aerometric
Geospatial Solutions
4020 Technology Parkway
Sheboygan, WI 53083
P: 920.457.3631
F: 920.457.0410
www.aerometric.com

PROJECT REPORT

FOR

U.S. Geological Survey

Grand County Colorado LiDAR

December 23, 2010

AEROMETRIC PROJECT NO. 1-100116

Airborne GPS Survey Report

For

U.S. Geological Survey (Grand County, CO – LiDAR)

NGTOC III

1400 Independence Road

ROLLA, MISSOURI 65401

(573) 308-3579

Prepared by

AEROMETRIC

4020 Technology Parkway

Sheboygan, Wisconsin 53083-6049

920-457-3631

AEROMETRIC Project No. 1100116

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USGS

Grand County Colorado LiDAR

Aerometric Project No. 1100116

1 INTRODUCTION

This report contains a summary of the LiDAR data acquisition and processing for the **USGS – GRAND COUNTY COLORADO LiDAR TASK ORDER**.

1.1 Contact Info

Questions regarding the technical aspects of this report should be addressed to:

AEROMETRIC, Inc.
4020 Technology Parkway
Sheboygan, WI 53081

Attention: Robert Merry (Geomatics Manager)
Telephone: 920-457-3631
FAX: 920-457-0410
Email: rmerry@aerometric.com

1.2 Purpose

AEROMETRIC, INC. acquired highly accurate Light Detection and Ranging (LiDAR) data for three areas that comprise approximately 438 square miles for the United State Geological Survey. Using AEROMETRIC's Optech 3100 AE LiDAR system, data was collected at multiple altitudes to support each project area's requirements.

1.3 Project Locations

The majority of the project area lies in Grand County, Colorado, with separate smaller areas in Larimer County and also in Park County. Each area was defined and supplied by USGS on January 22, 2010.

1.4 Time Period

LiDAR data acquisition, control and QC surveys were completed between August 1st , 2010 and August 27th, 2010. A total of 15 flight missions were required to cover the project areas. See Item 3.4 for a sketch of the acquisition missions and Section 7 of the report for each flight log. QC surveys were completed between August 1st and August 26th, 2010.

1.5 Project Scope

AEROMETRIC, INC. acquired highly accurate Light Detection and Ranging (LiDAR) data for areas that encompass three project areas of approximately 438 square miles in Colorado. Using AEROMETRIC's Optech 3100 AE LiDAR system, data was collected at multiple altitudes to support each project area's requirements.

As documented in our proposal dated January 15, 2010 we were to achieve a TIN accuracy of 15cm for all areas. The accuracy as tested and published in this report in Section 8 has easily met both vertical accuracy requirements.

1.6 Conditions Affecting Progress

- None.

2 GEODETIC CONTROL

2.1 Network Scope

Base horizontal control for the entire project area consisted of six NGS First Order stations: **D 450**, **H 360**, **M 361**, **W 299 RESET**, **WINDY GAP**, and **Y 450**; three NGS CORS stations: **COFC**, **P041**, and **ZDV1**; and one CODOT station: **CM229**.

Horizontal control is referenced to the Universal Transverse Mercator (UTM) Coordinate System – Zone 13, based on the North American Datum of 1983/2007 (NAD83/07). Final coordinates are published in meters.

Base vertical control for the entire project area consisted of six NGS First Order Class 2 stations: **D 450**, **H 360**, **M 361**, **W 299 RESET**, **WINDY GAP**, and **Y 450**; one NGS Second Order station: **S 299**; three NGS CORS stations: **COFC**, **P041**, and **ZDV1**; and one CODOT station: **CM229**. The NGS Geoid Model GEOID09 was applied to the derived ellipsoid heights that approximate the North American Vertical Datum of 1988.

Vertical control is based on the North American Vertical Datum of 1988 (NAVD88).

Base horizontal and vertical control for the Airborne GPS surveys consisted of two NGS station: **P041** and **ZDV1**; one NGS First Order station: **M 361**; and one temporary station: **101**.

NGS recovery sheets are located in Section 2 of the Control Survey Report.

2.2 Network Computations

GPS measurements were done in two stages. Initial computations were done with LEICA Geo Office (LGO), version 4.0. LGO permits the conversion of raw satellite data collected by the receivers to a meaningful coordinate difference between points (baseline solutions). Once the baseline solutions were determined, they were input into the GeoSurv-GeoLab2 series of programs (Geolab version 2.4d). Adjustments were performed for analysis and quality closure holding position and elevation of station **M 361**.

HORIZONTAL CLOSURES (in meters)

STATION	NORTHING	EASTING	LINEAR	DISTANCE	PROPORTION
CM229	0.031	0.013	0.034	58686.0	1:1,745,000
COFC	0.001	0.006	0.006	78325.7	1:12,876,000
D 450	0.009	0.007	0.011	61960.6	1:5,434,000
H 360	0.020	0.012	0.023	31574.3	1:1,353,000
P041	0.003	0.010	0.010	65144.4	1:6,239,000
W 299 RESET	0.018	0.003	0.018	63429.6	1:3,475,000
WINDY GAP	0.008	0.010	0.013	9956.9	1:777,000
Y 450	0.001	0.021	0.021	59967.5	1:2,852,000
ZDV1	0.012	0.009	0.015	65891.2	1:4,392,000

VERTICAL CLOSURES (in meters)

STATION	ADJUSTED ELEVATION	PUBLISHED ELEVATION	DIFFERENCE	DISTANCE	ALLOWABLE 3rd ORDER CLOSURE
CM229	3395.364	3395.412	0.048	58686.0	0.092
COFC	1596.004*	1595.974*	0.030	78325.7	0.106
D 450	2686.598	2686.669	0.071	61960.6	0.094
H 360	2734.434	2734.471	0.037	31574.3	0.067
P041	1729.710*	1729.708*	0.002	65144.4	0.097
S 299	3376.505	3376.468	0.037	58501.6	0.092
W 299 RESET	2825.092	2825.140	0.048	63429.6	0.096
WINDY GAP	2398.428	2398.459	0.031	9956.9	0.038
Y 450	2651.509	2651.566	0.057	59967.5	0.093
ZDV1	1541.781*	1541.783*	0.002	65891.2	0.097

Note: * - The published heights are ellipsoid.

The above control stations were held in the fully constrained scaled least squares base network adjustments to derive the ground control checkpoint values

3 LiDAR ACQUISITION & PROCEDURES

3.1 Acquisition Time Period

LiDAR data acquisition and Airborne GPS control surveys were completed between August 1st , 2010 and August 27th, 2010. A total of 15 flight missions were required to cover the project areas.

3.2 LiDAR Planning

The LiDAR data for this project was collected with Aerometric's Optech 3100 AE Airborne LiDAR system (Serial Number 03SEN145). All flight planning and acquisition was completed using Optech's ALTM-Nav, version 2.1.25b (flight planning and LiDAR control software).

The following are the acquisition settings for Area 1 (Larimer County)

- Flying Height (Above Ground): 1400 meters
- Laser Pulse Rate: 70 kHz
- Mirror Scan Frequency: 37 Hz
- Scan Angle (+/-): 22°
- Side Lap: 50 %
- Ground Speed: 160 kts
- Nominal Point Spacing: 0.7 meters

The following are the acquisition settings for Area 2 (Grand County)

- Flying Height (Above Ground): 1250 meters
- Laser Pulse Rate: 70 kHz
- Mirror Scan Frequency: 37 Hz
- Scan Angle (+/-): 22°
- Side Lap: 50 %
- Ground Speed: 160 kts
- Nominal Point Spacing: 0.7 meters

The following are the acquisition settings for Area 3 (Park County)

- Flying Height (Above Ground): 1500 meters
- Laser Pulse Rate: 70 kHz
- Mirror Scan Frequency: 37 Hz
- Scan Angle (+/-): 22°
- Side Lap: 50 %
- Ground Speed: 160 kts
- Nominal Point Spacing: 0.7 meters

3.3 LiDAR Acquisition

A total of 15 flight missions were required to cover the project areas. The missions were flown using the above planned values. See below for a sketch of the acquisition missions and Section 6 of the report for each flight log.

Airborne GPS and IMU trajectories for the LiDAR sensor where also acquired during the time of flight.

Each mission was typically four to five hours long. Before take-off, the LiDAR system and the Airborne GPS and IMU system were initiated for a period of five minutes and then again after landing for another five minutes. The missions acquired data according to the planned flight lines and included a minimum of one (usually two) cross flights. The cross flights were flown perpendicular to the planned flight lines and their data used in the in-situ calibration of the sensor.

3.4 LiDAR Trajectory Processing

The airborne positioning was based on the following control stations: 101, M361, P041, and ZDV1.

4 QC SURVEYS

The check point survey was performed between August 1th and August 26th, 2010 using Rapid Static GPS techniques. A total of 42 check points were surveyed across the project areas. These points were collected in open terrain to assess Fundamental Vertical Accuracy.

The control stations mentioned above to support the Airborne GPS acquisition were also used to complete the QC surveys.

See Section 5 of the control report for a complete listing.

5 FINAL LiDAR PROCESSING

5.1 ABGPS and IMU Processing

Airborne GPS

Applanix - POSGPS
Utilizing carrier phase ambiguity resolution on the fly (i.e., without initialization). The solution to sub-decimeter kinematic positioning without the operational constraint of static initialization as used in semi-kinematic or stop-and-go positioning was utilized for the airborne GPS post-processing.

The processing technique used by Applanix, Inc. for achieving the desired accuracy is Kinematic Ambiguity Resolution (KAR). KAR searches for ambiguities and uses a special method to evaluate the relative quality of each intersection (RMS). The quality indicator is used to evaluate the accuracy of the solution for each processing computation. In addition to the quality indicator, the software will compute separation plots between any two solutions, which will ultimately determine the acceptance of the airborne GPS post processing.

Inertial Data

The post-processing of inertial and aiding sensor data (i.e. airborne GPS post processed data) is to compute an optimally blended navigation solution. The Kalman filter-based aided inertial navigation algorithm generates an accurate (in the sense of least-square error) navigation solution that will retain the best characteristics of the processed input data. An example of inertial/GPS sensor blending is the following: inertial data is smooth in the short term. However, a free-inertial navigation solution has errors that grow without bound with time. A GPS navigation solution exhibits short-term noise but has errors that are bounded. This optimally blended navigation solution will retain the best features of both, i.e. the blended navigation solution has errors that are smooth and bounded.
The resultant processing generates the following data:

- Position: Latitude, Longitude, Altitude
- Velocity: North, East, and Down components
- 3-axis attitude: roll, pitch, true heading
- Acceleration: x, y, z components
- Angular rates: x, y, z components

The Applanix software, version 4.4, was used to determine both the ABGPS trajectory and the blending of inertial data.

The airborne GPS and blending of inertial and GPS post-processing were completed in multiple steps.

1. The collected data was transferred the field data collectors to the main computer. Data was saved under the project number and separated between LiDAR mission dates. Inside each mission date, a sub-directory was created with the aircraft's tail number and an A or B suffix was attached for the time of when the data was collected. Inside the tail number sub-directory, five sub-directories were also created EO, GPS, IMU, PROC, and RAW.

2. The aircraft raw data (IMU and GPS data combined) was run through a data extractor program. This separated the IMU and GPS data. In addition to the extracting of data, it provided the analyst the first statistics on the overall flight. The program was POSPac (POS post-processing PACkage).

3. Executing POSGPS program to derive accurate GPS positions for all flights:
   Applanix POSGPS
   The software utilized for the data collected was PosGPS, a kinematic on-the-fly (OTF) processing software package. Post processing of the data is computed from each base station (Note: only base stations within the flying area were used) in both a forward and backward direction. This provides the analyst the ability to Quality Check (QC) the post processing, since different ambiguities are determined from different base stations and also with the same data from different directions.

   The trajectory separation program is designed to display the time of week that the airborne or roving antenna traveled, and compute the differences found between processing runs. Processed data can be compared between a forward/reverse solution from one base station, a reverse solution from one base station and a forward solution from the second base station, etc. For the Applanix POSGPS processing, this is considered the final QC check for the given mission. If wrong ambiguities were found with one or both runs, the analyst would see disagreements from the trajectory plot, and re-processing would continue until an agreement was determined.

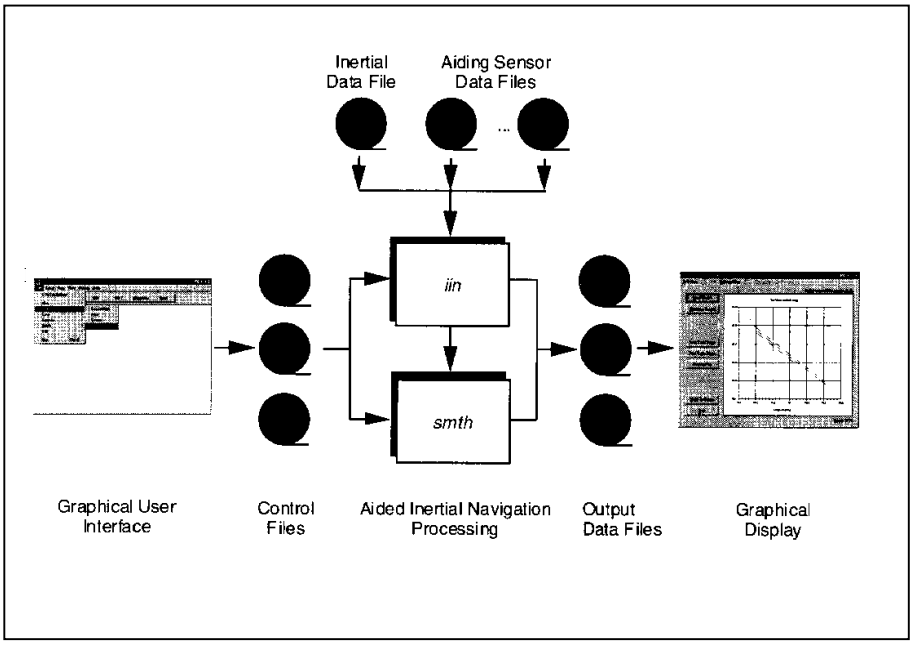
   Once the analyst accepts a forward and reverse processing solution, the trajectory plot is analyzed and the combined solution is stored in a file format acceptable for the IMU post processor.

   Please see Section 7 of the control report for the final accepted trajectory plots.

4. When the processed trajectory (either through POSGPS) data was accepted after quality control analysis, the combined solution is stored in a file format acceptable for the IMU post processor (i.e. POSProc).

5. Execute POSProc.
   POSProc comprises a set of individual processing interface tools that execute and provide the following functions:

   Diagram 3 shows the organization of these tools, and is a function of the



   POSProc processing components.

   - Integrated Inertial Navigation (*iin*) Module.
     The name *iin* is a contraction of Integrated Inertial Navigation. *iin* reads inertial data and aiding data from data files specified in a processing environment file and computes the aided inertial navigation solution. The inertial data comes from a strapdown IMU. *iin* outputs the navigation data between start and end times at a data rate as specified in the environment file. *iin* also outputs Kalman filter data for analysis of estimation error statistics and smoother data that the smoothing program *smth* uses to improve the navigation solution accuracy.
     iin implements a full strapdown inertial navigator that solves Newton's equation of motion on the earth using inertial data from a strapdown IMU. The inertial navigator implements coning and sculling compensation to handle potential problems caused by vibration of the IMU.

- Smoother Module (*smth*).
  smth is a companion processing module to *iin*. *smth* is comprised of two individual functions that run in sequence. *smth* first runs the *smoother function* and then runs the *navigation correction function*.

  The *smth* smoother function performs backwards-in-time processing of the forwards-in-time blended navigation solution and Kalman filter data generated by *iin* to compute smoothed error estimates. *smth* implements a modified Bryson-Frazier smoothing algorithm specifically designed for use with the *iin* Kalman filter. The resulting smoothed strapdown navigator error estimates at a given time point are the optimal estimates based on all input data before and after the given time point. In this sense, *smth* makes use of all available information in the input data. *smth* writes the smoothed error estimates and their RMS estimation errors to output data files.

  The *smth* navigation correction function implements a feedforward error correction mechanism similar to that in the *iin* strapdown navigation solution using the smoothed strapdown navigation errors. s*mth* reads in the smoothed error estimates and with these, corrects the strapdown navigation data. The resulting navigation solution is called a Best Estimate of Trajectory (BET), and is the best obtainable estimate of vehicle trajectory with the available inertial and aiding sensor data. [3]

The above mentioned modules provide the analyst the following statistics to ensure that the most optimal solution was achieved: a log of the *iin* processing, the Kalman filter Measurement Residuals, Smoothed RMS Estimation Errors, and Smoothed Sensor Errors and RMS.

5.2 LiDAR "Point Cloud" Processing

The ABGPS/IMU post processed data along with the LiDAR raw measurements were processed using Optech Incorporated's ASDA software. This software was used to match the raw LiDAR measurements with the computed ABGPS/IMU positions and attitudes of the LiDAR sensor. The result was a "point cloud" of LiDAR measured points referenced to the ground control system.

5.3 LIDAR CALIBRATION

Introduction

The purpose of the LiDAR system calibration is to refine the system parameters in order for the post-processing software to produce a "point cloud" that best fits the actual ground.

The following report outlines the calibration techniques employed for this project.

Calibration Procedures

AEROMETRIC routinely performs two types of calibrations on its Optech 3100 LiDAR system. The first calibration, system calibration, is performed whenever the LiDAR system is installed in the aircraft. This calibration is performed to define the system parameters affected by the physical misalignment of the system versus aircraft. The second calibration, in-situ calibration, is performed for each mission using that missions data. This calibration is performed to refine the system parameters that are affected by the on site conditions as needed.

System Calibration and Correction Software

Optech has developed a proprietary calibration software in December of 2009 that performs system calibration. The results from this new software achieved excellent results and an accuracy that meets the project requirements.

This new calibration tool incorporates Optech's proprietary optical sensor models to compute laser point positions and provide laser point calibration improvements on a per flightline basis for the entire project area. It furthermore calculates planar surfaces at different angles from each flight line and then uses a robust least squares solution to compute the orientation parameters at the optical level instead of the traditional methods relating to the ground points. Determining and correcting at the optical level is critical when correcting the data especially when working in terrain and aggressive design parameters as found in this project. Each flight line was computed individually and output in LAS 1.2 format.

In-situ Calibration

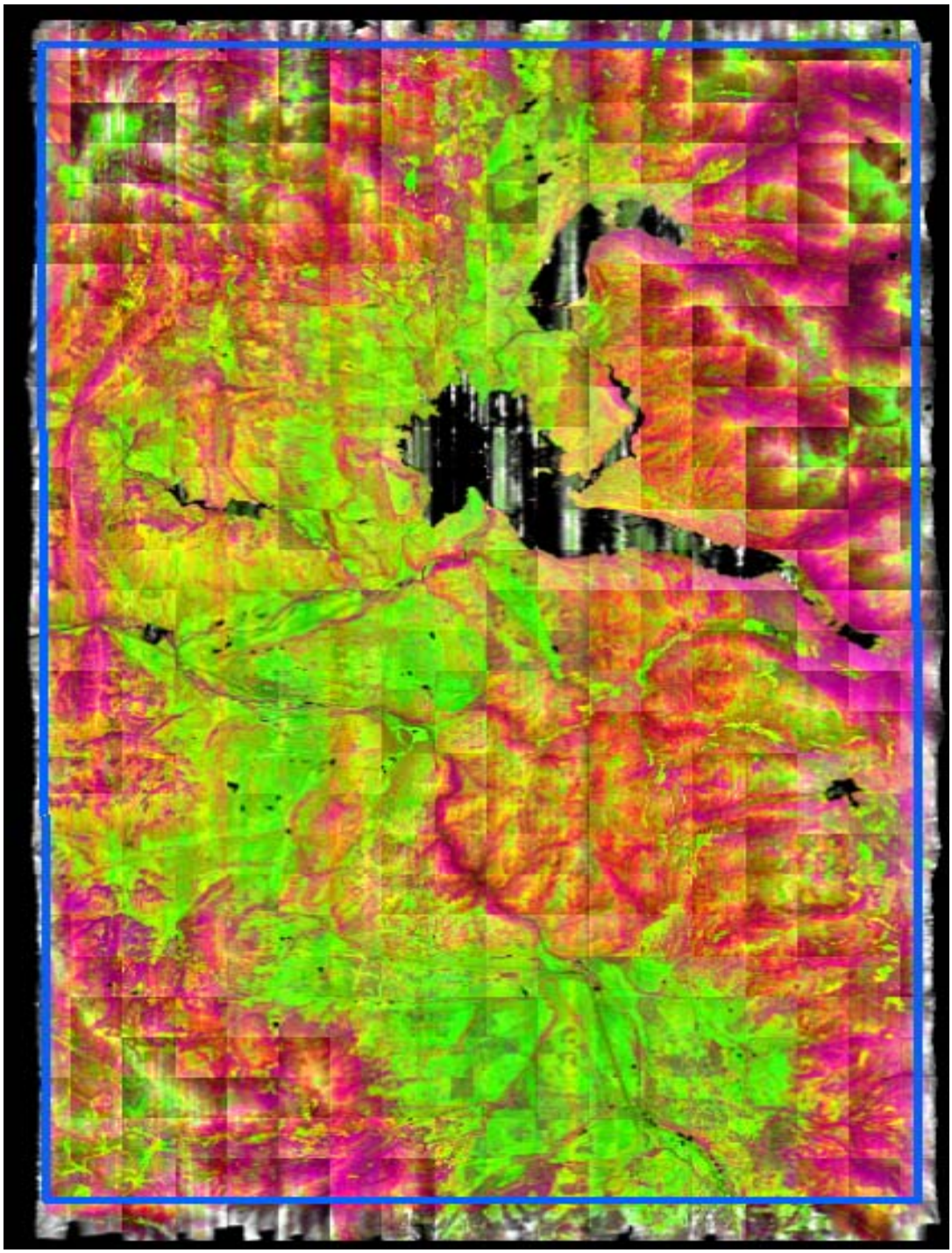
The in-situ calibration is performed as needed using the mission's data. This calibration is performed to refine the system parameters that are affected by the on site conditions.

For each mission, LiDAR data for at least one cross flight is acquired over the mission's acquisition site. The processed data of the cross flight is compared to the perpendicular flight lines using either the Optech proprietary software or TerraSolid's TerraMatch software to determine if any systematic errors are present. In this calibration, the data of individual flight lines are compared against each other and their systematic errors are corrected in the final processed data.

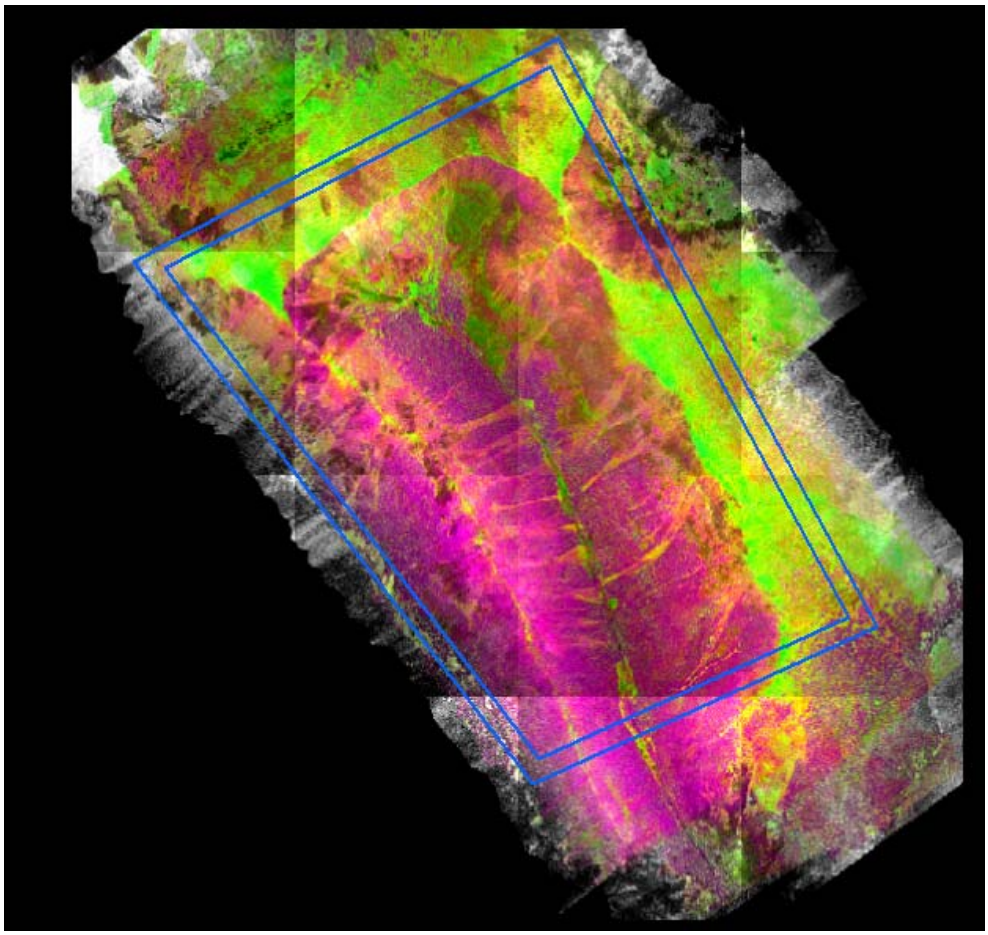
5.4 LiDAR Processing

The LAS files were then imported, verified, and parsed into manageable, tiled grids using GeoCue version 7.0.34.0. GeoCue allows for ease of data management and process tracking.

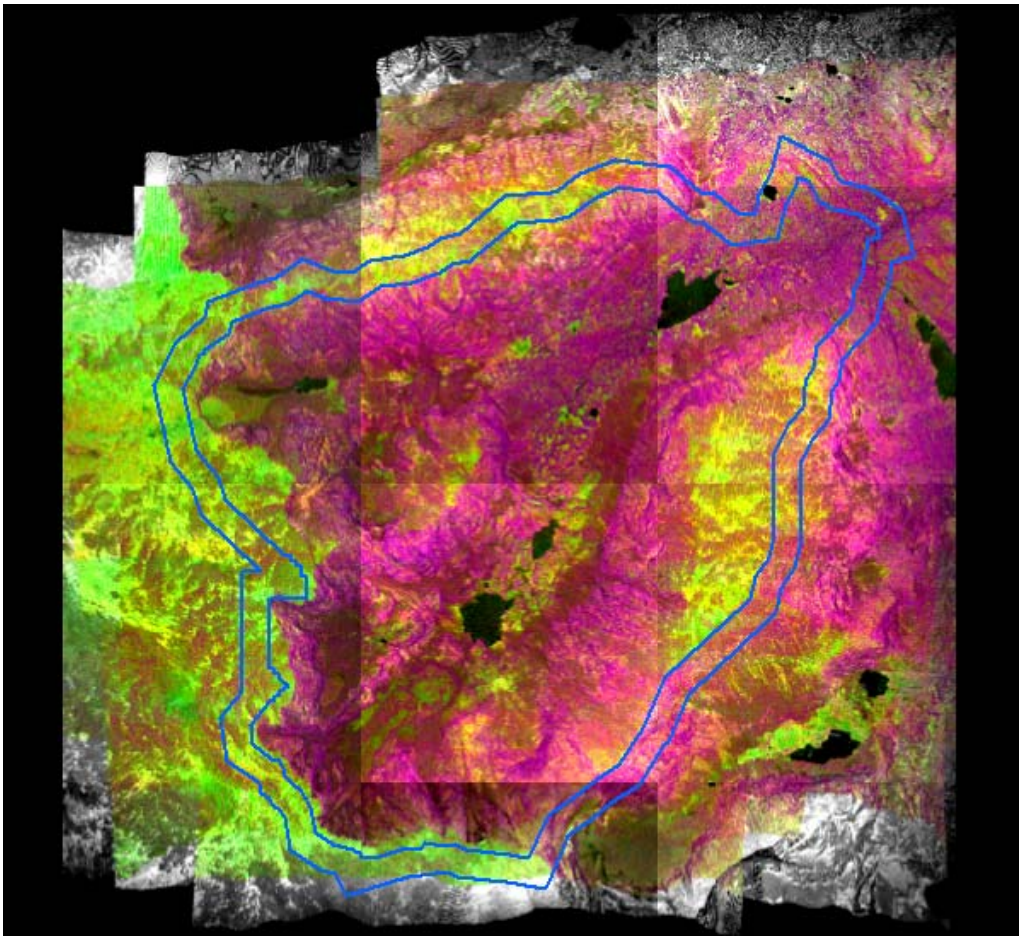
The first step after the data has been processed and calibrated is to perform a relative accuracy assessment on the flightline to flightline comparisons and also a data density test prior any further processing. To determine a proper accuracy assessment between flightlines, Aerometric uses GeoCue to create Orthos by elevation differences. The generated orthos have assigned elevation ranges that allow the technician to evaluate if the data passes the accuracy assessment and also determine if additional calibration efforts are needed based on the bias trends. Below are screen captures of the elevation orthos with green indicates a flightline comparison of less than 0.05 meters; yellow is 0.050 – 0.100 meters; orange is 0.101 – 0.150 meters; red is 0.151 – 0.200 meters, and greater than 0.20 meters is magenta.



Grand County

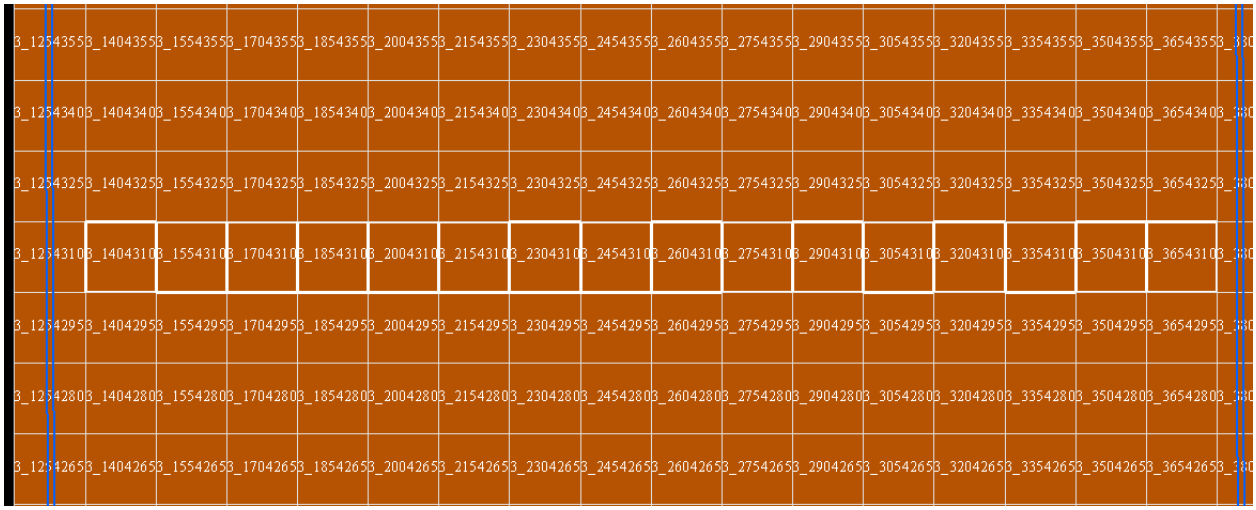


Park County



Larimer County

In addition to the relative accuracy assessment, Aerometric also reviews a few tiles to ensure that the desire density has been met. Aerometric utilizes an in-house proprietary software to complete this task. Initially a grid was placed according to the version 12 specification that is based on the nominal post spacing. The results indicated that the density of the sampled tiles achieved only 86% of the points meeting the specified data density criteria. However, using the latest USGS specification, version 13, which modifies the requirements to allow up to 2 times the nominal post spacing our data tests now easily meets the desired density requirements. Below are the statistics from the results of the inspected tiles as shown in the next image.



Sampled tiles: Grand County (3_1254310, 3_1404310, 3_1554310, 3_1704310, 3_1854310, 3_2004310, 3_2154310, 3_2304310, 3_2454310, 3_2604310, 3_2754310, 3_2904310, 3_3054310, 3_3204310, 3_3354310, 3_3504310, and 3_3654310)

Run 1 (Version 12 – 0.7m)
Total number of cells: 76,959,416
Total number of cells with one point: 65,490,294
Percentage of tiles with 1 point or more: 86%

Run 2 (Version 13 – 1.4m)
Total number of cells: 19,257,408
Total number of cells with one point: 19,192,447
Percentage of tiles with 1 point or more: 99.7%

Once both the accuracy between swaths and data density is accepted an automated classification algorithm is performed using TerraSolid's TerraScan, version 10.017. This will produce the majority of the bare-earth datasets.

The remainder of the data was classified using manual classification techniques. The majority of the manual edit moved points misclassified as ground (class 2) to unclassified (class 1). Erroneous low points, high points, including clouds are classified to class 7.

5.4 Check Point Validation

The data was then verified using the ground control data collected by Aerometric. TerraScan then computes the vertical differences between the surveyed elevation and the LiDAR derived elevation for each point.

A report listing the differences and common statistics was created and can be found in Section 8 of this report.

5.5 LiDAR Data Delivery

Raw point cloud data supplied is in the following format:

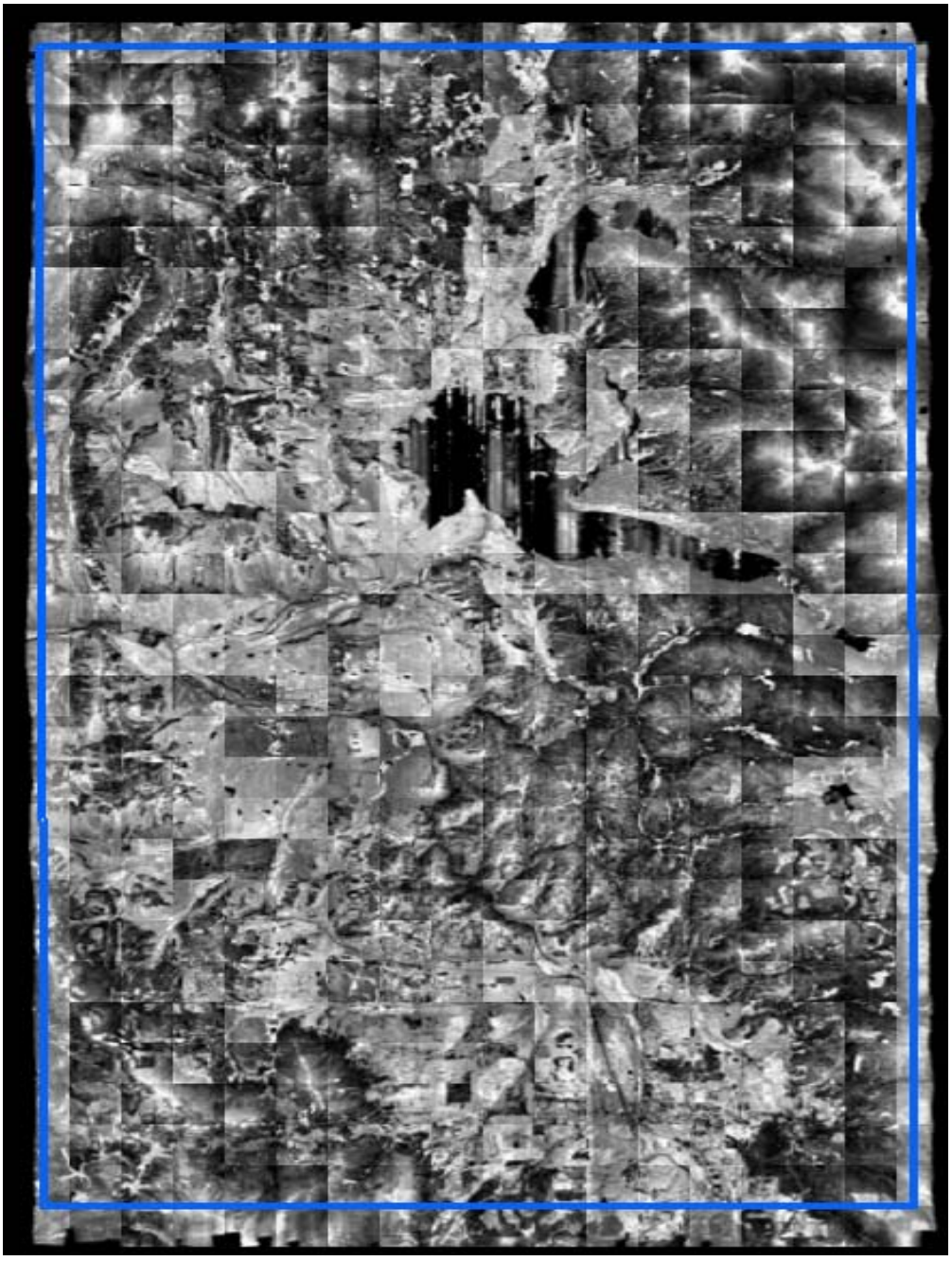
- LAS, version 1.2
- GPS times adjusted to GPS Absolute
- Full swaths and delivered as 1 file per swath which did not exceed 2gb.

Classified point cloud data is also being supplied using the following criteria.

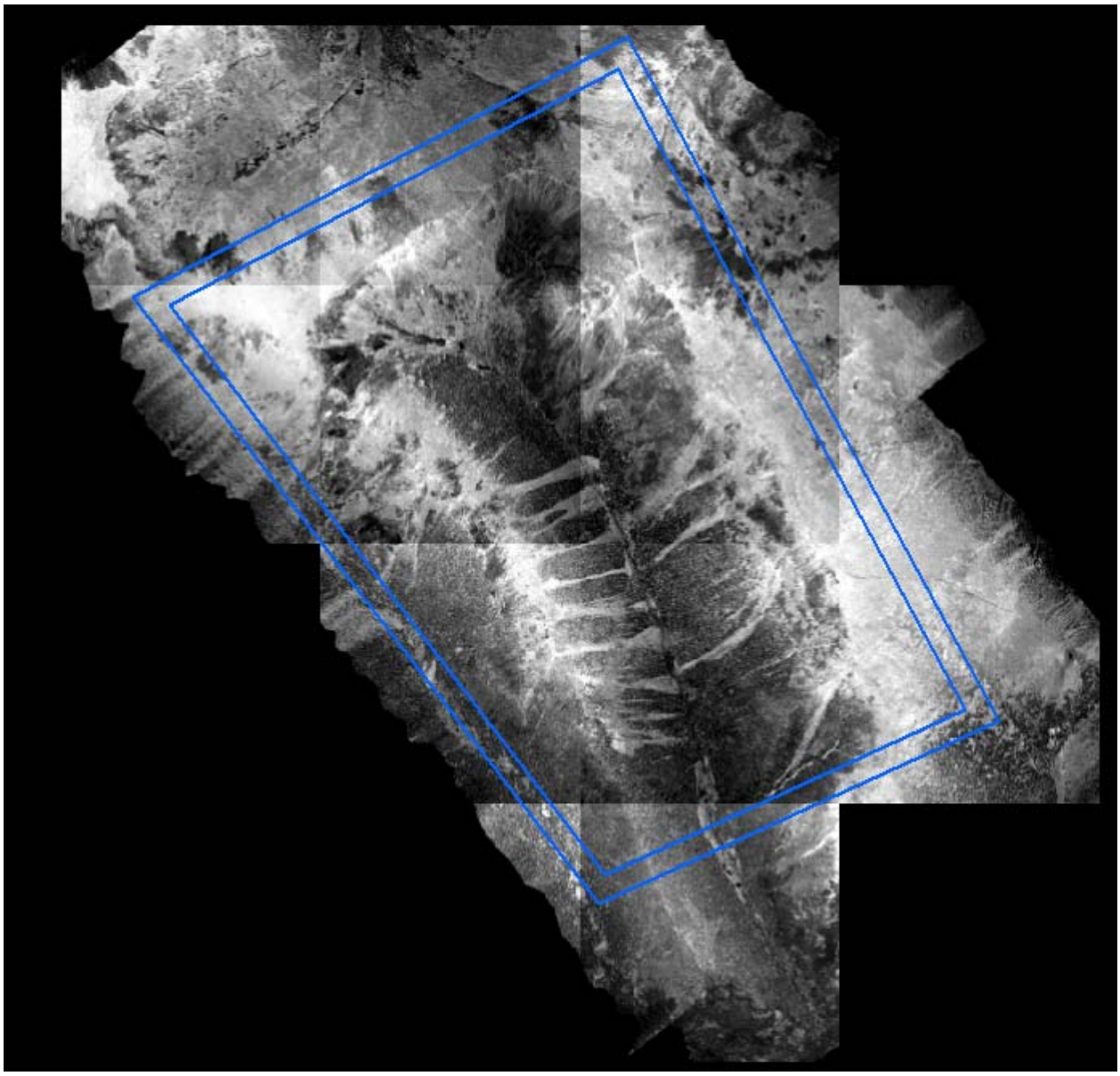
- LAS, version 1.2
- GPS times adjusted to GPS Absolute
- Classification scheme:
  - Code 1 – Processed, but unclassified
  - Code 2 – Ground
  - Code 7 – Noise
  - Code 9 - Water
  - Code 10 – Ignored Ground (Breakline proxmimty)

The 1 meter bare-earth DEMs were created in the following manner. First, ArcGrids in ASCII format were created using TerraModeler version 10.005 (TerraSolid Ltd.). The ASCII grids were then imported into ARC and translated to raster format and placed in a geodatabase DEM feature dataset.

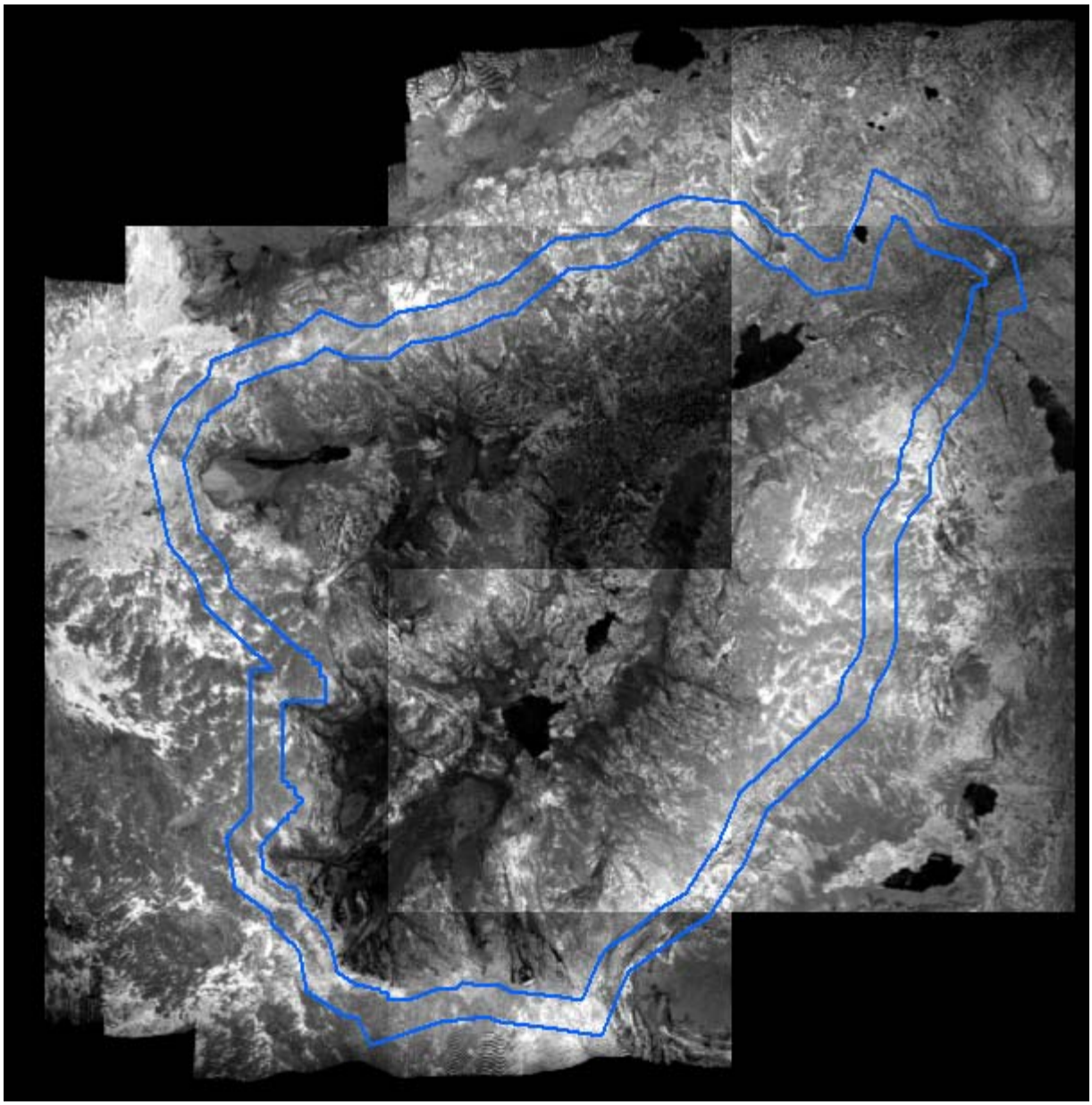
The first return 1 meter intensity images were created using GeoCue. These images are in GeoTiff format.



Grand County Intensity Raster



Park County Intensity Raster



Larimer County Intensity Raster

Collected breaklines are first collected in a Microstation environment using the base specifications. Upon acceptance the breaklines, either polygons or lines, are translated into ARC and imported to the final geodatabase as separate features.

6 CONCLUSION

Because of the rigorous procedures and use of new technology, this project will serve the USGS and all users requiring the provided LiDAR derivative products for all project areas in Grand, Larimer and Park Counties Colorado well into the future. Although this project tested the limits of both the equipment and personnel, the results are extremely accurate and reliable.

ITRF 00
FORT COLLINS (COFC), COLORADO

Retrieved from NGS DataBase on 05/11/09 at 12:40:46.

Antenna Reference Point(ARP): FORT COLLINS CORS ARP

PID = DL2742

ITRF00 POSITION (EPOCH 1997.0)
Computed in May. 2009 using 14s day of data.

X =	-1268727.799 m	latitude	= 40 35 36.13134 N
Y =	-4682467.537 m	longitude	= 105 09 37.60656 W
Z =	4129276.411 m	ellipsoid height	= 1595.117 m

ITRF00 VELOCITY
Predicted with HTDP_3.0 May. 2009.

VX =	-0.0149 m/yr	northward	= -0.0080 m/yr
VY =	-0.0008 m/yr	eastward	= -0.0142 m/yr
VZ =	-0.0065 m/yr	upward	= -0.0007 m/yr

NAD_83 (CORS96) POSITION (EPOCH 2002.0)
Transformed from ITRF00 (epoch 1997.0) position in May. 2009.

X =	-1268727.244 m	latitude	= 40 35 36.10790 N
Y =	-4682468.849 m	longitude	= 105 09 37.56921 W
Z =	4129276.419 m	ellipsoid height	= 1595.974 m

NAD_83 (CORS96) VELOCITY
Transformed from ITRF00 velocity in May. 2009.

VX =	0.0023 m/yr	northward	= 0.0002 m/yr
VY =	0.0004 m/yr	eastward	= 0.0021 m/yr
VZ =	-0.0006 m/yr	upward	= -0.0011 m/yr

L1 Phase Center of the current GPS antenna: FORT COLLINS CORS L1 PC C

The CONVERTED FROM ABSOLUTE igs05_1480.atx antenna
(Antenna Code = TRM57971.00 NONE) was installed on 12/24/08.
The L2 phase center is 0.020 m below the L1 phase center.

PID = DL2743

ITRF00 POSITION (EPOCH 1997.0)
Computed in May. 2009 using 14s day of data.

X =	-1268727.816 m	latitude	= 40 35 36.13136 N
Y =	-4682467.599 m	longitude	= 105 09 37.60656 W
Z =	4129276.467 m	ellipsoid height	= 1595.202 m

The ITRF00 VELOCITY of the L1 PC is the same as that for the ARP.

NAD_83 (CORS96) POSITION (EPOCH 2002.0)
Transformed from ITRF00 (epoch 1997.0) position in May. 2009.

X =	-1268727.261 m	latitude	= 40 35 36.10792 N
Y =	-4682468.912 m	longitude	= 105 09 37.56920 W
Z =	4129276.476 m	ellipsoid height	= 1596.060 m

The NAD_83 (CORS96) VELOCITY of the L1 PC is the same as that for the ARP.

* Latitude, longitude and ellipsoid height are computed from their corresponding cartesian coordinates using dimensions for the

GRS 80 ellipsoid: semi-major axis = 6,378,137.0 meters
flattening = 1/298.257222101...

* WARNING: Mixing of antenna types can lead to errors of up to 10 cm.
in height unless antenna-phase-center variation is properly modeled.

