
info@arctic-geophysics.com
www.arctic-geophysics.com

Survey Location: Tenderfoot, Placer Claim Group
Access was done by helicopter (Fireweed Helicopters)

Invoice # 20131027

Date: 27thth Oct, 2013

Quantity	Description	Amount \$CAN
Geophysical Survey		
1 day	Geoelectrical 2D-Resistivity Imaging System: 48 electrodes, 240m multi-core cable, PC, software, GPS, altimeter etc., plus camp equipment, 950.--/day	950.--
1/2 day	Mob/demob, building up/down camp, inspection of survey ground, 400.--/day	200.--
1 day	Data processing, Computer work, Writing report, 350.-- /day Printing / Binding /Shipping	350.-- 70.--
		NET Amount \$ 1 570.--
GST Number 846363216RT0001		G.S.T. (5%) \$ 78.50
Total Due		\$ 1 648.50

13.2 GPS-Data

Line01

Electrode No.	Location in Profile [m]	GPS-Coordinates ddd° mm' ss.s'' WGS 1984	GPS-Accuracy [m]	Post [*]
1	0	N63 18 51.0 W139 10 06.5	3	*
2	5	N63 18 51.0 W139 10 06.2	3	
3	10	N63 18 50.9 W139 10 05.9	3	
4	15	N63 18 50.8 W139 10 05.5	3	
5	20	N63 18 50.8 W139 10 05.3	3	
6	25	N63 18 50.7 W139 10 04.9	3	
7	30	N63 18 50.6 W139 10 04.6	3	
8	35	N63 18 50.5 W139 10 04.3	3	
9	40	N63 18 50.5 W139 10 04.1	3	
10	45	N63 18 50.5 W139 10 03.8	3	
11	50	N63 18 50.4 W139 10 03.5	3	
12	55	N63 18 50.3 W139 10 03.2	3	
13	60	N63 18 50.3 W139 10 02.7	3	
14	65	N63 18 50.2 W139 10 02.5	3	
15	70	N63 18 50.2 W139 10 02.3	3	
16	75	N63 18 50.1 W139 10 02.0	3	
17	80	N63 18 50.1 W139 10 01.8	3	
18	85	N63 18 50.0 W139 10 01.4	3	
19	90	N63 18 49.9 W139 10 00.9	3	
20	95	N63 18 49.8 W139 10 00.7	3	
21	100	N63 18 49.8 W139 10 00.5	3	
22	105	N63 18 49.7 W139 10 00.2	3	
23	110	N63 18 49.7 W139 10 00.1	3	
24	115	N63 18 49.6 W139 09 59.7	3	
25	117.5	N63 18 49.6 W139 09 59.5	3	*