* For additional information about the interpretation and/or derivation
of these positions and velocities, consult
http://www.ngs.noaa.gov/CORS/Coords.html
For additional information on the relation of the GPS antenna to other
relevant points at the site and on GPS equipment, consult the
link http://www.ngs.noaa.gov/cors/Logfiles.html

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
DATABASE =  ,PROGRAM = datasheet, VERSION = 7.85
1        National Geodetic Survey,   Retrieval Date = AUGUST 25, 2010
 DF5524 ***********************************************************************
 DF5524  DESIGNATION -  D 450
 DF5524  PID         -  DF5524
 DF5524  STATE/COUNTY-  CO/SUMMIT
 DF5524  USGS QUAD   -  DILLON (1987)
 DF5524
 DF5524                        *CURRENT SURVEY CONTROL
 DF5524  ______________________________________________________________________
 DF5524* NAD 83(2007)-  39 37 43.04698(N)    106 03 54.76899(W)     ADJUSTED
 DF5524* NAVD 88     -      2686.669  (meters)    8814.51   (feet)  ADJUSTED
 DF5524  ______________________________________________________________________
 DF5524  EPOCH DATE  -        2002.00
 DF5524  X           -  -1,361,841.508 (meters)                     COMP
 DF5524  Y           -  -4,728,984.714 (meters)                     COMP
 DF5524  Z           -   4,048,018.150 (meters)                     COMP
 DF5524  LAPLACE CORR-          -0.02  (seconds)                    DEFLEC09
 DF5524  ELLIP HEIGHT-        2674.041 (meters)          (02/10/07) ADJUSTED
 DF5524  GEOID HEIGHT-         -12.60  (meters)                     GEOID09
 DF5524  DYNAMIC HT  -        2683.366 (meters)    8803.68  (feet)  COMP
 DF5524
 DF5524  ------- Accuracy Estimates (at 95% Confidence Level in cm) --------
 DF5524  Type    PID    Designation                      North   East  Ellip
 DF5524  ----------------------------------------------------------------
 DF5524  NETWORK DF5524 D 450                             0.86   0.69   1.33
 DF5524  ----------------------------------------------------------------
 DF5524  MODELED GRAV-     979,300.6   (mgal)                      NAVD 88
 DF5524
 DF5524  VERT ORDER  -  FIRST     CLASS II
 DF5524
 DF5524.The horizontal coordinates were established by GPS observations
 DF5524.and adjusted by the National Geodetic Survey in February 2007.
 DF5524
 DF5524.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).
 DF5524.See National Readjustment for more information.
 DF5524.The horizontal coordinates are valid at the epoch date displayed above.
 DF5524.The epoch date for horizontal control is a decimal equivalence
 DF5524.of Year/Month/Day.
 DF5524
 DF5524.The orthometric height was determined by differential leveling and
 DF5524.adjusted in November 2003.
 DF5524
 DF5524.The X, Y, and Z were computed from the position and the ellipsoidal ht.
 DF5524
 DF5524.The Laplace correction was computed from DEFLEC09 derived deflections.
 DF5524
```

DF5524.The ellipsoidal height was determined by GPS observations
DF5524.and is referenced to NAD 83.
DF5524
DF5524.The geoid height was determined by GEOID09.
DF5524
DF5524.The dynamic height is computed by dividing the NAVD 88
DF5524.geopotential number by the normal gravity value computed on the
DF5524.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
DF5524.degrees latitude (g = 980.6199 gals.).
DF5524
DF5524.The modeled gravity was interpolated from observed gravity values.
DF5524

		North	East	Units	Scale Factor	Converg.
DF5524;SPC CO C	-	504,246.904	865,876.973	MT	0.99997824	-0 21 23.3
DF5524;SPC CO C	-	1,654,350.05	2,840,798.04	sFT	0.99997824	-0 21 23.3
DF5524;UTM 13	-	4,387,081.500	408,582.031	MT	0.99970289	-0 40 46.0

DF5524

		Elev Factor	x	Scale Factor	=	Combined Factor
DF5524!SPC CO C	-	0.99958066	x	0.99997824	=	0.99955891
DF5524!UTM 13	-	0.99958066	x	0.99970289	=	0.99928367

DF5524
DF5524 SUPERSEDED SURVEY CONTROL
DF5524

DF5524 NAD 83(1992)	-	39 37 43.04630(N)	106 03 54.76739(W)	AD(	)	1	
DF5524 ELLIP H (10/27/04)	2674.054	(m)		GP(	)	4	2
DF5524 NAVD 88 (10/27/04)	2686.67	(m)	8814.5 (f)	LEVELING		3	

DF5524
DF5524.Superseded values are not recommended for survey control.
DF5524.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DF5524.See file dsdata.txt to determine how the superseded data were derived.
DF5524
DF5524_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SDD0858287081(NAD 83)
DF5524_MARKER: DV = VERTICAL CONTROL DISK
DF5524_SETTING: 38 = SET IN THE ABUTMENT OR PIER OF A LARGE BRIDGE
DF5524_SP_SET: BRIDGE ABUTMENT
DF5524_STAMPING: D 450 2001
DF5524_MARK LOGO: NGS
DF5524_MAGNETIC: N = NO MAGNETIC MATERIAL
DF5524_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
DF5524_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
DF5524+SATELLITE: SATELLITE OBSERVATIONS - August 31, 2007
DF5524

DF5524 HISTORY	-	Date	Condition	Report By
DF5524 HISTORY	-	20010829	MONUMENTED	NGS
DF5524 HISTORY	-	20030910	GOOD	NGS
DF5524 HISTORY	-	20040130	GOOD	MSAM
DF5524 HISTORY	-	20070831	GOOD	MSCD

DF5524
DF5524 STATION DESCRIPTION
DF5524
DF5524'DESCRIBED BY NATIONAL GEODETIC SURVEY 2001 (RSC)
DF5524'THE STATION IS LOCATED ABOUT 0.5 MI SOUTHEAST OF SILVERTHORNE, 3.3 MI
DF5524'WEST OF
DF5524'TENDERFOOT MOUNTAIN AND 1.0 MI WEST OF DILLON, IN THE SOUTHEAST 1/4 OF
DF5524'SECTION 12, T 5 S, R
DF5524'78 W, AT U. S. HIGHWAY 6 MILEPOST 209.0. OWNERSHIP--COLORADO
DF5524'DEPARTMENT OF

DF5524'TRANSPORTATION RIGHT-OF-WAY.
DF5524'
DF5524'TO REACH THE STATION FROM THE INTERSTATE 70 EXIT 205 UNDERPASS, U. S.
DF5524'HIGHWAY 6, GO
DF5524'SOUTH 0.1 MI TO AN ON RAMP TO INTERSTATE 70 EASTBOUND AND A PEDESTRIAN
DF5524'BRIDGE AND THE
DF5524'MARK IN THE NORTHWEST CORNER OF THE BRIDGE.
DF5524'
DF5524'THE MARK IS A STANDARD DISK SET INTO A DRILL HOLE THE TOP OF THE
DF5524'NORTHWEST CORNER OF A
DF5524'PEDESTRIAN BRIDGE OVER STRAIGHT CREEK. THE BRIDGE IS 15.2 LONG. IT IS
DF5524'84.6 M WEST FROM THE
DF5524'EXTENDED CENTER OF STEPHENS WAY, 21.2 M SOUTHWEST FROM CDOT CONTROL
DF5524'MONUMENT
DF5524'209.01, 16.2 M NORTH FROM THE CENTER LINE OF U. S. HIGHWAY 6
DF5524'WESTBOUND, 9.6 M EAST FROM
DF5524'THE CENTER OF CROSSING AND THE INTERSTATE 70 EASTBOUND ON RAMP, 4.9 M
DF5524'NORTHEAST FROM
DF5524'A LIGHT POLE AND 0.25 M NORTH FROM THE NORTHWEST CORNER OF THE BRIDGE
DF5524'RAILING AND
DF5524'WITNESS POST.
DF5524'
DF5524'
DF5524
DF5524   STATION RECOVERY (2003)
DF5524
DF5524'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2003 (DW)
DF5524'MODIFICATIONS TO 2001 DESCRIPTION. FROM UNDERPASS, US HWY 6 AND COLO
DF5524'HWY 9, GO EAST FOR 0.1 MI TO ON RAMP. MARK IS AT NW CORNER OF BRIDGE
DF5524'AND 0.3 M BELOW SIDEWALK LEVEL. THIS IS GRAVITY BASE STATION
DF5524'SILVERTHORNE D 450.
DF5524
DF5524   STATION RECOVERY (2004)
DF5524
DF5524'RECOVERY NOTE BY MOUNTAIN SURVEYING AND MAPPING INC 2004 (KCH)
DF5524'RECOVERY NOTE BY MOUNTAIN SURVEYING AND MAPPING, INC. 2004 (BAJ)
DF5524'RECOVERED AS DESCRIBED
DF5524
DF5524   STATION RECOVERY (2007)
DF5524
DF5524'RECOVERY NOTE BY METROPOLITAN STATE COLLEGE-DENVER 2007 (RBP)
DF5524'RECOVERED IN GOOD CONDITION.

*** retrieval complete.
Elapsed Time = 00:00:00

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
DATABASE =  ,PROGRAM = datasheet, VERSION = 7.85
1        National Geodetic Survey,   Retrieval Date = AUGUST 25, 2010
 KK0984 ***********************************************************************
 KK0984  DESIGNATION -  H 360
 KK0984  PID         -  KK0984
 KK0984  STATE/COUNTY-  CO/GRAND
 KK0984  USGS QUAD   -  FRASER (1957)
 KK0984
 KK0984                        *CURRENT SURVEY CONTROL
 KK0984  ______________________________________________________________________
 KK0984* NAD 83(2007)-  39 54 11.98620(N)    105 46 49.67744(W)     ADJUSTED
 KK0984* NAVD 88     -      2734.471  (meters)    8971.34   (feet)  ADJUSTED
 KK0984  ______________________________________________________________________
 KK0984  EPOCH DATE  -        2002.00
 KK0984  X           -  -1,333,024.821 (meters)                     COMP
 KK0984  Y           -  -4,716,947.454 (meters)                     COMP
 KK0984  Z           -   4,071,503.479 (meters)                     COMP
 KK0984  LAPLACE CORR-          -0.68  (seconds)                    DEFLEC09
 KK0984  ELLIP HEIGHT-        2722.086 (meters)          (02/10/07) ADJUSTED
 KK0984  GEOID HEIGHT-         -12.36  (meters)                     GEOID09
 KK0984  DYNAMIC HT  -        2731.286 (meters)    8960.89  (feet)  COMP
 KK0984
 KK0984  ------- Accuracy Estimates (at 95% Confidence Level in cm) --------
 KK0984  Type    PID    Designation                      North   East  Ellip
 KK0984  ----------------------------------------------------------------------
 KK0984  NETWORK KK0984 H 360                             0.88   0.73   3.55
 KK0984  ----------------------------------------------------------------------
 KK0984  MODELED GRAV-     979,361.8   (mgal)                       NAVD 88
 KK0984
 KK0984  VERT ORDER  -  FIRST     CLASS II
 KK0984
 KK0984.The horizontal coordinates were established by GPS observations
 KK0984.and adjusted by the National Geodetic Survey in February 2007.
 KK0984
 KK0984.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).
 KK0984.See National Readjustment for more information.
 KK0984.The horizontal coordinates are valid at the epoch date displayed above.
 KK0984.The epoch date for horizontal control is a decimal equivalence
 KK0984.of Year/Month/Day.
 KK0984
 KK0984.The orthometric height was determined by differential leveling and
 KK0984.adjusted in June 1991.
 KK0984
 KK0984.The X, Y, and Z were computed from the position and the ellipsoidal ht.
 KK0984
 KK0984.The Laplace correction was computed from DEFLEC09 derived deflections.
 KK0984
```

KK0984.The ellipsoidal height was determined by GPS observations
KK0984.and is referenced to NAD 83.
KK0984
KK0984.The geoid height was determined by GEOID09.
KK0984
KK0984.The dynamic height is computed by dividing the NAVD 88
KK0984.geopotential number by the normal gravity value computed on the
KK0984.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
KK0984.degrees latitude (g = 980.6199 gals.).
KK0984
KK0984.The modeled gravity was interpolated from observed gravity values.
KK0984

		North	East	Units	Scale Factor	Converg.
KK0984;SPC CO N	-	368,125.032	890,418.657	MT	0.99997512	-0 10 52.4
KK0984;SPC CO N	-	1,207,756.88	2,921,315.21	sFT	0.99997512	-0 10 52.4
KK0984;UTM 13	-	4,417,319.322	433,285.440	MT	0.99965479	-0 30 02.5

KK0984

		Elev Factor	x	Scale Factor	=	Combined Factor
KK0984!SPC CO N	-	0.99957314	x	0.99997512	=	0.99954827
KK0984!UTM 13	-	0.99957314	x	0.99965479	=	0.99922808

KK0984

KK0984 SUPERSEDED SURVEY CONTROL

KK0984

KK0984 ELLIP H (12/03/02)	2722.096	(m)			GP( )	4	2
KK0984 NAD 83(1992)-	39 54 11.98532(N)		105 46 49.67607(W)		AD( )	1	
KK0984 ELLIP H (05/02/00)	2722.177	(m)			GP( )	4	1
KK0984 NAVD 88 (05/02/00)	2734.47	(m)	8971.3	(f)	LEVELING	3	
KK0984 NGVD 29 (??/??/92)	2732.989	(m)	8966.48	(f)	ADJ UNCH	1	2

KK0984
KK0984.Superseded values are not recommended for survey control.
KK0984.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
KK0984.See file dsdata.txt to determine how the superseded data were derived.
KK0984
KK0984_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SDE3328517319(NAD 83)
KK0984_MARKER: DB = BENCH MARK DISK
KK0984_SETTING: 80 = SET IN A BOULDER
KK0984_STAMPING: H 360 1954
KK0984_MARK LOGO: CGS
KK0984_MAGNETIC: O = OTHER; SEE DESCRIPTION
KK0984_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
KK0984+STABILITY: SURFACE MOTION
KK0984_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
KK0984+SATELLITE: SATELLITE OBSERVATIONS - January 13, 2000
KK0984

		Date	Condition	Report By
KK0984 HISTORY	-	Date	Condition	Report By
KK0984 HISTORY	-	1954	MONUMENTED	CGS
KK0984 HISTORY	-	20000113	GOOD	SLSS

KK0984

KK0984 STATION DESCRIPTION

KK0984
KK0984'DESCRIBED BY COAST AND GEODETIC SURVEY 1954
KK0984'1.2 MI W FROM WINTER PARK.
KK0984'1.15 MILES WEST ALONG THE DENVER AND SALT LAKE RAILROAD FROM THE
KK0984'STATION AT WINTER PARK, 42 FEET NORTHEAST OF THE NORTHEAST RAIL OF
KK0984'THE MAIN TRACK, 145 FEET SOUTHWEST OF THE CENTER LINE OF U.S.
KK0984'HIGHWAY 40, 107 FEET WEST OF A POWER POLE, 26 FEET NORTHEAST OF
KK0984'THE NORTHEAST RAIL OF A SIDE TRACK, 0.8 FOOT ABOVE THE GROUND, SET

KK0984'IN THE TOP OF A 4X6 FOOT GRANITE BOULDER.
KK0984
KK0984 STATION RECOVERY (2000)
KK0984
KK0984'RECOVERY NOTE BY STEPHENSON LAND SURVEYING SERVICES 2000 (GFS)
KK0984'THE STATION IS LOCATED ABOUT 1.5 MI (2.4 KM) NORTH OF WINTER PARK SKI
KK0984'AREA AND 1 MI (1.6 KM) SOUTH OF THE TOWN OF WINTER PARK, IN THE
KK0984'NORTHEAST 1/4 OF SECTION 4, T 2 S, R 75 W, AT U.S. HIGHWAY 40
KK0984'MILEPOST 230.8. OWNERSHIP--UNION PACIFIC RAILROAD RIGHT-OF-WAY
KK0984'TO REACH THE STATION FROM THE TOWN OF WINTER PARK, GO SOUTHEASTERY ON
KK0984'U.S. HIGHWAY 40 FOR 1.0 MI (1.6 KM) TO THE STATION ON THE RIGHT,
KK0984'ABOUT 300 FT (91.4 M) SOUTH FROM AN ARAPAHOE NATIONAL FOREST SIGN AND
KK0984'NEXT TO THE RAILROAD, THE DIRT TRACK ACCESS IS LOCATED AT U.S. HIGHWAY
KK0984'40 MILEPOST 230.7
KK0984'THE MARK IS A STANDARD DISK SET INTO THE TOP OF A 6 FT (1.8 M) BY 4 FT
KK0984'(1.2 M) GRANITE BOULDER. IT IS 55M WEST FROM THE CENTERLINE OF U.S.
KK0984'HIGHWAY 40 AT THE TOP OF BANK, 45.4 M (148.9 FT) SOUTH FROM THE
KK0984'RAILROAD MILEPOST 58, 8.8M EAST FROM THE CENTERLINE OF THE MOST
KK0984'EASTERLY OF TWO SETS OF RAILROAD TRACKS AND 1.13M SOUTH FROM A WITNESS
KK0984'POST.

*** retrieval complete.
Elapsed Time = 00:00:01

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

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DATABASE =  ,PROGRAM = datasheet, VERSION = 7.85
1        National Geodetic Survey,   Retrieval Date = AUGUST 25, 2010
 LL0739 ***********************************************************************
 LL0739  DESIGNATION -  M 361
 LL0739  PID         -  LL0739
 LL0739  STATE/COUNTY-  CO/GRAND
 LL0739  USGS QUAD   -  TRAIL MOUNTAIN (1978)
 LL0739
 LL0739                        *CURRENT SURVEY CONTROL
 LL0739  ______________________________________________________________________
 LL0739* NAD 83(2007)-  40 10 20.29194(N)    105 54 03.25034(W)     ADJUSTED
 LL0739* NAVD 88     -      2535.384  (meters)    8318.17   (feet)  ADJUSTED
 LL0739  ______________________________________________________________________
 LL0739  EPOCH DATE  -        2002.00
 LL0739  X           -  -1,337,629.368 (meters)                     COMP
 LL0739  Y           -  -4,695,503.550 (meters)                     COMP
 LL0739  Z           -   4,094,250.490 (meters)                     COMP
 LL0739  LAPLACE CORR-           1.63  (seconds)                    DEFLEC09
 LL0739  ELLIP HEIGHT-        2522.956 (meters)          (02/10/07) ADJUSTED
 LL0739  GEOID HEIGHT-         -12.44  (meters)                     GEOID09
 LL0739  DYNAMIC HT  -        2532.563 (meters)    8308.92  (feet)  COMP
 LL0739
 LL0739  ------- Accuracy Estimates (at 95% Confidence Level in cm) --------
 LL0739  Type    PID    Designation                       North   East  Ellip
 LL0739  ----------------------------------------------------------------------
 LL0739  NETWORK LL0739 M 361                               0.76   0.59   2.00
 LL0739  ----------------------------------------------------------------------
 LL0739  MODELED GRAV-     979,421.4   (mgal)                       NAVD 88
 LL0739
 LL0739  VERT ORDER  -  FIRST     CLASS II
 LL0739
 LL0739.The horizontal coordinates were established by GPS observations
 LL0739.and adjusted by the National Geodetic Survey in February 2007.
 LL0739
 LL0739.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).
 LL0739.See National Readjustment for more information.
 LL0739.The horizontal coordinates are valid at the epoch date displayed above.
 LL0739.The epoch date for horizontal control is a decimal equivalence
 LL0739.of Year/Month/Day.
 LL0739
 LL0739.The orthometric height was determined by differential leveling and
 LL0739.adjusted in June 1991.
 LL0739
 LL0739.The X, Y, and Z were computed from the position and the ellipsoidal ht.
 LL0739
 LL0739.The Laplace correction was computed from DEFLEC09 derived deflections.
 LL0739
```

LL0739.The ellipsoidal height was determined by GPS observations
LL0739.and is referenced to NAD 83.
LL0739
LL0739.The geoid height was determined by GEOID09.
LL0739
LL0739.The dynamic height is computed by dividing the NAVD 88
LL0739.geopotential number by the normal gravity value computed on the
LL0739.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
LL0739.degrees latitude (g = 980.6199 gals.).
LL0739
LL0739.The modeled gravity was interpolated from observed gravity values.
LL0739

		North	East	Units	Scale Factor	Converg.
LL0739;SPC CO N	-	398,028.842	880,254.947	MT	0.99995778	-0 15 32.5
LL0739;SPC CO N	-	1,305,866.29	2,887,969.77	sFT	0.99995778	-0 15 32.5
LL0739;UTM 13	-	4,447,270.535	423,292.300	MT	0.99967243	-0 34 52.3

LL0739

		Elev Factor	x	Scale Factor	=	Combined Factor
LL0739!SPC CO N	-	0.99960437	x	0.99995778	=	0.99956216
LL0739!UTM 13	-	0.99960437	x	0.99967243	=	0.99927693

LL0739

LL0739 SUPERSEDED SURVEY CONTROL
LL0739

LL0739 ELLIP H (10/21/02)	2522.938 (m)			GP( )	5	1
LL0739 NAD 83(1986)-	40 10 20.28428(N)	105 54 03.24670(W)		AD( )	3	
LL0739 NAD 83(1992)-	40 10 20.29120(N)	105 54 03.24976(W)		AD( )	B	
LL0739 ELLIP H (05/26/92)	2523.009 (m)			GP( )	4	1
LL0739 NAVD 88 (05/26/92)	2535.38 (m)	8318.2	(f) LEVELING		3	
LL0739 NGVD 29 (??/??/92)	2533.984 (m)	8313.58	(f) ADJ UNCH		1	2

LL0739
LL0739.Superseded values are not recommended for survey control.
LL0739.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
LL0739.See file dsdata.txt to determine how the superseded data were derived.
LL0739
LL0739_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TDE2329247270(NAD 83)
LL0739_MARKER: DB = BENCH MARK DISK
LL0739_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
LL0739_SP_SET: CONCRETE POST
LL0739_STAMPING: M 361 1954
LL0739_MARK LOGO: CGS
LL0739_MAGNETIC: O = OTHER; SEE DESCRIPTION
LL0739_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
LL0739+STABILITY: SURFACE MOTION
LL0739_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
LL0739+SATELLITE: SATELLITE OBSERVATIONS - January 27, 2000
LL0739

		Date	Condition	Report By
LL0739 HISTORY	-	1954	MONUMENTED	CGS
LL0739 HISTORY	-	19910711	GOOD	NGS
LL0739 HISTORY	-	19990713	GOOD	NGS
LL0739 HISTORY	-	20000113	GOOD	SLSS
LL0739 HISTORY	-	20000127	GOOD	NGS

LL0739

LL0739 STATION DESCRIPTION
LL0739

LL0739'DESCRIBED BY COAST AND GEODETIC SURVEY 1954
LL0739'7.8 MI SW FROM GRAND LAKE.

LL0739'0.9 MILE WEST ALONG STATE HIGHWAY 278 FROM THE POST OFFICE AT GRAND
LL0739'LAKE, THENCE 6.95 MILES SOUTHWEST ALONG U.S. HIGHWAY 34, 59 FEET
LL0739'WEST OF THE CENTER LINE OF THE HIGHWAY, 54 FEET NORTH OF THE CENTER
LL0739'LINE OF A PRIVATE ROAD, 17 FEET NORTH OF A POWER POLE, 48 FEET
LL0739'NORTHWEST OF THE NORTHWEST CORNER OF THE WEST HEADWALL OF A CONCRETE
LL0739'CULVERT. 18
LL0739'FEET EAST OF A FENCE, 2 FEET SOUTH OF A WITNESS POST, 1.0 MILE
LL0739'NORTHEAST OF BENCH MARK H 361, SET IN THE TOP OF A CONCRETE POST
LL0739'WHICH PROJECTS 0.8 FOOT ABOVE THE GROUND.
LL0739
LL0739 STATION RECOVERY (1991)
LL0739
LL0739'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1991
LL0739'STATION IS LOCATED ABOUT 12 KM (7.5 MI) NORTH OF GRANBY, ON THE WEST
LL0739'SIDE OF LAKE GRANBY, 0.25 KM (0.16 MI) SOUTH OF FISH BAY, IN THE
LL0739'SHADOW MOUNTAIN NATIONAL RECREATION AREA, ALONG US HIGHWAY 34, AT
LL0739'MILE 7.75, ON THE RIGHT-OF-WAY, IN THE SOUTHWEST 1/4 OF SECTION 34. T
LL0739'3 N, R 76 W. OWNERSHIP--STATE DEPARTMENT OF TRANSPORTATION.
LL0739'TO REACH FROM THE JUNCTION OF US HIGHWAYS 34 AND 40 (ABOUT 1 MILE WEST
LL0739'OF GRANBY), GO NORTH ON HIGHWAY 34 EAST FOR 5.45 MI (8.77 KM) TO
LL0739'COUNTY ROUTE 6 ON THE RIGHT NEAR TOP OF GRADE. CONTINUE AHEAD FOR
LL0739'1.35 MI (2.17 KM) TO THE ENTRANCE TO THE NORTON MARINA ON THE RIGHT.
LL0739'CONTINUE AHEAD FOR 0.9 MI (1.4 KM) TO A DIRT ROAD LEFT ON NORTH SIDE
LL0739'OF STOCK PENS AND STATION ON THE LEFT IN FRONT OF A LOG HOUSE.
LL0739'STATION MARK IS SET IN THE TOP OF A 30-CM OVAL CONCRETE POST
LL0739'PROJECTING 5 CM ABOVE GROUND. IT IS 16.4 M (53.8 FT) WEST OF, AND
LL0739'LEVEL WITH THE HIGHWAY CENTER, 17.0 M (55.8 FT) NORTH OF THE DIRT
LL0739'ROAD CENTER, 10.8 M (35.4 FT) SOUTH OF A DIRT DRIVEWAY CENTER, 0.6 M
LL0739'(2.0 FT) EAST OF A LOG FENCE, 0.6 M (2.0 FT) SOUTH OF A FIBERGLASS
LL0739'WITNESS POST AND 0.5 M (1.6 FT) NORTHEAST OF AN UNDERGROUND GAS
LL0739'PIPELINE METAL WITNESS POST.
LL0739'DESCRIBED BY G.R.HEID
LL0739
LL0739 STATION RECOVERY (1999)
LL0739
LL0739'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1999 (RSC)
LL0739'RECOVERED AS DESCRIBED.
LL0739
LL0739 STATION RECOVERY (2000)
LL0739
LL0739'RECOVERY NOTE BY STEPHENSON LAND SURVEYING SERVICES 2000 (GFS)
LL0739'RECOVERED AS DESCRIBED.
LL0739
LL0739 STATION RECOVERY (2000)
LL0739
LL0739'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2000 (RSC)
LL0739'RECOVERED AS DESCRIBED.

*** retrieval complete.
Elapsed Time = 00:00:00

ITRF 00
MARSHALL FIELD (P041), COLORADO

Retrieved from NGS DataBase on 10/19/04 at 10:42:26.

Antenna Reference Point(ARP): MARSHALL FIELD CORS ARP

PID = DG7429

ITRF00 POSITION (EPOCH 1997.0)
Computed in October 2004 using 28 days of data.

X =	-1283634.021 m	latitude	= 39 56 58.17316 N
Y =	-4726427.874 m	longitude	= 105 11 39.35348 W
Z =	4074798.069 m	ellipsoid height	= 1728.830 m

ITRF00 VELOCITY
Predicted with HTDP_2.7 October 2004.

VX =	-0.0171 m/yr	northward	= -0.0082 m/yr
VY =	-0.0012 m/yr	eastward	= -0.0162 m/yr
VZ =	-0.0060 m/yr	upward	= 0.0005 m/yr

NAD_83 (CORS96) POSITION (EPOCH 2002.0)
Transformed from ITRF00 (epoch 1997.0) position in Oct. 2004.

X =	-1283633.478 m	latitude	= 39 56 58.15000 N
Y =	-4726429.194 m	longitude	= 105 11 39.31685 W
Z =	4074798.085 m	ellipsoid height	= 1729.708 m

NAD_83 (CORS96) VELOCITY
Transformed from ITRF00 velocity in Oct. 2004.

VX =	-0.0000 m/yr	northward	= 0.0000 m/yr
VY =	-0.0000 m/yr	eastward	= 0.0000 m/yr
VZ =	-0.0000 m/yr	upward	= 0.0000 m/yr

L1 Phase Center of the current GPS antenna: MARSHALL FIELD CORS L1 PC C
The D/M element, chokerings, -radome antenna
(Antenna Code = TRM29659.00) was installed on 02/19/04.
The L2 phase center is 0.018 m above the L1 phase center.

PID = DG7430

ITRF00 POSITION (EPOCH 1997.0)
Computed in October 2004 using 28 days of data.

X =	-1283634.042 m	latitude	= 39 56 58.17320 N
Y =	-4726427.954 m	longitude	= 105 11 39.35346 W
Z =	4074798.141 m	ellipsoid height	= 1728.940 m

The ITRF00 VELOCITY of the L1 PC is the same as that for the ARP.

NAD_83 (CORS96) POSITION (EPOCH 2002.0)
Transformed from ITRF00 (epoch 1997.0) position in Oct. 2004.

X =	-1283633.499 m	latitude	= 39 56 58.15004 N
Y =	-4726429.275 m	longitude	= 105 11 39.31683 W
Z =	4074798.157 m	ellipsoid height	= 1729.818 m

The NAD_83 (CORS96) VELOCITY of the L1 PC is the same as that for the ARP.

Monument: MARSHALL FIELD GRP

PID = DG7431

```
|         Inscribed: UNKNOWN                                                  |
|                                                                             |
|                                                                             |
| ITRF00 POSITION (EPOCH 1997.0)                                              |
| Computed in October 2004 using 28 days of data.                             |
|     X =  -1283634.019 m     latitude    =  39 56 58.17316 N                 |
|     Y =  -4726427.868 m     longitude   = 105 11 39.35348 W                 |
|     Z =   4074798.064 m     ellipsoid height = 1728.822   m                 |
|                                                                             |
| The ITRF00 VELOCITY of the monument is the same as that for the ARP.        |
|                                                                             |
|                                                                             |
| NAD_83 (CORS96) POSITION (EPOCH 2002.0)                                     |
| Transformed from ITRF00 (epoch 1997.0) position in Oct. 2004.               |
|     X =  -1283633.476 m     latitude    =  39 56 58.15000 N                 |
|     Y =  -4726429.188 m     longitude   = 105 11 39.31685 W                 |
|     Z =   4074798.080 m     ellipsoid height = 1729.700   m                 |
|                                                                             |
| The NAD_83 (CORS96) VELOCITY of the monument is the same as that for the ARP|
|_____________________________________________________________________________|
```

* Latitude, longitude and ellipsoid height are computed from their corresponding cartesian coordinates using dimensions for the GRS 80 ellipsoid: semi-major axis = 6,378,137.0 meters
  flattening = 1/298.257222101...

* WARNING: Mixing of antenna types can lead to errors of up to 10 cm. in height unless antenna-phase-center variation is properly modeled.

* For additional information about the interpretation and/or derivation of these positions and velocities, consult http://www.ngs.noaa.gov/CORS/Derivation.html.
  For additional information on the relation of the GPS antenna to other relevant points at the site and on GPS equipment, consult the link ftp://www.ngs.noaa.gov/cors/.html/p041.log.txt

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
DATABASE =  ,PROGRAM = datasheet, VERSION = 7.85
1        National Geodetic Survey,   Retrieval Date = AUGUST 25, 2010
 KK1111 ***********************************************************************
 KK1111  DESIGNATION -  S 299
 KK1111  PID         -  KK1111
 KK1111  STATE/COUNTY-  CO/SUMMIT
 KK1111  USGS QUAD   -  GRAYS PEAK (1987)
 KK1111
 KK1111                        *CURRENT SURVEY CONTROL
 KK1111  ______________________________________________________________________
 KK1111* NAD 83(1986)-  39 38 44.      (N)    105 52 12.      (W)     SCALED
 KK1111* NAVD 88     -       3376.468  (meters)   11077.63   (feet)  ADJUSTED
 KK1111  ______________________________________________________________________
 KK1111  GEOID HEIGHT-          -12.38  (meters)                       GEOID09
 KK1111  DYNAMIC HT  -         3371.968 (meters)   11062.86  (feet)  COMP
 KK1111  MODELED GRAV-      979,169.8   (mgal)                         NAVD 88
 KK1111
 KK1111  VERT ORDER  -  SECOND    CLASS 0
 KK1111
 KK1111.The horizontal coordinates were scaled from a topographic map and have
 KK1111.an estimated accuracy of +/- 6 seconds.
 KK1111
 KK1111.The orthometric height was determined by differential leveling and
 KK1111.adjusted in June 1991.
 KK1111
 KK1111.The geoid height was determined by GEOID09.
 KK1111
 KK1111.The dynamic height is computed by dividing the NAVD 88
 KK1111.geopotential number by the normal gravity value computed on the
 KK1111.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 KK1111.degrees latitude (g = 980.6199 gals.).
 KK1111
 KK1111.The modeled gravity was interpolated from observed gravity values.
 KK1111
 KK1111;                     North         East     Units  Estimated Accuracy
 KK1111;SPC CO C     -   506,040.      882,640.      MT  (+/- 180 meters Scaled)
 KK1111
 KK1111                          SUPERSEDED SURVEY CONTROL
 KK1111
 KK1111  NGVD 29 (??/??/92) 3374.612  (m)        11071.54   (f) ADJ UNCH    2 0
 KK1111
 KK1111.Superseded values are not recommended for survey control.
 KK1111.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 KK1111.See file dsdata.txt to determine how the superseded data were derived.
 KK1111
 KK1111_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SDD253887(NAD 83)
 KK1111_MARKER: DB = BENCH MARK DISK
```

KK1111_SETTING: 80 = SET IN A BOULDER
KK1111_STAMPING: S 299 1951
KK1111_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
KK1111+STABILITY: SURFACE MOTION
KK1111
KK1111 HISTORY   - Date   Condition   Report By
KK1111 HISTORY   - 1951   MONUMENTED   CGS
KK1111
KK1111   STATION DESCRIPTION
KK1111
KK1111'DESCRIBED BY COAST AND GEODETIC SURVEY 1951
KK1111'12.2 MI E FROM DILLON.
KK1111'12.15 MILES EAST ALONG U.S. HIGHWAY 6 FROM THE PUBLIC SCHOOL AT
KK1111'DILLON, 0.3 MILE NORTHWEST OF A HIGHWAY MAINTENANCE BUILDING,
KK1111'232 FEET WEST OF A TELEPHONE POLE, AT A POINT WHERE THE TELEPHONE
KK1111'LINE CROSSES THE HIGHWAY, 100 FEET NORTHWEST OF THE CENTER
KK1111'LINE OF THE HIGHWAY, SET IN THE TOP OF A GRANITE BOULDER.

*** retrieval complete.
Elapsed Time = 00:00:01

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
DATABASE =  ,PROGRAM = datasheet, VERSION = 7.85
1        National Geodetic Survey,   Retrieval Date = AUGUST 25, 2010
 KK2135 ***********************************************************************
 KK2135  DESIGNATION -  W 299 RESET
 KK2135  PID         -  KK2135
 KK2135  STATE/COUNTY-  CO/SUMMIT
 KK2135  USGS QUAD   -  KEYSTONE (1987)
 KK2135
 KK2135                        *CURRENT SURVEY CONTROL
 KK2135  ______________________________________________________________________
 KK2135* NAD 83(2007)-  39 36 15.45747(N)    105 58 56.00795(W)     ADJUSTED
 KK2135* NAVD 88     -      2825.14   (meters)    9268.8    (feet)  RESET
 KK2135  ______________________________________________________________________
 KK2135  EPOCH DATE  -        2002.00
 KK2135  X           -  -1,355,494.317 (meters)                     COMP
 KK2135  Y           -  -4,732,711.518 (meters)                     COMP
 KK2135  Z           -   4,046,024.668 (meters)                     COMP
 KK2135  LAPLACE CORR-           4.63  (seconds)                    DEFLEC09
 KK2135  ELLIP HEIGHT-        2812.579 (meters)          (02/10/07) ADJUSTED
 KK2135  GEOID HEIGHT-         -12.55  (meters)                     GEOID09
 KK2135
 KK2135  ------- Accuracy Estimates (at 95% Confidence Level in cm) --------
 KK2135  Type    PID    Designation                       North   East  Ellip
 KK2135  ----------------------------------------------------------------------
 KK2135  NETWORK KK2135 W 299 RESET                        0.82   0.61   2.21
 KK2135  ----------------------------------------------------------------------
 KK2135  VERT ORDER  -  THIRD
 KK2135
 KK2135.The horizontal coordinates were established by GPS observations
 KK2135.and adjusted by the National Geodetic Survey in February 2007.
 KK2135
 KK2135.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).
 KK2135.See National Readjustment for more information.
 KK2135.The horizontal coordinates are valid at the epoch date displayed above.
 KK2135.The epoch date for horizontal control is a decimal equivalence
 KK2135.of Year/Month/Day.
 KK2135
 KK2135.The orthometric height was computed from unverified reset data.
 KK2135.No vertical observational check was made to the station.
 KK2135
 KK2135.The X, Y, and Z were computed from the position and the ellipsoidal ht.
 KK2135
 KK2135.The Laplace correction was computed from DEFLEC09 derived deflections.
 KK2135
 KK2135.The ellipsoidal height was determined by GPS observations
 KK2135.and is referenced to NAD 83.
 KK2135
```

KK2135.The geoid height was determined by GEOID09.
KK2135
KK2135; North East Units Scale Factor Converg.
KK2135;SPC CO C - 501,504.592 872,987.369 MT 0.99997442 -0 18 14.9
KK2135;SPC CO C - 1,645,352.98 2,864,126.06 sFT 0.99997442 -0 18 14.9
KK2135;UTM 13 - 4,384,299.991 415,674.883 MT 0.99968754 -0 37 34.3
KK2135
KK2135! - Elev Factor x Scale Factor = Combined Factor
KK2135!SPC CO C - 0.99955894 x 0.99997442 = 0.99953337
KK2135!UTM 13 - 0.99955894 x 0.99968754 = 0.99924662
KK2135
KK2135 SUPERSEDED SURVEY CONTROL
KK2135
KK2135 ELLIP H (12/03/02) 2812.597 (m) GP( ) 4 2
KK2135 NAD 83(1992)- 39 36 15.45675(N) 105 58 56.00646(W) AD( ) 1
KK2135 ELLIP H (12/08/98) 2812.635 (m) GP( ) 3 1
KK2135 NAVD 88 (12/08/98) 2825.15 (m) 9268.8 (f) LEVELING 3
KK2135 NGVD 29 (03/28/06) 2823.49 (m) 9263.4 (f) RESET 3
KK2135
KK2135.Superseded values are not recommended for survey control.
KK2135.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
KK2135.See file dsdata.txt to determine how the superseded data were derived.
KK2135
KK2135_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SDD1567484299(NAD 83)
KK2135_MARKER: DB = BENCH MARK DISK
KK2135_SETTING: 4 = OBJECT SURROUNDED BY MASS OF CONCRETE
KK2135_SP_SET: CONCRETE POST
KK2135_STAMPING: W 299 RESET 1987
KK2135_MARK LOGO: NGS
KK2135_PROJECTION: FLUSH
KK2135_MAGNETIC: N = NO MAGNETIC MATERIAL
KK2135_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
KK2135+STABILITY: SURFACE MOTION
KK2135_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
KK2135+SATELLITE: SATELLITE OBSERVATIONS - August 17, 1998
KK2135
KK2135 HISTORY - Date Condition Report By
KK2135 HISTORY - 1987 MONUMENTED NGS
KK2135 HISTORY - 19980817 GOOD CODOT
KK2135
KK2135 STATION DESCRIPTION
KK2135
KK2135'DESCRIBED BY NATIONAL GEODETIC SURVEY 1987
KK2135'0.6 KM (0.40 MI) WEST FROM KEYSTONE.
KK2135'0.6 KM (0.35 MI) WEST FROM THE INTERSECTION OF STATE HIGHWAY 6 AND
KK2135'KEYSTONE ROAD IN THE CENTER OF KEYSTONE RESORT AREA, 29.3 M (96.1 FT)
KK2135'SOUTH OF THE CENTERLINE OF HIGHWAY, 11.3 M (37.1 FT) WEST OF THE
KK2135'NORTHWEST CORNER OF UNIT 2181 PINES 10 CONDOMINIUM, 28.6 M (93.8 FT)
KK2135'NORTHEAST OF A FENCE CORNER, AND SET ON TOP OF AN EARTH BERM ON THE
KK2135'SOUTHSIDE OF THE HIGHWAY.
KK2135'THE MARK IS 38.1 FT N FROM A WITNESS POST
KK2135'THE MARK IS 9.8 FT ABOVE STATE HIGHWAY 6.
KK2135
KK2135 STATION RECOVERY (1998)
KK2135
KK2135'RECOVERY NOTE BY COLORADO DEPARTMENT OF TRANSPORTATION 1998 (KAW)
KK2135'THE STATION WILL BE USED DURING A CHARN DENSIFICATION PROJECT THE

KK2135'STATION IS LOCATED IN KEYSTONE AT US 6 MILEPOST 214.5 IN THE NORTHWEST
KK2135'1/4 OF SECTION 23, T 5 S, R 77 W, 6TH P.M OWNERSHIP-- UNKNOWN TO
KK2135'REACH THE STATION FROM THE JUNCTION OF US 6 AND I 70 (I 70 EXIT 205)
KK2135'PROCEED SOUTHEAST ON US 6 FOR 5.7 MI (9.2 KM) TO THE STATION ON THE
KK2135'RIGHT ON TOP OF AN EARTHEN BERM ON THE SOUTH SIDE OF THE HIGHWAY. IT
KK2135'IS 0.35 MI (0.56 KM) WEST FROM THE INTERSECTION OF US 6 AND KEYSTONE
KK2135'ROAD IN THE CENTER OF THE KEYSTONE RESORT AREA THE STATION IS A BRASS
KK2135'NGS BENCHMARK DISK IN A CONCRETE POST PROJECTING 8 CM FROM THE GROUND.
KK2135'IT IS 22.5 M (73.8 FT) SOUTH OF THE CENTER OF EASTBOUND US 6, 28.6 M
KK2135'(93.8 FT) NORTHEAST OF A FENCE CORNER, 16.7 M (54.8 FT) SOUTHEAST OF A
KK2135'PHONE RISER, 11.3 M (37.1 FT) WEST OF THE NORTHWEST CORNER OF UNIT
KK2135'2181 PINES 10 CONDOMINIUM AND 10.4 M (34.1 FT) SOUTH OF A FIBERGLASS
KK2135'NGS WITNESS POST. THE STATION IS APPROX. 3 M (9.8 FT) ABOVE US 6
KK2135'DESCRIPTION BY K A WILLIAMS, CODOT

*** retrieval complete.
Elapsed Time = 00:00:00

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
DATABASE =  ,PROGRAM = datasheet, VERSION = 7.85
1        National Geodetic Survey,   Retrieval Date = AUGUST 25, 2010
 LL0793 ***********************************************************************
 LL0793  DESIGNATION -  WINDY GAP
 LL0793  PID         -  LL0793
 LL0793  STATE/COUNTY-  CO/GRAND
 LL0793  USGS QUAD   -  GRANBY (1978)
 LL0793
 LL0793                        *CURRENT SURVEY CONTROL
 LL0793  ______________________________________________________________________
 LL0793* NAD 83(2007)-  40 06 07.66758(N)    105 58 25.32555(W)     ADJUSTED
 LL0793* NAVD 88     -      2398.459  (meters)    7868.94   (feet)  ADJUSTED
 LL0793  ______________________________________________________________________
 LL0793  EPOCH DATE  -        2002.00
 LL0793  X           -  -1,344,948.224 (meters)                     COMP
 LL0793  Y           -  -4,698,530.147 (meters)                     COMP
 LL0793  Z           -   4,088,202.905 (meters)                     COMP
 LL0793  LAPLACE CORR-           1.23  (seconds)                    DEFLEC09
 LL0793  ELLIP HEIGHT-        2385.848 (meters)          (02/10/07) ADJUSTED
 LL0793  GEOID HEIGHT-         -12.59  (meters)                     GEOID09
 LL0793  DYNAMIC HT  -        2395.816 (meters)    7860.27  (feet)  COMP
 LL0793
 LL0793  ------- Accuracy Estimates (at 95% Confidence Level in cm) --------
 LL0793  Type    PID    Designation                       North   East  Ellip
 LL0793  ----------------------------------------------------------------------
 LL0793  NETWORK LL0793 WINDY GAP                          1.04   0.76   3.96
 LL0793  ----------------------------------------------------------------------
 LL0793  MODELED GRAV-     979,437.9   (mgal)                       NAVD 88
 LL0793
 LL0793  VERT ORDER  -  FIRST     CLASS II
 LL0793
 LL0793.The horizontal coordinates were established by GPS observations
 LL0793.and adjusted by the National Geodetic Survey in February 2007.
 LL0793
 LL0793.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).
 LL0793.See National Readjustment for more information.
 LL0793.The horizontal coordinates are valid at the epoch date displayed above.
 LL0793.The epoch date for horizontal control is a decimal equivalence
 LL0793.of Year/Month/Day.
 LL0793
 LL0793.The orthometric height was determined by differential leveling and
 LL0793.adjusted in June 1991.
 LL0793
 LL0793.The X, Y, and Z were computed from the position and the ellipsoidal ht.
 LL0793
 LL0793.The Laplace correction was computed from DEFLEC09 derived deflections.
 LL0793
```

LL0793.The ellipsoidal height was determined by GPS observations
LL0793.and is referenced to NAD 83.
LL0793
LL0793.The geoid height was determined by GEOID09.
LL0793
LL0793.The dynamic height is computed by dividing the NAVD 88
LL0793.geopotential number by the normal gravity value computed on the
LL0793.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
LL0793.degrees latitude (g = 980.6199 gals.).
LL0793
LL0793.The modeled gravity was interpolated from observed gravity values.
LL0793

	North	East	Units	Scale Factor	Converg.
SPC CO N -	390,267.986	874,012.756	MT	0.99996019	-0 18 21.9
SPC CO N -	1,280,404.22	2,867,490.18	sFT	0.99996019	-0 18 21.9
UTM 13 -	4,439,547.012	417,008.398	MT	0.99968479	-0 37 38.1

	Elev Factor	x	Scale Factor	=	Combined Factor
SPC CO N -	0.99962586	x	0.99996019	=	0.99958606
UTM 13 -	0.99962586	x	0.99968479	=	0.99931076

	Primary Azimuth Mark	Grid Az
SPC CO N -	WINDY GAP AZ MK	332 45 00.5
UTM 13 -	WINDY GAP AZ MK	333 04 16.7

PID	Reference Object	Distance	Geod. Az
			dddmmss.s
LL0794	WINDY GAP RM 1	15.412 METERS	07100
LL0792	WINDY GAP RM 2	14.186 METERS	32741
CP9384	WINDY GAP AZ MK		3322638.6

SUPERSEDED SURVEY CONTROL

ELLIP H (12/03/02)	2385.852 (m)			GP( )	4	2
NAD 83(1992)-	40 06 07.66675(N)	105 58 25.32463(W)		AD( )	1	
ELLIP H (05/02/00)	2385.928 (m)			GP( )	4	1
NAD 83(1992)-	40 06 07.66587(N)	105 58 25.32501(W)		AD( )	2	
NAD 83(1986)-	40 06 07.65907(N)	105 58 25.32124(W)		AD( )	2	
NAD 27 -	40 06 07.71000(N)	105 58 23.26000(W)		AD( )	2	
NAVD 88 (05/02/00)	2398.46 (m)	7868.9	(f) LEVELING		3	
NGVD 29 (??/??/92)	2397.084 (m)	7864.43	(f) ADJ UNCH		1	2

LL0793
LL0793.Superseded values are not recommended for survey control.
LL0793.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
LL0793.See file dsdata.txt to determine how the superseded data were derived.
LL0793
LL0793_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TDE1700839547(NAD 83)
LL0793_MARKER: DS = TRIANGULATION STATION DISK
LL0793_SETTING: 80 = SET IN A BOULDER
LL0793_STAMPING: WINDY GAP 1951
LL0793_MARK LOGO: CGS
LL0793_MAGNETIC: O = OTHER; SEE DESCRIPTION
LL0793_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
LL0793+STABILITY: SURFACE MOTION
LL0793_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

LL0793+SATELLITE: SATELLITE OBSERVATIONS - March 29, 2006
LL0793
LL0793 HISTORY   - Date   Condition   Report By
LL0793 HISTORY   - 1951   MONUMENTED   CGS
LL0793 HISTORY   - 1954   GOOD   CGS
LL0793 HISTORY   - 1954   GOOD   NGS
LL0793 HISTORY   - 20000113 GOOD   SLSS
LL0793 HISTORY   - 20060329 GOOD   INDIV
LL0793
LL0793   STATION DESCRIPTION
LL0793
LL0793'DESCRIBED BY COAST AND GEODETIC SURVEY 1951 (WRH)
LL0793'STATION IS LOCATED, AIRLINE, ABOUT 2-1/2 MILES WEST NORTHWEST
LL0793'OF GRANBY, 0.1 MILE NORTHWEST OF THE HIGHWAY BRIDGE OVER THE
LL0793'COLORADO RIVER, 0.7 MILE SOUTHEAST OF THE JUNCTION OF STATE
LL0793'HIGHWAY 125 AND 1/4 MILE NORTH NORTHWEST OF THE CONFLUENCE OF
LL0793'THE COLORADO AND FRASER RIVERS. IT IS ON TOP OF A ROCKY HIGHWAY
LL0793'CUT EMBANKMENT ON THE NORTHEAST SIDE OF U.S. HIGHWAY 40.
LL0793'
LL0793'TO REACH THE STATION FROM THE U.S. POST OFFICE IN GRANBY,
LL0793'GO WEST ON U.S. HIGHWAY 40 FOR 2.1 MILES TO THE BRIDGE OVER
LL0793'THE COLORADO RIVER. CONTINUE ON THE HIGHWAY FOR 0.1 MILE
LL0793'TO THE STATION ON THE RIGHT SIDE OF THE HIGHWAY.
LL0793'
LL0793'STATION MARK, STAMPED WINDY GAP 1951, IS A STANDARD DISK
LL0793'CEMENTED IN A DRILL HOLE IN OUTCROPPING BEDROCK THAT PROJECTS
LL0793'2 INCHES. IT IS ABOUT 50 FEET EAST OF THE CENTERLINE OF THE
LL0793'HIGHWAY, 34 FEET WEST OF A FENCE LINE AND 8 FEET SOUTH OF
LL0793'A WITNESS POST.
LL0793'
LL0793'REFERENCE MARK NUMBER 1, STAMPED WINDY GAP NO 1 1951, IS
LL0793'A STANDARD DISK CEMENTED IN A DRILL HOLE IN A 1-1/2 BY 3 FOOT
LL0793'BOULDER THAT PROJECTS 10 INCHES. IT IS 2 FEET HIGHER IN
LL0793'ELEVATION THAN THE STATION AND 16.4 FEET EAST OF THE FENCE LINE.
LL0793'
LL0793'REFERENCE MARK NUMBER 2, STAMPED WINDY GAP NO 2 1951, IS A
LL0793'STANDARD DISK CEMENTED IN A DRILL HOLE IN OUTCROPPING BEDROCK
LL0793'THAT IS FLUSH WITH THE GROUND AND 3 FEET HIGHER IN ELEVATION
LL0793'THAN THE STATION. IT IS 3 FEET EAST OF THE EDGE OF THE CUT BANK.
LL0793'
LL0793'AZIMUTH MARK, STAMPED WINDY GAP 1951, IS A STANDARD DISK
LL0793'CEMENTED IN A DRILL HOLE IN A 2 BY 2 FOOT BOULDER THAT PROJECTS
LL0793'1 FOOT. TO REACH FROM THE STATION, GO WEST ON U.S. HIGHWAY
LL0793'40 FOR 0.7 MILE TO THE JUNCTION WITH STATE HIGHWAY 125 ON
LL0793'THE RIGHT. FROM HERE THE AZIMUTH MARK IS ABOUT 0.1 MILE
LL0793'NORTHEAST ON TOP OF THE THIRD LITTLE HILL TO THE RIGHT OF
LL0793'STATE HIGHWAY 125.
LL0793'
LL0793'HEIGHT OF LIGHT ABOVE STATION MARK 1.4 METERS.
LL0793
LL0793   STATION RECOVERY (1954)
LL0793
LL0793'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1954
LL0793'2.6 MILES WEST ALONG U.S. HIGHWAY 40 FROM THE POST OFFICE AT
LL0793'GRANBY, 0.7 MILE EAST OF A JUNCTION WITH STATE HIGHWAY 125,
LL0793'0.1 MILE WEST OF A BRIDGE OVER THE COLORADO RIVER, 45 FEET
LL0793'NORTHEAST OF THE CENTER LINE OF THE HIGHWAY, 47 FEET SOUTHEAST

LL0793'OF A POWER POLE, 35 FEET SOUTHWEST OF A FENCE, 6.8 FEET SOUTH
LL0793'OF A WITNESS POST, 9 FEET ABOVE THE LEVEL OF THE HIGHWAY,
LL0793'0.2 FOOT ABOVE THE GROUND, A TRIANGULATION STATION DISK SET
LL0793'IN THE TOP OF A SMALL GRANITE BOULDER, STAMPED WINDY GAP 1951.
LL0793'
LL0793'WINDY GAP R.M. 1 IS 50.5 FEET EAST OF TRIANGULATION STATION
LL0793'WINDY GAP 1951, 94.4 FEET NORTHEAST OF THE CENTER LINE OF THE
LL0793'HIGHWAY, 16.4 FEET NORTHEAST OF A FENCE, 62 FEET SOUTHEAST
LL0793'OF A POWER POLE, 14 FEET ABOVE THE LEVEL OF THE HIGHWAY, 1
LL0793'FOOT ABOVE THE GROUND, A REFERENCE MARK DISK SET IN THE TOP
LL0793'OF A 2 X 4 FOOT GRANITE BOULDER, STAMPED WINDY GAP NO 1 1951.
LL0793'
LL0793'WINDY GAP R.M. 2 IS 46.5 FEET NORTHWEST OF TRIANGULATION
LL0793'STATION WINDY GAP 1951, 39 FEET NORTHEAST OF THE CENTER LINE
LL0793'OF THE HIGHWAY, 12.5 FEET SOUTHWEST OF A POWER POLE, 39.5
LL0793'FEET SOUTHWEST OF A FENCE, 12 FEET ABOVE THE LEVEL OF THE
LL0793'HIGHWAY, 0.2 FOOT ABOVE THE GROUND, A REFERENCE MARK DISK
LL0793'SET IN THE TOP OF A GRANITE OUTCROP, STAMPED WINDY GAP NO 2 1951.
LL0793
LL0793 STATION RECOVERY (1954)
LL0793
LL0793'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1954
LL0793'2.6 MI W FROM GRANBY.
LL0793'2.6 MILES WEST ALONG U.S. HIGHWAY 40 FROM THE POST OFFICE
LL0793'AT GRANBY, 0.7 MILE EAST OF A JUNCTION WITH STATE HIGHWAY 125,
LL0793'0.1 MILE WEST OF A BRIDGE OVER THE COLORADO RIVER, 45 FEET
LL0793'NORTHEAST OF THE CENTER LINE OF THE HIGHWAY, 47 FEET SOUTHEAST OF
LL0793'A POWER POLE, 35 FEET SOUTHWEST OF A FENCE, 6.8 FEET SOUTH OF A
LL0793'WITNESS POST, 9 FEET ABOVE THE LEVEL OF THE HIGHWAY, 0.2 FOOT
LL0793'ABOVE THE GROUND, SET IN THE TOP OF A SMALL GRANITE BOULDER.
LL0793
LL0793 STATION RECOVERY (2000)
LL0793
LL0793'RECOVERY NOTE BY STEPHENSON LAND SURVEYING SERVICES 2000 (GFS)
LL0793'THE STATION IS LOCATED ABOUT 2.6 MI (4.2 KM) WEST ALONG U.S. HIGHWAY
LL0793'40 FROM GRANBY, 0.7 MI (1.1 KM) EAST FROM THE INTERSECTION OF STATE
LL0793'HIGHWAY 125 AND U.S. HIGHWAY 40, 0.1 MI (0.2 KM) WEST FROM A BRIDGE
LL0793'OVER THE COLORADO RIVER, IN THE SOUTHWEST 1/4 0F SECTION 25, T 2 N, R
LL0793'77 W, AT U. S. HIGHWAY 40 MILEPOST 209.9. OWNERSHIP--COLORADO DEPT.
LL0793'OF TRANSPORTATION RIGHT-OF-WAY
LL0793'TO REACH THE STATION FROM THE INTERSECTION OF U. S. HIGHWAY 40 AND
LL0793'STATE HIGHWAY 125, GO EAST ON U. S. HIGHWAY 40 FOR 0.7 MI (1.1 KM)
LL0793'TO THE STATION ON THE LEFT
LL0793'THE MARK IS A STANDARD DISK IN A DRILL HOLE IN A BOULDER 30 CM BY 45
LL0793'CM, PROJECTING 3 CM ABOVE THE GROUND. IT IS 29.2 M (95.8 FT)
LL0793'NORTHEAST FROM THE CENTERLINE OF U. S. HIGHWAY 40, 10.4 M (34.1 FT)
LL0793'SOUTHWEST FROM A RIGHT-OF-WAY FENCE, 0.7 M (2.3 FT) NORTHEAST FROM A
LL0793'WITNESS POST, ABOUT 3 M (9.8 FT) ABOVE THE HIGHWAY AND 1 M (3.3 FT)
LL0793'FROM THE EDGE OF A ROAD CUT.
LL0793
LL0793 STATION RECOVERY (2006)
LL0793
LL0793'RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2006 (HPB)
LL0793'RECOVERD AS DESCRIBED

*** retrieval complete.
Elapsed Time = 00:00:00

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
DATABASE =  ,PROGRAM = datasheet, VERSION = 7.85
1        National Geodetic Survey,   Retrieval Date = AUGUST 25, 2010
 DF5537 ***********************************************************************
 DF5537  DESIGNATION -  Y 450
 DF5537  PID         -  DF5537
 DF5537  STATE/COUNTY-  CO/SUMMIT
 DF5537  USGS QUAD   -  DILLON (1987)
 DF5537
 DF5537                        *CURRENT SURVEY CONTROL
 DF5537  ______________________________________________________________________
 DF5537* NAD 83(2007)-  39 38 59.53287(N)    106 04 46.62461(W)     ADJUSTED
 DF5537* NAVD 88     -      2651.566  (meters)    8699.35   (feet)  ADJUSTED
 DF5537  ______________________________________________________________________
 DF5537  EPOCH DATE  -        2002.00
 DF5537  X           -  -1,362,605.884 (meters)                     COMP
 DF5537  Y           -  -4,727,169.642 (meters)                     COMP
 DF5537  Z           -   4,049,813.068 (meters)                     COMP
 DF5537  LAPLACE CORR-           0.28  (seconds)                    DEFLEC09
 DF5537  ELLIP HEIGHT-        2638.964 (meters)          (02/10/07) ADJUSTED
 DF5537  GEOID HEIGHT-         -12.59  (meters)                     GEOID09
 DF5537  DYNAMIC HT  -        2648.314 (meters)    8688.68  (feet)  COMP
 DF5537
 DF5537  ------- Accuracy Estimates (at 95% Confidence Level in cm) --------
 DF5537  Type    PID    Designation                      North   East  Ellip
 DF5537  ----------------------------------------------------------------
 DF5537  NETWORK DF5537 Y 450                             0.92   0.74   1.41
 DF5537  ----------------------------------------------------------------
 DF5537  MODELED GRAV-     979,304.7   (mgal)                      NAVD 88
 DF5537
 DF5537  VERT ORDER  -  FIRST     CLASS II
 DF5537
 DF5537.The horizontal coordinates were established by GPS observations
 DF5537.and adjusted by the National Geodetic Survey in February 2007.
 DF5537
 DF5537.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).
 DF5537.See National Readjustment for more information.
 DF5537.The horizontal coordinates are valid at the epoch date displayed above.
 DF5537.The epoch date for horizontal control is a decimal equivalence
 DF5537.of Year/Month/Day.
 DF5537
 DF5537.The orthometric height was determined by differential leveling and
 DF5537.adjusted in November 2003.
 DF5537
 DF5537.The X, Y, and Z were computed from the position and the ellipsoidal ht.
 DF5537
 DF5537.The Laplace correction was computed from DEFLEC09 derived deflections.
 DF5537
```

DF5537.The ellipsoidal height was determined by GPS observations
DF5537.and is referenced to NAD 83.
DF5537
DF5537.The geoid height was determined by GEOID09.
DF5537
DF5537.The dynamic height is computed by dividing the NAVD 88
DF5537.geopotential number by the normal gravity value computed on the
DF5537.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
DF5537.degrees latitude (g = 980.6199 gals.).
DF5537
DF5537.The modeled gravity was interpolated from observed gravity values.
DF5537

		North	East	Units	Scale Factor	Converg.
DF5537;SPC CO C	-	506,613.504	864,655.395	MT	0.99998173	-0 21 56.0
DF5537;SPC CO C	-	1,662,114.47	2,836,790.24	sFT	0.99998173	-0 21 56.0
DF5537;UTM 13	-	4,389,454.298	407,374.154	MT	0.99970563	-0 41 20.2

DF5537

		Elev Factor	x	Scale Factor	=	Combined Factor
DF5537!SPC CO C	-	0.99958616	x	0.99998173	=	0.99956790
DF5537!UTM 13	-	0.99958616	x	0.99970563	=	0.99929191

DF5537

DF5537 SUPERSEDED SURVEY CONTROL

DF5537

DF5537 NAD 83(1992)-	39 38 59.53224(N)	106 04 46.62300(W)	AD( )	1		
DF5537 ELLIP H (10/27/04)	2638.974 (m)		GP( )	4	2	
DF5537 NAVD 88 (10/27/04)	2651.57 (m)	8699.4 (f)	LEVELING	3		

DF5537
DF5537.Superseded values are not recommended for survey control.
DF5537.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DF5537.See file dsdata.txt to determine how the superseded data were derived.
DF5537
DF5537_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SDD0737489454(NAD 83)
DF5537_MARKER: DV = VERTICAL CONTROL DISK
DF5537_SETTING: 32 = SET IN A RETAINING WALL OR CONCRETE LEDGE
DF5537_SP_SET: CULVERT HEADWALL
DF5537_STAMPING: Y 450 2001
DF5537_MARK LOGO: NGS
DF5537_MAGNETIC: M = MARKER EQUIPPED WITH BAR MAGNET
DF5537_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
DF5537+STABILITY: SURFACE MOTION
DF5537_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
DF5537+SATELLITE: SATELLITE OBSERVATIONS - August 31, 2007
DF5537

DF5537 HISTORY	-	Date	Condition	Report By
DF5537 HISTORY	-	20011019	MONUMENTED	NGS
DF5537 HISTORY	-	20040130	GOOD	MSAM
DF5537 HISTORY	-	20070831	GOOD	MSCD

DF5537

DF5537 STATION DESCRIPTION

DF5537
DF5537'DESCRIBED BY NATIONAL GEODETIC SURVEY 2001 (RSC)
DF5537'THE STATION IS LOCATED ABOUT 4.15 MI WEST-NORTHWEST OF TENDERFOOT
DF5537'MOUNTAIN, 0.2 MI
DF5537'WEST OF WHERE WILLOW CREEK JOINS THE BLUE RIVER AND IN THE NORTHERN
DF5537'PART OF
DF5537'SILVERTHORNE, IN THE NORTHWEST 1/4 OF SECTION 1, T 5 S, R 78 W, AT
DF5537'STATE HIGHWAY 9

DF5537'MILEPOST 103.25. OWNERSHIP--COLORADO DEPT. OF TRANSPORTATION
DF5537'RIGHT-OF-WAY.
DF5537'
DF5537'TO REACH THE STATION FROM INTERSTATE 70 EXIT 205, SILVERTHORNE-DILLON
DF5537'EXIT, GO NORTH
DF5537'ON STATE HIGHWAY 9 FOR 1.7 MI TO THE INTERSECTION OF BLUE RIVER
DF5537'PARKWAY, STATE HIGHWAY
DF5537'9, AND BLUE RIVER CIRCLE. TURN RIGHT, TO THE NORTHEAST CORNER OF THE
DF5537'INTERSECTION AND
DF5537'THE STATION IN A CONCRETE HEADWALL FOR WILLOW CREEK.
DF5537'
DF5537'THE MARK IS A STANDARD DISK SET INTO A DRILL HOLE IN THE TOP OF THE
DF5537'NORTH END OF A 5.2 M
DF5537'LONG CONCRETE HEADWALL FOR A BOX CULVERT FOR WILLOW CREEK. IT IS 1.4 M
DF5537'ABOVE THE WATER
DF5537'LEVEL. IT IS 25.6 M NORTH FROM THE CENTER OF BLUE RIVER CIRCLE, 11.0 M
DF5537'EAST FROM THE CENTER
DF5537'LINE OF THE NORTHBOUND LANES OF STATE HIGHWAY 9, 5.9 M EAST FROM TOP
DF5537'OF GUARD RAIL, 5.3 M
DF5537'NORTH FROM AN ANGLE IRON FENCE POST AT THE SOUTH END OF THE CULVERT,
DF5537'0.4 M SOUTH FROM
DF5537'A WITNESS POST, 0.1 M SOUTH FROM THE NORTH END OF THE CULVERT AND
DF5537'ABOUT 1.2 M BELOW
DF5537'STATE HIGHWAY 9.
DF5537'
DF5537'
DF5537
DF5537 STATION RECOVERY (2004)
DF5537
DF5537'RECOVERY NOTE BY MOUNTAIN SURVEYING AND MAPPING INC 2004 (KCH)
DF5537'RECOVERY NOTE BY MOUNTAIN SURVEYING AND MAPPING, INC. 2004 (BAJ)
DF5537'RECOVERED AS DESCRIBED
DF5537
DF5537 STATION RECOVERY (2007)
DF5537
DF5537'RECOVERY NOTE BY METROPOLITAN STATE COLLEGE-DENVER 2007 (RBP)
DF5537'RECOVERED IN GOOD CONDITION.

*** retrieval complete.
Elapsed Time = 00:00:00

ITRF 00
DENVER WAAS 1 (ZDV1), COLORADO

Retrieved from NGS DataBase on 05/08/07 at 14:42:23.

Antenna Reference Point(ARP): DENVER WAAS 1 CORS ARP

PID = DF9219

ITRF00 POSITION (EPOCH 1997.0)
Computed in December, 2003 using 22 days of data.

X =	-1273628.261 m	latitude	= 40 11 14.29552 N
Y =	-4711375.239 m	longitude	= 105 07 37.99705 W
Z =	4094889.912 m	ellipsoid height	= 1540.910 m

ITRF00 VELOCITY
Predicted with HTDP_2.7 November 2003.

VX =	-0.0171 m/yr	northward	= -0.0081 m/yr
VY =	-0.0012 m/yr	eastward	= -0.0162 m/yr
VZ =	-0.0059 m/yr	upward	= 0.0005 m/yr

NAD_83 (CORS96) POSITION (EPOCH 2002.0)
Transformed from ITRF00 (epoch 1997.0) position in Dec. 2003.

X =	-1273627.718 m	latitude	= 40 11 14.27224 N
Y =	-4711376.557 m	longitude	= 105 07 37.96036 W
Z =	4094889.927 m	ellipsoid height	= 1541.783 m

NAD_83 (CORS96) VELOCITY
Transformed from ITRF00 velocity in Dec. 2003.

VX =	0.0000 m/yr	northward	= 0.0000 m/yr
VY =	-0.0000 m/yr	eastward	= 0.0000 m/yr
VZ =	0.0000 m/yr	upward	= 0.0000 m/yr

L1 Phase Center of the current GPS antenna: DENVER WAAS 1 CORS L1 PC C
The WAAS L1/L2/L5 antenna
(Antenna Code = MPL_WAAS_2225NW) was installed on 04/24/07.
The L2 phase center is 0.002 m above the L1 phase center.
PID = DI6103

ITRF00 POSITION (EPOCH 1997.0)
Computed in December, 2003 using 22 days of data.

X =	-1273628.356 m	latitude	= 40 11 14.29553 N
Y =	-4711375.579 m	longitude	= 105 07 37.99720 W
Z =	4094890.210 m	ellipsoid height	= 1541.372 m

The ITRF00 VELOCITY of the L1 PC is the same as that for the ARP.

NAD_83 (CORS96) POSITION (EPOCH 2002.0)
Transformed from ITRF00 (epoch 1997.0) position in Dec. 2003.

X =	-1273627.813 m	latitude	= 40 11 14.27225 N
Y =	-4711376.897 m	longitude	= 105 07 37.96051 W
Z =	4094890.225 m	ellipsoid height	= 1542.246 m

The NAD_83 (CORS96) VELOCITY of the L1 PC is the same as that for the ARP.

* Latitude, longitude and ellipsoid height are computed from their corresponding cartesian coordinates using dimensions for the

GRS 80 ellipsoid: semi-major axis = 6,378,137.0 meters
flattening = 1/298.257222101...

* WARNING: Mixing of antenna types can lead to errors of up to 10 cm.
in height unless antenna-phase-center variation is properly modeled.

* For additional information about the interpretation and/or derivation
of these positions and velocities, consult
http://www.ngs.noaa.gov/CORS/Derivation.html.
For additional information on the relation of the GPS antenna to other
relevant points at the site and on GPS equipment, consult the
link ftp://www.ngs.noaa.gov/cors/.html/zdv1.log.txt

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 Base + Control

PROJECT 1-100116
OPERATOR MB
DATE 8.1.10

SITE NUMBER 1
SITE NAME M 361

TRACKING TIMES (LOCAL) MEASURE ✓
START 7:46 a.
STOP

SENSOR TYPE 500 9500 399 299
MEMORY CARD 603
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 0.360

OBSTRUCTIONS:

HEIGHT READINGS MTS FT
1.230

AT502 1.590

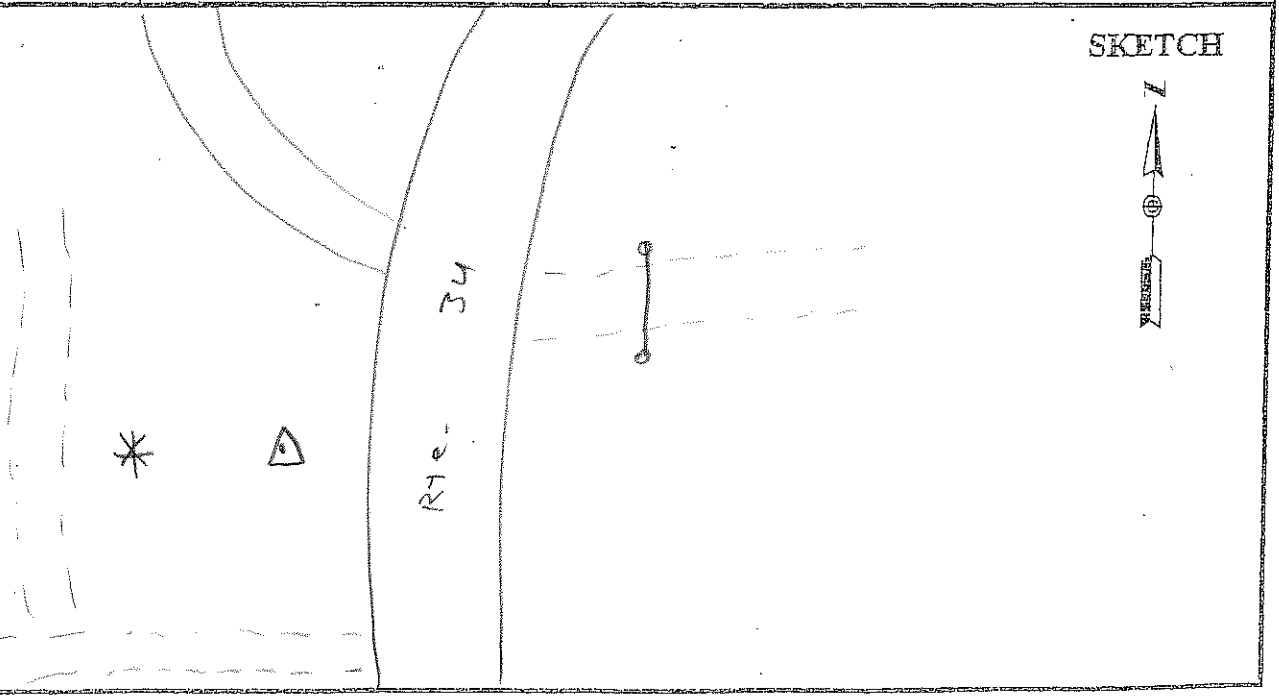
STATION DESCRIPTIONS USC + GS cap/
conc. mon.
"M 361 1954"

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
846	1.9	6/8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
40 10 20.3
105 54 03.3

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 Base

PROJECT 1-160116
OPERATOR MS
DATE 8.1.10

SITE NUMBER 1
SITE NAME 101

TRACKING TIMES (LOCAL) MEASURE ✓
START 7:04a.
STOP

SENSOR TYPE 500 9500 399 299
MEMORY CARD 704
BATTERY NO. CB
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 0.360

OBSTRUCTIONS: none

HEIGHT READINGS MTS FT
1.331

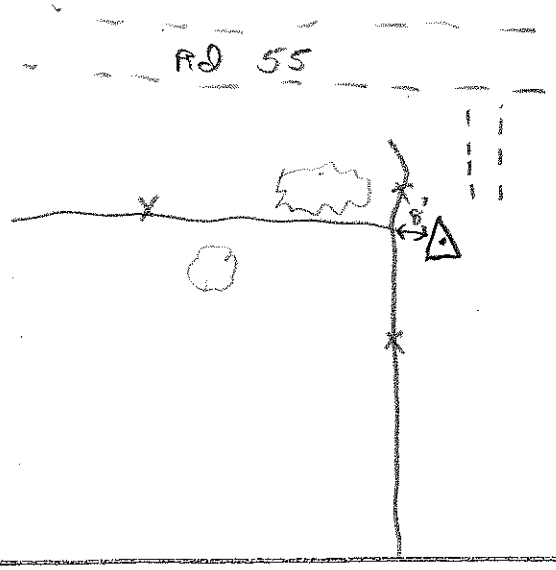
STATION DESCRIPTIONS set 6" rebar w/cap
CAN BE USED AS A CHECKPOINT

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
804	2.2	6/7

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
40 01 51.4
105 56 25.6

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 VPT

PROJECT 1-100116
OPERATOR MB
DATE 8.1.10

SITE NUMBER 1
SITE NAME 1

TRACKING TIMES (LOCAL) MEASURE ✓
START 8:14 a
STOP 8:54 a

SENSOR TYPE 500 9500 399 299
MEMORY CARD 231
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/~~9500~~ ~~0.389~~
500 0.360

HEIGHT READINGS MTS FT
1.420
1.780

OBSTRUCTIONS: trees E

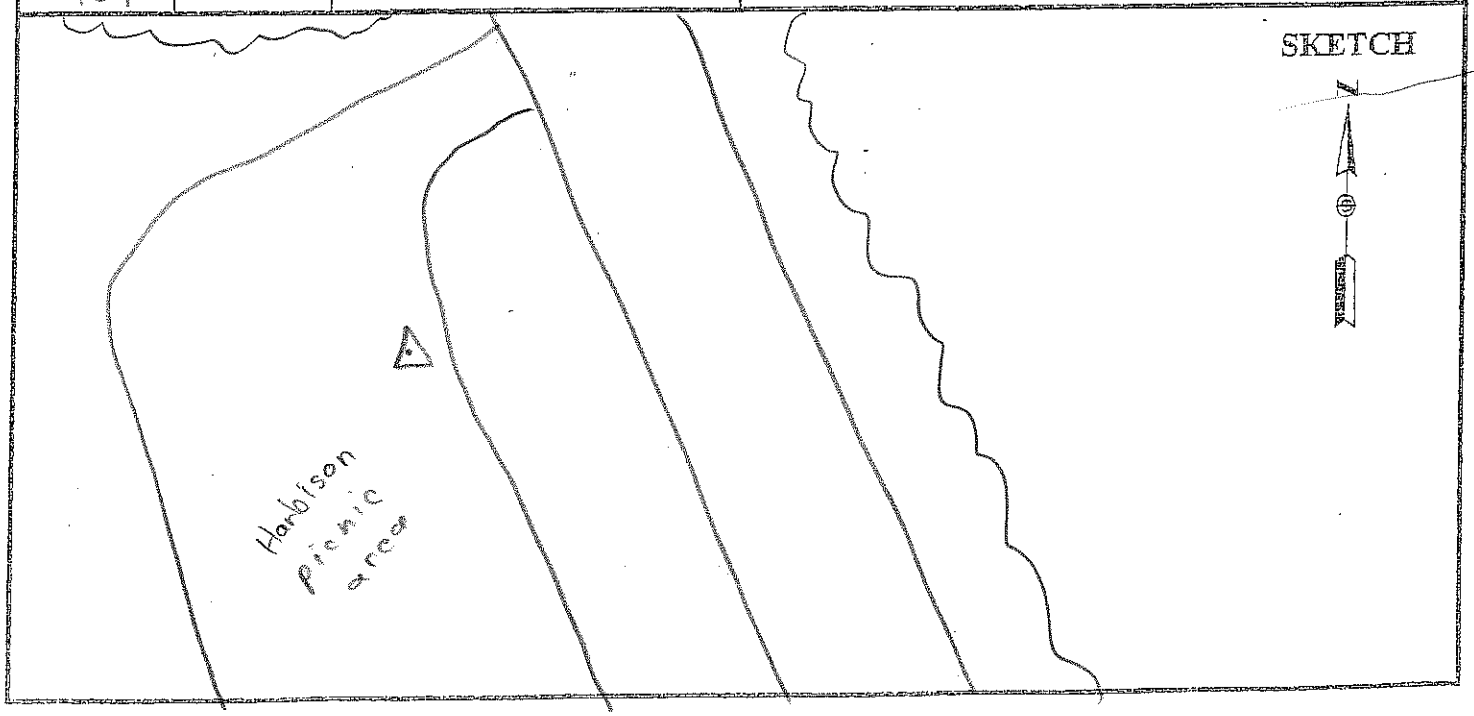
STATION DESCRIPTIONS paved parking lot

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
914	1.8	7/8
954		

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 ✓ PT

PROJECT 1-100116
OPERATOR MB
DATE 8·1·10

SITE NUMBER 2
SITE NAME 2

TRACKING TIMES (LOCAL) MEASURE ✓
START 9:06 a.
STOP 9:43 a.

SENSOR TYPE 500 9500 399 299
MEMORY CARD 731
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 0.360

OBSTRUCTIONS: trees E + W

HEIGHT READINGS MTS FT
1.421

AT 502 1781

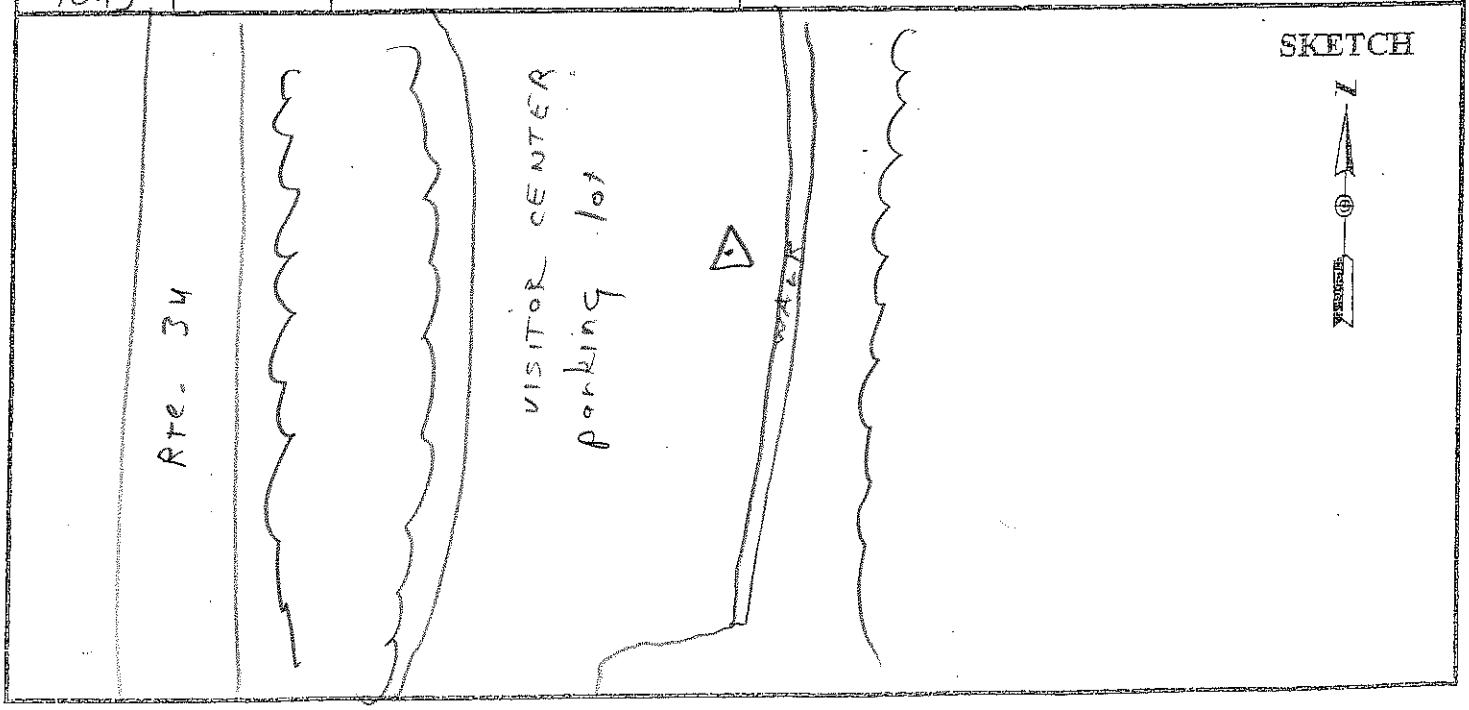
STATION DESCRIPTIONS paved parking lot

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
1006	5.7	5/5
1043		

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 ✓ PT

PROJECT 1-100116
OPERATOR NB
DATE 8.1.10

SITE NUMBER 3
SITE NAME 3

TRACKING TIMES (LOCAL) MEASURE _____
START 9:57a.
STOP 10:37a.

SENSOR TYPE 500 9500 399 299
MEMORY CARD 731
BATTERY NO. _____
CONTROLLER NO. _____
SENSOR NO. _____

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
(500) (0.360)

OBSTRUCTIONS: trees all quads

HEIGHT READINGS MTS FT
1.392 _____

STATION DESCRIPTIONS in turn-around

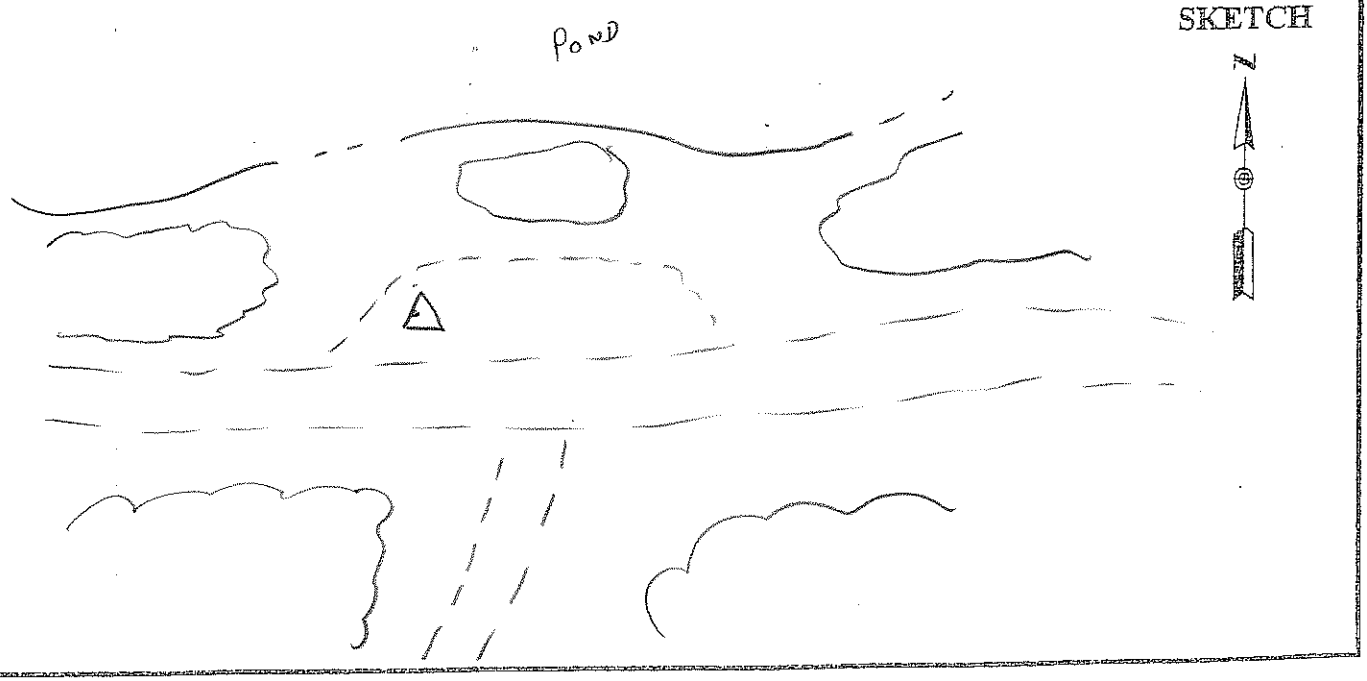
AT502 1.752

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
1057	3.5	5/6
1137		

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 ✓PT

PROJECT 1-100116
OPERATOR MB
DATE 8·1·10

SITE NUMBER 4
SITE NAME 4

TRACKING TIMES (LOCAL) MEASURE ✓
START 11:07a
STOP 11:43a

SENSOR TYPE 500 9500 399 299
MEMORY CARD 731
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 0.360

OBSTRUCTIONS: trees NW → SE + S

HEIGHT READINGS MTS FT
1.392

STATION DESCRIPTIONS in gravel wide spot

AT502 1752

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
1207	3.3	8/8
1243		

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

SKETCH

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 ✓ PT

PROJECT 1-100116
OPERATOR MB
DATE 8.1.10

SITE NUMBER 5
SITE NAME 5

TRACKING TIMES (LOCAL) MEASURE ✓
START 12:02 P
STOP 12:32 P

SENSOR TYPE 500 9500 399 299
MEMORY CARD 731
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
(500) (0.360)

OBSTRUCTIONS: trees W + E

HEIGHT READINGS MTS FT
1.372

STATION DESCRIPTIONS in grave)
W. of road

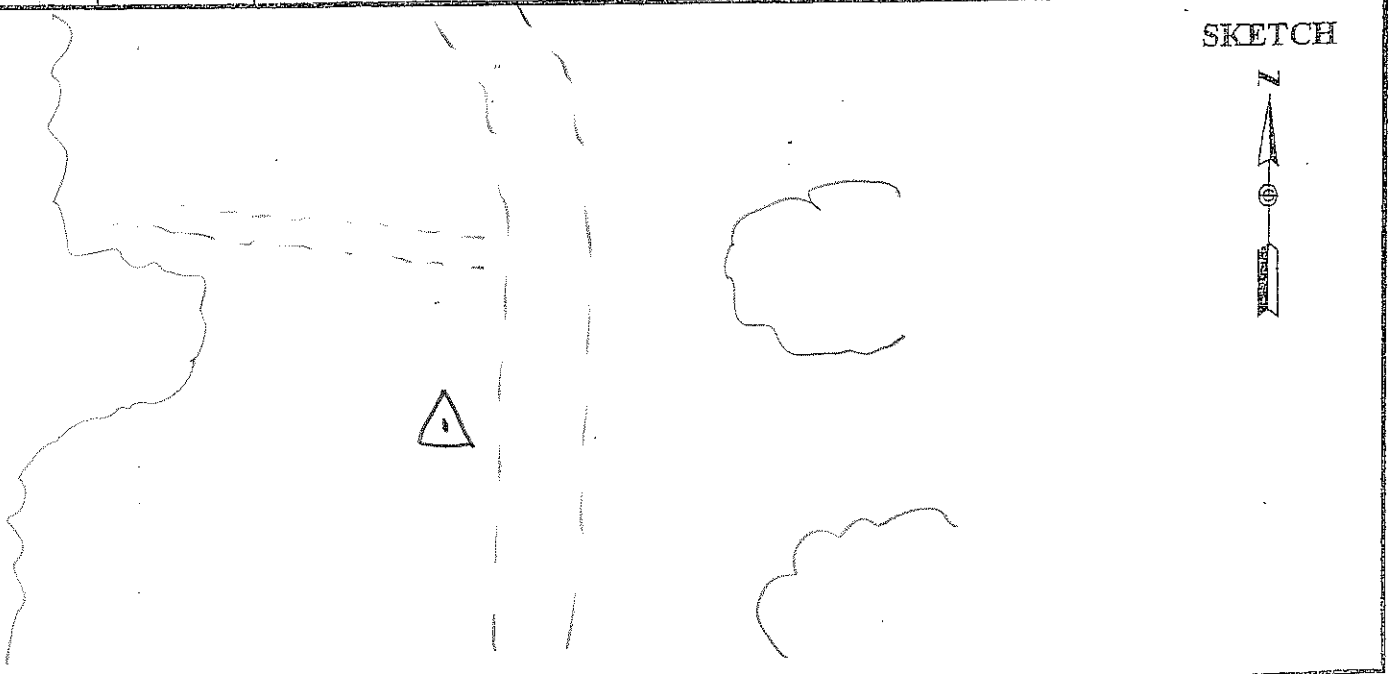
AT502 1.732

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
1302	3.9	7/7
1332		

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 VRS

PROJECT 1-100116
OPERATOR MB
DATE 8.1.10

SITE NUMBER 6
SITE NAME 6

TRACKING TIMES (LOCAL) MEASURE ✓
START 12:57 p
STOP 1:29 p

SENSOR TYPE 500 9500 399 299
MEMORY CARD 731
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 0.360

OBSTRUCTIONS: none

HEIGHT READINGS MTS FT
1.445

STATION DESCRIPTIONS NE side road

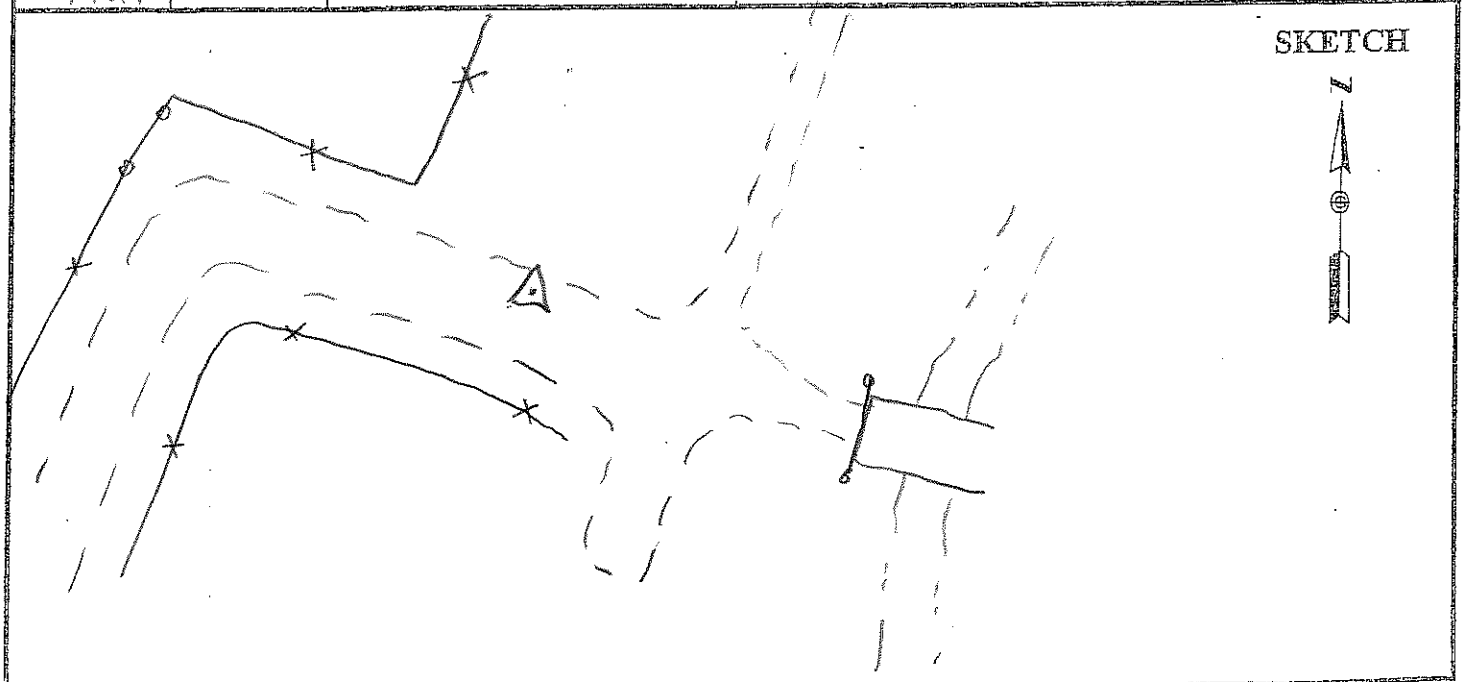
AT502 1805

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
1356	2.4	9/9
1429		

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 ✓PT

PROJECT 1-100116
OPERATOR MB
DATE 8·1·10

SITE NUMBER 7
SITE NAME 7

TRACKING TIMES (LOCAL) MEASURE ✓
START 1:50 p
STOP 2:22 p

SENSOR TYPE 500 9500 399 299
MEMORY CARD 731
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
(500) (0.360)

OBSTRUCTIONS: trees N

HEIGHT READINGS MTS FT
1.383

STATION DESCRIPTIONS in clearing

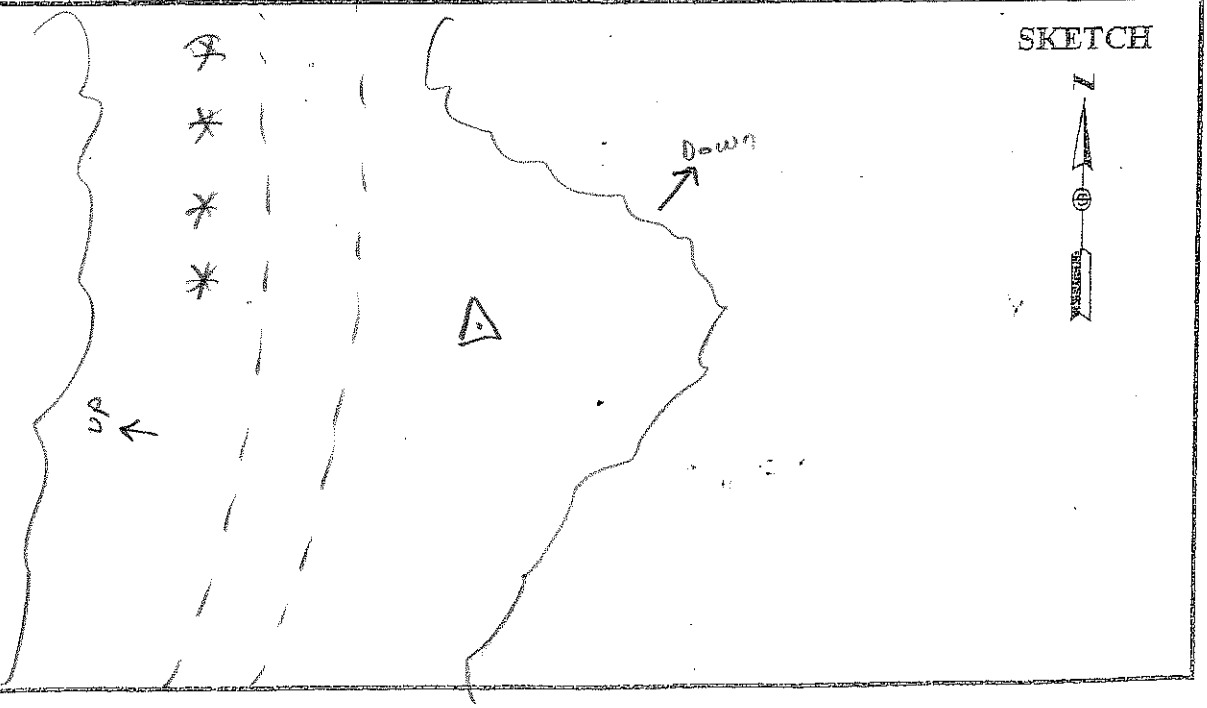
AT502 1743

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
1450	2.5	
1522		

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 Base

PROJECT 1-100116
OPERATOR MS
DATE 8.2.10

SITE NUMBER 1
SITE NAME 101

TRACKING TIMES (LOCAL) MEASURE ✓
START 6:43 a.
STOP

SENSOR TYPE 500 9500 399 299
MEMORY CARD 704
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
(500) (0.360)

OBSTRUCTIONS:

HEIGHT READINGS MTS FT
1.367

STATION DESCRIPTIONS

AT502 1.727

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
743	2.0	9/9

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

SKETCH

See previous

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 Base + Control

PROJECT 1-100116
OPERATOR MB
DATE 8.2.10

SITE NUMBER 1
SITE NAME M 361

TRACKING TIMES (LOCAL) MEASURE ✓
START 7:46 a.
STOP

SENSOR TYPE 500 9500 399 299
MEMORY CARD 731
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
~~500~~ 0.360

OBSTRUCTIONS:

HEIGHT READINGS MTS FT
1.228

STATION DESCRIPTIONS

AT502 1.588

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
846	1.9	7/8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

SKETCH

See previous

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 1pt

PROJECT 1-100116
OPERATOR MB
DATE 8 · 2 · 10

SITE NUMBER 1
SITE NAME 8

TRACKING TIMES (LOCAL) MEASURE ✓
START 8:14 a.
STOP 8:44 a.

SENSOR TYPE 500 9500 399 299
MEMORY CARD 603
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
(500) (0.360)

HEIGHT READINGS MTS FT
1.415
AT 502 1.775

OBSTRUCTIONS: tree S.

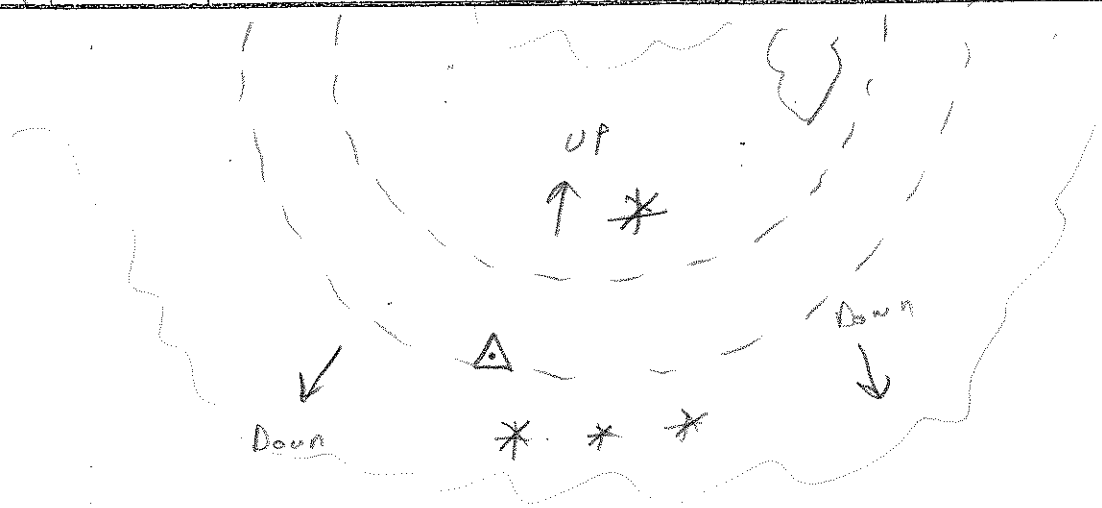
STATION DESCRIPTIONS S. edge road

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
914	2.2	7/7
944		

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 ✓PT

PROJECT 1-100116
OPERATOR MD
DATE 8-2-10

SITE NUMBER 2
SITE NAME 9

TRACKING TIMES (LOCAL) MEASURE ✓
START 8:58 a.
STOP 9:28 a.

SENSOR TYPE 500 9500 399 299
MEMORY CARD 603
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
(500) (0.360)

OBSTRUCTIONS: trees NW ↑

HEIGHT READINGS MTS FT
1.391

STATION DESCRIPTIONS NW corner of intersection

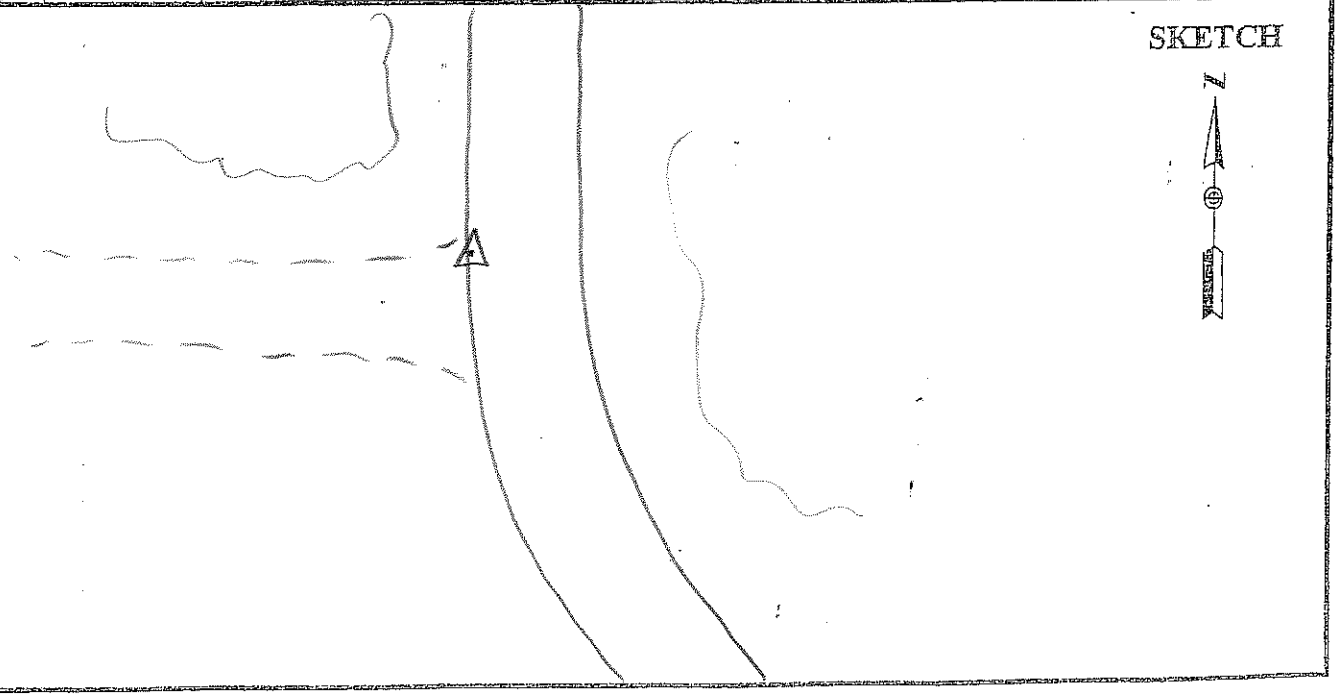
AT502 1751

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
958	2.7	5/5
1028		

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 ✓PT

PROJECT 1-100116
OPERATOR MB
DATE 8.2.10

SITE NUMBER 3
SITE NAME 10

TRACKING TIMES (LOCAL) MEASURE ✓
START 9:52a.
STOP 10:19a.

SENSOR TYPE 500 9500 399 299
MEMORY CARD 6GB
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
(500) (0.360)

OBSTRUCTIONS: trees all quads

HEIGHT READINGS MTS FT
1.390
AT 502 1.750

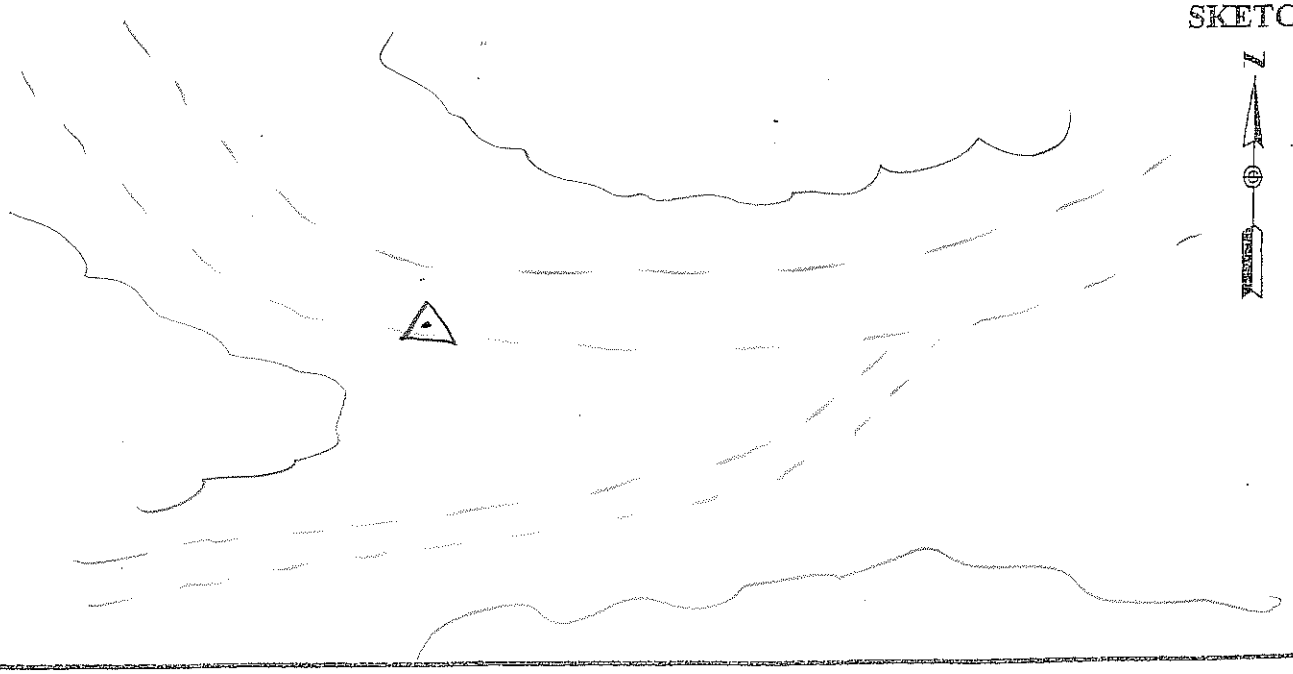
STATION DESCRIPTIONS SW side of road

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
1052	3.5	6/6
1119		

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 ✓ DT

PROJECT 1-160 116
OPERATOR MB
DATE 8-2-10

SITE NUMBER 4
SITE NAME 11

TRACKING TIMES (LOCAL) MEASURE ✓
START 10:32 a.
STOP 10:57 a.

SENSOR TYPE 500 9500 399 299
MEMORY CARD 603
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
(500) (0.360)

OBSTRUCTIONS: trees E.

HEIGHT READINGS MTS FT
1.417
AT502 1.777

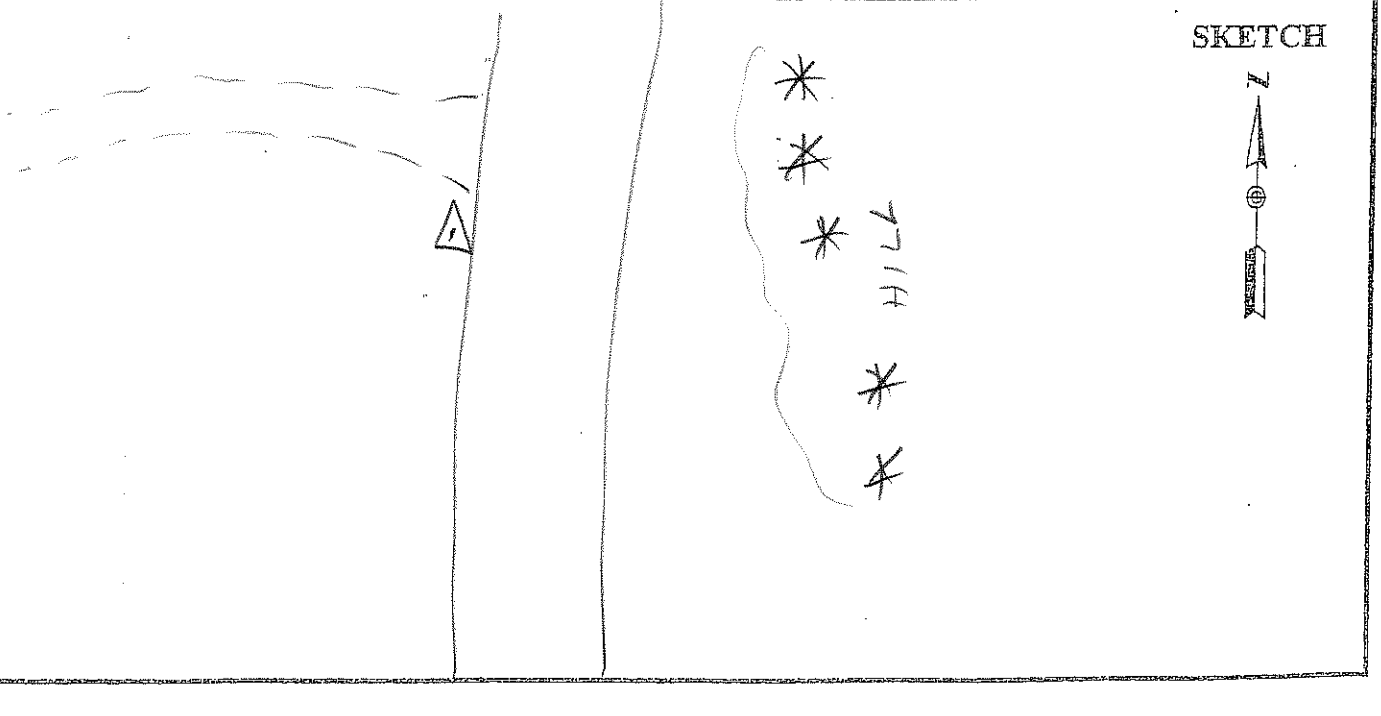
STATION DESCRIPTIONS W. side road

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
1132	2.8	7/8
1157		

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 ✓ PT

PROJECT 1-100116
OPERATOR NG
DATE 8·2·10

SITE NUMBER 5
SITE NAME 12

TRACKING TIMES (LOCAL) MEASURE ✓
START 11:21a.
STOP 11:42a.

SENSOR TYPE 500 9500 399 299
MEMORY CARD 603
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 ~~0.389~~
500 0.360

OBSTRUCTIONS: none

HEIGHT READINGS MTS FT
1.375

STATION DESCRIPTIONS in road E

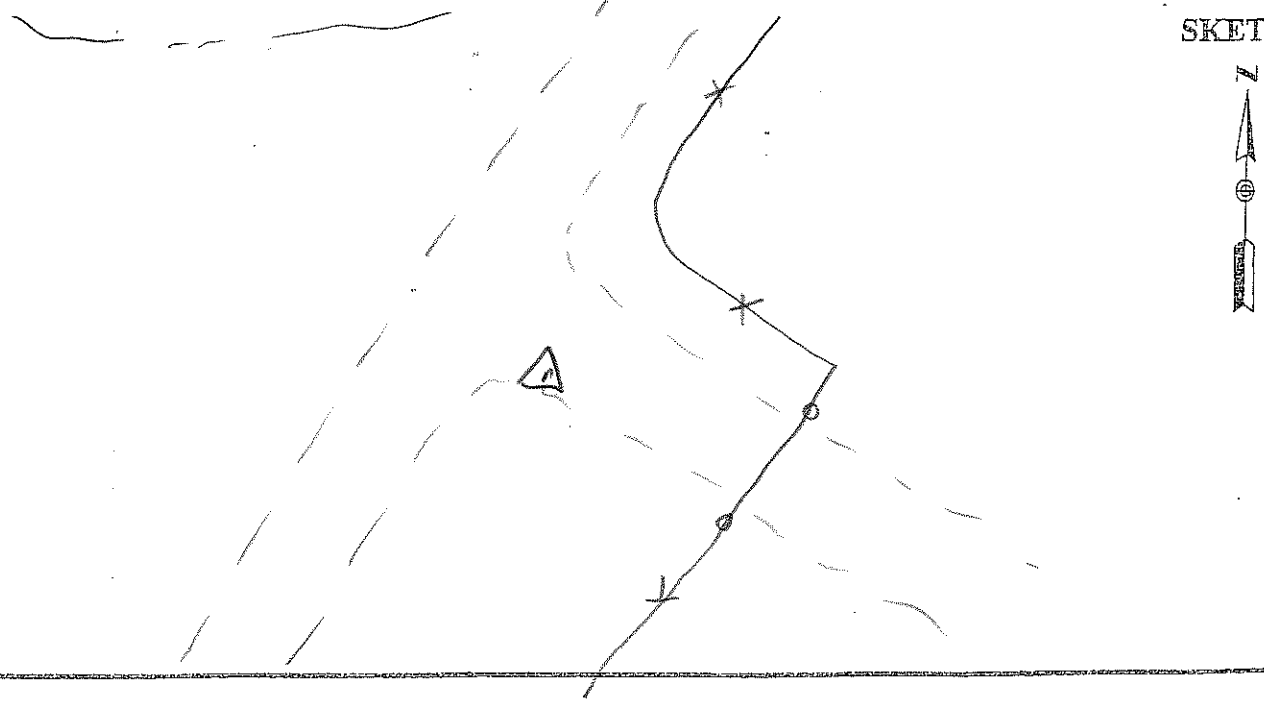
AT502 1.735

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
1221	1.9	9/9
1242		

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 √PT

PROJECT 1-100116
OPERATOR MB
DATE 8.2.10

SITE NUMBER 6
SITE NAME 13

TRACKING TIMES (LOCAL) MEASURE ✓
START 12:12 P
STOP 12:31 P

SENSOR TYPE 500 9500 399 299
MEMORY CARD 603
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 ~~0.389~~
500 0.360

HEIGHT READINGS MTS FT
1.389

AT 502 1.749

OBSTRUCTIONS: none

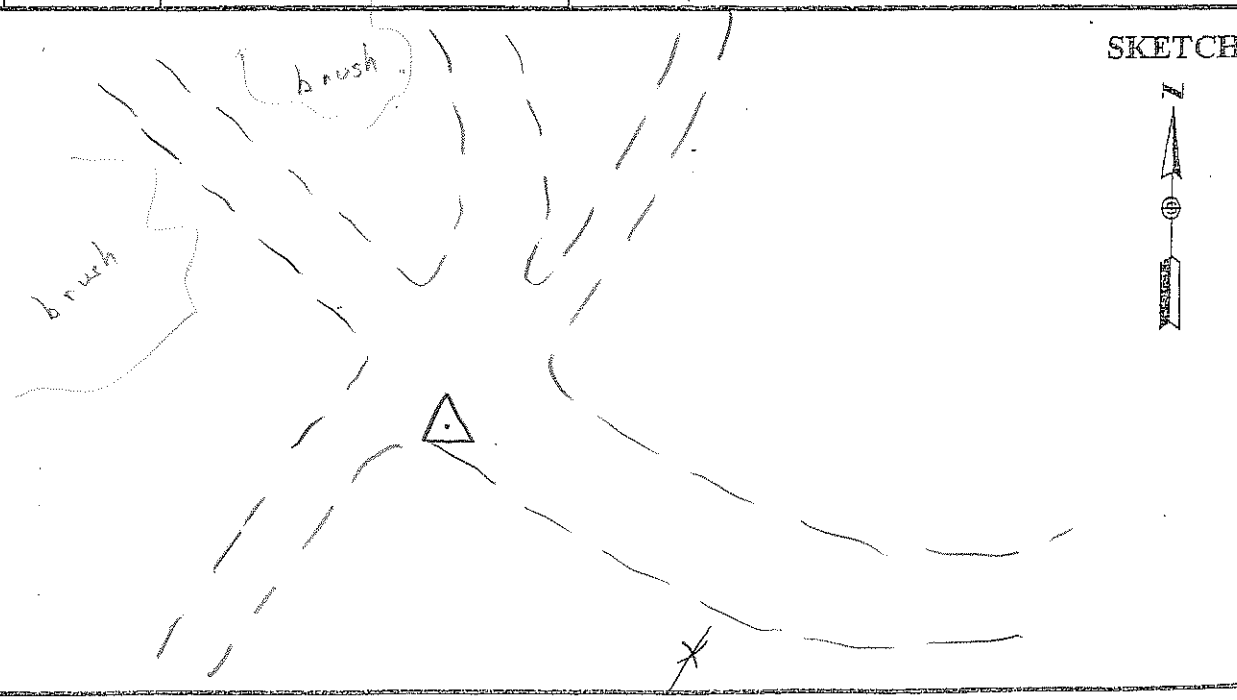
STATION DESCRIPTIONS center of intersection

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
1312	2.5	9/9
1331		

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 √PT

PROJECT 1-100116
OPERATOR MB
DATE 8.2.10

SITE NUMBER 7
SITE NAME 14

TRACKING TIMES (LOCAL) MEASURE √
START 12:54 P
STOP 1:19 P

SENSOR TYPE 500 9500 399 299
MEMORY CARD 603
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
(500) (0.360)

OBSTRUCTIONS: none

HEIGHT READINGS MTS FT
1.357

AT502

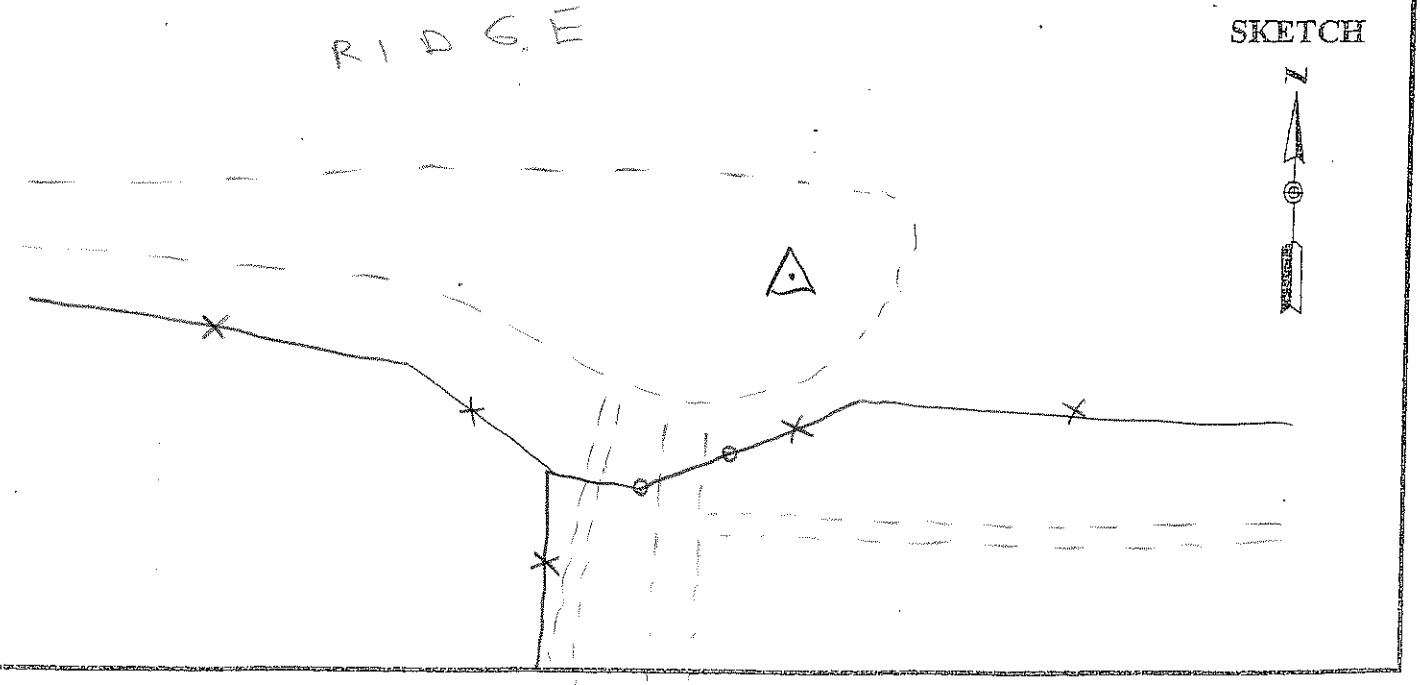
STATION DESCRIPTIONS in turn-around

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
1354	2.4	9/9
1419		

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 ✓ PT

PROJECT 1-100116
OPERATOR MS
DATE 8.2.10

SITE NUMBER 8
SITE NAME 15

TRACKING TIMES (LOCAL) MEASURE ✓
START 1:33 P
STOP 1:56 P

SENSOR TYPE 500 9500 399 299
MEMORY CARD 603
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 ~~0.389~~
(500) (0.360)

OBSTRUCTIONS: trees all quads

HEIGHT READINGS MTS FT
1.448

STATION DESCRIPTIONS W. side road

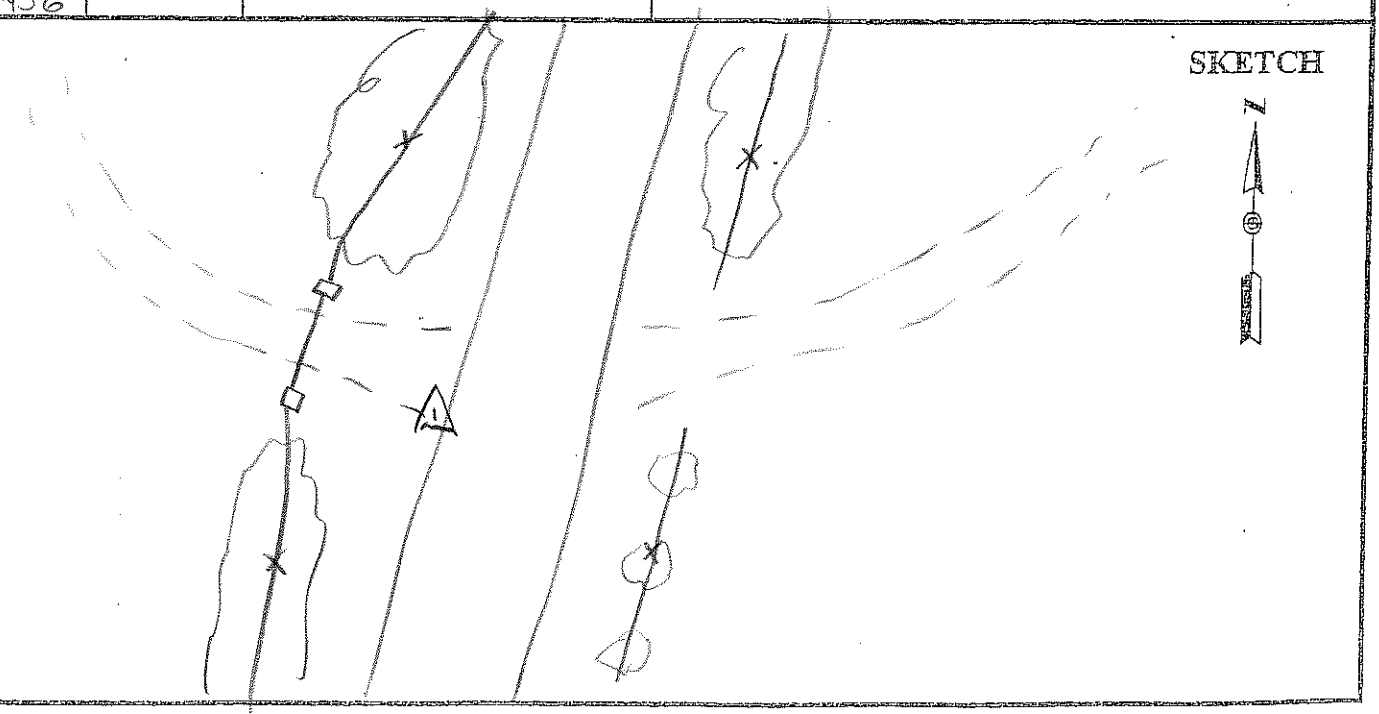
AT 502 1,808

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
1433	2.3	8/8
1456		

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 √PT

PROJECT 1-100116
OPERATOR NG
DATE 8·2·10

SITE NUMBER 9
SITE NAME 16

TRACKING TIMES (LOCAL) MEASURE √
START 2:07 p
STOP 2:25 p

SENSOR TYPE 500 9500 399 299
MEMORY CARD 603
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 0.360

OBSTRUCTIONS: hill south

HEIGHT READINGS MTS FT
1.435

STATION DESCRIPTIONS in gravel area

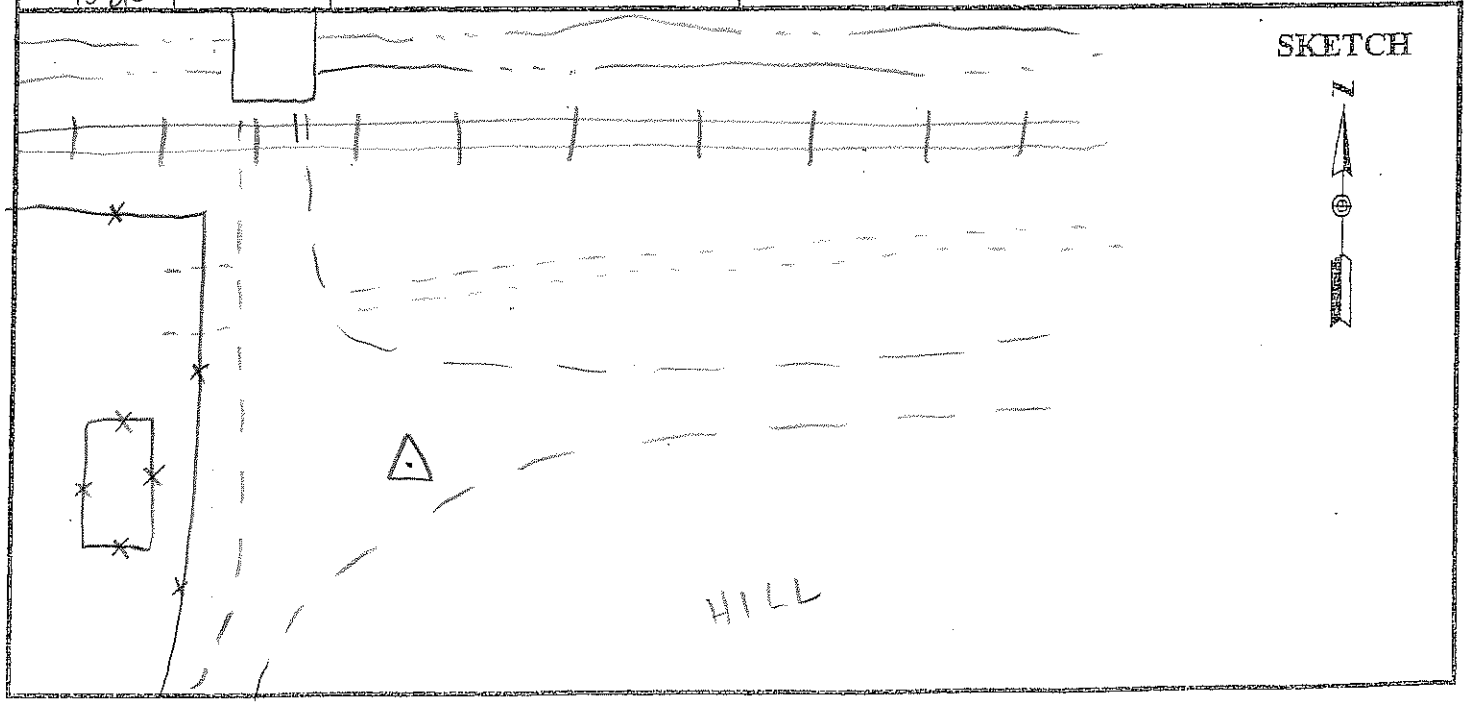
AT502 1795

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
1507	2.6	6/6
1585		

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 CONTROL

PROJECT 1-100116
OPERATOR MB
DATE 8-2-10

SITE NUMBER 10
SITE NAME WINDY GAP

TRACKING TIMES (LOCAL) MEASURE ✓

START 2:37p
STOP 2:56p

SENSOR TYPE 500 9500 399 299
MEMORY CARD 603
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT

299/399	0.441
399E/9500	0.389
(500)	(0.360)

OBSTRUCTIONS: none

HEIGHT READINGS

MTS	FT
1.347	

AT502 1.707

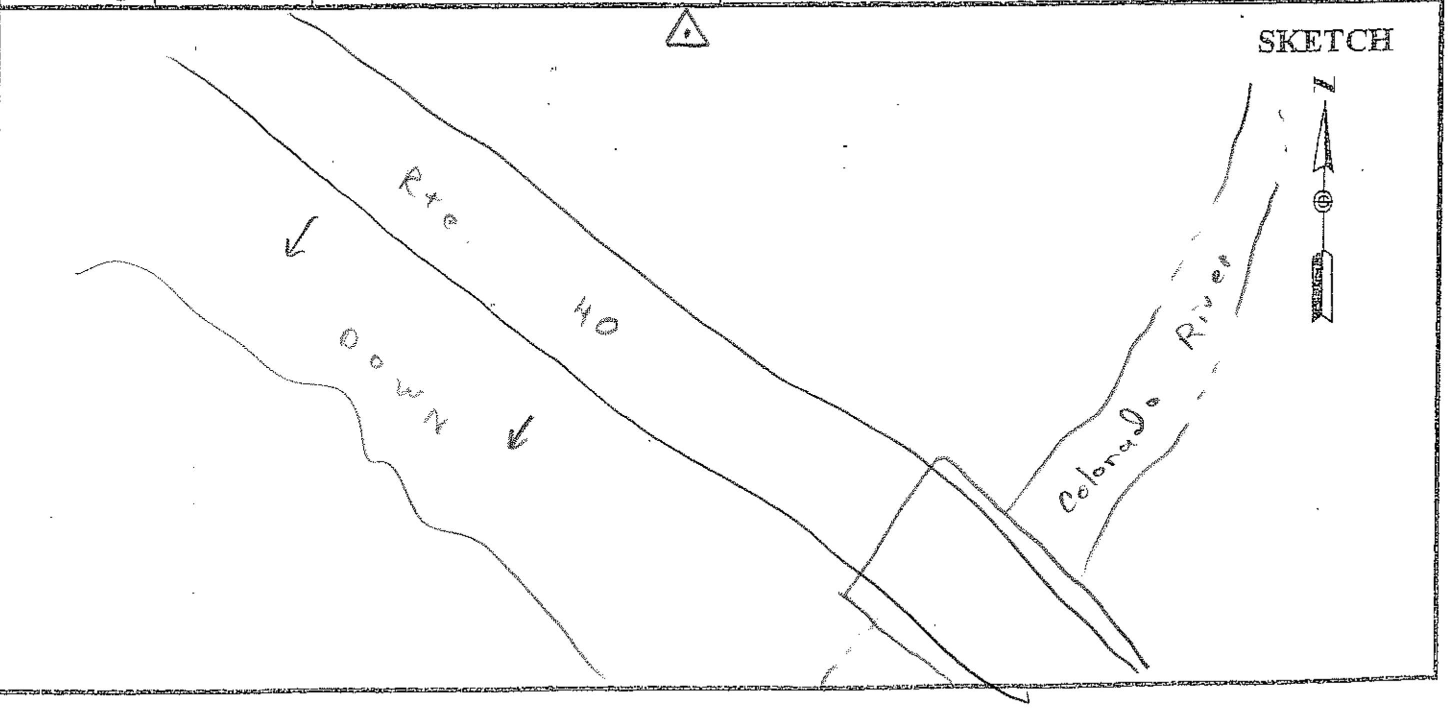
STATION DESCRIPTIONS fnd USC + GS cap in outcrop
"Windy Gap 1951"

SATELLITE OBSERVATIONS

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

TIME	GDOP	SATELLITES
1537	2.3	8/8
1556		

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 VPT

PROJECT 1-100116
OPERATOR MB
DATE 8.2.10

SITE NUMBER 11
SITE NAME 17

TRACKING TIMES (LOCAL) MEASURE ✓
START 3:07 P
STOP 3:24 P

SENSOR TYPE 500 9500 399 299
MEMORY CARD 603
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 0.360

OBSTRUCTIONS: none

HEIGHT READINGS MTS FT
1.352

AT502 1.712

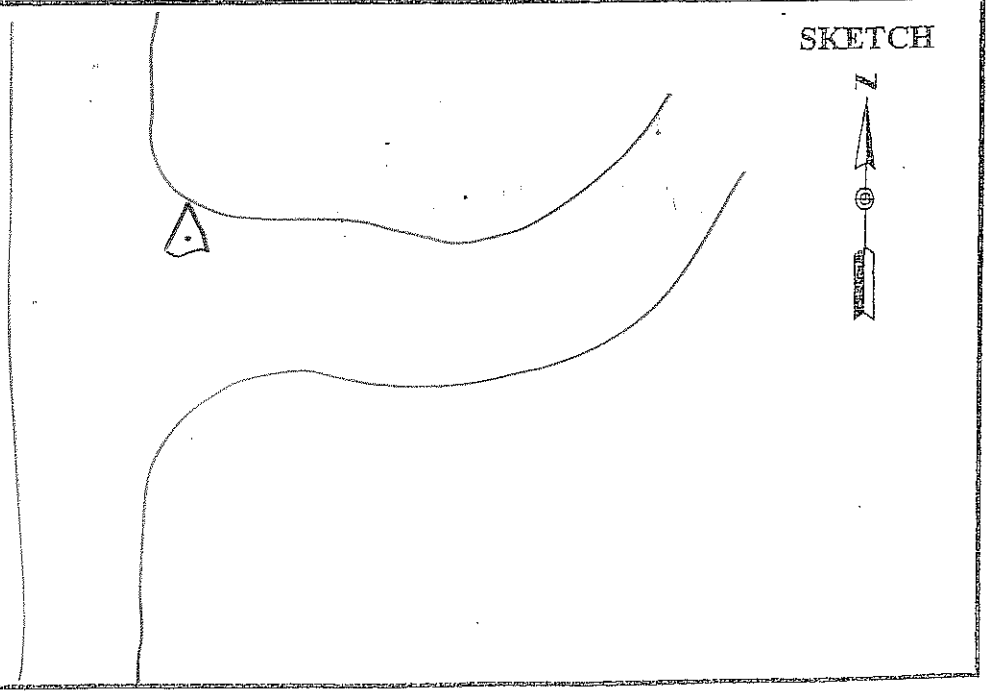
STATION DESCRIPTIONS N. side road

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
1607	2.7	7/8
1624		

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

SKETCH



Grand County, CO - Lidar

CLIENT INFORMATION

U S Geological Survey Acquisitions & Grants
NGTOC
1400 Independence Road
Rolla State: Missouri
65401 Country: United States of America
one: 573-308-3612 Fax: 573-308-3810
Client No.: 10178

Project #: 1100116
Opportunity ID: E109-3308
Date: 1/29/2010
Marketing Rep: Stagg
Project Mgr: Nugent
Contract Type ○PO ○Standard ◉Owner ○Other
Authority PO 1/27/10
Category #: 1
Category Desc: Federal

PROJECT INFORMATION

Site Name: Grand County, CO - Lidar
State: Colorado County: See USGS Shapefiles City: See USGS Shapefiles
Sec/T/R: N/A
Quads: See USGS Shapefiles
Start Date: 6/1/2010 Final: 12/29/2010

Client Contact: John Murphey, MS 602 Email: jmurphey@usgs.gov
Phone: 573-308-3579 Fax: 573-308-3810

SHIPPING INFORMATION

Customer: USGS
Address1: NGTOC III
1400 Independence Road
City: Rolla State: Missouri
Zip: 65401 Country: United States of America
Phone: 573-308-3587

Instructions
☐ Best Way ☑ Special
Special
☐ FTP

BILLING INFORMATION

Lump Sum $219,333.95 Other
Unit Fee Retainance Billing Frequency
Cost Plus Fixed Fee

PROJECT DESCRIPTION

Contract No. G10PC00025 - Task Order: G10PD00526 Grand County, Colorado LiDAR ARRA Proposal.

The Grand County LiDAR project area is made up of three rectangular areas of interest, the main area in Grand County, and two small areas, one in Larimer County and one in Park County. Total area for this includes approximately 438-square miles.

Please see proposal and specification for all LiDAR deliverables

Acquisition will occur between June 1 and September 30 with all deliverables, due no later than December 29th 2010.

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 110016
OPERATOR WM
DATE 8/4/10

SITE NUMBER 1
SITE NAME 101

TRACKING TIMES (LOCAL) MEASURE MDT
START 9:43
STOP

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 11
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: BUSHES NW 215°

HEIGHT READINGS MTS FT
1.150
1.510

STATION DESCRIPTIONS Rebar and CAP set 8/1/10

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
15:43	2.3	8/3-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
MC

SKETCH

as before described

2

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 1100116
OPERATOR WJN
DATE 8/4/10

SITE NUMBER 1
SITE NAME M 361

TRACKING TIMES (LOCAL) MEASURE MDT
START 10:06
STOP 15:51

SENSOR TYPE ~~500~~ 9500 399 299
MEMORY CARD
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 0.360

OBSTRUCTIONS: PPL S

HEIGHT READINGS MTS FT
1.049

1-409

STATION DESCRIPTIONS BRASS DISK
"M 361" 1954
US COAST AND G. Survey

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
16:46	3.4	8/8-8
21:51	2.7	7/7-7

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
PC

as described
FIRST OCC 8/1/10

SKETCH

2

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

PROJECT 1100316
OPERATOR WJN
DATE 8/4/10

SITE NUMBER 18
SITE NAME 18

TRACKING TIMES (LOCAL) MEASURE MDT
START 12:29
STOP 12:55

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 601
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 (0.360)

HEIGHT READINGS MTS FT
1.316
1.676

OBSTRUCTIONS: TREES N, SW

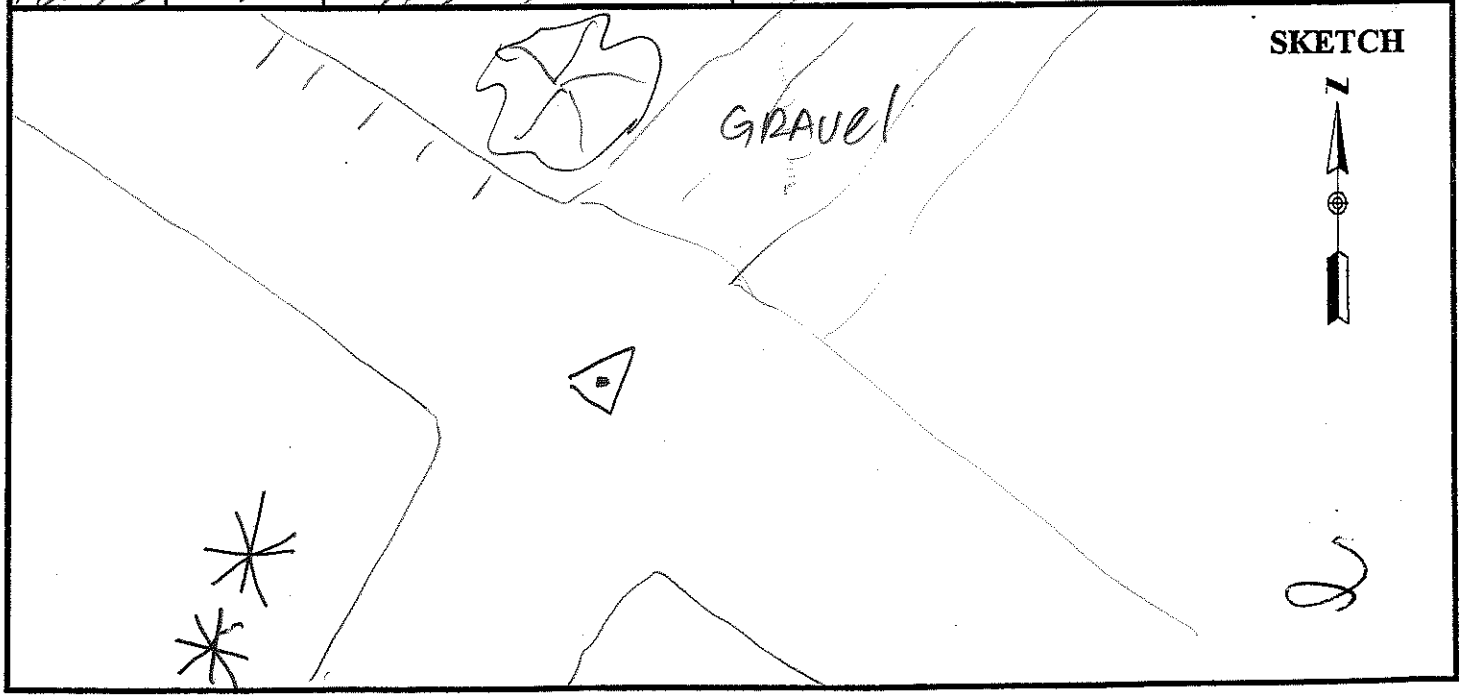
STATION DESCRIPTIONS ℄-℄

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
19:28	3.3	7/7-10
18:55	2.2	9/9-9

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
MC

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

PROJECT 1100116
OPERATOR WJN
DATE 8/4/10

SITE NUMBER 2
SITE NAME 19

TRACKING TIMES (LOCAL) MEASURE MDT
START 1:29
STOP 1:49

SENSOR TYPE (500) 9500 399 299
MEMORY CARD
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: N/O

HEIGHT READINGS MTS FT
1.312
1.672

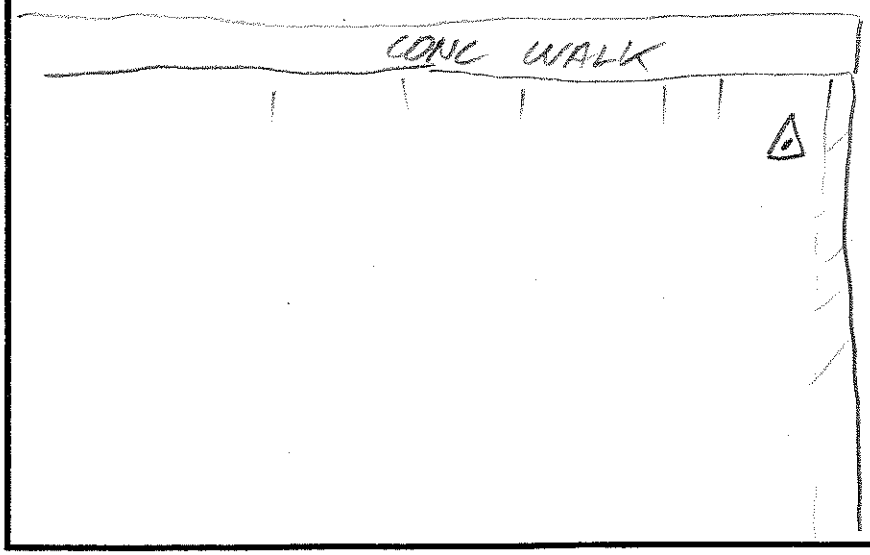
STATION DESCRIPTIONS BMT
±13' SW OF NE COR PAVED PARKING LOT

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
19:29	1.7	10/10-10
19:49	1.7	10/10-10

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
MC

SKETCH



2

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

V

PROJECT 1100116
OPERATOR WNW
DATE 8/4/10

SITE NUMBER 3
SITE NAME 20

TRACKING TIMES (LOCAL) MEASURE MDT
START 14:18
STOP 14:43

SENSOR TYPE (500) 9500 399 299
MEMORY CARD
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: TERRAIN N-S-E

HEIGHT READINGS MTS FT
1.313
1.673

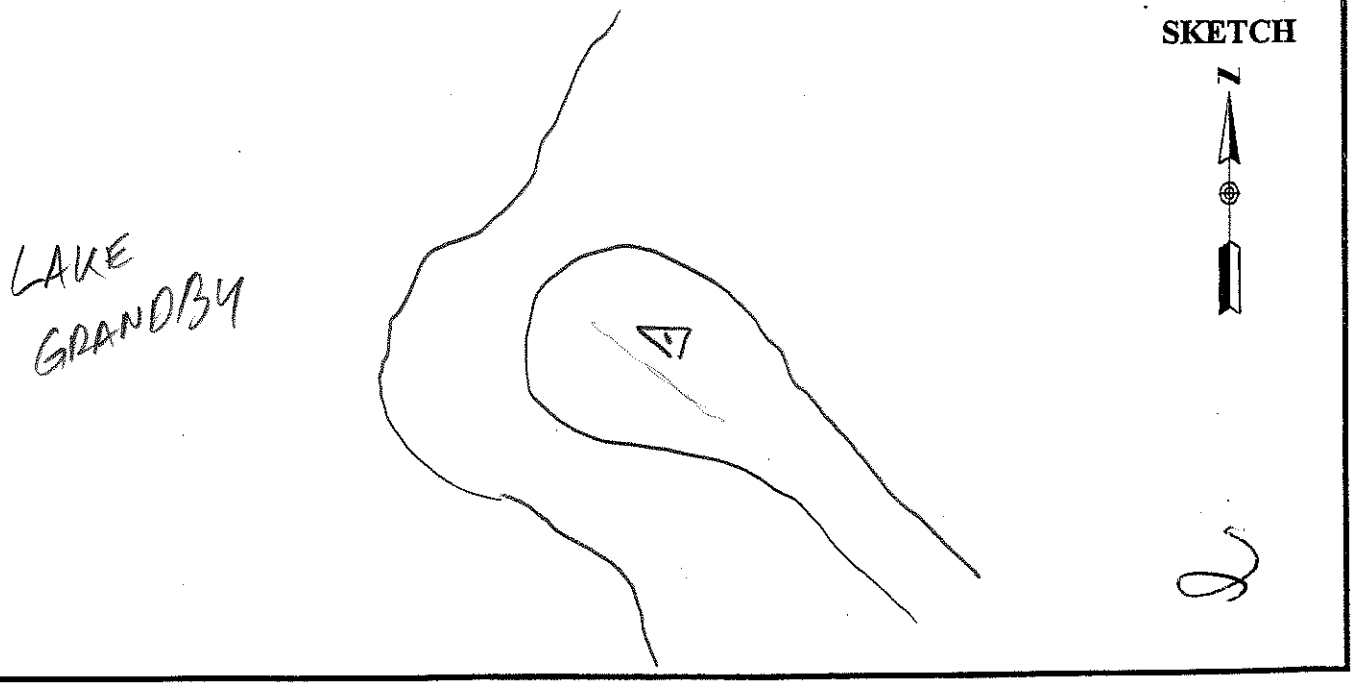
STATION DESCRIPTIONS POINT ON GRAVEL AREA @ BOAT LAUNCH AREA

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
20:18	3.3	8/7-8
20:43	2.6	8/8-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
RAIN

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

✓

PROJECT	110116	SITE NUMBER	4
OPERATOR	WJN	SITE NAME	21
DATE	8/14/10		

TRACKING TIMES (LOCAL) MEASURE MDT

START 15:07

STOP 15:32

SENSOR TYPE (500) 9500 399 299

MEMORY CARD 601

BATTERY NO.

CONTROLLER NO.

SENSOR NO.

SENSOR CONSTANT

299/399	0.441
399E/9500	0.389
500	(0.360)

HEIGHT READINGS

MTS	FT
1.311	

OBSTRUCTIONS: TREES N, W
TERRAIN S

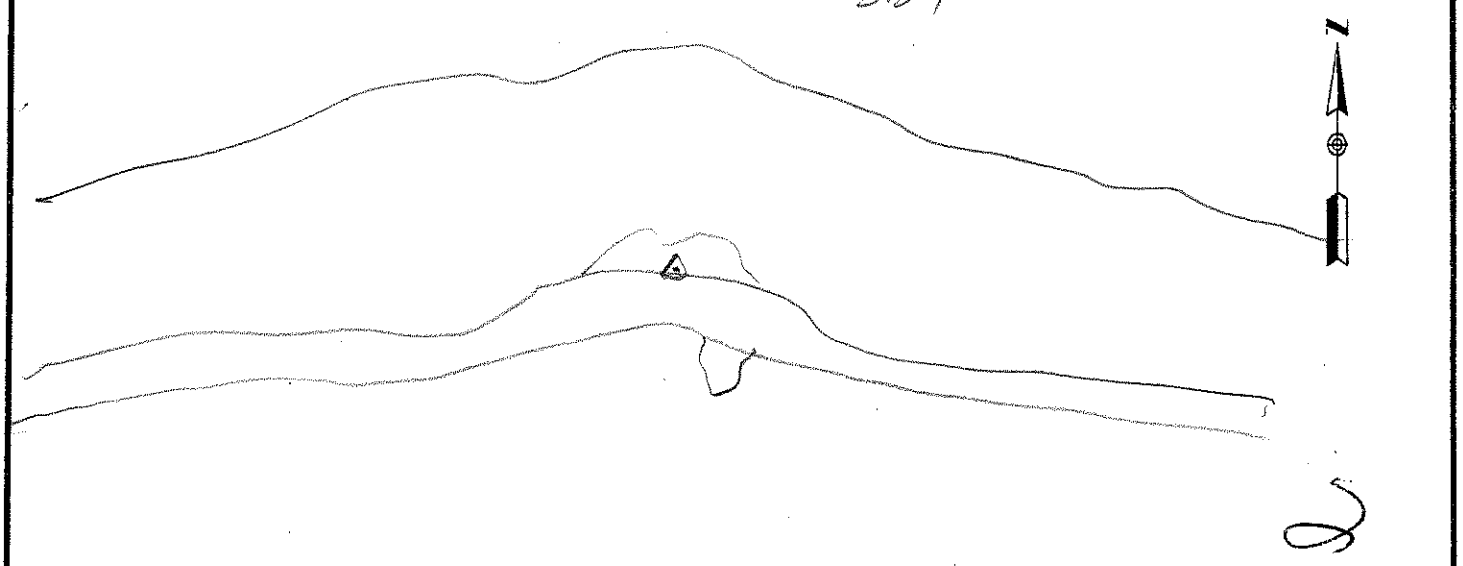
STATION DESCRIPTIONS POINT IN
GRAVEL TURNOUT

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
21:07	2.8	7/7-8
21:32	2.9	7/7-7

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 100116
OPERATOR WJN
DATE 8/5/10

SITE NUMBER 1
SITE NAME 101

TRACKING TIMES (LOCAL) MEASURE MDT
START 7:31
STOP 15:04

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 11
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 ~~0.360~~

HEIGHT READINGS MTS FT
1.191
1.551

OBSTRUCTIONS: TALL BUSHES
NNL

STATION DESCRIPTIONS REBAR
AND CAP set 8/1/10

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
13:31	1.9	9/9-9
21:04	2.6	8/9-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
FOG, LOW STRATUS

as before described

SKETCH

2

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083 BASE

PROJECT 110016
OPERATOR WNB
DATE 8/5/10

SITE NUMBER 1
SITE NAME M 361

TRACKING TIMES (LOCAL) MEASURE MDT
START 7:54
STOP 15:28

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 14
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

HEIGHT READINGS MTS FT
1.095

OBSTRUCTIONS: PPL SOUTH

STATION DESCRIPTIONS BRASS DISK IN CONC. "M 361" 1954

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
13:54	1.9	8/9-8
21:29	2.4	6/9-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
FOG

as before describes

SKETCH

2

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

PROJECT 1100116
OPERATOR WJW
DATE 8/5/10

SITE NUMBER 1
SITE NAME 22

TRACKING TIMES (LOCAL) MEASURE MDT
START 8:41
STOP 9:01

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 601
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: NO

HEIGHT READINGS MTS FT
1.282
1.642

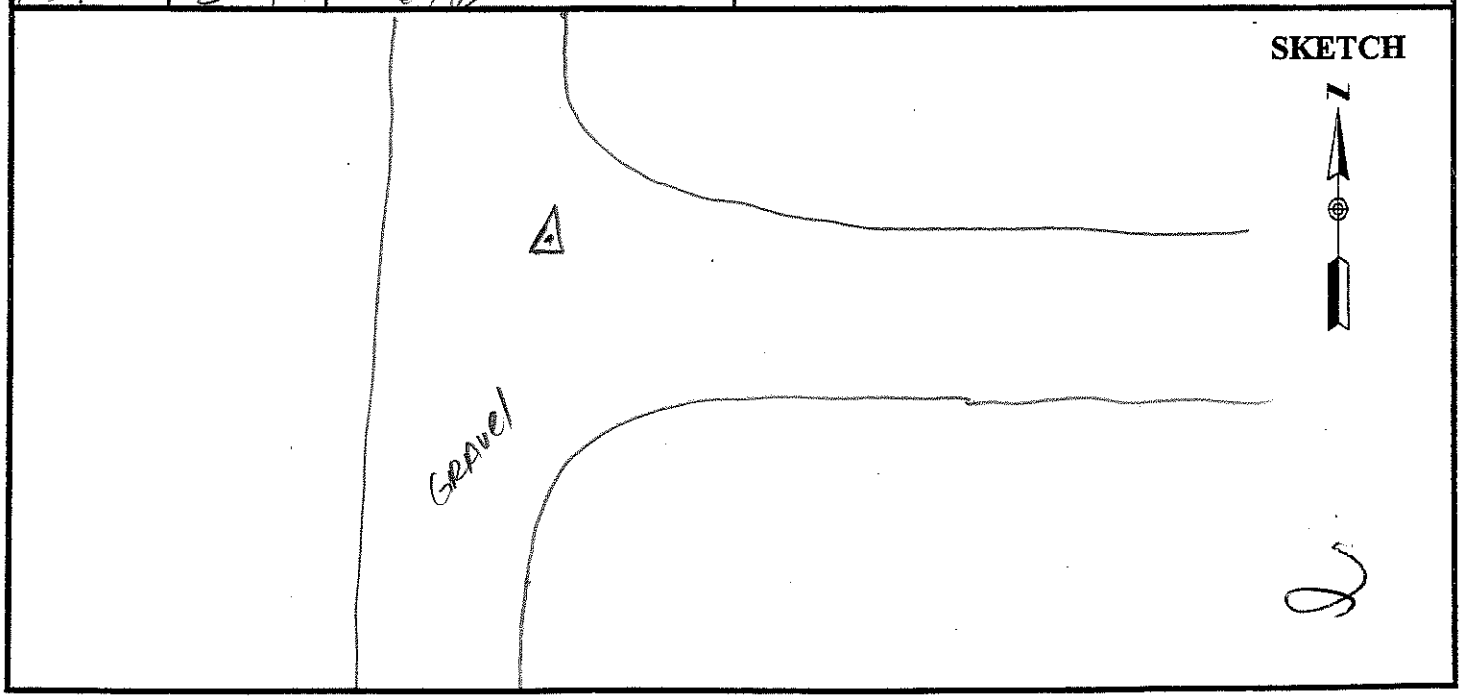
STATION DESCRIPTIONS POINT IN GRAVEL ROAD INT NNE OF CC

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
14:41	2.1	7/7-7
15:01	2.9	6/6-6

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
PC

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

PROJECT 11007116
OPERATOR WJN
DATE 8/5/10

SITE NUMBER 23
SITE NAME 23

TRACKING TIMES (LOCAL) MEASURE MDT
START 9:24
STOP 9:44

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 601
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 (0.360)

HEIGHT READINGS MTS FT
1.327
1.687

OBSTRUCTIONS: NO

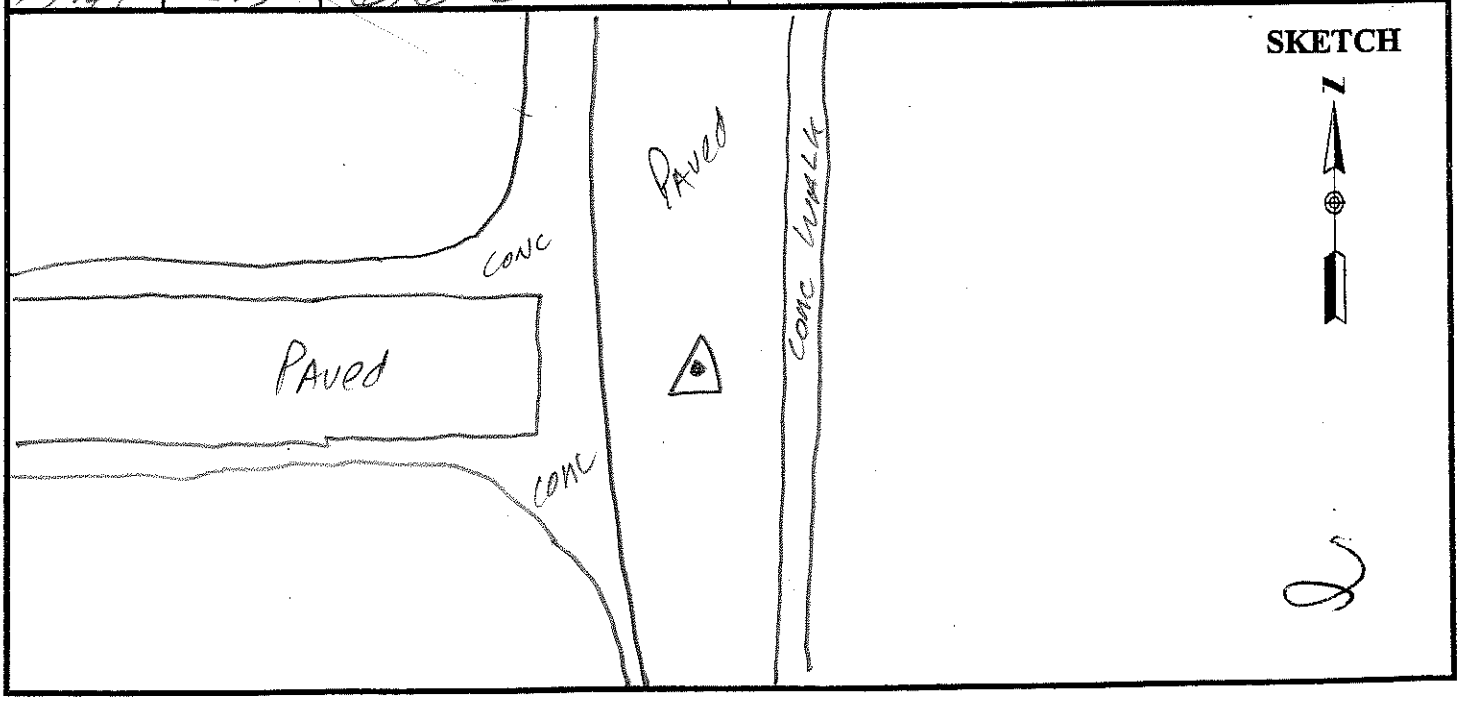
STATION DESCRIPTIONS ℄-℄
INT

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
15:24	4.3	6/6-6
15:44	3.3	6/6-6

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
PC becoming MC

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

PROJECT 1100116
OPERATOR UNN
DATE 8/5/10

SITE NUMBER 4
SITE NAME 24

TRACKING TIMES (LOCAL) MEASURE MDT
START 10:01
STOP 10:20

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 001
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

HEIGHT READINGS MTS 1.318 FT

OBSTRUCTIONS: TERRAIN NE
TREES S

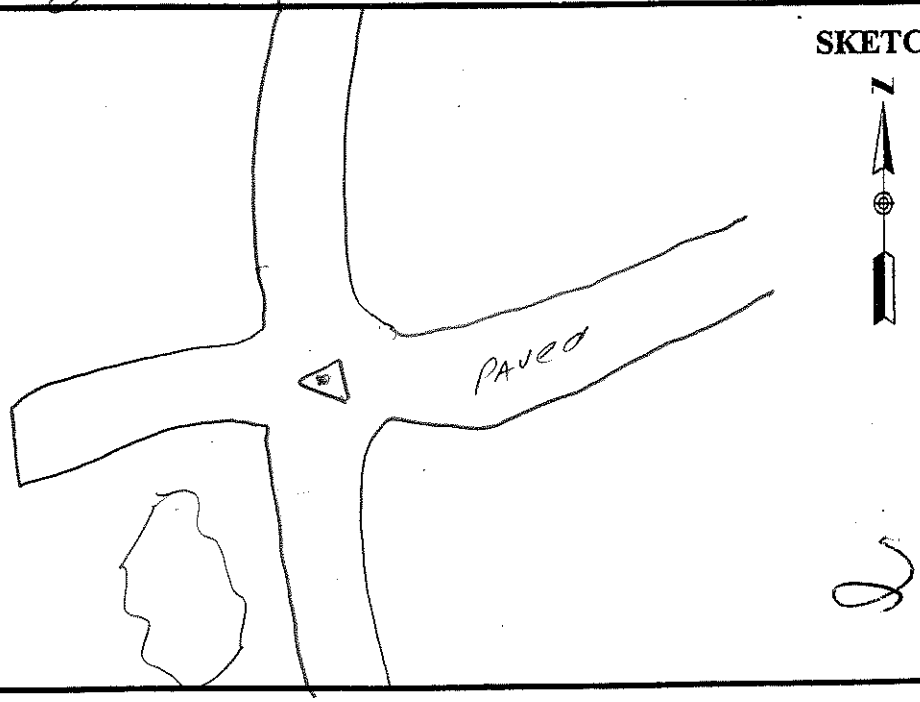
STATION DESCRIPTIONS ℄ - ℄ INT
PAVED NARROW RDS

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
16:01	1.9	9/9-9
16:20	2.6	8/8-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
MC

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

PROJECT 1100116
OPERATOR WJN
DATE 8/5/10

SITE NUMBER 5
SITE NAME 25

TRACKING TIMES (LOCAL) MEASURE MDT
START 10:47
STOP 11:11

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 601
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: TERRAIN S.

HEIGHT READINGS MTS FT
1.336

STATION DESCRIPTIONS POINT NEAR S. EDGE OF WIDE SPOT IN ACCESS RD

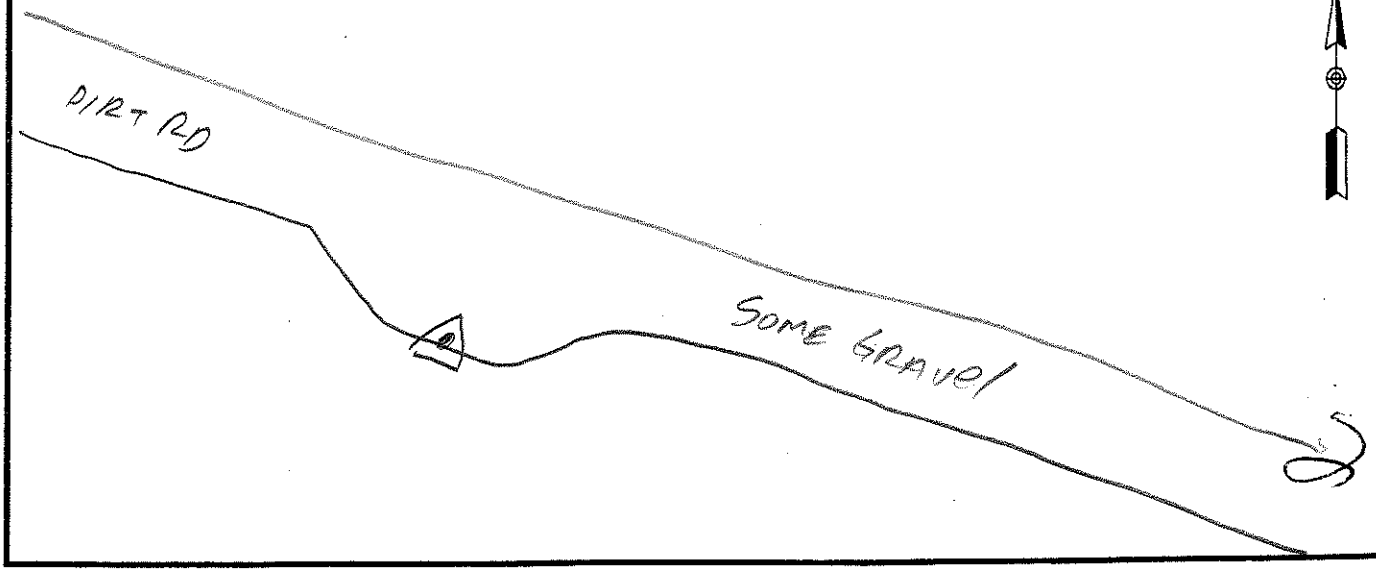
1-696

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
16:47	3.3	8/8-9
17:11	1.9	9/9-9

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
MC

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

PROJECT 1100116
OPERATOR WJW
DATE 8/5/10

SITE NUMBER 6
SITE NAME 26

TRACKING TIMES (LOCAL) MEASURE M
START 11:26
STOP 11:47

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 601
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: NO

HEIGHT READINGS MTS FT
1.311

STATION DESCRIPTIONS NEAR END OF PAVEMENT @ CATTLE GUARD

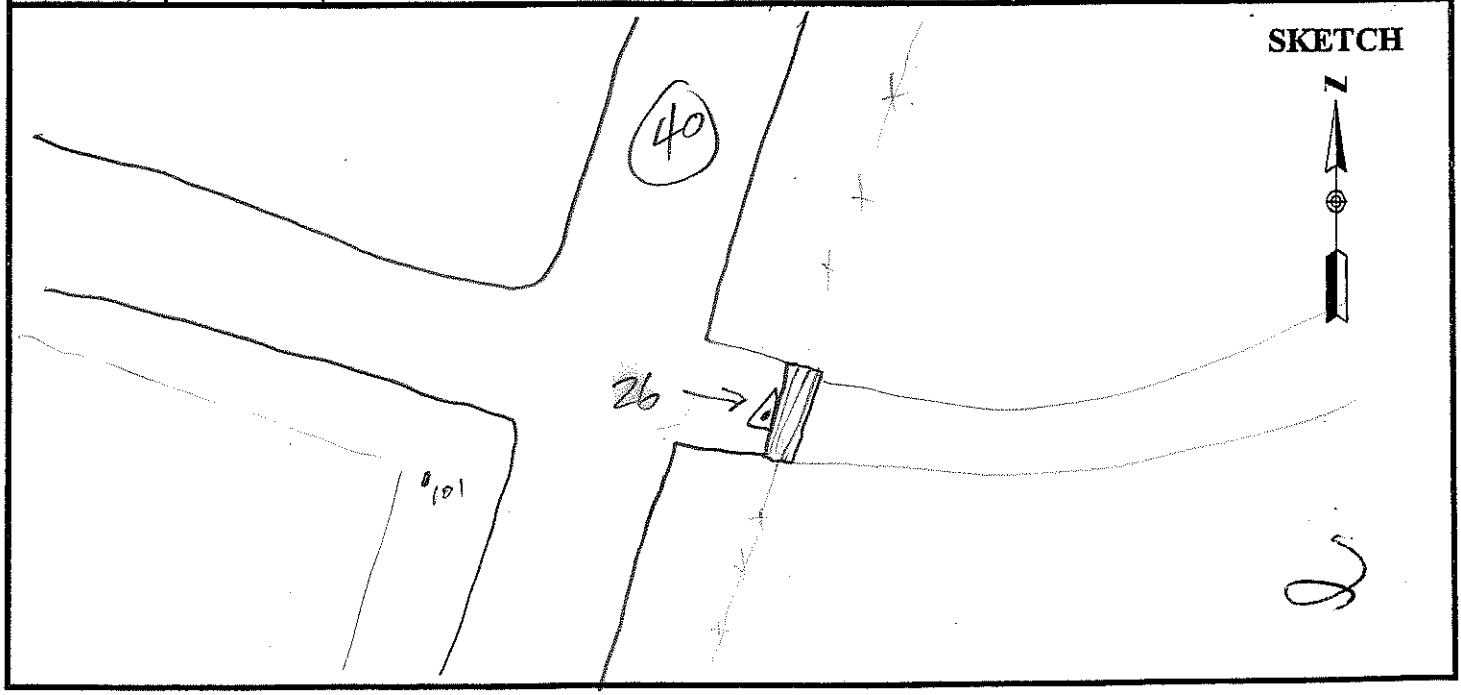
1-671

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
17:26	1.9	10/10-10
17:47		

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
ML

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

H+V control

PROJECT 110116
OPERATOR WJN
DATE 8/5/10

SITE NUMBER 7
SITE NAME H 360

TRACKING TIMES (LOCAL) MEASURE MDT
START 12:44
STOP

SENSOR TYPE (500) 9500 399 299
MEMORY CARD
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
(500) 0.360

HEIGHT READINGS MTS FT
0.787
1.147

OBSTRUCTIONS: TREES N-E
TERRAIN W

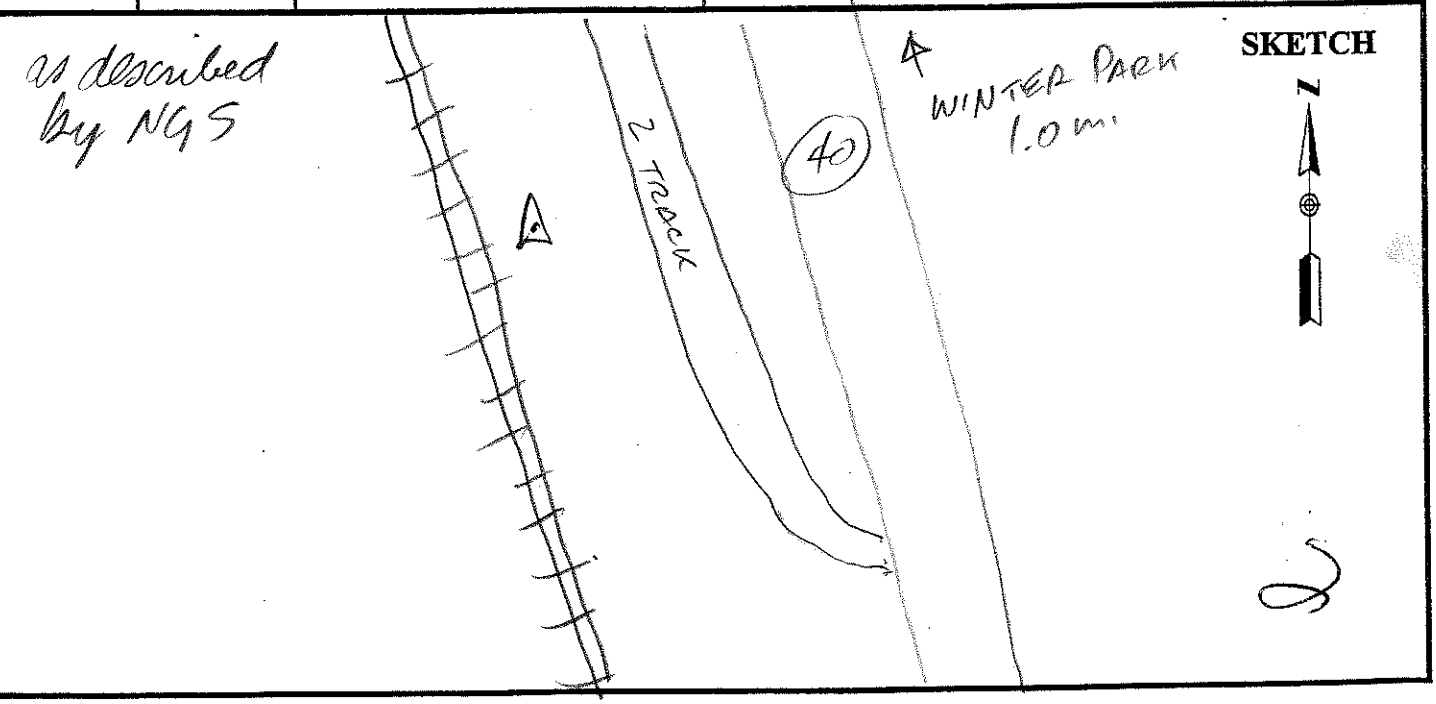
STATION DESCRIPTIONS BRASS DISK
IN LARGE BOULDER
MKD "H 360 1951"
USC AND GS

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
18:46	3.3	7/7-16

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
RAIN

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

✓

PROJECT 1100116
OPERATOR WJN
DATE 8/05/10

SITE NUMBER 8
SITE NAME 27

TRACKING TIMES (LOCAL) MEASURE MDT
START 14:03
STOP 14:27

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 601
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 (0.360)

HEIGHT READINGS MTS 1.287 FT

OBSTRUCTIONS: TERRAIN W, N, NE

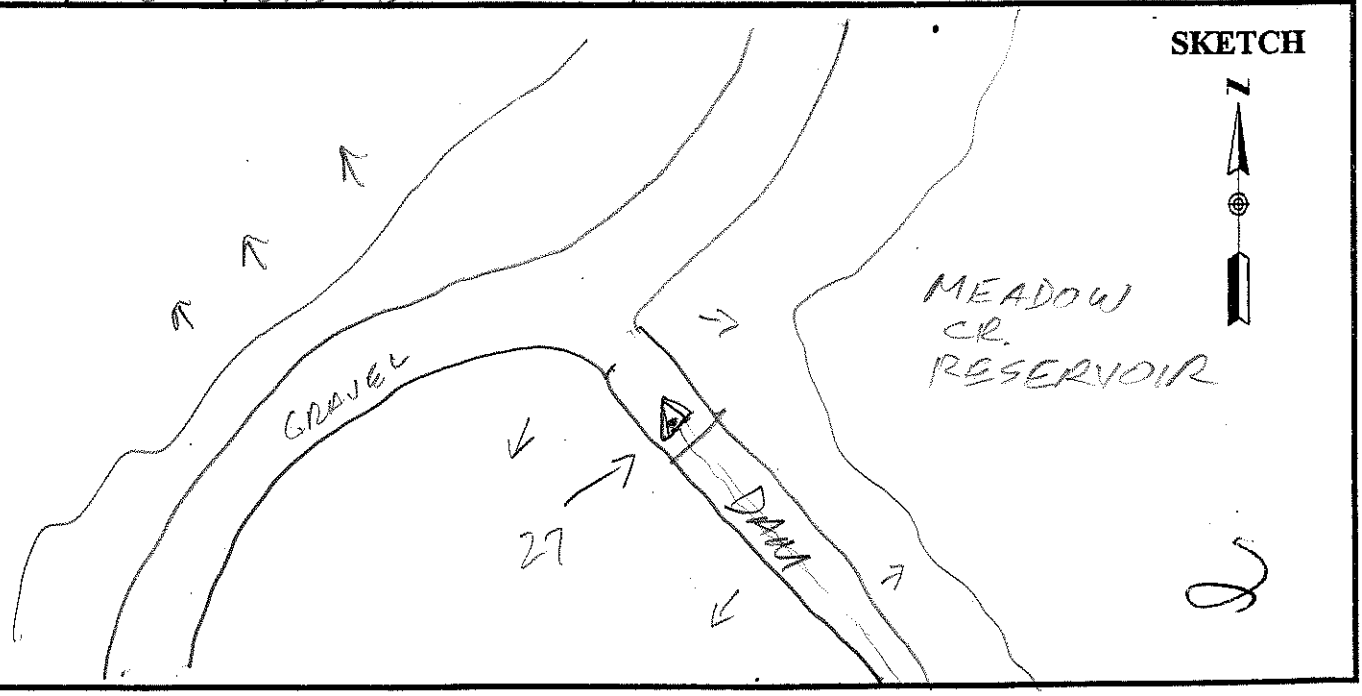
STATION DESCRIPTIONS POINT @ N/W END OF DAM @ NW END 2 TRACK

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
20:03	1.9	9/9-9
20:27	2.6	8/8-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
MC

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 1100116
OPERATOR WJN
DATE 8/6/10

SITE NUMBER 1
SITE NAME 101

TRACKING TIMES (LOCAL) MEASURE MDT
START 7:03
STOP 14:45

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 11
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: BUSHES NW

HEIGHT READINGS MTS FT
1.181

STATION DESCRIPTIONS Rebar and CAP

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
13:03	2.2	8/9-8
20:45	2.0	9/8-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
SKC

as before described

SKETCH

3

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

PROJECT 1100116
OPERATOR WVN
DATE 3/6/10

SITE NUMBER 1
SITE NAME M 361

TRACKING TIMES (LOCAL) MEASURE MDT
START 7:29
STOP 15:04

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 14
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: PPL S

HEIGHT READINGS MTS FT
1.036
1.396

STATION DESCRIPTIONS BRASS
DISK IN CONC MKR
"M 361 1954"

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
13:29	2.2	8/8-8
21:04	2.4	8/8-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
Fog

as before described

SKETCH

2

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

V

PROJECT 1100116
OPERATOR WJN
DATE 8/6/10

SITE NUMBER 1
SITE NAME 28

TRACKING TIMES (LOCAL) MEASURE MDT
START 8:08
STOP 8:31

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 601
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: TERRAIN E

HEIGHT READINGS MTS FT
1.662 ____
1.662

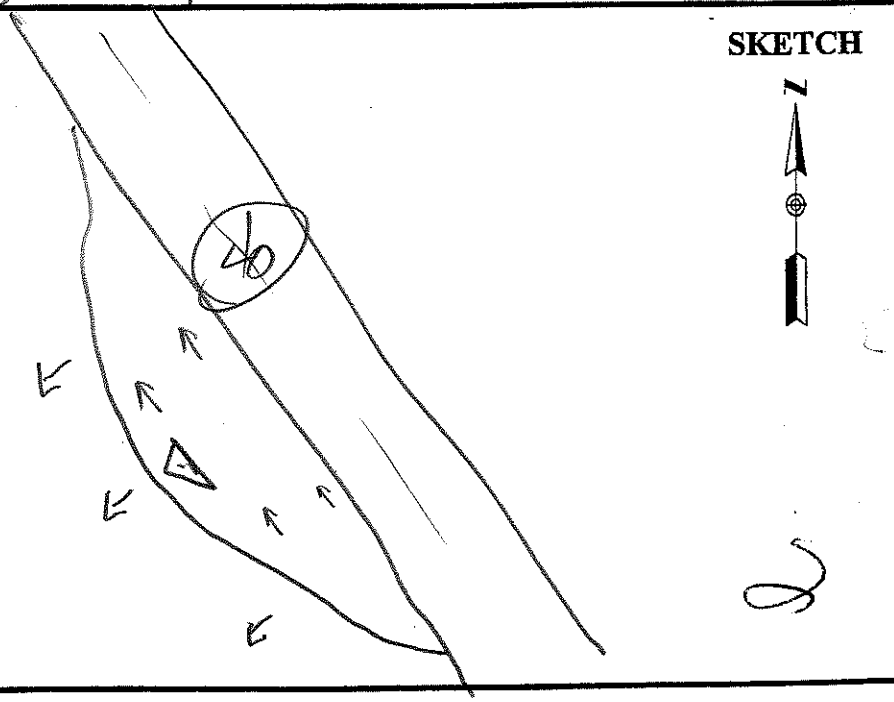
STATION DESCRIPTIONS POINT IN GR

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
14:08	2.4	8/9-8
14:31	2.7	8/8-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
PC

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

PROJECT 400116
OPERATOR WJN
DATE 9/6/10

SITE NUMBER 2
SITE NAME 29

TRACKING TIMES (LOCAL) MEASURE MDT
START 8:48
STOP 9:28

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 601
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: TREES, TERRAIN ALL BUT

HEIGHT READINGS MTS FT
1.275
1.635

STATION DESCRIPTIONS POINT IN GRAVEL TURNOUT

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
14:48	6.6	5/5-6
15:28	5.6	5/5-6

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
PC becoming SKC

SKETCH

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

PROJECT 110116
OPERATOR WJW
DATE 8/6/10

SITE NUMBER 3
SITE NAME 30

TRACKING TIMES (LOCAL) MEASURE MDT
START 9:57
STOP 10:22

SENSOR TYPE (500) 9500 399 299
MEMORY CARD
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 0.360

OBSTRUCTIONS: NO

HEIGHT READINGS MTS FT
1.291
1.651

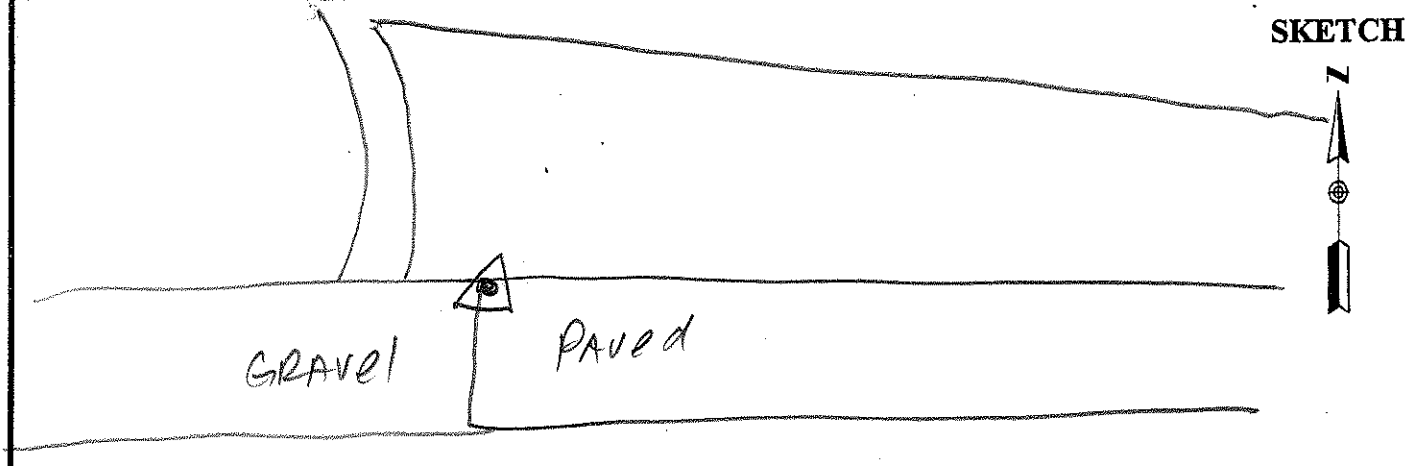
STATION DESCRIPTIONS N EDGE OF RD @ NW COR PAVEMENT. N COR END PVMNT

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
15:57	2.5	7/7-7
16:22	3.0	7/7-7

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
PC

SKETCH



2

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

✓

PROJECT 1100116
OPERATOR WJN
DATE 8/6/10

SITE NUMBER 4
SITE NAME 31

TRACKING TIMES (LOCAL) MEASURE MDT
START 10:35
STOP 11:00

SENSOR TYPE (500) 9500 399 299
MEMORY CARD
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: TREES S

HEIGHT READINGS MTS FT
1.323

STATION DESCRIPTIONS CENTER OF 14'x7' CONC SLAB

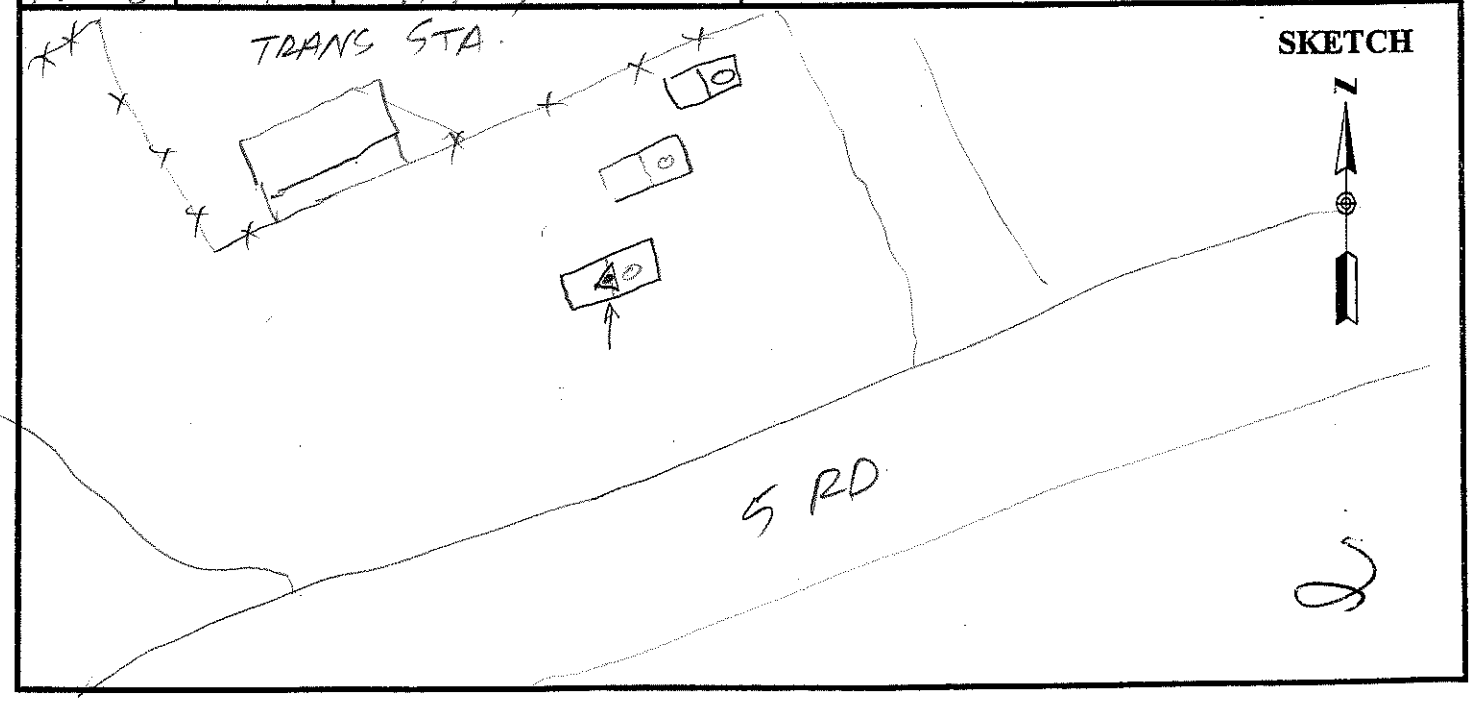
1-683

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
16:35	3.3	6/6-8
17:00	1.9	9/9-9

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
PC

SKETCH



2

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

✓

PROJECT 110211a
OPERATOR WJN
DATE 8/6/10

SITE NUMBER 5
SITE NAME 32

TRACKING TIMES (LOCAL) MEASURE MDT
START 11:35
STOP 12:06

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 001
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: TERRAIN N. W. 5 @ 20° MAX

HEIGHT READINGS MTS FT
1-333

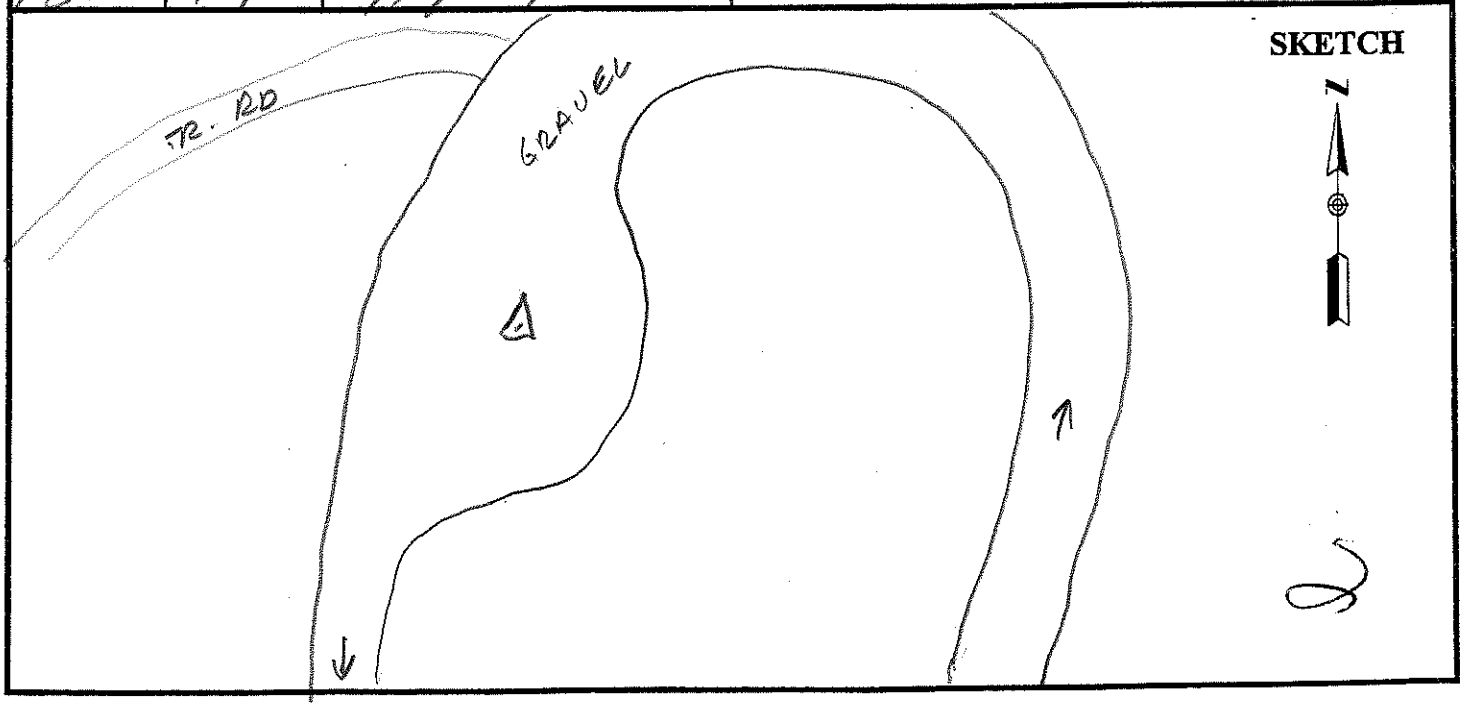
STATION DESCRIPTIONS POINT IN LARGE TURNOUT @ SWITCHBACK

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
17:35	2.5	7/7-7
18:06	1.9	9/9-9

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
MC

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

V

PROJECT 100116	**SITE NUMBER** 6
OPERATOR WJN	**SITE NAME** 33
DATE 8/6/10	

TRACKING TIMES (LOCAL) **MEASURE** MDT

START 13:15

STOP 13:46

SENSOR TYPE (500) 9500 399 299

MEMORY CARD 601

BATTERY NO.

CONTROLLER NO.

SENSOR NO.

SENSOR CONSTANT

299/399	0.441
399E/9500	0.389
500	(0.360)

OBSTRUCTIONS: TREES W, E

HEIGHT READINGS

MTS	FT
1.315	
1.675	

STATION DESCRIPTIONS POINT ON TURNOUT

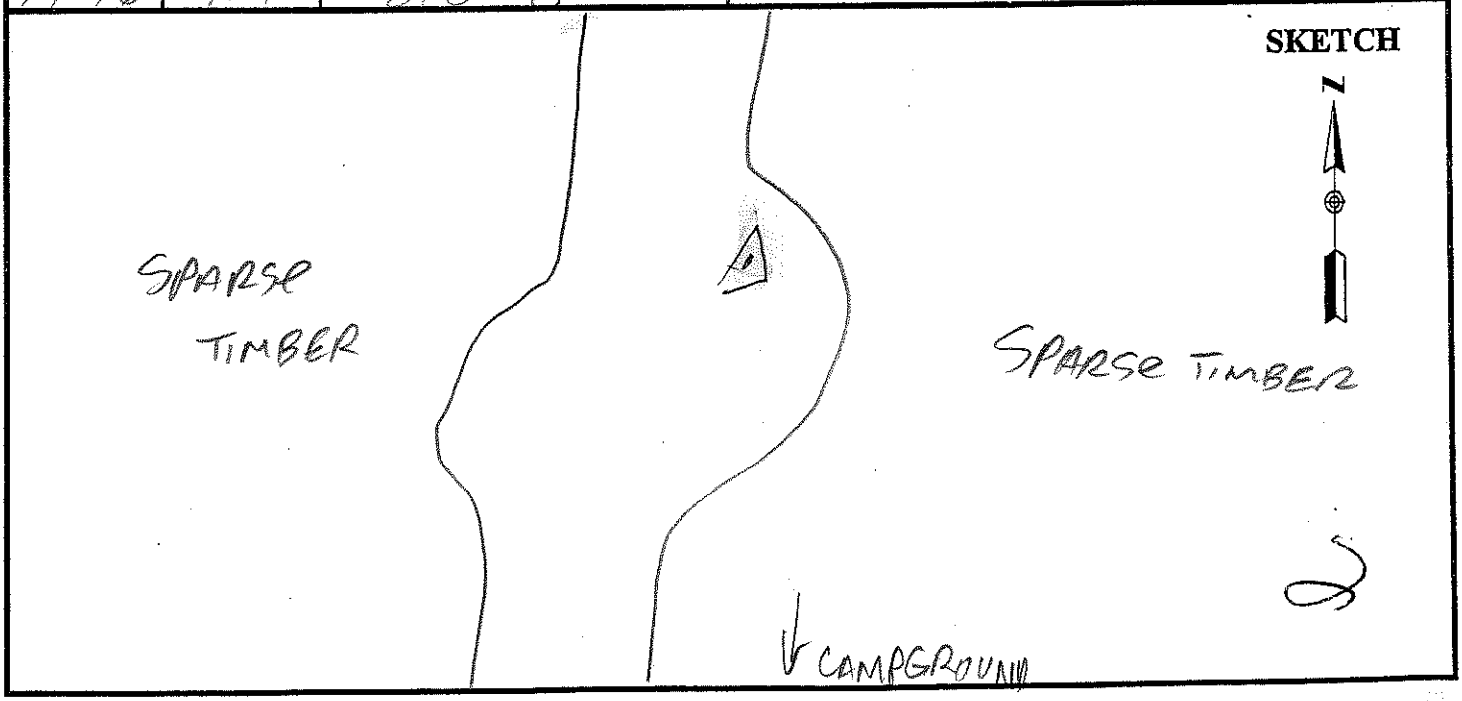
SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
19:15	2.6	8/9-10
19:46	1.9	9/8-9

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

MC

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

PROJECT 1100116
OPERATOR WN
DATE 8/6/10

SITE NUMBER 7
SITE NAME 34

TRACKING TIMES (LOCAL) MEASURE MDT
START 13:59
STOP 14:25

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 601
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 0.360

HEIGHT READINGS MTS FT
1.314

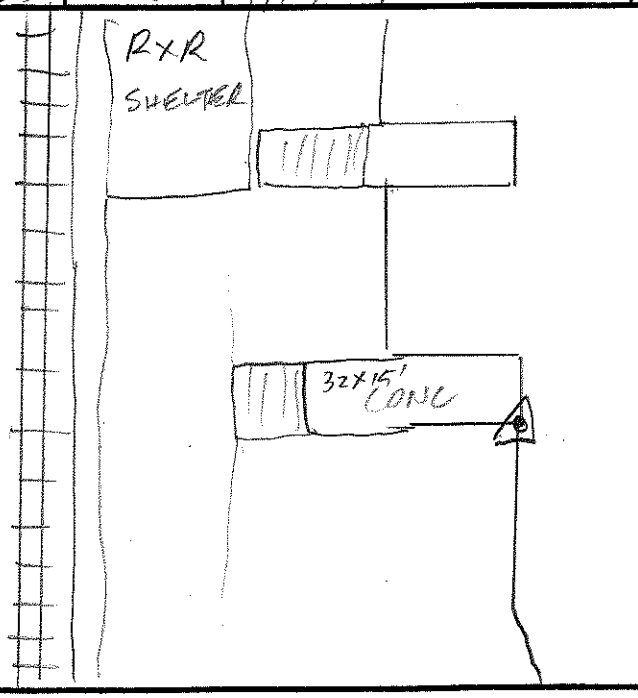
OBSTRUCTIONS: NO

STATION DESCRIPTIONS SE COR
CONCRETE @ W EDGE
ASPHALT

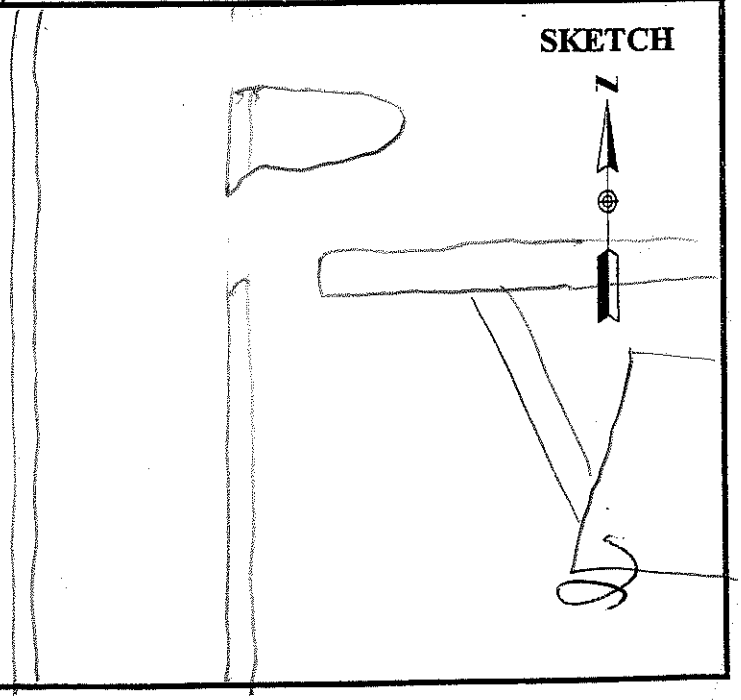
SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
19:59	1.8	9/9-9
20:25	2.0	9/9-9

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS



SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

Base

PROJECT 100116	**SITE NUMBER** 1
OPERATOR WJN	**SITE NAME** 101
DATE 8/7/10	

TRACKING TIMES (LOCAL) MEASURE MDT	**SENSOR TYPE** (500 circled) 9500 399 299
START 7:04	**MEMORY CARD** 9101
STOP 13:56	**BATTERY NO.**
	CONTROLLER NO.
	SENSOR NO.

SENSOR CONSTANT

299/399	0.441
399E/9500	0.389
500	0.360 (circled)

OBSTRUCTIONS: BUSHES NW

HEIGHT READINGS

MTS	FT
1.224	

1.584

STATION DESCRIPTIONS Rebar and plastic cap.

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
13:04	2.2	8/9-9
18:56		

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

PC

SKETCH

As before described

N

2

39 56 25.4 (uncertain reading)
105 59 17.8 (uncertain reading)

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 1100116
OPERATOR WJN
DATE 9/7/10

SITE NUMBER 1
SITE NAME M 361

TRACKING TIMES (LOCAL) MEASURE MDT
START 7:29
STOP 12:35

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 14
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT	
299/399	0.441
399E/9500	0.389
500	0.360

HEIGHT READINGS	MTS	FT
	1.073	
	1.433	

OBSTRUCTIONS: PPLS

STATION DESCRIPTIONS BRASS DISK
IN CONC
"M 361 1954"

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
13:29	2.0	8/8 - 8
16:35	2.0	10/10 - 10

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
MC

SKETCH

as before described

2

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

PROJECT 100116
OPERATOR WJW
DATE 8/7/10

SITE NUMBER 1
SITE NAME 35

TRACKING TIMES (LOCAL) MEASURE MDT
START 8:11
STOP 9:46

SENSOR TYPE ~~500~~ 9500 399 299
MEMORY CARD 601
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 ~~0.360~~

OBSTRUCTIONS: NO

HEIGHT READINGS MTS FT
1.361
1.721

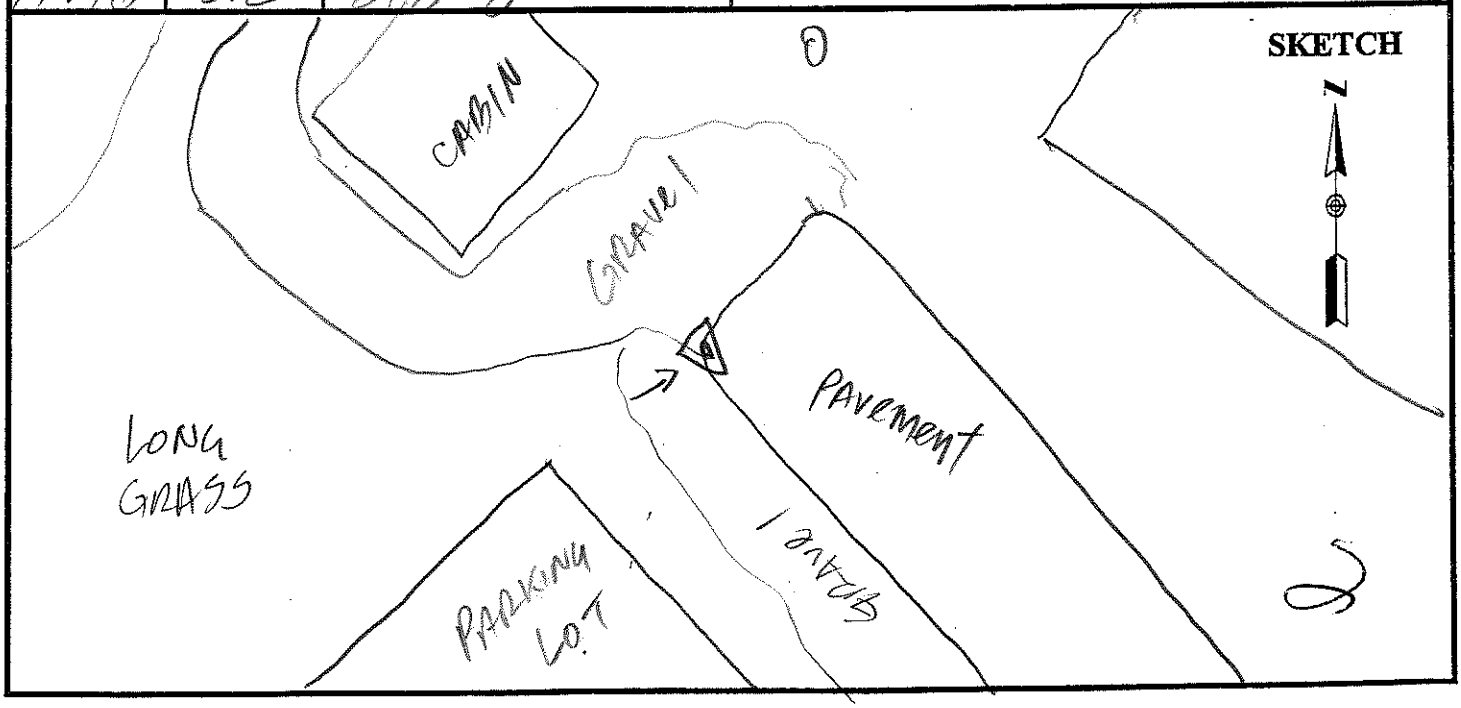
STATION DESCRIPTIONS NW 1/4 COR PAVEMENT

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
14:11	2.0	8/8-6
14:46	2.2	8/8-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
MC

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

PROJECT 1100116
OPERATOR WJN
DATE 8/7/10

SITE NUMBER 2
SITE NAME 36

TRACKING TIMES (LOCAL) MEASURE MDT
START 9:17
STOP 9:53

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 0001
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: NO

HEIGHT READINGS MTS FT
1.313
1.673

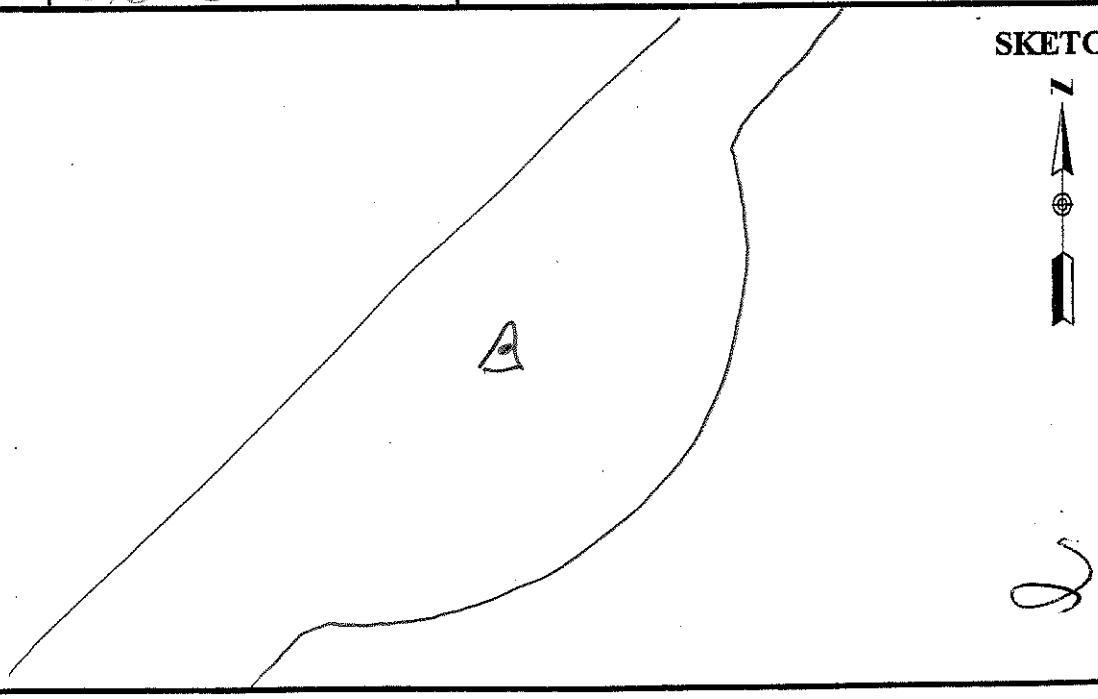
STATION DESCRIPTIONS POINT ON LEVEL SPOT, SE EDGE RD @ TURNOUT

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
15:17	4.6	6/6-6
15:53	3.3	6/6-6

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
PC

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

V

PROJECT 1100116
OPERATOR WJN
DATE 8/7/10

SITE NUMBER 3
SITE NAME 37

TRACKING TIMES (LOCAL) MEASURE MDT
START 11:56
STOP 12:13

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 601
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: TERRAIN E

HEIGHT READINGS MTS FT
1.308

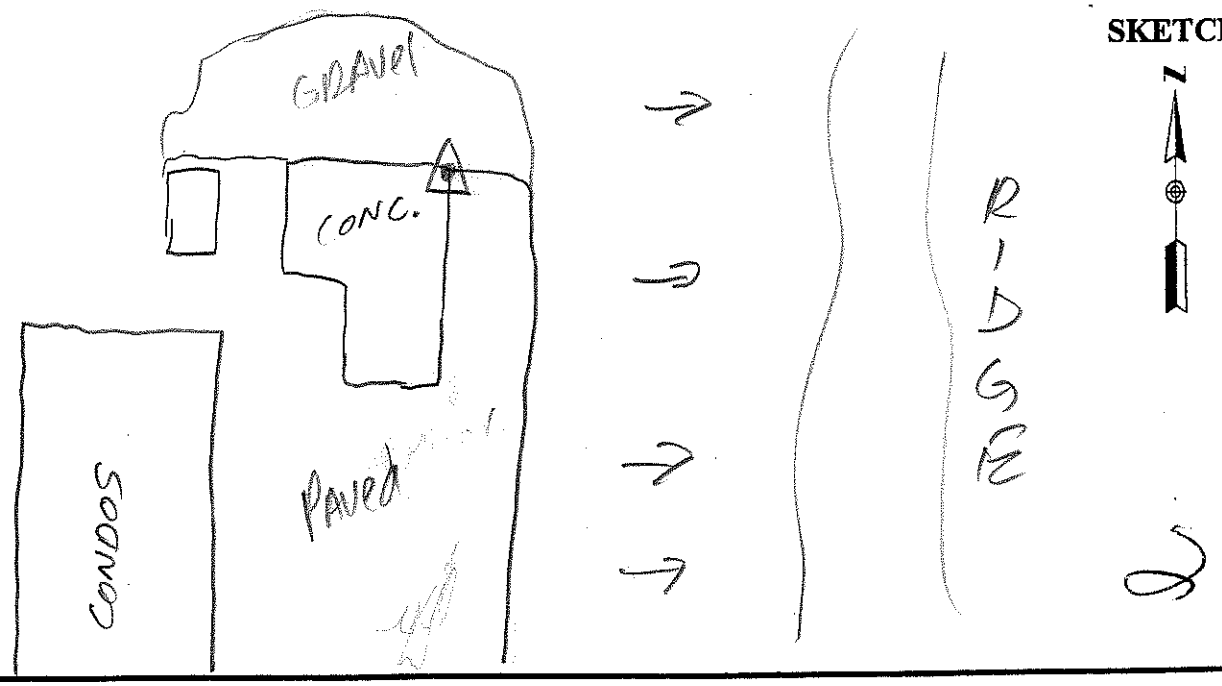
STATION DESCRIPTIONS NE COR CONCRETE

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
16:56	2.6	10/9-10
17:13	2.2	10/10-10

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
MC

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 1100116
OPERATOR WJN
DATE 9/3/10

SITE NUMBER 1
SITE NAME 101

TRACKING TIMES (LOCAL) MEASURE MDT
START 6:58
STOP ______

SENSOR TYPE (500 circled) 9500 399 299
MEMORY CARD 11
BATTERY NO. ______
CONTROLLER NO. ______
SENSOR NO. ______

SENSOR CONSTANT		
	299/399	0.441
	399E/9500	0.389
	500	0.360 (circled)

OBSTRUCTIONS: BUSHES NW

HEIGHT READINGS	**MTS**	**FT**
	1.194	

STATION DESCRIPTIONS REBAR AND CAP

SATELLITE OBSERVATIONS

TIME	**GDOP**	**SATELLITES**
12:58	2.0	9/3-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
OVC

SKETCH

as before described

N

2

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 100116
OPERATOR WJN
DATE 8/18/10

SITE NUMBER 1
SITE NAME M 361

TRACKING TIMES (LOCAL) MEASURE MDT
START 7:22
STOP

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 601
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 0.360

OBSTRUCTIONS: PPLS

HEIGHT READINGS MTS FT
1.088
1.448

STATION DESCRIPTIONS BRASS
DISK IN CONC
" M 361 1954"

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
13:22	2.2	8/8-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
RAIN

as before described

SKETCH

2

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

PROJECT 1100116
OPERATOR WVN
DATE 8/8/10

SITE NUMBER 1
SITE NAME 38

TRACKING TIMES (LOCAL) MEASURE MDT
START 8:57
STOP 9:30

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 60'
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: TREES NW, E

HEIGHT READINGS MTS FT
1.305
1.665

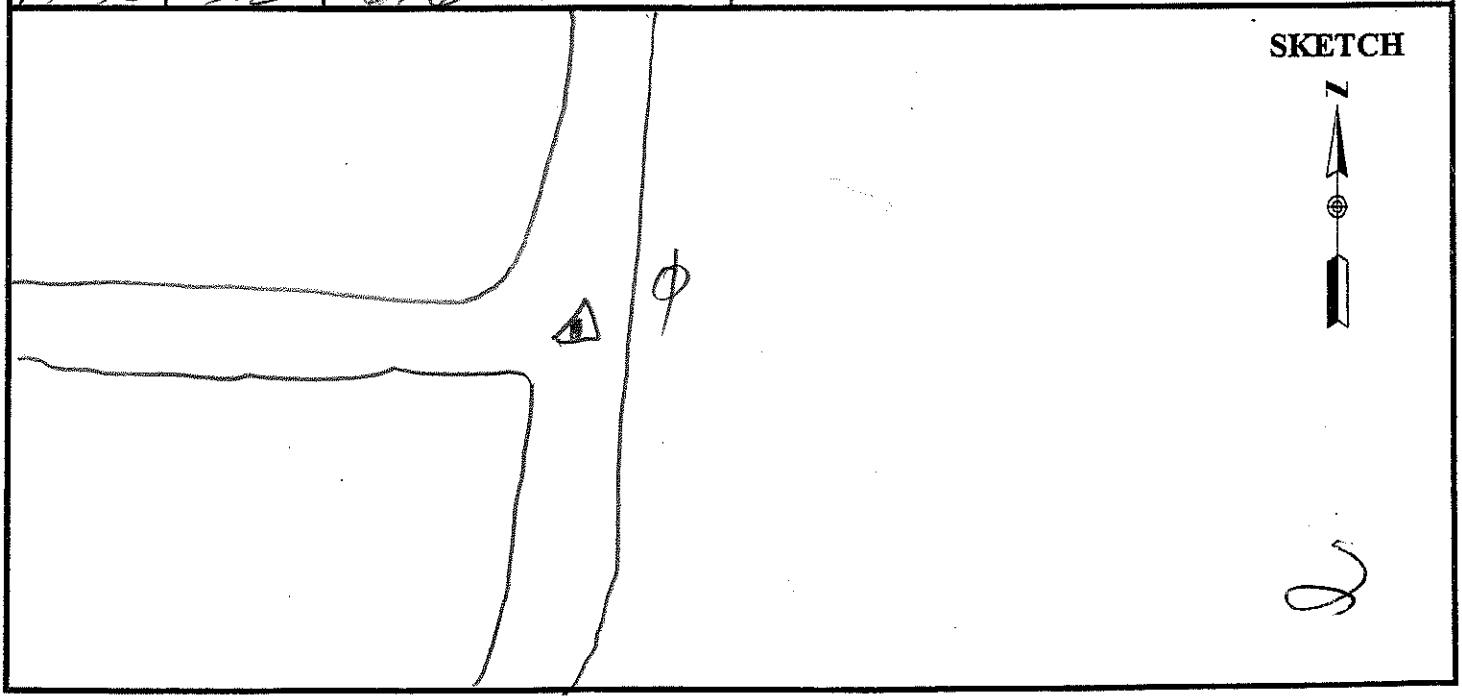
STATION DESCRIPTIONS G G INT
GRAVEL RDS

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
14:57	4.6	6/6 -6
15:30	3.2	6/6 -6

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
OVC

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

PROJECT 100116
OPERATOR WJN
DATE 8/9/10

SITE NUMBER 2
SITE NAME 39

TRACKING TIMES (LOCAL) MEASURE MDT
START 10:10
STOP 10:43

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 601
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 (0.360)

HEIGHT READINGS MTS FT
1-306
1-066

OBSTRUCTIONS: TREES NW, NE, SE

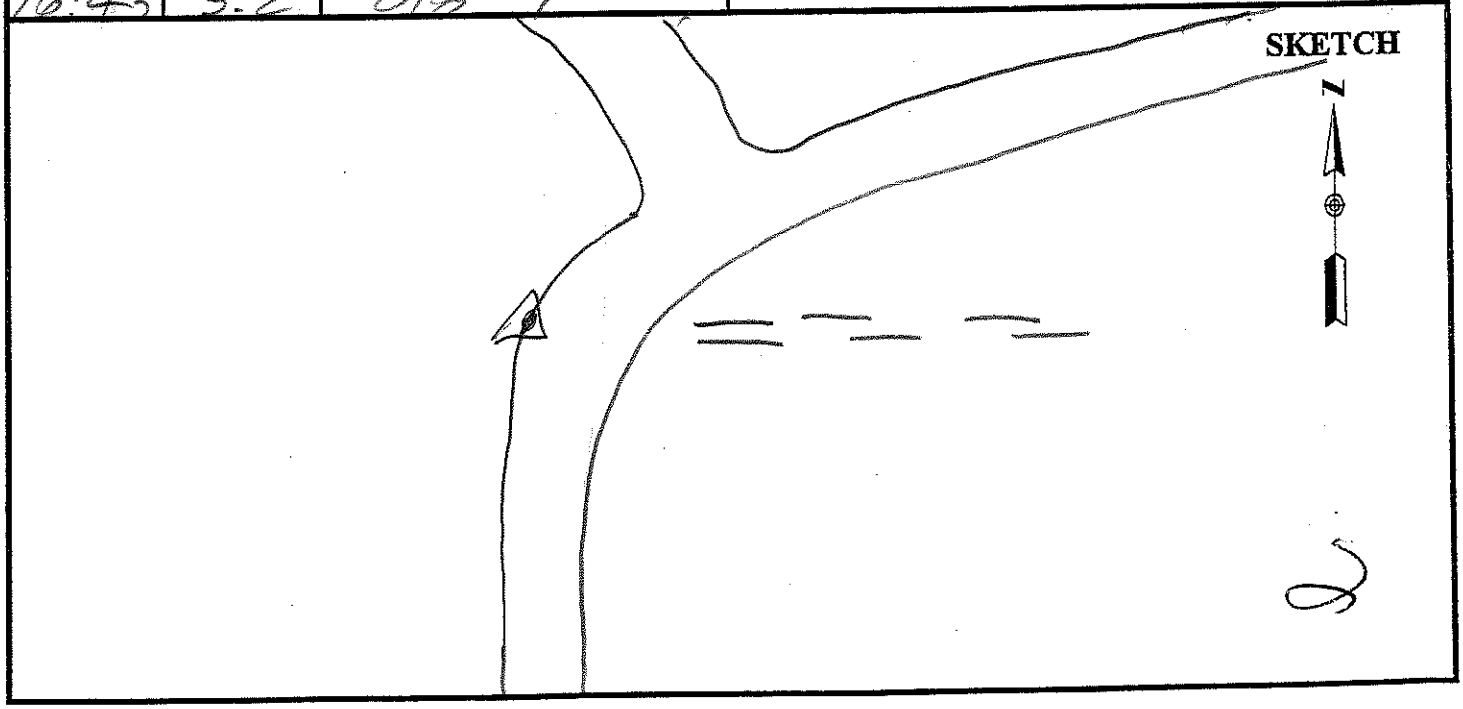
STATION DESCRIPTIONS W EDGE RD OPP RAIL FENCE EAST

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
16:10	2.9	8 13 -8
16:43	3.2	8 13 -9

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

✓

PROJECT 1100116	**SITE NUMBER** 3
OPERATOR WJM	**SITE NAME** 40
DATE 8/3/10	

TRACKING TIMES (LOCAL) MEASURE MDT

START 11:29

STOP 11:59

SENSOR TYPE (500) 9500 399 299

MEMORY CARD 601

BATTERY NO.

CONTROLLER NO.

SENSOR NO.

SENSOR CONSTANT

299/399	0.441
399E/9500	0.389
500	0.360

OBSTRUCTIONS: TREES

HEIGHT READINGS

MTS	FT
1.309	
1.669	

STATION DESCRIPTIONS 4 4 INT

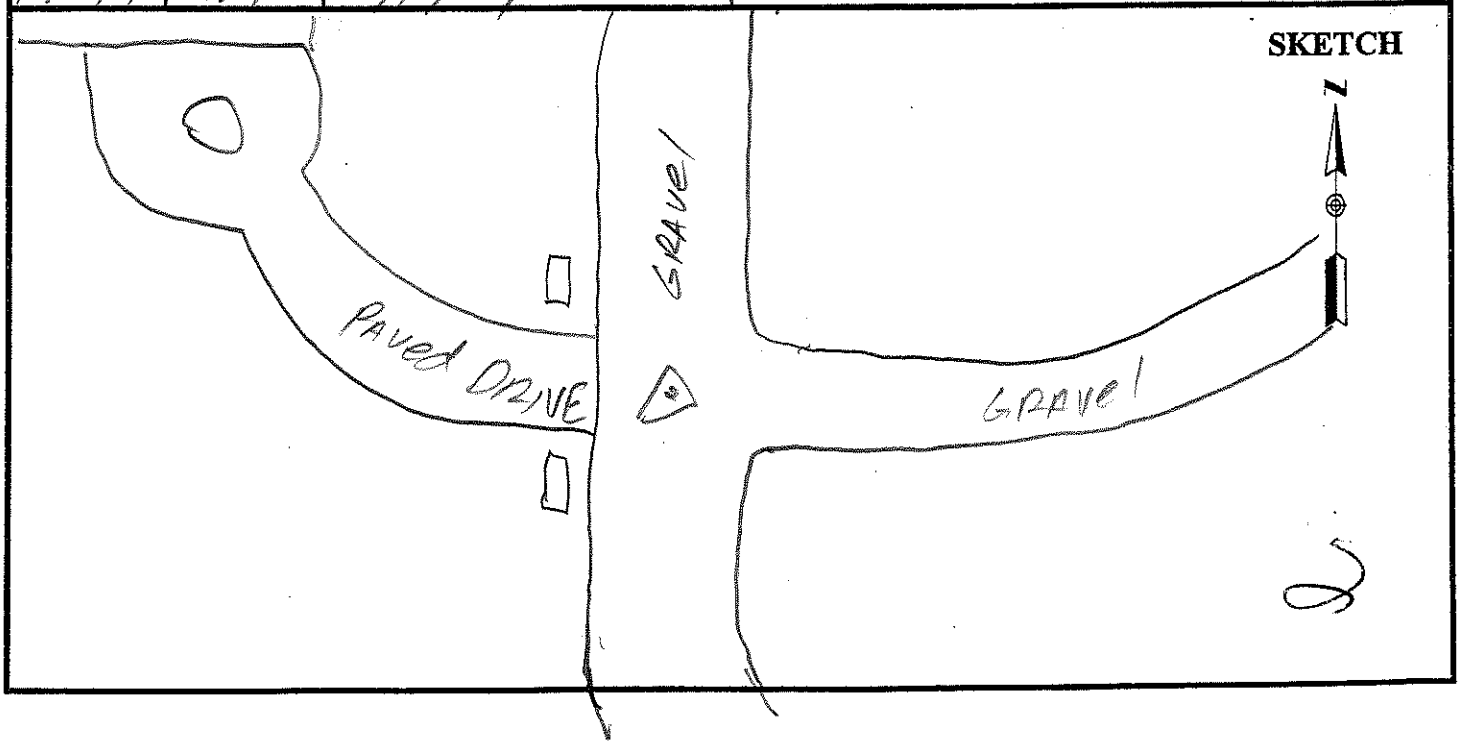
SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
17:29	2.1	9/9-9
17:59	1.9	9/9-9

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

MC

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 100116
OPERATOR WWJ
DATE 8/10/12

SITE NUMBER 1
SITE NAME 101

TRACKING TIMES (LOCAL) MEASURE MDT
START 6:58
STOP 11:58

SENSOR TYPE (500) 9500 399 299
MEMORY CARD
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 ~~0.360~~

OBSTRUCTIONS: BUSHES NW

HEIGHT READINGS MTS FT
1.187
1.541

STATION DESCRIPTIONS Rebar and CAP

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
12:58	2.0	8/9-3
17:58	2.2	8/9-3

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
SK

SKETCH

S

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 100116
OPERATOR WJN
DATE 8/10/12

SITE NUMBER 1
SITE NAME M 361

TRACKING TIMES (LOCAL) MEASURE MDT
START 7:20
STOP 12:14

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 001
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 0.360

OBSTRUCTIONS: PPL S

HEIGHT READINGS MTS FT
1.097

1.447

STATION DESCRIPTIONS BASS
DISK
"M 361 1954"

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
13:20	2.0	8/8-8
18:14	2.2	8/8-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
PC

As Before described

SKETCH

2

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 1120116
OPERATOR WJA
DATE 8/11/10

SITE NUMBER 1
SITE NAME 101

TRACKING TIMES (LOCAL) MEASURE MDT
START 6:46
STOP 12:05

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 11
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 (0.360)

HEIGHT READINGS MTS FT
1.195

OBSTRUCTIONS: BUSHES NW

STATION DESCRIPTIONS Rebar
AND CAP

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
14:46	2.7	8/9-8
19:05	1.7	11/11-11

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
SKC

as left as described

SKETCH

2

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASD

PROJECT 110046
OPERATOR WJN
DATE 8/11/10

SITE NUMBER 1
SITE NAME M 361

TRACKING TIMES (LOCAL) MEASURE MST
START 7:12
STOP 11:29

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 14
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
(500 0.360)

HEIGHT READINGS MTS FT
1.092

OBSTRUCTIONS: PPL S

STATION DESCRIPTIONS BRASS
DISK
"M 361 1951"

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
13:12	1.8	9/9-9
17:29	1.9	10/10-10

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
SKC

as before described

SKETCH

S

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 110116
OPERATOR WJN
DATE 8/12/10

SITE NUMBER 1
SITE NAME NM 361

TRACKING TIMES (LOCAL) MEASURE MDT
START 7:13
STOP 11:21

SENSOR TYPE (500) 9500 399 299
MEMORY CARD
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 0.360

HEIGHT READINGS MTS FT
1.095

OBSTRUCTIONS: PPLS

STATION DESCRIPTIONS BRASS DISK
"NM 361 1954"

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
13:13	2.0	3/8-8
17:21	2.2	3/8-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
FOG @ start
MC Cool

as before described

SKETCH

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 100116
OPERATOR WJN
DATE 8/12/10

SITE NUMBER 1
SITE NAME 101

TRACKING TIMES (LOCAL) MEASURE MST
START 7:40
STOP 10:59

SENSOR TYPE (500) 9500 399 299
MEMORY CARD
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

HEIGHT READINGS MTS FT
1.180

OBSTRUCTIONS: BUSHES NW

STATION DESCRIPTIONS Rebar and cap

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
13:40	2.0	8/9-8
16:59	2.1	8/9-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
MC

As before described

SKETCH

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 110116
OPERATOR WJN
DATE 8/13/10

SITE NUMBER 1
SITE NAME 101

TRACKING TIMES (LOCAL) MEASURE MOT
START 6:04
STOP 12:41

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 11
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 (0.360)

HEIGHT READINGS MTS FT
1.194

OBSTRUCTIONS: BUSHES NW

STATION DESCRIPTIONS Rebar and CAP

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
12:04	2.0	9/9-9
18:41	1.7	10/10-11

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
SUC

as before described

SKETCH

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 1100116
OPERATOR WJN
DATE 9/13/10

SITE NUMBER 1
SITE NAME M 361

TRACKING TIMES (LOCAL) MEASURE MDT
START 6:30
STOP 12:01

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 14
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

HEIGHT READINGS MTS FT
1.086

OBSTRUCTIONS: PPL S

STATION DESCRIPTIONS BRASS DISK "M 361 1954"

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
12:30	2.2	3/8-8
18:01	2.0	9 19-9

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
SKC

As before described

SKETCH

2

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 1100116
OPERATOR WJN
DATE 8/14/10

SITE NUMBER 1
SITE NAME 101

TRACKING TIMES (LOCAL) MEASURE MDT
START 6:46
STOP 11:37

SENSOR TYPE (500) 9500 399 299
MEMORY CARD
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 ~~0.360~~

OBSTRUCTIONS: BUSHES NW

HEIGHT READINGS MTS FT
1.177

STATION DESCRIPTIONS Rebar and Cap

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
12:46	2.2	8/8-10
17:37	2.2	8/8-2

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
SKC

as before described

SKETCH

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 1100116
OPERATOR WJN
DATE 9/14/10

SITE NUMBER 1
SITE NAME M361

TRACKING TIMES (LOCAL) MEASURE MDT
START 7:14
STOP 11:17

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 14
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

HEIGHT READINGS
MTS 1.087
FT

OBSTRUCTIONS: PPL S

STATION DESCRIPTIONS BRASS DISK "M361 1954"

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
13:14	2.0	8/8-8
17:17	2.4	9/8-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
SKC

as before described

SKETCH

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 100116
OPERATOR WW
DATE 8/15/10

SITE NUMBER 1
SITE NAME 101

TRACKING TIMES (LOCAL) MEASURE MDT
START 6:47
STOP 10:57

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 11
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: BUSHES NW

HEIGHT READINGS MTS FT
1.116

STATION DESCRIPTIONS Rebar and Cap

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
12:47	1.9	10/10-10
16:57	2.0	9/9-9

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
SKC

As before described

SKETCH

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 1100116
OPERATOR WJN
DATE 9/15/10

SITE NUMBER 1
SITE NAME M 361

TRACKING TIMES (LOCAL) MEASURE MDT
START 7:10
STOP 10:30

SENSOR TYPE 500 9500 399 299
MEMORY CARD 14
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 ~~0.360~~

OBSTRUCTIONS: PPL S

HEIGHT READINGS MTS FT
1.090

STATION DESCRIPTIONS BRASS DISK "M 361 1954"

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
13:10	2.0	9/9-9
16:30	1.8	10/10-10

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
SKC

As before described

SKETCH

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 1100116
OPERATOR WJN
DATE 8/16/10

SITE NUMBER 1
SITE NAME M 361

TRACKING TIMES (LOCAL) MEASURE MDT
START 6:16
STOP 10:12

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 14
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

HEIGHT READINGS MTS FT
1.091

OBSTRUCTIONS: PPL S

STATION DESCRIPTIONS BRASS DISK
IN CONC
"M 361 1954"

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
11:16	2.2	8/9-8
16:12	1.9	9/9-9

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
MC

AS BEFORE DESCRIBED

SKETCH

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 1100116
OPERATOR WJN
DATE 8/16/10

SITE NUMBER 1
SITE NAME 101

TRACKING TIMES (LOCAL) MEASURE MDT
START 5:53
STOP 9:30

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 11
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

HEIGHT READINGS MTS FT
1.112

OBSTRUCTIONS: BUSHES NW

STATION DESCRIPTIONS REBAR AND CAP

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
11:53	2.0	8/9-8
15:30	1.8	9/9-9

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
MC

AS BEFORE DESCRIBED

SKETCH

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BAG

PROJECT 1100116
OPERATOR WLW
DATE 8/17/10

SITE NUMBER 1
SITE NAME CM229

TRACKING TIMES (LOCAL) MEASURE MDT
START 10:50
STOP 14:20

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 101
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: TREES,

HEIGHT READINGS MTS FT
1.302
1.662

STATION DESCRIPTIONS CO DOT
3" ALUM CAP
"CM 229"

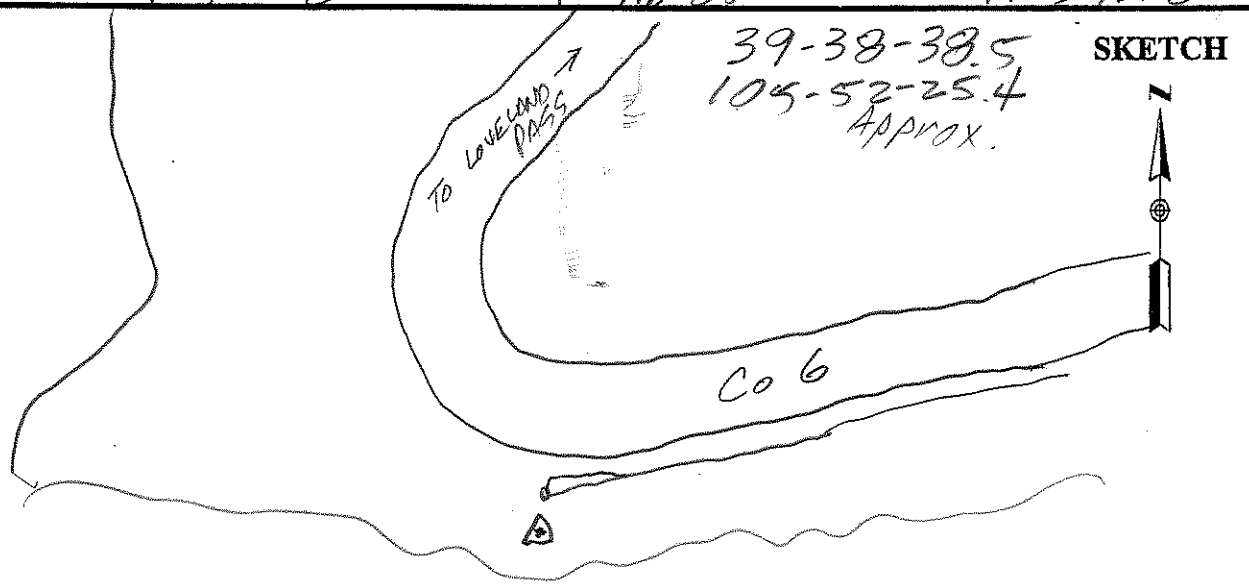
SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
16:50	2.3	9/8-9
20:20	4.4	5/5-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
MC WINDY

CDOT Published 1660605.39
NAD 83/92 US Survey CoC 2896390.10
NAD 88 11139.78

SKETCH



SEE BACK

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

U + V control

BASE

PROJECT 100116
OPERATOR WJN
DATE 8/17/10

SITE NUMBER 1
SITE NAME W 299 Reset

TRACKING TIMES (LOCAL) MEASURE MDT
START 11:26
STOP 14:36

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 14
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 ~~0.360~~

HEIGHT READINGS MTS FT
1.091
1.451

OBSTRUCTIONS: TREE, HOUSE E 25°

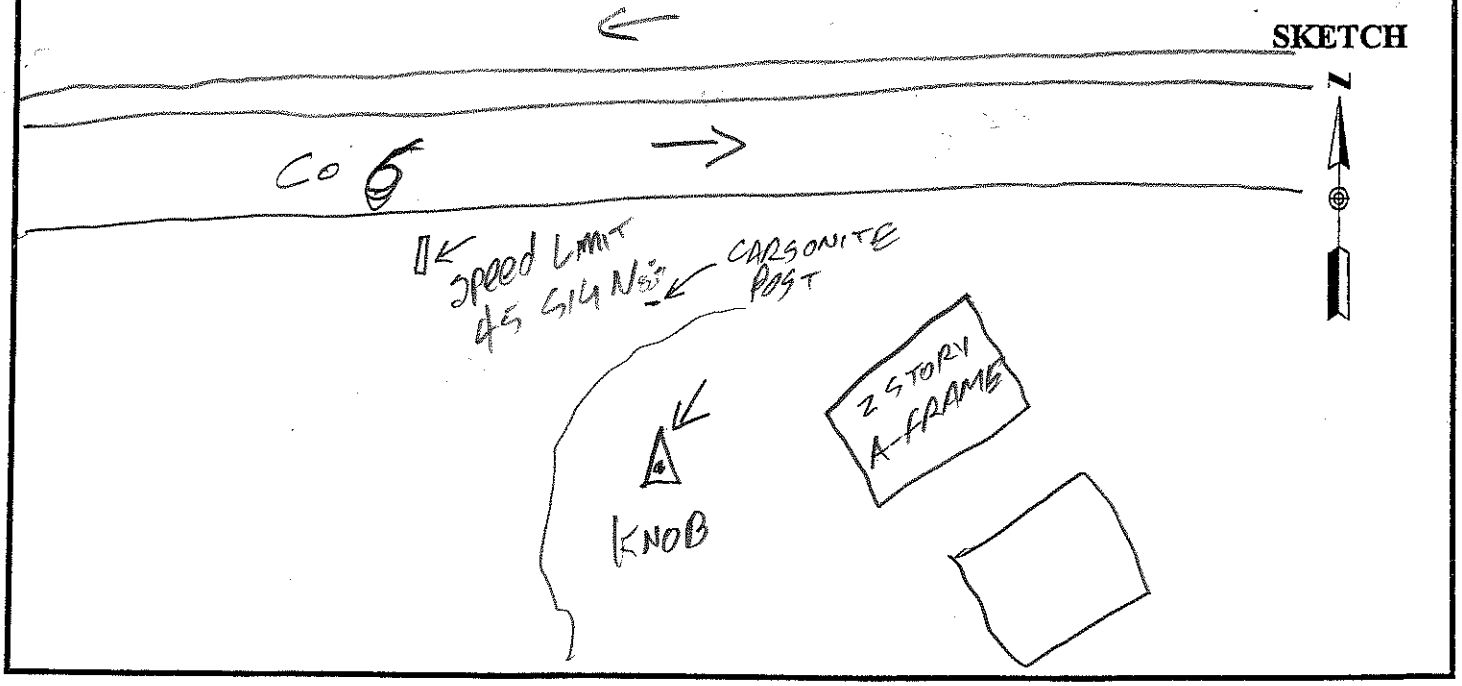
STATION DESCRIPTIONS BRASS DISK IN CONC MKD "W 299 RESET 1987" NGS AS Described By NGS

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
17:26	1.9	10/10-10
20:36	2.6	7/7-7

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
MC

SKETCH



39 36 15.45747
105 58 56.00795
2812.579

08 2825.14

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

H + V CONTROL

PROJECT 1100116	SITE NUMBER 1
OPERATOR WJN	SITE NAME D450
DATE 8/17	

TRACKING TIMES (LOCAL) MEASURE MDT

START 12:04

STOP 12:24

SENSOR TYPE (500) 9500 399 299

MEMORY CARD 60f

BATTERY NO.

CONTROLLER NO.

SENSOR NO.

SENSOR CONSTANT

299/399	0.441
399E/9500	0.389
500	(0.360)

HEIGHT READINGS

MTS	FT
1.399	
1.759	

OBSTRUCTIONS: NO

STATION DESCRIPTIONS BRASS DISK IN FOOT BRIDGE ABUTMENT MKD "D450 2001" NGS

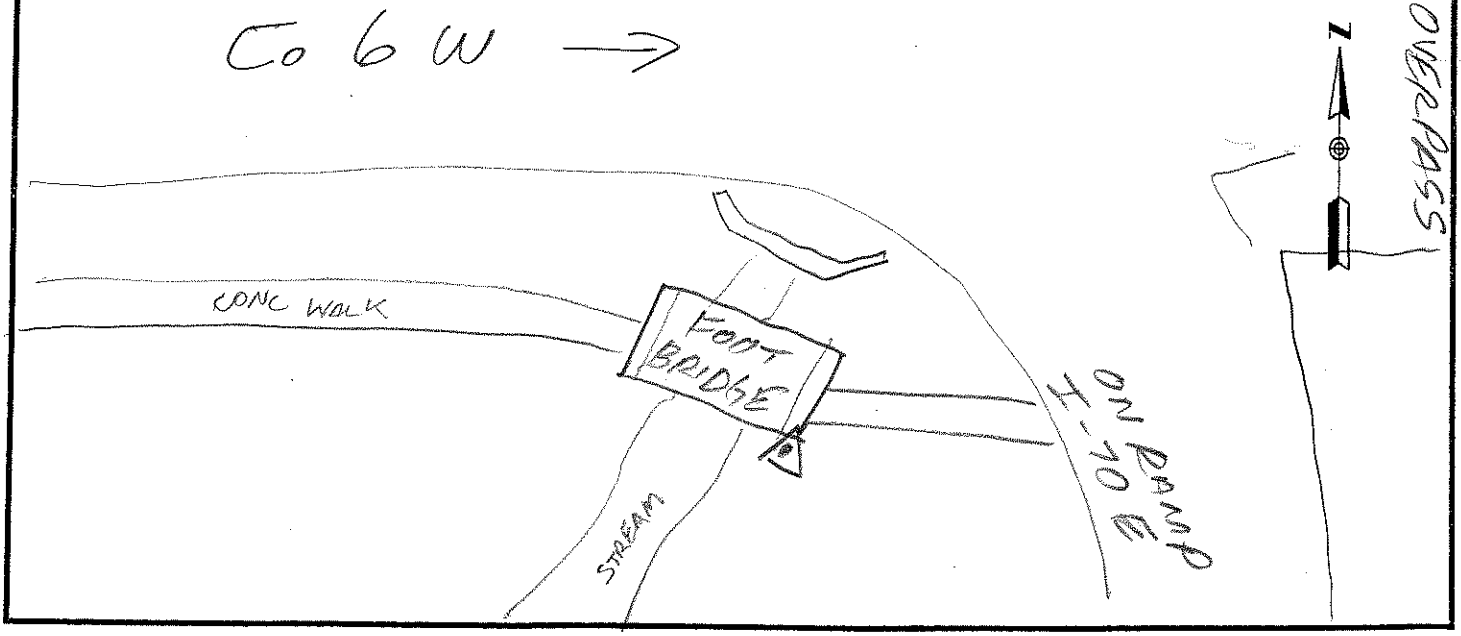
SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
18:	1.9	9/9-9
18:24	1.9	9/9-9

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

MC

SKETCH



ECIP 2674-041 88 2686.669

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

H+V CONTROL

PROJECT 100116
OPERATOR WJN
DATE 8/17/00

SITE NUMBER 2
SITE NAME Y 450

TRACKING TIMES (LOCAL) MEASURE MDT
START 12:47
STOP 13:09

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 601
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: NO

HEIGHT READINGS MTS FT
1.316
1.676

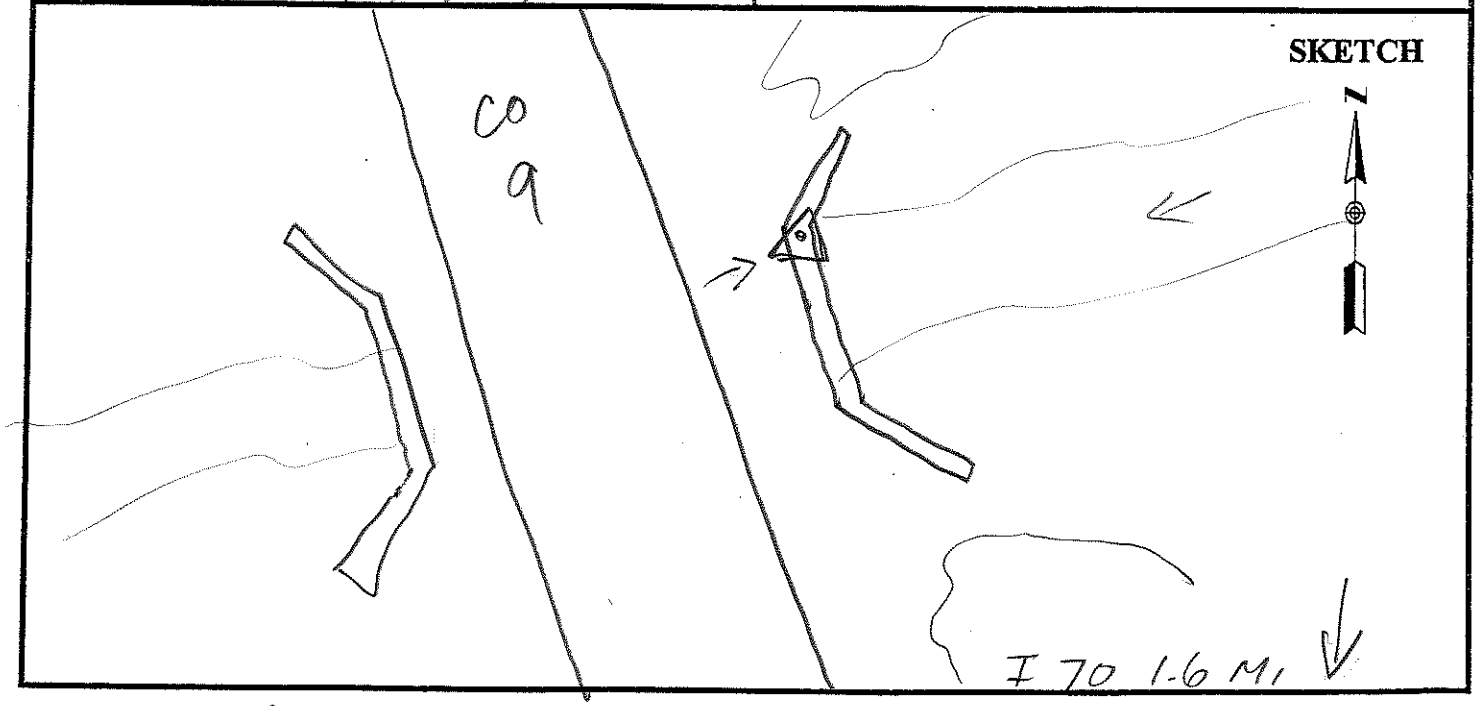
STATION DESCRIPTIONS BRASS DISC IN NW COR WING WALL " Y 450 2001 " NGS AS DESCRIBED BY NGS

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
12:47	2.2	8/8-9
13:09	1.9	9/9-9

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
MC

SKETCH



ELIP 2638.964 88 2651.566

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

Vert control

PROJECT 1100116	**SITE NUMBER** 3
OPERATOR WJN	**SITE NAME** S 299
DATE 8/17/10	

TRACKING TIMES (LOCAL) **MEASURE** MDT

START 13:40

STOP 14:23

SENSOR TYPE (500) 9500 399 299

MEMORY CARD

BATTERY NO.

CONTROLLER NO.

SENSOR NO.

SENSOR CONSTANT

299/399	0.441
399E/9500	~~0.389~~
500	(0.360)

HEIGHT READINGS

MTS	FT
1.327	

1.687

OBSTRUCTIONS: TREES, TERRAIN ALL QUADRANTS

STATION DESCRIPTIONS BRASS DISK SET IN BOULDER "S 299 1951"

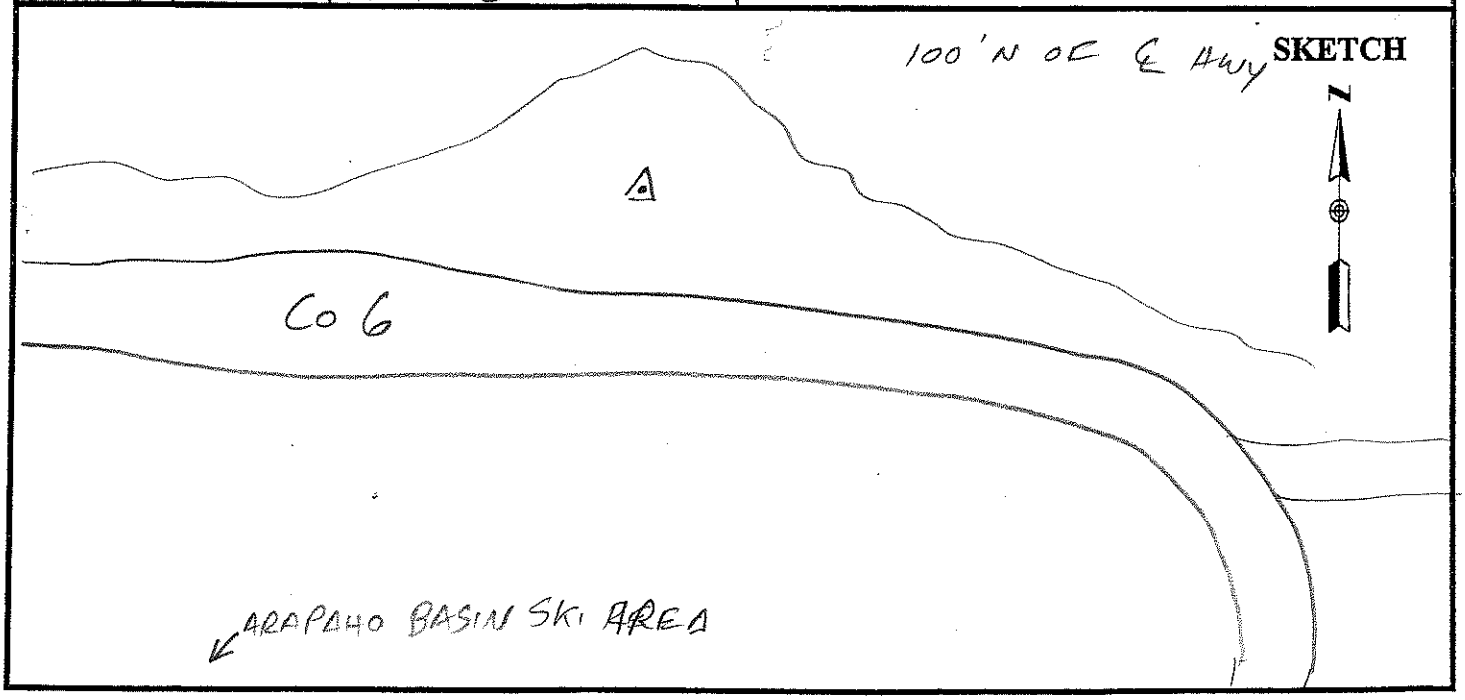
SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
19:40	8.9↓	6/5-8
20:23	7-9	4/4-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

MC

SKETCH



3371.968
-12.38

88 3376.468

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

ANT OUT
BASE

PROJECT 100116
OPERATOR W. JN
DATE 8/18/10

SITE NUMBER 1
SITE NAME W 299 Reset

TRACKING TIMES (LOCAL) MEASURE MDT
START 8:11
STOP 12:09

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 11
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: TERRAIN E

HEIGHT READINGS
MTS 1.107
FT

STATION DESCRIPTIONS BRASS DIST "W 299 RESET 1987"

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
14:11	4.4	6/6-6
19:09	2.2	8/8-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
PC

as before described

SKETCH

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 11001/6
OPERATOR WJN
DATE 9/18/10

SITE NUMBER 1
SITE NAME CM 229

TRACKING TIMES (LOCAL) MEASURE MDT
START 9:32
STOP 11:41

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 10
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: TREES (ALL)

HEIGHT READINGS MTS FT
1.311
1.671

STATION DESCRIPTIONS ALUM CAP
"CM 229"
CO DOT

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
14:32	4.3	6/6-8
17:41	2.3	8/8-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
PC

As before described

SKETCH

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

PROJECT 110016
OPERATOR WJN
DATE 9/16/10

SITE NUMBER 1
SITE NAME 41

TRACKING TIMES (LOCAL) MEASURE MDT
START 9:53
STOP 10:15

SENSOR TYPE (500) 9500 399 299
MEMORY CARD
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: Terrain E

HEIGHT READINGS MTS FT
1.276

1-636

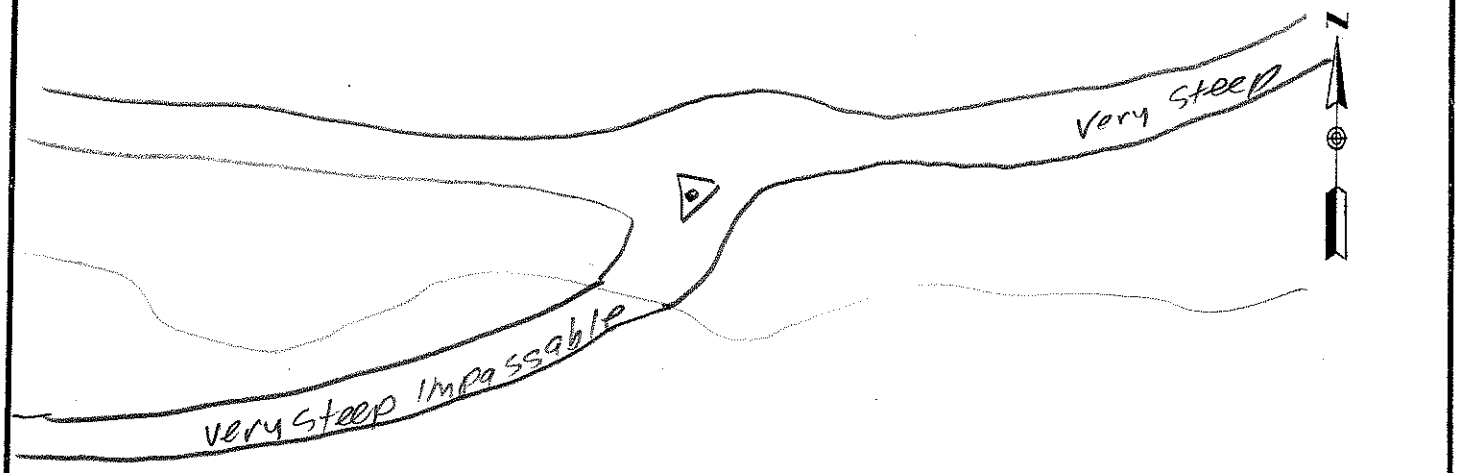
STATION DESCRIPTIONS FLAT
AREA NEAR G.C. INT
GRAVEL TRAILS

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
15:53	2.9	7/7-8
16:15	2.2	8/8-9

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
PC

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

PROJECT 1100116
OPERATOR WJW
DATE 8/18/10

SITE NUMBER 2
SITE NAME 42

TRACKING TIMES (LOCAL) MEASURE MD
START 10:17
STOP 10:33

SENSOR TYPE 500 9500 399 299
MEMORY CARD
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 0.360

HEIGHT READINGS MTS FT
1.214

OBSTRUCTIONS:

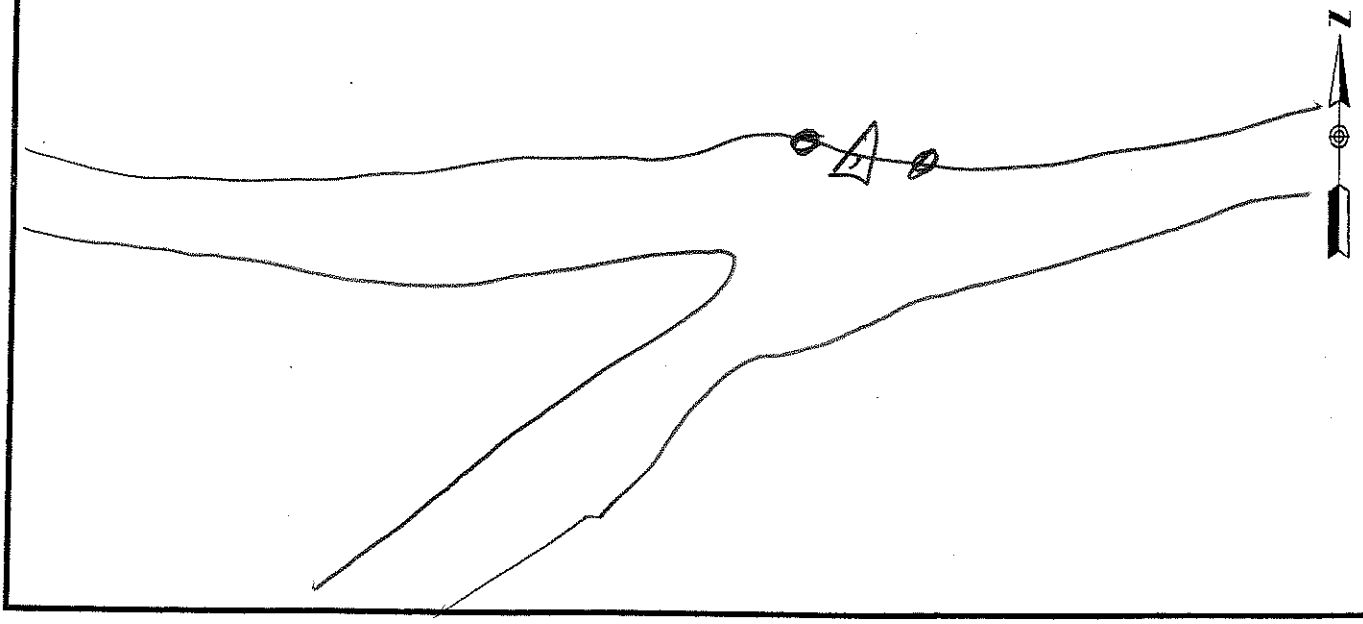
STATION DESCRIPTIONS N. EDGE
GRAVEL between
two SIGNS

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
16:17	2.2	8/8-9
16:33	2.1	8/8-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
PC Becoming
Very Windy

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BDG

PROJECT 11001/6
OPERATOR WJN
DATE 8/21/10

SITE NUMBER 1
SITE NAME 101

TRACKING TIMES (LOCAL) MEASURE MDT
START 5:54
STOP 12:44

SENSOR TYPE (500) 9500 399 299
MEMORY CARD
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

HEIGHT READINGS MTS FT
1.142

OBSTRUCTIONS: BUSHES N+W

STATION DESCRIPTIONS Rebar and CAP

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
11:54	2.2	8/9-8
12:44	1.6	10/10-10

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
PATCHY FOG

As before

SKETCH

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 110116
OPERATOR MJN
DATE 9/21/10

SITE NUMBER 1
SITE NAME M 316

TRACKING TIMES (LOCAL) MEASURE MDT
START 6:20
STOP 12:19

SENSOR TYPE (500) 9500 399 299
MEMORY CARD
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 ~~0.360~~

HEIGHT READINGS MTS FT
0.993

OBSTRUCTIONS: PPL S

STATION DESCRIPTIONS BRASS DISK IN CONC "M 361 1954"

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
12:20	2.0	9/9-9
18:19	1.4	12/12-12

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
SKC, PATCHY FOG

as before described

SKETCH

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 100116
OPERATOR WJN
DATE 8/22/10

SITE NUMBER 1
SITE NAME 101

TRACKING TIMES (LOCAL) MEASURE MDT
START 6:40
STOP 12:43

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 11
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: BUSHES NW

HEIGHT READINGS MTS FT
1.160

STATION DESCRIPTIONS Rebar

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
12:40	2.0	9/9-9
18:43	1.8	10/10-10

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
SKC GROUND FOG

As before described

SKETCH

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 110116
OPERATOR W.JN
DATE 9/22/10

SITE NUMBER 1
SITE NAME M 361

TRACKING TIMES (LOCAL) MEASURE MDT
START 7:03
STOP 12:10

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 14
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

HEIGHT READINGS MTS FT
1.084

OBSTRUCTIONS: PPL S

STATION DESCRIPTIONS BRASS DISK
" M 361 1954"

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
13:03	2.0	9/9-9
18:10	1.4	11/11-11

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
SKC GROUND FOG

as before described

SKETCH

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 1100146
OPERATOR WJA
DATE 8/25/10

SITE NUMBER 1
SITE NAME 101

TRACKING TIMES (LOCAL) MEASURE MDT
START 5:50
STOP 12:10

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 11
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 (0.360)

HEIGHT READINGS MTS FT
1.136

OBSTRUCTIONS: BUSHES NW

STATION DESCRIPTIONS Rebar and CAP

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
11:50	1.8	9/9-9
19:10	1.6	12/12-12

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
SKC

as before described

SKETCH

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 110116
OPERATOR WJN
DATE 9/25/10

SITE NUMBER 1
SITE NAME M 361

TRACKING TIMES (LOCAL) MEASURE UNIT
START 6:13
STOP 11:40

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 14
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

HEIGHT READINGS MTS FT
1.087

OBSTRUCTIONS: PPL S

STATION DESCRIPTIONS BRASS DISK IN CON "M 361 1954"

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
12:13	1.9	9/9-9
17:40	2.0	8/8-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
SKC

as before described

SKETCH

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 100116
OPERATOR WJW
DATE 8/26/10

SITE NUMBER 1
SITE NAME CM 229

TRACKING TIMES (LOCAL) MEASURE MDT
START 6:07
STOP 11:42

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 11
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

HEIGHT READINGS MTS FT
1.329

OBSTRUCTIONS: TERRAIN NW

STATION DESCRIPTIONS COLORADO DOT 3 1/2 AC
" CM 229

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
12:07	1.9	9/9-9
17:42	2.0	8/8-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
SKC

as before described

SKETCH

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 100116
OPERATOR WJN
DATE 9/26/10

SITE NUMBER 1
SITE NAME W 299 Reset

TRACKING TIMES (LOCAL) MEASURE MDT
START 6:26
STOP 11:41

SENSOR TYPE ~~500~~ (circled) 9500 399 299
MEMORY CARD 14
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT

299/399	0.441
399E/9500	0.389
500	0.360 (circled)

HEIGHT READINGS

MTS	FT
1.140	

OBSTRUCTIONS: TREES, BLGS E

STATION DESCRIPTIONS BRASS DISK IN CONC " W 299 RESET 1997"

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
12:26	1.9	8/9-8
17:41	1.9	9/9-9

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
Skc

SKETCH

as before described

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT 1100116
OPERATOR WJN
DATE 9/26/10

SITE NUMBER 1
SITE NAME 102

TRACKING TIMES (LOCAL) MEASURE MDT
START 9:00
STOP 12:03

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 001
BATTERY NO.
CONTROLLER NO.
SENSOR NO.

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

HEIGHT READINGS MTS FT
1.126

OBSTRUCTIONS: NO

STATION DESCRIPTIONS Set Rebar and CAP

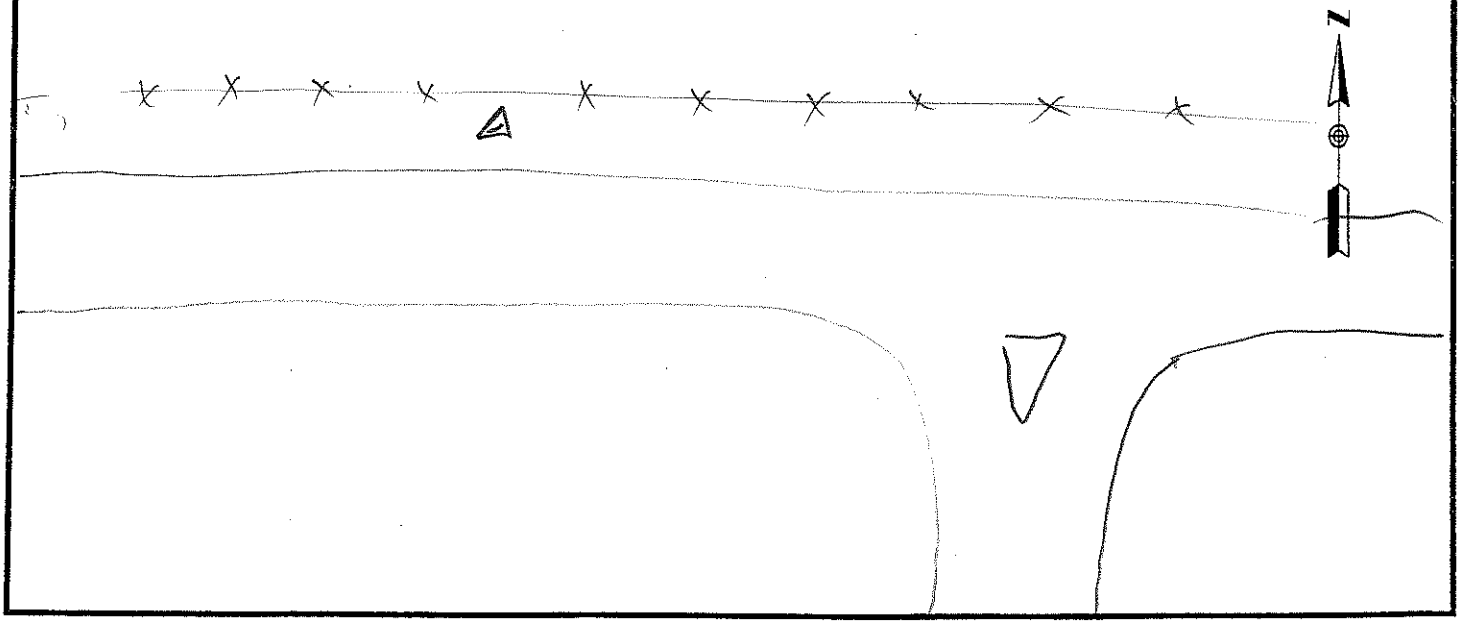
SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
15:00	1.9	9/9-9
19:03	2.0	9/9-9

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
SKC

39-36-12.6 approx
106-00-22.1

SKETCH



AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

1100116
WJN
8/27/10

SITE NUMBER 1

SITE NAME 101

KING TIMES (LOCAL) MEASURE MDT

START 6:02

STOP 9:53

SENSOR TYPE (500) 9500 399 299

MEMORY CARD 11

BATTERY NO.

CONTROLLER NO.

SENSOR NO.

SENSOR CONSTANT 299/399 0.441
399E/9500 0.389
500 (0.360)

HEIGHT READINGS MTS FT
1.215

OBSTRUCTIONS: BUSHES NW

STATION DESCRIPTIONS Rebar and CAP

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
12:02	1.8	9/9-G
15:53	2.0	8/8-G

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS

SKC

as before described

SKETCH

AERO-METRIC, INC.
4020 TECHNOLOGY PARKWAY
SHEBOYGAN, WISCONSIN 53083

BASE

PROJECT _____
OPERATOR _____
DATE 9/27/10

SITE NUMBER 1
SITE NAME M 361

TRACKING TIMES (LOCAL) MEASURED CDT
START 6:27
STOP 10:19

SENSOR TYPE (500) 9500 399 299
MEMORY CARD 14
BATTERY NO. _____
CONTROLLER NO. _____
SENSOR NO. _____

SENSOR CONSTANT
299/399 0.441
399E/9500 0.389
500 (0.360)

OBSTRUCTIONS: PLS

HEIGHT READINGS MTS FT
1.015 _____

STATION DESCRIPTIONS BRASS DISK
"M 361 1954"

SATELLITE OBSERVATIONS

TIME	GDOP	SATELLITES
12:27	1.8	9/9-9
16:19	2.0	9/8-8

WEATHER CONDITIONS/IMPORTANT OBSERVATIONS
SKC

as before described

SKETCH

08:30:19, Tue Aug 24, 2010

INI file: C:\WINNT\GEOLAB.INI
Input file: R:\1100116\G~VFTSZJ\SURVEY\GEO\C.IOB
Output file: R:\1100116\G~VFTSZJ\SURVEY\GEO\C.LST

Geoid File: C:\GEOLAB2\G2009U06.GEO

PARAMETERS		OBSERVATIONS	
Description	Number	Description	Number
No. of Stations	54	Directions	0
Coord Parameters	131	Distances	0
Free Latitudes	44	Azimuths	0
Free Longitudes	44	Vertical Angles	0
Free Heights	43	Zenithal Angles	0
Fixed Coordinates	31	Angles	0
Astro. Latitudes	0	Heights	0
Astro. Longitudes	0	Height Differences	0
Geoid Records	0	Auxiliary Params.	0
All Aux. Pars.	0	2-D Coords.	0
Direction Pars.	0	2-D Coord. Diffs.	0
Scale Parameters	0	3-D Coords.	0
Constant Pars.	0	3-D Coord. Diffs.	351
Rotation Pars.	0		
Translation Pars.	0		
	--------		--------
Total Parameters	131	Total Observations	351
Degrees of Freedom = 220			

SUMMARY OF SELECTED OPTIONS

OPTION	SELECTION
Computation Mode	Adjustment
Maximum Iterations	5
Convergence Criterion	0.00100
Confidence Level for Statistics	95.000
Covariance Matrix Computation	Connected Portion Only
Residual Rejection Criterion	Tau Max
Confidence Region Types	3D Station Relative
Relative Confidence Regions	Connected Only
Variance Factor (VF) Known	Yes
CMULT (Multiply Parm Cov With VF)	Yes
RMULT (Multiply Res Cov With VF)	No
Force Convergence in Max Iters	Yes
Distances Affect 3D	No
Full Inverse Computed	No
Normals Reordered	Yes
Coordinates Generated	No
Geoid Interpolation Method	Bi-Linear

Adjusted NEO Coordinates:

CODE	FFF	STATION	NORTHING STD DEV	EASTING STD DEV	O-HEIGHT STD DEV	MAPPROJ
NEO	000	1	4459433.599	428723.152	2653.569	UTM 13
			0.016	0.016	0.016	
SFMC		1	0.99966254	0-32 31.717377		UTM 13
NEO	000	10	4448990.093	418873.040	2657.937	UTM 13
			0.008	0.008	0.009	
SFMC		10	0.99968102	0-36 54.015552		UTM 13
NEO	000	101	4431613.362	419762.253	2486.165	UTM 13
			0.005	0.005	0.005	
SFMC		101	0.99967926	0-36 17.663782		UTM 13
NEO	000	11	4447349.014	423307.270	2533.983	UTM 13
			0.001	0.001	0.002	
SFMC		11	0.99967240	0-34 51.929047		UTM 13
NEO	000	12	4444458.632	419661.499	2484.116	UTM 13
			0.008	0.008	0.008	
SFMC		12	0.99967945	0-36 29.340018		UTM 13
NEO	000	13	4441992.298	422355.523	2424.812	UTM 13
			0.009	0.009	0.009	
SFMC		13	0.99967421	0-35 14.274893		UTM 13
NEO	000	14	4448002.782	415354.379	2516.179	UTM 13
			0.013	0.013	0.013	
SFMC		14	0.99968820	0-38 29.297442		UTM 13
NEO	000	15	4445599.340	415049.339	2551.416	UTM 13
			0.013	0.013	0.014	
SFMC		15	0.99968884	0-38 35.844605		UTM 13
NEO	000	16	4440217.573	414580.477	2378.270	UTM 13
			0.014	0.014	0.014	
SFMC		16	0.99968982	0-38 44.635209		UTM 13
NEO	000	17	4438639.817	418491.414	2406.766	UTM 13
			0.011	0.011	0.011	
SFMC		17	0.99968178	0-36 57.107100		UTM 13
NEO	000	18	4456072.052	430455.848	2558.540	UTM 13
			0.019	0.019	0.019	
SFMC		18	0.99965953	0-31 42.242513		UTM 13
NEO	000	19	4445018.090	425564.539	2533.210	UTM 13
			0.006	0.006	0.007	
SFMC		19	0.99966821	0-33 48.861024		UTM 13
NEO	000	2	4457642.824	429212.687	2658.460	UTM 13
			0.020	0.020	0.020	
SFMC		2	0.99966168	0-32 17.210296		UTM 13
NEO	000	20	4442386.457	434421.806	2526.419	UTM 13
			0.018	0.018	0.019	
SFMC		20	0.99965294	0-29 45.974855		UTM 13
NEO	000	21	4442938.063	430153.223	2556.182	UTM 13
			0.013	0.013	0.013	
SFMC		21	0.99966006	0-31 42.545581		UTM 13
NEO	000	22	4438486.713	425949.906	2596.993	UTM 13
			0.012	0.012	0.012	
SFMC		22	0.99966750	0-33 34.163728		UTM 13
NEO	000	23	4435343.202	420735.557	2441.981	UTM 13
			0.008	0.008	0.008	
SFMC		23	0.99967734	0-35 53.811575		UTM 13
NEO	000	24	4433870.744	423798.627	2596.138	UTM 13

Adjusted NEO Coordinates:

CODE	FFF	STATION	NORTHING STD DEV	EASTING STD DEV	O-HEIGHT STD DEV	MAPPROJ
			0.009	0.009	0.009	
SFMC		24	0.99967148	0-34 29.622701	UTM 13	
NEO	000	25	4432457.886	414611.190	2548.843	UTM 13
			0.010	0.010	0.010	
SFMC		25	0.99968976	0-38 38.060736	UTM 13	
NEO	000	26	4431618.213	419819.121	2484.253	UTM 13
			0.005	0.005	0.005	
SFMC		26	0.99967914	0-36 16.124009	UTM 13	
NEO	000	27	4434055.787	435749.306	3053.915	UTM 13
			0.022	0.022	0.022	
SFMC		27	0.99965082	0-29 5.186990	UTM 13	
NEO	000	28	4429493.045	420811.480	2583.335	UTM 13
			0.006	0.006	0.006	
SFMC		28	0.99967720	0-35 47.740529	UTM 13	
NEO	000	29	4428540.537	430052.861	2558.681	UTM 13
			0.018	0.018	0.019	
SFMC		29	0.99966023	0-31 36.557403	UTM 13	
NEO	000	3	4459834.153	427301.895	2654.865	UTM 13
			0.022	0.022	0.023	
SFMC		3	0.99966506	0-33 10.882597	UTM 13	
NEO	000	30	4425994.482	425787.994	2577.914	UTM 13
			0.015	0.015	0.015	
SFMC		30	0.99966780	0-33 30.545749	UTM 13	
NEO	000	31	4423431.588	427627.718	2639.133	UTM 13
			0.019	0.019	0.019	
SFMC		31	0.99966448	0-32 39.109755	UTM 13	
NEO	000	32	4421177.573	423178.298	2731.537	UTM 13
			0.019	0.019	0.019	
SFMC		32	0.99967265	0-34 38.041592	UTM 13	
NEO	000	33	4419914.274	426603.500	2695.114	UTM 13
			0.022	0.022	0.023	
SFMC		33	0.99966632	0-33 4.603604	UTM 13	
NEO	000	34	4422237.032	430173.170	2610.842	UTM 13
			0.023	0.023	0.023	
SFMC		34	0.99966002	0-31 29.494203	UTM 13	
NEO	000	35	4420057.463	432691.881	2656.175	UTM 13
			0.027	0.027	0.027	
SFMC		35	0.99965577	0-30 20.081655	UTM 13	
NEO	000	36	4419103.305	428850.108	2707.104	UTM 13
			0.025	0.025	0.025	
SFMC		36	0.99966232	0-32 3.367553	UTM 13	
NEO	000	37	4434409.362	422196.759	2536.779	UTM 13
			0.008	0.008	0.008	
SFMC		37	0.99967452	0-35 13.484795	UTM 13	
NEO	000	38	4421652.749	432917.474	2740.245	UTM 13
			0.026	0.026	0.027	
SFMC		38	0.99965540	0-30 14.905364	UTM 13	
NEO	000	39	4421124.260	416695.831	3022.970	UTM 13
			0.019	0.019	0.019	
SFMC		39	0.99968543	0-37 33.322796	UTM 13	
NEO	000	4	4455354.030	431312.763	2570.728	UTM 13
			0.019	0.019	0.019	

Adjusted NEO Coordinates:

CODE	FFF	STATION	NORTHING STD DEV	EASTING STD DEV	O-HEIGHT STD DEV	MAPPROJ
SFMC		4	0.99965808	0-31 18.377044		UTM 13
NEO	000	40	4424064.829	433006.860	2608.979	UTM 13
			0.024	0.024	0.024	
SFMC		40	0.99965525	0-30 13.882097		UTM 13
NEO	000	41	4376062.238	428445.169	3688.126	UTM 13
			0.018	0.018	0.018	
SFMC		41	0.99966304	0-31 47.904299		UTM 13
NEO	000	42	4376076.535	428443.961	3688.249	UTM 13
			0.018	0.018	0.018	
SFMC		42	0.99966304	0-31 47.945210		UTM 13
NEO	000	5	4450506.151	428663.673	2538.600	UTM 13
			0.011	0.011	0.011	
SFMC		5	0.99966264	0-32 27.802507		UTM 13
NEO	000	6	4452852.224	426244.755	2585.507	UTM 13
			0.011	0.011	0.011	
SFMC		6	0.99966696	0-33 35.344786		UTM 13
NEO	000	7	4454893.278	424939.954	2778.428	UTM 13
			0.014	0.013	0.014	
SFMC		7	0.99966935	0-34 12.325704		UTM 13
NEO	000	8	4452771.174	420374.178	2730.532	UTM 13
			0.011	0.011	0.011	
SFMC		8	0.99967805	0-36 15.673379		UTM 13
NEO	000	9	4451528.620	424610.627	2620.656	UTM 13
			0.008	0.008	0.009	
SFMC		9	0.99966996	0-34 19.122025		UTM 13
NEO	111	CM229	4388610.429	425034.018	3395.412	UTM 13
			0.000	0.000	0.000	
SFMC		CM229	0.99966919	0-33 26.878099		UTM 13
NEO	111	COFC	4493630.495	486424.510	1611.119	UTM 13
			0.000	0.000	0.000	
SFMC		COFC	0.99960227	0 -6 15.816925		UTM 13
NEO	111	D 450	4387081.500	408582.031	2686.669	UTM 13
			0.000	0.000	0.000	
SFMC		D 450	0.99970289	0-40 46.018772		UTM 13
NEO	111	H 360	4417319.322	433285.440	2734.471	UTM 13
			0.000	0.000	0.000	
SFMC		H 360	0.99965479	0-30 2.458200		UTM 13
NEO	111	M 361	4447270.535	423292.300	2535.395	UTM 13
			0.000	0.000	0.000	
SFMC		M 361	0.99967243	0-34 52.285020		UTM 13
NEO	111	P041	4422168.758	483406.261	1745.950	UTM 13
			0.000	0.000	0.000	
SFMC		P041	0.99960339	0 -7 29.040757		UTM 13
NEO	001	S 299	4388806.145	425379.471	3376.468	UTM 13
			0.002	0.002	0.000	
SFMC		S 299	0.99966855	0-33 17.756507		UTM 13
NEO	111	W 299 RESET	4384299.990	415674.883	2825.140	UTM 13
			0.000	0.000	0.000	
SFMC		W 299 RESET	0.99968754	0-37 34.273131		UTM 13
NEO	111	WINDY GAP	4439547.012	417008.398	2398.459	UTM 13
			0.000	0.000	0.000	
SFMC		WINDY GAP	0.99968479	0-37 38.091379		UTM 13

Adjusted NEO Coordinates:

CODE	FFF	STATION	NORTHING STD DEV	EASTING STD DEV	O-HEIGHT STD DEV	MAPPROJ
NEO	111	Y 450	4389454.298 0.000	407374.154 0.000	2651.566 0.000	UTM 13
SFMC		Y 450	0.99970563	0-41 20.209517		UTM 13
NEO	111	ZDV1	4448553.542 0.000	489171.014 0.000	1558.405 0.000	UTM 13
SFMC		ZDV1	0.99960144	0 -4 55.516768		UTM 13

Adjusted PLH Coordinates:

CODE	FFF	STATION	LATITUDE	STD DEV	LONGITUDE	STD DEV	ELIP-HEIGHT	STD DEV
PLH	000	1	N 40 16 56.47004	0.016	W105 50 18.51475	0.016	2641.611	0.016
PLH	000	10	N 40 11 14.56117	0.008	W105 57 10.85589	0.008	2645.486	0.009
PLH	000	101	N 40 01 51.33661	0.005	W105 56 25.48563	0.005	2473.621	0.005
PLH	000	11	N 40 10 22.84198	0.001	W105 54 2.65112	0.001	2521.545	0.002
PLH	000	12	N 40 08 47.87926	0.008	W105 56 35.48154	0.008	2471.589	0.008
PLH	000	13	N 40 07 28.80687	0.009	W105 54 40.56466	0.009	2412.301	0.009
PLH	000	14	N 40 10 41.29185	0.013	W105 59 39.17168	0.013	2503.687	0.013
PLH	000	15	N 40 09 23.23867	0.013	W105 59 50.92705	0.013	2538.876	0.014
PLH	000	16	N 40 06 28.53908	0.014	W106 00 8.17847	0.014	2365.663	0.014
PLH	000	17	N 40 05 38.76890	0.011	W105 57 22.28368	0.011	2394.184	0.011
PLH	000	18	N 40 15 7.97873	0.019	W105 49 3.83051	0.019	2546.508	0.019
PLH	000	19	N 40 09 7.98027	0.006	W105 52 26.25246	0.006	2520.785	0.007
PLH	000	2	N 40 15 58.54434	0.020	W105 49 57.07311	0.020	2646.452	0.020
PLH	000	20	N 40 07 45.28973	0.018	W105 46 10.94258	0.018	2514.217	0.019
PLH	000	21	N 40 08 1.94128	0.013	W105 49 11.50545	0.013	2543.866	0.013
PLH	000	22	N 40 05 36.28470	0.012	W105 52 7.26827	0.012	2584.549	0.012
PLH	000	23	N 40 03 52.62937	0.008	W105 55 46.06653	0.008	2429.430	0.008
PLH	000	24	N 40 03 5.89333	0.009	W105 53 36.15364	0.009	2583.642	0.009
PLH	000	25	N 40 02 16.90432	0.010	W106 00 3.19540	0.010	2536.257	0.010
PLH	000	26	N 40 01 51.51339	0.005	W105 56 23.08864	0.005	2471.709	0.005
PLH	000	27	N 40 03 15.47877	0.022	W105 45 11.87457	0.022	3041.636	0.022
PLH	000	28	N 40 00 42.92973	0.006	W105 55 40.28929	0.006	2570.824	0.006
PLH	000	29	N 40 00 14.97685	0.018	W105 49 10.14481	0.018	2546.293	0.019
PLH	000	3	N 40 17 9.01955	0.022	W105 51 18.86122	0.022	2642.894	0.023
PLH	000	30	N 39 58 51.09362	0.015	W105 52 8.95727	0.015	2565.482	0.015
PLH	000	31	N 39 57 28.54850	0.019	W105 50 50.37169	0.019	2626.741	0.019

Adjusted PLH Coordinates:

CODE	FFF	STATION	LATITUDE	STD DEV	LONGITUDE	STD DEV	ELIP-HEIGHT	STD DEV
PLH	000	32	N 39 56 14.03446	0.019	W105 53 56.92895	0.019	2719.168	0.019
PLH	000	33	N 39 55 34.15734	0.022	W105 51 32.10947	0.022	2682.760	0.023
PLH	000	34	N 39 56 50.57670	0.023	W105 49 2.63435	0.023	2598.472	0.023
PLH	000	35	N 39 55 40.62249	0.027	W105 47 15.69013	0.027	2643.817	0.027
PLH	000	36	N 39 55 8.54611	0.025	W105 49 57.15345	0.025	2694.757	0.025
PLH	000	37	N 40 03 22.83444	0.008	W105 54 43.98693	0.008	2524.253	0.008
PLH	000	38	N 39 56 32.42624	0.026	W105 47 6.77801	0.026	2727.882	0.027
PLH	000	39	N 39 56 10.09800	0.019	W105 58 30.01127	0.019	3010.615	0.019
PLH	000	4	N 40 14 44.94752	0.019	W105 48 27.28361	0.019	2558.695	0.019
PLH	000	40	N 39 57 50.68153	0.024	W105 47 3.90530	0.024	2596.613	0.024
PLH	000	41	N 39 31 52.45601	0.018	W105 49 57.37155	0.018	3675.675	0.018
PLH	000	42	N 39 31 52.91936	0.018	W105 49 57.42766	0.018	3675.798	0.018
PLH	000	5	N 40 12 6.93062	0.011	W105 50 17.46046	0.011	2526.354	0.011
PLH	000	6	N 40 13 22.26131	0.011	W105 52 0.73690	0.011	2573.272	0.011
PLH	000	7	N 40 14 28.03583	0.014	W105 52 56.79866	0.013	2766.239	0.014
PLH	000	8	N 40 13 17.69861	0.011	W105 56 9.06679	0.011	2718.206	0.011
PLH	000	9	N 40 12 38.81302	0.008	W105 53 9.31339	0.008	2608.341	0.009
PLH	111	CM229	N 39 38 38.39409	0.000	W105 52 25.35428	0.000	3383.025	0.000
PLH	111	COFC	N 40 35 36.10790	0.000	W105 09 37.56921	0.000	1595.974	0.000
PLH	111	D 450	N 39 37 43.04698	0.000	W106 03 54.76899	0.000	2674.070	0.000
PLH	111	H 360	N 39 54 11.98620	0.000	W105 46 49.67744	0.000	2722.110	0.000
PLH	111	M 361	N 40 10 20.29194	0.000	W105 54 3.25034	0.000	2522.956	0.000
PLH	111	P041	N 39 56 58.15000	0.000	W105 11 39.31685	0.000	1729.708	0.000
PLH	001	S 299	N 39 38 44.85063	0.002	W105 52 10.94118	0.002	3364.088	0.000
PLH	111	W 299 RESET	N 39 36 15.45747	0.000	W105 58 56.00795	0.000	2812.591	0.000
PLH	111	WINDY GAP	N 40 06 7.66758	0.000	W105 58 25.32555	0.000	2385.868	0.000

Adjusted PLH Coordinates:

CODE	FFF	STATION	LATITUDE	STD DEV	LONGITUDE	STD DEV	ELIP-HEIGHT	STD DEV
PLH	111	Y 450	N 39 38 59.53287	0.000	W106 04 46.62461	0.000	2638.973	0.000
PLH	111	ZDV1	N 40 11 14.27224	0.000	W105 07 37.96036	0.000	1541.783	0.000

Geoid Values:

CODE	NAME	N/S DEFLECTION	E/W DEFLECTION	UNDULATION
GEOI	1	- 0 0 6.8	- 0 0 3.0	-11.959
GEOI	10	- 0 0 5.4	- 0 0 1.1	-12.451
GEOI	101	+ 0 0 1.5	- 0 0 1.7	-12.544
GEOI	11	- 0 0 3.7	- 0 0 2.9	-12.437
GEOI	12	- 0 0 2.9	- 0 0 1.6	-12.527
GEOI	13	- 0 0 1.5	- 0 0 2.8	-12.511
GEOI	14	- 0 0 5.5	- 0 0 0.5	-12.492
GEOI	15	- 0 0 3.8	- 0 0 0.7	-12.540
GEOI	16	- 0 0 1.1	- 0 0 1.2	-12.607
GEOI	17	- 0 0 1.0	- 0 0 2.0	-12.582
GEOI	18	- 0 0 6.5	- 0 0 3.3	-12.032
GEOI	19	- 0 0 2.3	- 0 0 4.0	-12.425
GEOI	2	- 0 0 6.9	- 0 0 3.2	-12.008
GEOI	20	- 0 0 2.5	- 0 0 3.4	-12.202
GEOI	21	- 0 0 1.8	- 0 0 4.7	-12.316
GEOI	22	- 0 0 0.3	- 0 0 3.6	-12.445
GEOI	23	+ 0 0 0.1	- 0 0 2.4	-12.551
GEOI	24	+ 0 0 0.1	- 0 0 3.1	-12.496
GEOI	25	+ 0 0 2.3	- 0 0 1.0	-12.586
GEOI	26	+ 0 0 1.5	- 0 0 1.8	-12.543
GEOI	27	- 0 0 2.6	- 0 0 0.4	-12.279
GEOI	28	+ 0 0 1.9	- 0 0 1.4	-12.511
GEOI	29	- 0 0 0.5	- 0 0 1.9	-12.388
GEOI	3	- 0 0 6.8	- 0 0 2.9	-11.971
GEOI	30	+ 0 0 1.3	- 0 0 1.6	-12.432
GEOI	31	+ 0 0 2.3	- 0 0 1.0	-12.392
GEOI	32	+ 0 0 3.5	+ 0 0 0.2	-12.369
GEOI	33	+ 0 0 2.5	+ 0 0 0.1	-12.353
GEOI	34	+ 0 0 1.2	- 0 0 0.4	-12.370
GEOI	35	+ 0 0 0.5	+ 0 0 0.6	-12.357
GEOI	36	+ 0 0 1.8	+ 0 0 0.3	-12.348
GEOI	37	+ 0 0 0.3	- 0 0 2.8	-12.526
GEOI	38	+ 0 0 0.3	+ 0 0 0.1	-12.362
GEOI	39	+ 0 0 3.8	+ 0 0 0.1	-12.355
GEOI	4	- 0 0 6.2	- 0 0 3.1	-12.033
GEOI	40	- 0 0 0.2	- 0 0 0.1	-12.367
GEOI	41	- 0 0 2.9	- 0 0 2.2	-12.452
GEOI	42	- 0 0 2.9	- 0 0 2.2	-12.452
GEOI	5	- 0 0 6.0	- 0 0 4.6	-12.246
GEOI	6	- 0 0 7.1	- 0 0 3.6	-12.235
GEOI	7	- 0 0 7.6	- 0 0 2.9	-12.188
GEOI	8	- 0 0 7.3	- 0 0 1.6	-12.326
GEOI	9	- 0 0 7.4	- 0 0 3.4	-12.315
GEOI	CM229	- 0 0 1.1	- 0 0 2.8	-12.386
GEOI	COFC	- 0 0 3.8	+ 0 0 17.0	-15.145
GEOI	D 450	- 0 0 0.6	- 0 0 0.5	-12.599
GEOI	H 360	- 0 0 0.1	+ 0 0 1.4	-12.361
GEOI	M 361	- 0 0 3.7	- 0 0 2.9	-12.439
GEOI	P041	+ 0 0 4.3	+ 0 0 14.3	-16.242
GEOI	S 299	- 0 0 1.0	- 0 0 2.7	-12.380
GEOI	W 299 RESET	- 0 0 1.2	- 0 0 2.1	-12.549
GEOI	WINDY GAP	- 0 0 1.1	- 0 0 1.6	-12.591
GEOI	Y 450	- 0 0 0.7	+ 0 0 0.0	-12.592

Geoid Values:

CODE	NAME	N/S DEFLECTION	E/W DEFLECTION	UNDULATION
GEOI	ZDV1	- 0 0 4.7	+ 0 0 12.7	-16.622

Residuals (critical value = 3.915):

TYPE	AT	FROM	TO	OBSERVATION STD DEV	RESIDUAL STD DEV	STD RES PPM
GROUP: 080110.ASC ,obs#: 1						
DXCT		101	1	13252.18170	0.008	0.151
				0.053	0.050	0.26
DYCT		101	1	14820.46460	-0.006	-0.128
				0.053	0.050	0.22
DZCT		101	1	21453.98700	0.000	0.007
				0.053	0.050	0.01
GROUP: 080110.ASC ,obs#: 2						
DXCT		M 361	1	7246.80530	-0.001	-0.067
				0.024	0.018	0.09
DYCT		M 361	1	6053.49760	-0.003	-0.172
				0.024	0.018	0.23
DZCT		M 361	1	9410.07530	-0.001	-0.055
				0.024	0.018	0.07
GROUP: 080110.ASC ,obs#: 3						
DXCT		M 361	1	7246.80450	-0.000	-0.022
				0.024	0.018	0.03
DYCT		M 361	1	6053.49010	0.004	0.247
				0.024	0.018	0.33
DZCT		M 361	1	9410.07340	0.001	0.051
				0.024	0.018	0.07
GROUP: 080110.ASC ,obs#: 4						
DXCT		101	2	13423.41400	0.008	0.163
				0.050	0.046	0.27
DYCT		101	2	13566.99280	-0.002	-0.046
				0.050	0.046	0.08
DZCT		101	2	20093.37100	0.014	0.297
				0.051	0.046	0.50
GROUP: 080110.ASC ,obs#: 5						
DXCT		M 361	2	7418.03770	-0.001	-0.163
				0.022	0.009	0.12
DYCT		M 361	2	4800.02660	0.000	0.046
				0.022	0.009	0.03
DZCT		M 361	2	8049.47430	-0.003	-0.297
				0.022	0.009	0.21
GROUP: 080110.ASC ,obs#: 6						
DXCT		101	3	11948.41130	-0.009	-0.177
				0.054	0.049	0.30
DYCT		101	3	15449.81480	-0.013	-0.258
				0.055	0.050	0.44
DZCT		101	3	21750.21180	0.013	0.273
				0.054	0.049	0.46
GROUP: 080110.ASC ,obs#: 7						
DXCT		M 361	3	5943.01580	0.002	0.169
				0.024	0.010	0.13
DYCT		M 361	3	6682.83580	0.002	0.249
				0.024	0.010	0.19
DZCT		M 361	3	9706.31480	-0.003	-0.265
				0.024	0.010	0.20
GROUP: 080110.ASC ,obs#: 8						
DXCT		101	4	15083.93410	0.015	0.333
				0.048	0.044	0.55

Residuals (critical value = 3.915):

TYPE	AT	FROM	TO	OBSERVATION / STD DEV	RESIDUAL / STD DEV	STD RES / PPM
DYCT		101	4	11640.79790	0.007	0.161
				0.048	0.044	0.27
DZCT		101	4	18303.56640	-0.016	-0.366
				0.048	0.044	0.61
GROUP: 080110.ASC ,obs#: 9						
DXCT		M 361	4	9078.56620	-0.003	-0.333
				0.021	0.008	0.24
DYCT		M 361	4	2873.84260	-0.001	-0.160
				0.021	0.008	0.11
DZCT		M 361	4	6259.63430	0.003	0.365
				0.021	0.008	0.26
GROUP: 080110.ASC ,obs#: 10						
DXCT		101	5	11724.93530	0.014	0.392
				0.038	0.036	0.68
DYCT		101	5	9345.70140	0.011	0.308
				0.038	0.036	0.53
DZCT		101	5	14559.82890	-0.003	-0.074
				0.038	0.036	0.13
GROUP: 080110.ASC ,obs#: 11						
DXCT		M 361	5	5719.56550	-0.001	-0.392
				0.011	0.003	0.20
DYCT		M 361	5	578.74990	-0.001	-0.309
				0.011	0.003	0.16
DZCT		M 361	5	2515.91290	0.000	0.076
				0.012	0.003	0.04
GROUP: 080110.ASC ,obs#: 12						
DXCT		101	6	9774.87610	0.002	0.062
				0.040	0.039	0.11
DYCT		101	6	11422.26060	-0.007	-0.182
				0.040	0.039	0.32
DZCT		101	6	16365.17520	0.015	0.378
				0.040	0.039	0.66
GROUP: 080110.ASC ,obs#: 13						
DXCT		M 361	6	3769.49350	-0.000	-0.061
				0.011	0.003	0.03
DYCT		M 361	6	2655.28930	0.001	0.184
				0.012	0.003	0.09
DZCT		M 361	6	4321.27790	-0.001	-0.379
				0.012	0.003	0.19
GROUP: 080110.ASC ,obs#: 14						
DXCT		101	7	8817.86640	-0.002	-0.055
				0.043	0.041	0.09
DYCT		101	7	12904.13170	-0.011	-0.265
				0.044	0.041	0.46
DZCT		101	7	18039.29630	0.007	0.166
				0.043	0.041	0.29
GROUP: 080110.ASC ,obs#: 15						
DXCT		M 361	7	2812.47870	0.000	0.057
				0.014	0.004	0.03
DYCT		M 361	7	4137.15590	0.001	0.267
				0.014	0.005	0.15
DZCT		M 361	7	5995.39080	-0.001	-0.169

Residuals (critical value = 3.915):

TYPE	AT	FROM	TO	OBSERVATION / STD DEV	RESIDUAL / STD DEV	STD RES / PPM
				0.014	0.004	0.10
GROUP: 080110.ASC ,obs#: 16						
DXCT		101	M 361	6005.37700	0.008	0.285
				0.029	0.029	0.51
DYCT		101	M 361	8766.95420	0.009	0.330
				0.029	0.029	0.59
DZCT		101	M 361	12043.92550	-0.012	-0.433
				0.029	0.029	0.77
GROUP: 080110.ASC ,obs#: 17						
DXCT		101	M 361	6005.37750	0.008	0.268
				0.029	0.029	0.48
DYCT		101	M 361	8766.96760	-0.004	-0.136
				0.029	0.029	0.24
DZCT		101	M 361	12043.91970	-0.007	-0.231
				0.029	0.029	0.41
GROUP: 080210C.ASC ,obs#: 18						
DXCT		101	10	2006.42430	-0.003	-0.110
				0.032	0.030	0.19
DYCT		101	10	10934.32790	-0.013	-0.432
				0.032	0.031	0.76
DZCT		101	10	13402.35600	0.011	0.365
				0.032	0.030	0.64
GROUP: 080210C.ASC ,obs#: 19						
DXCT		M 361	10	-3998.96450	0.000	0.119
				0.009	0.002	0.06
DYCT		M 361	10	2167.35000	0.001	0.441
				0.009	0.002	0.22
DZCT		M 361	10	1358.45490	-0.001	-0.375
				0.009	0.002	0.18
GROUP: 080210C.ASC ,obs#: 20						
DXCT		101	11	6033.22500	0.003	0.095
				0.029	0.029	0.17
DYCT		101	11	8812.91400	0.017	0.573
				0.030	0.029	1.05
DZCT		101	11	12103.11750	0.009	0.296
				0.029	0.029	0.53
GROUP: 080210C.ASC ,obs#: 21						
DXCT		M 361	11	27.84260	-0.000	0.000*
				0.001	0.000	0.36
DYCT		M 361	11	45.96730	-0.000	-0.461
				0.002	0.000	1.16
DZCT		M 361	11	59.21300	0.000	0.000*
				0.001	0.000	0.30
GROUP: 080210C.ASC ,obs#: 22						
DXCT		101	12	2045.93520	0.004	0.202
				0.023	0.022	0.34
DYCT		101	12	8024.98890	-0.009	-0.410
				0.023	0.022	0.69
DZCT		101	12	9831.53210	0.005	0.240
				0.023	0.022	0.40
GROUP: 080210C.ASC ,obs#: 23						
DXCT		M 361	12	-3959.44510	-0.001	-0.200

Residuals (critical value = 3.915):

TYPE	AT	FROM	TO	OBSERVATION / STD DEV	RESIDUAL / STD DEV	STD RES / PPM
				0.008	0.003	0.12
DYCT		M 361	12	-741.98480	0.001	0.413
				0.008	0.003	0.26
DZCT		M 361	12	-2212.37510	-0.001	-0.246
				0.008	0.003	0.15
GROUP: 080210C.ASC ,obs#:		24				
DXCT		101	13	4243.85090	0.000	0.029
				0.019	0.017	0.05
DYCT		101	13	5809.42000	-0.015	-0.912
				0.019	0.017	1.44
DZCT		101	13	7928.02530	0.003	0.174
				0.019	0.017	0.28
GROUP: 080210C.ASC ,obs#:		25				
DXCT		M 361	13	-1761.53370	-0.000	-0.026
				0.010	0.004	0.02
DYCT		M 361	13	-2957.56310	0.004	0.914
				0.010	0.004	0.74
DZCT		M 361	13	-4115.88400	-0.001	-0.186
				0.010	0.004	0.15
GROUP: 080210C.ASC ,obs#:		26				
DXCT		101	14	-1520.66810	0.008	0.290
				0.031	0.028	0.47
DYCT		101	14	11367.62490	0.015	0.549
				0.031	0.028	0.90
DZCT		101	14	12526.59040	-0.007	-0.240
				0.031	0.028	0.39
GROUP: 080210C.ASC ,obs#:		27				
DXCT		M 361	14	-7526.04350	-0.002	-0.289
				0.014	0.006	0.22
DYCT		M 361	14	2600.67990	-0.003	-0.548
				0.015	0.006	0.42
DZCT		M 361	14	482.66920	0.001	0.238
				0.015	0.006	0.18
GROUP: 080210C.ASC ,obs#:		28				
DXCT		101	15	-2223.66340	0.007	0.307
				0.027	0.023	0.48
DYCT		101	15	9925.14020	0.002	0.089
				0.027	0.023	0.14
DZCT		101	15	10708.85160	0.005	0.232
				0.027	0.023	0.37
GROUP: 080210C.ASC ,obs#:		29				
DXCT		M 361	15	-8229.03920	-0.002	-0.306
				0.015	0.008	0.27
DYCT		M 361	15	1158.17930	-0.001	-0.086
				0.016	0.008	0.08
DZCT		M 361	15	-1335.05430	-0.002	-0.228
				0.016	0.008	0.21
GROUP: 080210C.ASC ,obs#:		30				
DXCT		101	16	-3537.58240	0.001	0.089
				0.018	0.012	0.11
DYCT		101	16	6825.21180	0.010	0.794
				0.018	0.012	0.95

Residuals (critical value = 3.915):

TYPE	AT	FROM	TO	OBSERVATION STD DEV	RESIDUAL STD DEV	STD RES PPM
DZCT		101	16	6475.89220	-0.001	-0.076
				0.018	0.012	0.09
GROUP: 080210C.ASC ,obs#: 31						
DXCT		M 361	16	-9542.96520	-0.001	-0.089
				0.020	0.015	0.12
DYCT		M 361	16	-1941.73040	-0.012	-0.793
				0.020	0.015	1.06
DZCT		M 361	16	-5568.02290	0.001	0.075
				0.020	0.015	0.10
GROUP: 080210C.ASC ,obs#: 32						
DXCT		101	17	-37.01110	0.005	0.703
				0.013	0.008	0.74
DYCT		101	17	4771.20070	-0.005	-0.672
				0.013	0.008	0.73
DZCT		101	17	5319.62220	-0.001	-0.158
				0.013	0.008	0.17
GROUP: 080210C.ASC ,obs#: 33						
DXCT		M 361	17	-6042.38090	-0.010	-0.712
				0.018	0.014	1.02
DYCT		M 361	17	-3995.77790	0.010	0.685
				0.018	0.014	0.98
DZCT		M 361	17	-6724.29450	0.002	0.171
				0.018	0.014	0.25
GROUP: 080210C.ASC ,obs#: 34						
DXCT		101	8	4070.60350	0.002	0.055
				0.038	0.037	0.10
DYCT		101	8	12837.70910	-0.004	-0.115
				0.039	0.037	0.20
DZCT		101	8	16351.27730	0.003	0.092
				0.039	0.037	0.16
GROUP: 080210C.ASC ,obs#: 35						
DXCT		M 361	8	-1934.77950	-0.000	-0.055
				0.011	0.003	0.03
DYCT		M 361	8	4070.74080	0.000	0.116
				0.011	0.003	0.06
DZCT		M 361	8	4307.36790	-0.000	-0.092
				0.011	0.003	0.05
GROUP: 080210C.ASC ,obs#: 36						
DXCT		101	9	7970.44360	0.009	0.240
				0.037	0.036	0.42
DYCT		101	9	11007.62270	0.015	0.393
				0.039	0.037	0.72
DZCT		101	9	15364.10110	-0.012	-0.321
				0.040	0.038	0.60
GROUP: 080210C.ASC ,obs#: 37						
DXCT		M 361	9	1965.06750	-0.000	-0.244
				0.008	0.002	0.09
DYCT		M 361	9	2240.67450	-0.001	-0.414
				0.009	0.002	0.18
DZCT		M 361	9	3320.17500	0.001	0.346
				0.009	0.002	0.16
GROUP: 080210C.ASC ,obs#: 38						

Residuals (critical value = 3.915):

TYPE	AT	FROM	TO	OBSERVATION / STD DEV	RESIDUAL / STD DEV	STD RES / PPM
DXCT		101	COFC	74907.49240	0.016	0.098
				0.165	0.165	0.18
DYCT		101	COFC	21801.65220	0.012	0.076
				0.165	0.165	0.14
DZCT		101	COFC	47069.85560	-0.013	-0.078
				0.165	0.165	0.14
GROUP: 080210C.ASC ,obs#: 39						
DXCT		M 361	COFC	68902.11470	0.009	0.062
				0.142	0.142	0.11
DYCT		M 361	COFC	13034.68380	0.017	0.121
				0.142	0.142	0.22
DZCT		M 361	COFC	35025.95070	-0.021	-0.148
				0.142	0.142	0.27
GROUP: 080210C.ASC ,obs#: 40						
DXCT		101	M 361	6005.37570	0.009	0.331
				0.029	0.029	0.59
DYCT		101	M 361	8766.96560	-0.002	-0.067
				0.029	0.029	0.12
DZCT		101	M 361	12043.90720	0.006	0.204
				0.029	0.029	0.37
GROUP: 080210C.ASC ,obs#: 41						
DXCT		101	P041	60001.26120	0.014	0.120
				0.117	0.116	0.22
DYCT		101	P041	-22158.67870	-0.002	-0.013
				0.117	0.116	0.02
DZCT		101	P041	-7408.49790	0.006	0.053
				0.117	0.116	0.10
GROUP: 080210C.ASC ,obs#: 42						
DXCT		M 361	P041	53995.88400	0.006	0.051
				0.118	0.118	0.09
DYCT		M 361	P041	-30925.64800	0.004	0.035
				0.118	0.118	0.06
DZCT		M 361	P041	-19452.40220	-0.003	-0.021
				0.118	0.118	0.04
GROUP: 080210C.ASC ,obs#: 43						
DXCT		101	WINDY GAP	-1313.47730	0.002	0.151
				0.015	0.015	0.26
DYCT		101	WINDY GAP	5740.39000	-0.037	-2.490
				0.016	0.015	4.43
DZCT		101	WINDY GAP	5996.32880	0.012	0.837
				0.016	0.015	1.48
GROUP: 080210C.ASC ,obs#: 44						
DXCT		M 361	WINDY GAP	-7318.86170	0.001	0.078
				0.018	0.018	0.14
DYCT		M 361	WINDY GAP	-3026.59360	-0.017	-0.949
				0.018	0.018	1.74
DZCT		M 361	WINDY GAP	-6047.58490	0.013	0.717
				0.018	0.018	1.31
GROUP: 080210C.ASC ,obs#: 45						
DXCT		101	ZDV1	70007.02170	0.014	0.105
				0.129	0.129	0.19
DYCT		101	ZDV1	-7106.05220	0.009	0.070

Residuals (critical value = 3.915):

TYPE	AT	FROM	TO	OBSERVATION / STD DEV	RESIDUAL / STD DEV	STD RES / PPM
				0.129	0.129	0.13
DZCT		101	ZDV1	12683.34030	0.009	0.071
				0.129	0.129	0.13
GROUP: 080210C.ASC ,obs#: 46						
DXCT		M 361	ZDV1	64001.64310	0.007	0.059
				0.119	0.119	0.11
DYCT		M 361	ZDV1	-15873.01750	0.011	0.089
				0.119	0.119	0.16
DZCT		M 361	ZDV1	639.43330	0.003	0.026
				0.119	0.119	0.05
GROUP: 080410.ASC ,obs#: 47						
DXCT		101	18	14380.21060	-0.007	-0.158
				0.048	0.044	0.26
DYCT		101	18	12327.01190	-0.004	-0.086
				0.049	0.044	0.14
DZCT		101	18	18838.06790	0.020	0.455
				0.048	0.044	0.76
GROUP: 080410.ASC ,obs#: 48						
DXCT		M 361	18	8374.81710	0.001	0.158
				0.021	0.008	0.11
DYCT		M 361	18	3560.04370	0.001	0.086
				0.021	0.008	0.06
DZCT		M 361	18	6794.17870	-0.004	-0.455
				0.021	0.008	0.32
GROUP: 080410.ASC ,obs#: 49						
DXCT		101	19	7820.51030	-0.034	-1.345
				0.026	0.025	2.34
DYCT		101	19	6755.89470	-0.027	-1.044
				0.027	0.025	1.82
DZCT		101	19	10337.30910	0.034	1.323
				0.027	0.025	2.30
GROUP: 080410.ASC ,obs#: 50						
DXCT		M 361	19	1815.08890	0.002	1.483
				0.006	0.001	0.61
DYCT		M 361	19	-2011.09780	0.002	1.301
				0.007	0.002	0.71
DZCT		M 361	19	-1706.56800	-0.002	-1.542
				0.006	0.001	0.72
GROUP: 080410.ASC ,obs#: 51						
DXCT		101	20	15924.41230	-0.012	-0.443
				0.033	0.027	0.67
DYCT		101	20	2754.95060	-0.013	-0.461
				0.033	0.028	0.70
DZCT		101	20	8382.59730	-0.010	-0.369
				0.033	0.027	0.56
GROUP: 080410.ASC ,obs#: 52						
DXCT		M 361	20	9919.00960	0.005	0.443
				0.022	0.012	0.44
DYCT		M 361	20	-6012.03140	0.006	0.461
				0.022	0.012	0.46
DZCT		M 361	20	-3661.33040	0.005	0.371
				0.022	0.012	0.37

Residuals (critical value = 3.915):

TYPE	AT	FROM	TO	OBSERVATION / STD DEV	RESIDUAL / STD DEV	STD RES / PPM
GROUP: 080410.ASC ,obs#: 53						
DXCT		101	21	11893.32920	0.005	0.195
				0.028	0.024	0.31
DYCT		101	21	4215.83170	-0.010	-0.413
				0.028	0.025	0.66
DZCT		101	21	8794.52940	0.001	0.031
				0.028	0.025	0.05
GROUP: 080410.ASC ,obs#: 54						
DXCT		M 361	21	5887.95010	-0.001	-0.196
				0.015	0.007	0.16
DYCT		M 361	21	-4551.14500	0.003	0.414
				0.015	0.007	0.35
DZCT		M 361	21	-3249.38270	-0.000	-0.029
				0.015	0.007	0.02
GROUP: 080410.ASC ,obs#: 55						
DXCT		101	M 361	6005.39750	-0.012	-0.428
				0.029	0.029	0.77
DYCT		101	M 361	8766.96870	-0.005	-0.174
				0.029	0.029	0.31
DZCT		101	M 361	12043.90640	0.007	0.232
				0.029	0.029	0.41
GROUP: 080510.ASC ,obs#: 56						
DXCT		101	22	7088.49220	0.001	0.121
				0.017	0.012	0.15
DYCT		101	22	2537.01020	-0.003	-0.215
				0.017	0.012	0.27
DZCT		101	22	5383.58370	0.002	0.203
				0.017	0.012	0.26
GROUP: 080510.ASC ,obs#: 57						
DXCT		M 361	22	1083.10980	-0.001	-0.121
				0.017	0.012	0.15
DYCT		M 361	22	-6229.95850	0.002	0.215
				0.017	0.012	0.27
DZCT		M 361	22	-6660.32460	-0.002	-0.202
				0.017	0.012	0.26
GROUP: 080510.ASC ,obs#: 58						
DXCT		101	23	1569.22920	-0.000	-0.151
				0.007	0.002	0.08
DYCT		101	23	2091.38960	-0.001	-0.280
				0.007	0.002	0.16
DZCT		101	23	2836.47920	0.001	0.484
				0.007	0.002	0.27
GROUP: 080510.ASC ,obs#: 59						
DXCT		M 361	23	-4436.15930	0.003	0.145
				0.022	0.021	0.24
DYCT		M 361	23	-6675.58010	0.005	0.262
				0.022	0.021	0.44
DZCT		M 361	23	-9207.42300	-0.010	-0.474
				0.022	0.021	0.80
GROUP: 080510.ASC ,obs#: 60						
DXCT		101	24	4244.62440	-0.000	-0.115
				0.008	0.003	0.07

Residuals (critical value = 3.915):

TYPE	AT	FROM	TO	OBSERVATION / STD DEV	RESIDUAL / STD DEV	STD RES / PPM
DYCT		101	24	240.93880	0.000	0.077
				0.009	0.003	0.05
DZCT		101	24	1831.98720	-0.003	-0.922
				0.008	0.003	0.54
GROUP: 080510.ASC ,obs#: 61						
DXCT		M 361	24	-1760.76390	0.003	0.123
				0.024	0.023	0.21
DYCT		M 361	24	-8526.02320	-0.001	-0.064
				0.025	0.023	0.11
DZCT		M 361	24	-10211.94930	0.021	0.922
				0.024	0.023	1.56
GROUP: 080510.ASC ,obs#: 62						
DXCT		101	25	-4837.88460	0.001	0.413
				0.009	0.003	0.22
DYCT		101	25	1862.50550	0.001	0.466
				0.010	0.003	0.25
DZCT		101	25	644.31740	-0.000	-0.164
				0.010	0.003	0.09
GROUP: 080510.ASC ,obs#: 63						
DXCT		M 361	25	-10843.25650	-0.012	-0.412
				0.031	0.030	0.71
DYCT		M 361	25	-6904.44310	-0.014	-0.464
				0.031	0.030	0.80
DZCT		M 361	25	-11399.60090	0.005	0.162
				0.031	0.030	0.28
GROUP: 080510.ASC ,obs#: 64						
DXCT		101	26	56.03350	0.000	0.000*
				0.001	0.000	0.15
DYCT		101	26	-10.83340	0.000	0.000*
				0.001	0.000	0.63
DZCT		101	26	2.94720	-0.000	0.000*
				0.002	0.000	0.44
GROUP: 080510.ASC ,obs#: 65						
DXCT		M 361	26	-5949.34400	-0.008	-0.267
				0.029	0.029	0.48
DYCT		M 361	26	-8777.77740	-0.020	-0.677
				0.029	0.029	1.22
DZCT		M 361	26	-12040.96770	0.002	0.062
				0.030	0.029	0.11
GROUP: 080510.ASC ,obs#: 66						
DXCT		101	27	15705.58350	0.004	0.216
				0.029	0.019	0.26
DYCT		101	27	-3173.79230	0.012	0.589
				0.030	0.020	0.72
DZCT		101	27	2353.10440	-0.000	-0.011
				0.030	0.020	0.01
GROUP: 080510.ASC ,obs#: 67						
DXCT		M 361	27	9700.20780	-0.005	-0.215
				0.033	0.025	0.29
DYCT		M 361	27	-11940.72980	-0.015	-0.589
				0.033	0.025	0.80
DZCT		M 361	27	-9690.80910	0.000	0.009

Residuals (critical value = 3.915):

TYPE	AT	FROM	TO	OBSERVATION / STD DEV	RESIDUAL / STD DEV	STD RES / PPM
				0.033	0.025	0.01
GROUP: 080510.ASC ,obs#: 68						
DXCT		101	H 360	10609.92100	0.006	0.164
				0.036	0.035	0.30
DYCT		101	H 360	-12676.94220	-0.016	-0.437
				0.036	0.036	0.79
DZCT		101	H 360	-10703.12250	0.040	1.135
				0.036	0.036	2.05
GROUP: 080510.ASC ,obs#: 69						
DXCT		M 361	H 360	4604.53100	0.011	0.186
				0.057	0.057	0.34
DYCT		M 361	H 360	-21443.90650	-0.015	-0.260
				0.057	0.057	0.47
DZCT		M 361	H 360	-22747.02710	0.032	0.556
				0.057	0.057	1.01
GROUP: 080510.ASC ,obs#: 70						
DXCT		101	M 361	6005.38480	0.000	0.014
				0.029	0.029	0.02
DYCT		101	M 361	8766.95840	0.005	0.184
				0.029	0.029	0.33
DZCT		101	M 361	12043.90820	0.005	0.169
				0.029	0.029	0.30
GROUP: 080610.ASC ,obs#: 71						
DXCT		101	28	637.90290	-0.000	-0.120
				0.004	0.001	0.03
DYCT		101	28	-1671.11760	0.000	0.676
				0.005	0.001	0.18
DZCT		101	28	-1553.88440	-0.000	-0.715
				0.004	0.001	0.18
GROUP: 080610.ASC ,obs#: 72						
DXCT		M 361	28	-5367.48670	0.004	0.135
				0.033	0.032	0.24
DYCT		M 361	28	-10438.06000	-0.021	-0.646
				0.033	0.032	1.16
DZCT		M 361	28	-13597.81990	0.022	0.684
				0.033	0.032	1.22
GROUP: 080610.ASC ,obs#: 73						
DXCT		101	29	9395.42770	0.000	0.026
				0.019	0.009	0.02
DYCT		101	29	-4718.36300	0.006	0.688
				0.020	0.009	0.60
DZCT		101	29	-2230.28860	-0.001	-0.084
				0.020	0.010	0.07
GROUP: 080610.ASC ,obs#: 74						
DXCT		M 361	29	3390.04360	-0.001	-0.027
				0.036	0.032	0.04
DYCT		M 361	29	-13485.29770	-0.023	-0.689
				0.037	0.033	1.13
DZCT		M 361	29	-14274.20560	0.003	0.094
				0.038	0.033	0.16
GROUP: 080610.ASC ,obs#: 75						
DXCT		101	30	4854.80540	-0.003	-0.621

Residuals (critical value = 3.915):

TYPE	AT	FROM	TO	OBSERVATION / STD DEV	RESIDUAL / STD DEV	STD RES / PPM
				0.015	0.005	0.40
DYCT		101	30	-5174.10390	0.002	0.340
				0.015	0.005	0.22
DZCT		101	30	-4200.88130	-0.002	-0.329
				0.015	0.005	0.21
GROUP: 080610.ASC ,obs#: 76						
DXCT		M 361	30	-1150.60550	0.022	0.620
				0.039	0.036	1.04
DYCT		M 361	30	-13941.05340	-0.012	-0.339
				0.039	0.036	0.58
DZCT		M 361	30	-16244.80800	0.012	0.329
				0.039	0.036	0.55
GROUP: 080610.ASC ,obs#: 77						
DXCT		101	31	6189.57020	-0.004	-0.470
				0.021	0.009	0.36
DYCT		101	31	-7302.92780	0.008	0.968
				0.021	0.009	0.75
DZCT		101	31	-6113.48790	-0.003	-0.312
				0.021	0.009	0.24
GROUP: 080610.ASC ,obs#: 78						
DXCT		M 361	31	184.16230	0.019	0.469
				0.044	0.040	0.77
DYCT		M 361	31	-16069.84430	-0.039	-0.968
				0.044	0.040	1.60
DZCT		M 361	31	-18157.41610	0.012	0.313
				0.044	0.040	0.51
GROUP: 080610.ASC ,obs#: 79						
DXCT		101	32	1504.87970	-0.001	-0.090
				0.020	0.008	0.06
DYCT		101	32	-7579.28670	0.010	1.266
				0.020	0.008	0.89
DZCT		101	32	-7816.76530	-0.003	-0.360
				0.020	0.008	0.25
GROUP: 080610.ASC ,obs#: 80						
DXCT		M 361	32	-4500.51010	0.004	0.090
				0.047	0.043	0.15
DYCT		M 361	32	-16346.18550	-0.055	-1.266
				0.047	0.044	2.11
DZCT		M 361	32	-19860.69680	0.016	0.359
				0.048	0.044	0.60
GROUP: 080610.ASC ,obs#: 81						
DXCT		101	33	4605.22920	-0.003	-0.269
				0.025	0.011	0.21
DYCT		101	33	-9253.31930	0.020	1.851
				0.025	0.011	1.49
DZCT		101	33	-8783.65480	0.006	0.598
				0.025	0.011	0.48
GROUP: 080610.ASC ,obs#: 82						
DXCT		M 361	33	-1400.17100	0.012	0.270
				0.050	0.045	0.44
DYCT		M 361	33	-18020.17940	-0.083	-1.852
				0.050	0.045	3.02

Residuals (critical value = 3.915):

TYPE	AT	FROM	TO	OBSERVATION / STD DEV	RESIDUAL / STD DEV	STD RES / PPM
DZCT		M 361	33	-20827.53440	-0.027	-0.602
				0.050	0.045	0.98
GROUP: 080610.ASC ,obs#: 83						
DXCT		101	34	8451.56030	-0.006	-0.496
				0.025	0.012	0.43
DYCT		101	34	-8703.90080	0.011	0.918
				0.026	0.012	0.80
DZCT		101	34	-7029.79430	0.005	0.399
				0.026	0.012	0.35
GROUP: 080610.ASC ,obs#: 84						
DXCT		M 361	34	2446.14850	0.021	0.499
				0.047	0.041	0.79
DYCT		M 361	34	-17470.81500	-0.038	-0.924
				0.047	0.041	1.47
DZCT		M 361	34	-19073.68570	-0.017	-0.407
				0.047	0.041	0.65
GROUP: 080610.ASC ,obs#: 85						
DXCT		101	M 361	6005.39650	-0.011	-0.394
				0.029	0.029	0.70
DYCT		101	M 361	8766.94330	0.020	0.710
				0.029	0.029	1.27
DZCT		101	M 361	12043.91460	-0.002	-0.053
				0.029	0.029	0.10
GROUP: 080710.ASC ,obs#: 86						
DXCT		101	35	10508.86560	-0.001	-0.072
				0.031	0.016	0.07
DYCT		101	35	-10762.34190	0.003	0.156
				0.032	0.016	0.15
DZCT		101	35	-8655.66050	-0.004	-0.255
				0.032	0.016	0.24
GROUP: 080710.ASC ,obs#: 87						
DXCT		M 361	35	4503.47600	0.003	0.073
				0.052	0.045	0.11
DYCT		M 361	35	-19529.29610	-0.007	-0.155
				0.052	0.045	0.24
DZCT		M 361	35	-20699.58910	0.011	0.254
				0.052	0.045	0.39
GROUP: 080710.ASC ,obs#: 88						
DXCT		101	36	6634.41410	-0.002	-0.139
				0.028	0.013	0.12
DYCT		101	36	-10365.99430	0.004	0.262
				0.028	0.013	0.23
DZCT		101	36	-9381.99700	-0.004	-0.315
				0.028	0.013	0.27
GROUP: 080710.ASC ,obs#: 89						
DXCT		M 361	36	629.02060	0.006	0.141
				0.052	0.046	0.22
DYCT		M 361	36	-19132.94260	-0.012	-0.259
				0.052	0.046	0.41
DZCT		M 361	36	-21425.92860	0.014	0.313
				0.052	0.046	0.50
GROUP: 080710.ASC ,obs#: 90						

Residuals (critical value = 3.915):

TYPE	AT	FROM	TO	OBSERVATION / STD DEV	RESIDUAL / STD DEV	STD RES / PPM
DXCT		101	37	2802.39280	-0.001	-0.424
				0.007	0.002	0.21
DYCT		101	37	1048.87870	0.001	0.773
				0.007	0.002	0.40
DZCT		101	37	2193.88840	-0.004	-2.227
				0.007	0.002	1.18
GROUP: 080710.ASC ,obs#: 91						
DXCT		M 361	37	-3203.00300	0.010	0.444
				0.023	0.022	0.76
DYCT		M 361	37	-7718.06820	-0.015	-0.692
				0.023	0.022	1.18
DZCT		M 361	37	-9850.07780	0.049	2.204
				0.024	0.022	3.78
GROUP: 080710.ASC ,obs#: 92						
DXCT		101	M 361	6005.38970	-0.005	-0.157
				0.029	0.029	0.28
DYCT		101	M 361	8766.95790	0.006	0.201
				0.029	0.029	0.36
DZCT		101	M 361	12043.92380	-0.011	-0.374
				0.029	0.029	0.67
GROUP: 080810.ASC ,obs#: 93						
DXCT		101	38	10974.17990	-0.002	-0.150
				0.030	0.015	0.14
DYCT		101	38	-9894.58530	-0.004	-0.272
				0.030	0.016	0.26
DZCT		101	38	-7376.06880	0.003	0.211
				0.031	0.016	0.21
GROUP: 080810.ASC ,obs#: 94						
DXCT		M 361	38	4968.78610	0.006	0.148
				0.050	0.042	0.23
DYCT		M 361	38	-18661.56460	0.011	0.266
				0.050	0.042	0.41
DZCT		M 361	38	-19419.96980	-0.009	-0.204
				0.050	0.043	0.32
GROUP: 080810.ASC ,obs#: 95						
DXCT		101	39	-4815.11440	0.001	0.114
				0.020	0.007	0.08
DYCT		101	39	-6088.05000	0.002	0.209
				0.020	0.007	0.14
DZCT		101	39	-7722.81180	0.001	0.169
				0.020	0.007	0.11
GROUP: 080810.ASC ,obs#: 96						
DXCT		M 361	39	-10820.49360	-0.005	-0.114
				0.049	0.045	0.19
DYCT		M 361	39	-14855.00260	-0.010	-0.209
				0.049	0.046	0.35
DZCT		M 361	39	-19766.71600	-0.008	-0.168
				0.049	0.045	0.28
GROUP: 080810.ASC ,obs#: 97						
DXCT		101	40	11488.98990	0.001	0.042
				0.028	0.014	0.04
DYCT		101	40	-8324.21810	0.006	0.410

Residuals (critical value = 3.915):

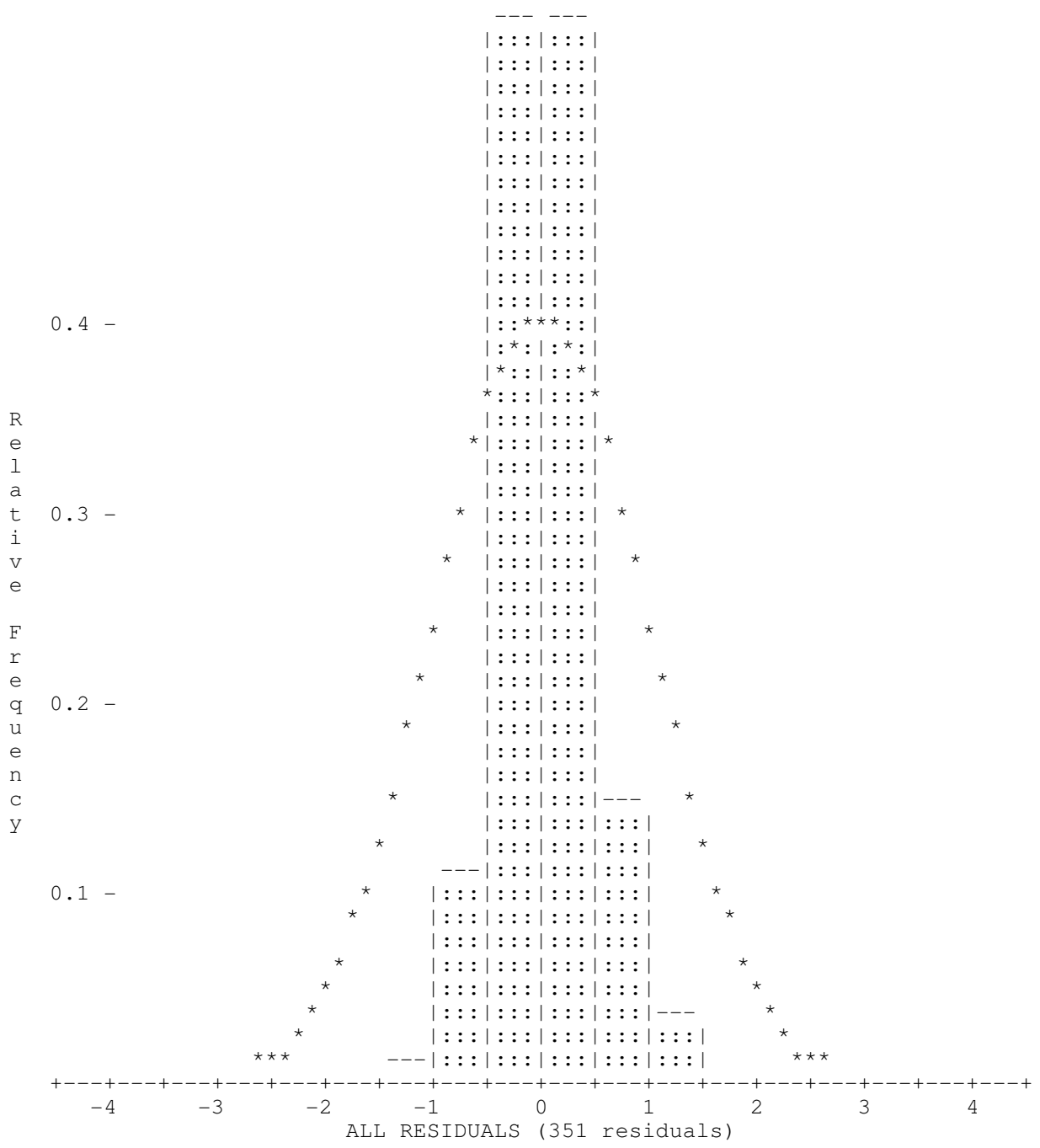
TYPE	AT	FROM	TO	OBSERVATION / STD DEV	RESIDUAL / STD DEV	STD RES / PPM
				0.028	0.014	0.39
DZCT		101	40	-5609.38990	-0.003	-0.179
				0.028	0.015	0.17
GROUP: 080810.ASC ,obs#: 98						
DXCT		M 361	40	5483.60690	-0.002	-0.041
				0.046	0.039	0.06
DYCT		M 361	40	-17091.16000	-0.016	-0.408
				0.046	0.039	0.63
DZCT		M 361	40	-17653.31240	0.007	0.176
				0.046	0.039	0.27
GROUP: 080810.ASC ,obs#: 99						
DXCT		101	M 361	6005.38800	-0.003	-0.098
				0.029	0.029	0.17
DYCT		101	M 361	8766.95320	0.010	0.365
				0.029	0.029	0.65
DZCT		101	M 361	12043.92700	-0.014	-0.485
				0.029	0.029	0.87
GROUP: 081710C.ASC ,obs#: 100						
DXCT		CM229	COFC	77151.99450	0.009	0.042
				0.220	0.220	0.08
DYCT		CM229	COFC	50518.44520	0.092	0.418
				0.220	0.220	0.76
DZCT		CM229	COFC	79490.86180	-0.034	-0.157
				0.220	0.220	0.28
GROUP: 081710C.ASC ,obs#: 101						
DXCT		W 299 RESET	COFC	86767.05030	0.025	0.107
				0.236	0.236	0.19
DYCT		W 299 RESET	COFC	50242.61130	0.066	0.279
				0.236	0.236	0.51
DZCT		W 299 RESET	COFC	83251.80510	-0.061	-0.257
				0.236	0.236	0.46
GROUP: 081710C.ASC ,obs#: 102						
DXCT		CM229	D 450	-15962.24940	-0.017	-0.554
				0.030	0.030	1.01
DYCT		CM229	D 450	4002.60690	0.044	1.443
				0.030	0.030	2.65
DZCT		CM229	D 450	-1767.43290	0.009	0.309
				0.030	0.030	0.57
GROUP: 081710C.ASC ,obs#: 103						
DXCT		W 299 RESET	D 450	-6347.20030	0.006	0.422
				0.014	0.014	0.77
DYCT		W 299 RESET	D 450	3726.82310	-0.032	-2.290
				0.014	0.014	4.25
DZCT		W 299 RESET	D 450	1993.47790	0.016	1.123
				0.014	0.014	2.07
GROUP: 081710C.ASC ,obs#: 104						
DXCT		CM229	P041	62245.75920	0.011	0.092
				0.122	0.122	0.17
DYCT		CM229	P041	6558.13450	0.058	0.474
				0.122	0.122	0.86
DZCT		CM229	P041	25012.50770	-0.015	-0.121
				0.122	0.122	0.22

Residuals (critical value = 3.915):

TYPE	AT	FROM	TO	OBSERVATION STD DEV	RESIDUAL STD DEV	STD RES PPM
GROUP: 081710C.ASC ,obs#: 105						
DXCT		W 299 RESET	P041	71860.81570	0.026	0.187
				0.141	0.141	0.34
DYCT		W 299 RESET	P041	6282.30590	0.026	0.188
				0.141	0.141	0.34
DZCT		W 299 RESET	P041	28773.44870	-0.039	-0.274
				0.141	0.141	0.50
GROUP: 081710C.ASC ,obs#: 106						
DXCT		CM229	S 299	369.45270	0.023	11.222
				0.003	0.002	58.36
					^^^^^^^^^^^^^^^^^	
DYCT		CM229	S 299	42.17770	0.085	11.245
				0.008	0.008	213.73
					^^^^^^^^^^^^^^^^^	
DZCT		CM229	S 299	141.35720	-0.028	-11.090
				0.003	0.003	70.86
					^^^^^^^^^^^^^^^^^	
GROUP: 081710C.ASC ,obs#: 107						
DXCT		W 299 RESET	S 299	9984.52930	0.018	0.931
				0.020	0.020	1.70
DYCT		W 299 RESET	S 299	-233.64260	0.045	2.089
				0.022	0.022	4.22
DZCT		W 299 RESET	S 299	3902.32170	-0.075	-3.841
				0.020	0.020	7.04
GROUP: 081710C.ASC ,obs#: 108						
DXCT		CM229	W 299 RESET	-9615.07350	0.002	0.101
				0.019	0.019	0.18
DYCT		CM229	W 299 RESET	275.83990	0.020	1.076
				0.019	0.019	1.95
DZCT		CM229	W 299 RESET	-3760.97050	0.053	2.846
				0.019	0.019	5.16
GROUP: 081710C.ASC ,obs#: 109						
DXCT		CM229	Y 450	-16726.63420	-0.004	-0.109
				0.032	0.032	0.20
DYCT		CM229	Y 450	5817.71360	0.024	0.729
				0.033	0.033	1.34
DZCT		CM229	Y 450	27.45160	0.030	0.923
				0.032	0.032	1.68
GROUP: 081710C.ASC ,obs#: 110						
DXCT		W 299 RESET	Y 450	-7111.59050	0.024	1.375
				0.018	0.018	2.50
DYCT		W 299 RESET	Y 450	5541.90370	-0.026	-1.469
				0.018	0.018	2.70
DZCT		W 299 RESET	Y 450	3788.40480	-0.006	-0.347
				0.018	0.018	0.63
GROUP: 081710C.ASC ,obs#: 111						
DXCT		CM229	ZDV1	72251.52060	0.010	0.062
				0.159	0.159	0.11
DYCT		CM229	ZDV1	21610.77780	0.052	0.324
				0.159	0.159	0.59
DZCT		CM229	ZDV1	45104.33070	0.003	0.021
				0.159	0.159	0.04

Residuals (critical value = 3.915):

TYPE	AT	FROM	TO	OBSERVATION / STD DEV	RESIDUAL / STD DEV	STD RES / PPM
GROUP: 081710C.ASC ,obs#: 112						
DXCT	W 299	RESET	ZDV1	81866.57820	0.024	0.135
				0.177	0.177	0.24
DYCT	W 299	RESET	ZDV1	21334.95200	0.017	0.098
				0.177	0.177	0.18
DZCT	W 299	RESET	ZDV1	48865.26970	-0.018	-0.104
				0.177	0.177	0.19
GROUP: 081810.ASC ,obs#: 113						
DXCT	W 299	RESET	41	10771.65960	0.009	0.405
				0.028	0.021	0.56
DYCT	W 299	RESET	41	-9136.87130	-0.029	-1.353
				0.028	0.021	1.90
DZCT	W 299	RESET	41	-5706.04390	-0.014	-0.652
				0.028	0.021	0.90
GROUP: 081810.ASC ,obs#: 114						
DXCT		CM229	41	1156.60280	-0.006	-0.411
				0.024	0.015	0.48
DYCT		CM229	41	-8861.06100	0.021	1.359
				0.024	0.015	1.60
DZCT		CM229	41	-9466.98500	0.010	0.660
				0.024	0.015	0.78
GROUP: 081810.ASC ,obs#: 115						
DXCT	W 299	RESET	42	10772.82100	0.014	0.682
				0.028	0.021	0.94
DYCT	W 299	RESET	42	-9127.84920	-0.021	-0.987
				0.028	0.021	1.37
DZCT	W 299	RESET	42	-5694.93120	-0.020	-0.954
				0.028	0.021	1.33
GROUP: 081810.ASC ,obs#: 116						
DXCT		CM229	42	1157.77420	-0.010	-0.685
				0.024	0.015	0.81
DYCT		CM229	42	-8852.02520	0.015	0.991
				0.024	0.015	1.17
DZCT		CM229	42	-9455.88330	0.015	0.959
				0.024	0.015	1.13
GROUP: 081810.ASC ,obs#: 117						
DXCT	W 299	RESET	CM229	9615.05810	0.014	0.723
				0.019	0.019	1.31
DYCT	W 299	RESET	CM229	-275.83820	-0.022	-1.168
				0.019	0.019	2.12
DZCT	W 299	RESET	CM229	3760.94620	-0.029	-1.549
				0.019	0.019	2.80


Relative Frequency
0.4
0.3
0.2
0.1
-4
-3
-2
-1
0
1
2
3
4
ALL RESIDUALS (351 residuals)

S T A T I S T I C S S U M M A R Y

Residual Critical Value Type	Tau Max
Residual Critical Value	3.9149
Number of Flagged Residuals	3
Convergence Criterion	0.0010
Final Iteration Counter Value	2
Confidence Level Used	95.0000
Estimated Variance Factor	1.0000
Number of Degrees of Freedom	220

Chi-Square Test on the Variance Factor:

8.3658e-01 < 1.0000 < 1.2167e+00 ?

THE TEST PASSES

NOTE: All confidence regions were computed using the following factors:

Variance factor used	=	1.0000
3-D expansion factor	=	2.7955

Note that, for relative confidence regions, precisions are computed from the ratio of the major semi-axis and the spatial distance between the two stations.

3D Station Confidence Regions (95.000 percent):

STATION	MAJ-SEMI	(AZ,VANG)	MED-SEMI	(AZ,VANG)	MIN-SEMI	(AZ,VANG)
1	0.046	(0, 90)	0.045	(0, 0)	0.045	(90, 0)
10	0.024	(0, 90)	0.023	(90, 0)	0.023	(0, 0)
101	0.013	(0, 90)	0.013	(0, 0)	0.013	(90, 0)
11	0.007	(180, 69)	0.002	(90, 0)	0.002	(0, 21)
12	0.022	(0, 90)	0.022	(0, 0)	0.022	(90, 0)
13	0.025	(0, 90)	0.025	(0, 0)	0.024	(90, 0)
14	0.037	(0, 90)	0.037	(0, 0)	0.037	(90, 0)
15	0.039	(157, 82)	0.037	(0, 7)	0.037	(270, 3)
16	0.039	(0, 90)	0.039	(0, 0)	0.039	(90, 0)
17	0.031	(0, 90)	0.031	(0, 0)	0.031	(90, 0)
18	0.053	(0, 90)	0.053	(0, 0)	0.053	(90, 0)
19	0.020	(180, 81)	0.016	(0, 9)	0.016	(90, 0)
2	0.056	(0, 74)	0.056	(90, 0)	0.056	(180, 16)
20	0.052	(0, 90)	0.051	(0, 0)	0.051	(90, 0)
21	0.037	(0, 90)	0.037	(0, 0)	0.037	(90, 0)
22	0.034	(0, 77)	0.034	(180, 13)	0.034	(90, 0)
23	0.023	(0, 90)	0.022	(0, 0)	0.022	(90, 0)
24	0.026	(180, 77)	0.025	(90, 0)	0.025	(0, 13)
25	0.028	(0, 90)	0.028	(0, 0)	0.028	(90, 0)
26	0.014	(0, 90)	0.013	(0, 0)	0.013	(90, 0)
27	0.063	(180, 80)	0.062	(0, 10)	0.062	(90, 0)
28	0.018	(0, 90)	0.017	(0, 0)	0.017	(90, 0)
29	0.052	(30, 75)	0.049	(180, 13)	0.049	(272, 7)
3	0.063	(248, 77)	0.061	(90, 12)	0.061	(359, 5)
30	0.041	(180, 76)	0.041	(90, 0)	0.041	(0, 14)
31	0.054	(180, 70)	0.053	(0, 20)	0.053	(90, 0)
32	0.053	(0, 75)	0.053	(180, 15)	0.052	(90, 0)
33	0.063	(180, 82)	0.063	(0, 8)	0.063	(90, 0)
34	0.064	(180, 81)	0.063	(0, 9)	0.063	(90, 0)
35	0.077	(41, 82)	0.076	(180, 6)	0.076	(271, 5)
36	0.071	(0, 87)	0.070	(90, 0)	0.070	(180, 3)
37	0.022	(0, 90)	0.022	(0, 0)	0.022	(90, 0)
38	0.075	(12, 77)	0.072	(271, 3)	0.072	(180, 13)
39	0.053	(180, 70)	0.053	(0, 20)	0.053	(90, 0)
4	0.053	(0, 90)	0.053	(0, 0)	0.053	(90, 0)
40	0.068	(24, 72)	0.067	(180, 16)	0.067	(272, 7)
41	0.051	(180, 71)	0.050	(0, 19)	0.050	(90, 0)
42	0.050	(0, 90)	0.050	(0, 0)	0.050	(90, 0)
5	0.031	(0, 75)	0.031	(180, 15)	0.031	(90, 0)
6	0.031	(0, 90)	0.031	(0, 0)	0.031	(90, 0)
7	0.039	(180, 79)	0.038	(0, 11)	0.038	(90, 0)
8	0.031	(0, 90)	0.030	(0, 0)	0.030	(90, 0)
9	0.026	(27, 74)	0.022	(180, 14)	0.022	(272, 7)
S 299	0.006	(0, 0)	0.005	(90, 0)	0.000	(0, 90)

3D Relative Confidence Regions (95.000 percent):

FROM	TO	MAJ-SEMI (AZ,VANG)	MED-SEMI (AZ,VANG)	MIN-SEMI (AZ,VANG)	DISTANCE	PPM
1	101	0.047	0.047	0.047	29249.617	1.61
		(0, 90)	(0, 0)	(90, 0)		
1	M 361	0.046	0.045	0.045	13330.809	3.42
		(0, 90)	(0, 0)	(90, 0)		
10	101	0.027	0.026	0.026	17412.880	1.56
		(0, 90)	(90, 0)	(0, 0)		
10	M 361	0.024	0.023	0.023	4747.054	5.14
		(0, 90)	(90, 0)	(0, 0)		
101	11	0.015	0.013	0.013	16141.662	0.91
		(180, 71)	(0, 19)	(90, 0)		
101	12	0.025	0.025	0.025	12854.777	1.96
		(0, 90)	(0, 0)	(90, 0)		
101	13	0.027	0.026	0.026	10705.750	2.50
		(0, 90)	(0, 0)	(90, 0)		
101	14	0.039	0.038	0.038	16983.844	2.27
		(0, 90)	(0, 0)	(90, 0)		
101	15	0.040	0.039	0.038	14769.317	2.74
		(157, 82)	(0, 7)	(270, 3)		
101	16	0.039	0.038	0.038	10051.632	3.85
		(0, 90)	(0, 0)	(90, 0)		
101	17	0.031	0.030	0.030	7145.911	4.28
		(0, 90)	(0, 0)	(90, 0)		
101	18	0.054	0.054	0.054	26713.647	2.03
		(0, 90)	(0, 0)	(90, 0)		
101	19	0.023	0.020	0.020	14617.190	1.58
		(180, 81)	(0, 9)	(90, 0)		
101	2	0.057	0.057	0.057	27712.733	2.07
		(0, 75)	(180, 15)	(90, 0)		
101	20	0.052	0.052	0.052	18205.603	2.88
		(0, 90)	(0, 0)	(90, 0)		
101	21	0.038	0.038	0.038	15380.777	2.48
		(0, 90)	(0, 0)	(90, 0)		
101	22	0.034	0.034	0.034	9255.601	3.71
		(0, 77)	(180, 13)	(90, 0)		
101	23	0.020	0.019	0.019	3857.721	5.06
		(0, 90)	(0, 0)	(90, 0)		
101	24	0.023	0.022	0.022	4629.369	4.98
		(180, 76)	(90, 0)	(0, 14)		
101	25	0.026	0.025	0.025	5223.906	4.92
		(0, 90)	(0, 0)	(90, 0)		
101	26	0.005	0.003	0.002	57.147	81.43
		(0, 90)	(0, 0)	(90, 0)		
101	27	0.063	0.062	0.062	16194.921	3.87
		(180, 80)	(0, 10)	(90, 0)		
101	28	0.013	0.012	0.012	2369.411	5.47
		(0, 90)	(0, 0)	(90, 0)		
101	29	0.051	0.048	0.048	10747.611	4.78
		(30, 75)	(180, 13)	(272, 7)		
101	3	0.064	0.062	0.062	29232.396	2.20
		(248, 77)	(90, 12)	(359, 5)		
101	30	0.039	0.039	0.039	8245.475	4.78
		(180, 74)	(90, 0)	(0, 16)		

3D Relative Confidence Regions (95.000 percent):

FROM	TO	MAJ-SEMI (AZ,VANG)	MED-SEMI (AZ,VANG)	MIN-SEMI (AZ,VANG)	DISTANCE	PPM
101	31	0.053 (180, 69)	0.052 (0, 21)	0.052 (90, 0)	11358.615	4.64
101	32	0.052 (0, 73)	0.051 (180, 17)	0.051 (90, 0)	10991.450	4.70
101	33	0.063 (180, 82)	0.062 (0, 8)	0.062 (90, 0)	13564.075	4.61
101	34	0.064 (180, 81)	0.063 (0, 9)	0.063 (90, 0)	14021.569	4.53
101	35	0.076 (40, 81)	0.075 (180, 7)	0.075 (271, 5)	17354.674	4.39
101	36	0.070 (0, 86)	0.069 (90, 0)	0.069 (180, 4)	15475.501	4.53
101	37	0.019 (0, 90)	0.018 (0, 0)	0.018 (90, 0)	3710.347	5.14
101	38	0.074 (12, 77)	0.072 (271, 3)	0.072 (180, 13)	16514.897	4.51
101	39	0.052 (180, 69)	0.051 (0, 21)	0.051 (90, 0)	10949.496	4.73
101	4	0.054 (0, 90)	0.054 (0, 0)	0.054 (90, 0)	26420.708	2.06
101	40	0.067 (24, 72)	0.066 (180, 17)	0.066 (272, 7)	15256.300	4.40
101	5	0.033 (0, 77)	0.033 (180, 13)	0.033 (90, 0)	20899.888	1.59
101	6	0.033 (0, 90)	0.033 (0, 0)	0.033 (90, 0)	22222.411	1.50
101	7	0.040 (180, 79)	0.039 (0, 11)	0.039 (90, 0)	23868.128	1.69
101	8	0.033 (0, 90)	0.033 (0, 0)	0.033 (90, 0)	21183.505	1.56
101	9	0.029 (28, 75)	0.025 (180, 14)	0.025 (272, 7)	20512.226	1.41
101	COFC	0.013 (0, 90)	0.013 (0, 0)	0.013 (90, 0)	91115.408	0.14
101	H 360	0.013 (0, 90)	0.013 (0, 0)	0.013 (90, 0)	19693.445	0.66
101	M 361	0.013 (0, 90)	0.013 (0, 0)	0.013 (90, 0)	16061.760	0.81
101	P041	0.013 (0, 90)	0.013 (0, 0)	0.013 (90, 0)	64389.796	0.20
101	WINDY GAP	0.013 (0, 90)	0.013 (0, 0)	0.013 (90, 0)	8404.343	1.54
101	ZDV1	0.013 (0, 90)	0.013 (0, 0)	0.013 (90, 0)	71500.687	0.18
11	M 361	0.007 (180, 69)	0.002 (90, 0)	0.002 (0, 21)	79.965	90.79
12	M 361	0.022 (0, 90)	0.022 (0, 0)	0.022 (90, 0)	4595.906	4.89
13	M 361	0.025 (0, 90)	0.025 (0, 0)	0.024 (90, 0)	5365.693	4.63
14	M 361	0.037 (0, 90)	0.037 (0, 0)	0.037 (90, 0)	7977.333	4.66

3D Relative Confidence Regions (95.000 percent):

FROM	TO	MAJ-SEMI (AZ,VANG)	MED-SEMI (AZ,VANG)	MIN-SEMI (AZ,VANG)	DISTANCE	PPM
15	M 361	0.039 (157, 82)	0.037 (0, 7)	0.037 (270, 3)	8416.702	4.68
16	M 361	0.039 (0, 90)	0.039 (0, 0)	0.039 (90, 0)	11217.907	3.47
17	M 361	0.031 (0, 90)	0.031 (0, 0)	0.031 (90, 0)	9883.965	3.17
18	M 361	0.053 (0, 90)	0.053 (0, 0)	0.053 (90, 0)	11356.598	4.68
19	M 361	0.020 (180, 81)	0.016 (0, 9)	0.016 (90, 0)	3201.787	6.17
2	M 361	0.056 (0, 74)	0.056 (90, 0)	0.056 (180, 16)	11952.469	4.72
20	M 361	0.052 (0, 90)	0.051 (0, 0)	0.051 (90, 0)	12162.920	4.27
21	M 361	0.037 (0, 90)	0.037 (0, 0)	0.037 (90, 0)	8120.303	4.54
22	M 361	0.034 (0, 77)	0.034 (180, 13)	0.034 (90, 0)	9183.977	3.73
23	M 361	0.023 (0, 90)	0.022 (0, 0)	0.022 (90, 0)	12207.358	1.86
24	M 361	0.026 (180, 77)	0.025 (90, 0)	0.025 (0, 13)	13419.272	1.92
25	M 361	0.028 (0, 90)	0.028 (0, 0)	0.028 (90, 0)	17181.350	1.65
26	M 361	0.014 (0, 90)	0.013 (0, 0)	0.013 (90, 0)	16044.606	0.85
27	M 361	0.063 (180, 80)	0.062 (0, 10)	0.062 (90, 0)	18182.054	3.45
28	M 361	0.018 (0, 90)	0.017 (0, 0)	0.017 (90, 0)	17962.837	1.01
29	M 361	0.052 (30, 75)	0.049 (180, 13)	0.049 (272, 7)	19927.346	2.63
3	M 361	0.063 (248, 77)	0.061 (90, 12)	0.061 (359, 5)	13198.192	4.80
30	M 361	0.041 (180, 76)	0.041 (90, 0)	0.041 (0, 14)	21437.597	1.91
31	M 361	0.054 (180, 70)	0.053 (0, 20)	0.053 (90, 0)	24248.018	2.21
32	M 361	0.053 (0, 75)	0.053 (180, 15)	0.052 (90, 0)	26113.230	2.02
33	M 361	0.063 (180, 82)	0.063 (0, 8)	0.063 (90, 0)	27576.759	2.30
34	M 361	0.064 (180, 81)	0.063 (0, 9)	0.063 (90, 0)	25981.158	2.47
35	M 361	0.077 (41, 82)	0.076 (180, 6)	0.076 (271, 5)	28812.281	2.66
36	M 361	0.071 (0, 87)	0.070 (90, 0)	0.070 (180, 3)	28732.132	2.46
37	M 361	0.022 (0, 90)	0.022 (0, 0)	0.022 (90, 0)	12917.084	1.74
38	M 361	0.075 (12, 77)	0.072 (271, 3)	0.072 (180, 13)	27387.553	2.74

3D Relative Confidence Regions (95.000 percent):

FROM	TO	MAJ-SEMI (AZ,VANG)	MED-SEMI (AZ,VANG)	MIN-SEMI (AZ,VANG)	DISTANCE	PPM
39	M 361	0.053 (180, 70)	0.053 (0, 20)	0.053 (90, 0)	26990.331	1.96
4	M 361	0.053 (0, 90)	0.053 (0, 0)	0.053 (90, 0)	11395.716	4.68
40	M 361	0.068 (24, 72)	0.067 (180, 16)	0.067 (272, 7)	25175.731	2.69
41	CM229	0.051 (180, 71)	0.050 (0, 19)	0.050 (90, 0)	13018.424	3.89
41	W 299 RESET	0.051 (180, 71)	0.050 (0, 19)	0.050 (90, 0)	15233.873	3.33
42	CM229	0.050 (0, 90)	0.050 (0, 0)	0.050 (90, 0)	13004.305	3.88
42	W 299 RESET	0.050 (0, 90)	0.050 (0, 0)	0.050 (90, 0)	15225.126	3.31
5	M 361	0.031 (0, 75)	0.031 (180, 15)	0.031 (90, 0)	6275.204	4.96
6	M 361	0.031 (0, 90)	0.031 (0, 0)	0.031 (90, 0)	6319.262	4.94
7	M 361	0.039 (180, 79)	0.038 (0, 11)	0.038 (90, 0)	7808.381	4.93
8	M 361	0.031 (0, 90)	0.030 (0, 0)	0.030 (90, 0)	6234.398	4.94
9	M 361	0.026 (27, 74)	0.022 (180, 14)	0.022 (272, 7)	4461.578	5.87
CM229	S 299	0.006 (0, 0)	0.005 (90, 0)	0.000 (0, 90)	397.835	14.25
S 299	W 299 RESET	0.006 (0, 0)	0.005 (90, 0)	0.000 (0, 90)	10722.560	0.53

1100116 USGS-GRAND CO *** GROUND SURVEY FILE ***
HORIZONTAL - NAD 83/07 UTM ZONE 13
VERTICAL - NAVD88 METERS

STATION	EASTING	NORTHING	ELEVATION
1	428723.152	4459433.599	2653.569
2	429212.687	4457642.824	2658.460
3	427301.895	4459834.153	2654.865
4	431312.763	4455354.030	2570.728
5	428663.673	4450506.151	2538.600
6	426244.755	4452852.224	2585.507
7	424939.954	4454893.278	2778.428
8	420374.178	4452771.174	2730.532
9	424610.627	4451528.620	2620.656
10	418873.040	4448990.093	2657.937
11	423307.270	4447349.014	2533.983
12	419661.499	4444458.632	2484.116
13	422355.523	4441992.298	2424.812
14	415354.379	4448002.782	2516.179
15	415049.339	4445599.340	2551.416
16	414580.477	4440217.573	2378.270
17	418491.414	4438639.817	2406.766
18	430455.848	4456072.052	2558.540
19	425564.539	4445018.090	2533.210
20	434421.806	4442386.457	2526.419
21	430153.223	4442938.063	2556.182
22	425949.906	4438486.713	2596.993
23	420735.557	4435343.202	2441.981
24	423798.627	4433870.744	2596.138
25	414611.190	4432457.886	2548.843
26	419819.121	4431618.213	2484.253
27	435749.306	4434055.787	3053.915
28	420811.480	4429493.045	2583.335
29	430052.861	4428540.537	2558.681
30	425787.994	4425994.482	2577.914
31	427627.718	4423431.588	2639.133
32	423178.298	4421177.573	2731.537
33	426603.500	4419914.274	2695.114
34	430173.170	4422237.032	2610.842
35	432691.881	4420057.463	2656.175
36	428850.108	4419103.305	2707.104
37	422196.759	4434409.362	2536.779
38	432917.474	4421652.749	2740.245
39	416695.831	4421124.260	3022.970
40	433006.860	4424064.829	2608.979
41	428445.169	4376062.238	3688.126
42	428443.961	4376076.535	3688.249
101	419762.253	4431613.362	2486.165
CM229	425034.018	4388610.429	3395.412
COFC	486424.510	4493630.495	1611.119
D 450	408582.031	4387081.500	2686.669
H 360	433285.440	4417319.322	2734.471
M 361	423292.300	4447270.535	2535.395
P041	483406.261	4422168.758	1745.950
S 299	425379.471	4388806.145	3376.468
W 299RESET	415674.883	4384299.990	2825.140
WINDY GAP	417008.398	4439547.012	2398.459
Y 450	407374.154	4389454.298	2651.566
ZDV1	489171.014	4448553.542	1558.405

LIDAR FLIGHT LOG

ALTM

JS1

MISSION: Q080510A | DATE: 8-5-10

PILOT: JOSEY | OPERATOR: JIM | AIRCRAFT: N280MB

PROJECT NUMBER	LINE NO. & Hdg		GND SPEED (KTS)	SCAN FREQ	SCAN ANGLE	PRF	ALT (m)	GMT TIME START	GMT TIME STOP	Tranzpak Drive	REMARKS
1100116								14:19	14:49		FERRY: EGE → SITE .5
GRAND COUNTY,	TEST				32	70	1250	14:49	14:50		
2	TEST							14:52	14:52		
3	1	359	160	37.8				14:57	15:00		POOP AT 3.2 (15:01) N40:02:23
4											DC BUFFER OVERFLOW (15:00)
5	2	179						15:09	15:19		POOP 3.05 AT START 3/4 TIME LINE
6	3	359						15:22	15:24		CUE N39:59:36 - N40:00:16
7	3	359	″	″				15:24	15:31		N 40:00:16 → N. END (PARTIAL LINE)
8	4	179	155	37.2				15:34	15:35		CUE N40:15 → 40:14:43
9	4	179	″	″				15:39	15:42		N40:14:43 - 39:59:04 CUE AT S. END
10	5	359	160	37.8				15:45	15:51		N 39:59:58 - 40:15:24 ESSO -- HI HILL
11	3	179	155	37.2				15:55	15:57		GAP AREA 40:14:05 - 40:13:52
12	5	359	160	37.8				16:01	16:02		N. END GAP AREA 40:14:59 - N. END (NEED SOUTH END)
13	4	179	155	37.2				16:06	16:07		GAP AREA N. END 40:16:13 - 40:14:05
14	CROSS	W	160	37.8				16:10	16:11		N. END
15	CROSS	E	″	″	″	″	″	16:15	16:16		S. END
											FERRY: SITE → CALIBRATION (EGE)
DOWN RUNWAY		252			32	70	10K FT	16:35	16:36		
PERP		351			″	″	″	16:39	16:40		
PERP		177			″	″	″	16:41	16:42		→ JS2

STATUS	TOTAL LINES	FLOWN	LEFT	AIRCRAFT SITE	AIRCRAFT FERRY	STATIC	START:	STOP:	NOTES:
⊘ 1100116	141	3	13.8	1.7	1.0	2.7	14:19	16:57	SCT 12K / OVC 15K
○						WX			
○									

AERO-METRIC, INC. N.6216 Resource Drive Sheboygan Falls, WI. 53085 PHONE: 920-467-2655 FAX: 920-457-1451 E-Mail: amephoto@aerometric.com

LIDAR FLIGHT LOG

ALTM

J52

MISSION: Q080510A DATE: 8-5-10

PILOT: JOSEY OPERATOR: JIM AIRCRAFT: N280MB

PROJECT NUMBER	LINE NO. & Hdg	GND SPEED (KTS)	SCAN FREQ	SCAN ANGLE	PRF	ALT (m)	TIME START	TIME STOP	Tranzpak Drive	REMARKS
1100116							16:42	16:57		FERRY: SITE → EGE .3

STATUS	TOTAL LINES	FLOWN	LEFT	AIRCRAFT SITE	AIRCRAFT FERRY	STATIC	START:	STOP:	NOTES:
○									
○						WX			
○									

AERO-METRIC, INC. N.6216 Resource Drive Sheboygan Falls, WI. 53085 PHONE: 920-467-2655 FAX: 920-457-1451 E-Mail: amenphoto@aerometric.com

LIDAR FLIGHT LOG

MISSION: Q080610A **DATE:** 8-6-10 FRI

PILOT: JOSEY **OPERATOR:** JIM **AIRCRAFT:** N280MB

ALTM JSI

PROJECT NUMBER	LINE NO. & Hdg	GND SPEED (KTS)	SCAN FREQ	SCAN ANGLE	PRF	ALT (m)	TIME START	TIME STOP	Tranzpak Drive	REMARKS
j100116							14:05	14:26	068	FERRY: EGE → SITE .3
GRAND COUNTY	TEST			22	70	1250	14:26	14:26		
	TEST						14:26	14:27		
	4 359	160	37.8				14:35	14:38		S. END → 40:01:12 TO COMPLETE LINE
	5 179	155	37.2				14:41	14:44		40:02 → S. END TO COMPLETE LINE
	6 359	160	37.8				14:48	14:57		
	7 179						15:01	15:10		
	8 359						15:13	15:22		
	9 179						15:26	15:35		
	10 359						15:38	15:46		ESSO S. END → 40:15:18 (PARTIAL)
	CROSS W						15:50	—		N. END ESSO
	CROSS E						15:53	15:54		N. END
	CROSS W						15:58	15:59		S. END
								16:27		FERRY: SITE → EGE .5

STATUS	TOTAL LINES	FLOWN	LEFT	AIRCRAFT SITE	AIRCRAFT FERRY	STATIC	START:	STOP:	NOTES:
⊘ 1100116	141	3/6	132	1.6	.8	2.4	14:05	16:27	
○						WX SCT 8K SCT 13K			
○									

AERO-METRIC, INC. N.6216 Resource Drive Sheboygan Falls, WI. 53085 PHONE: 920-467-2655 FAX: 920-457-1451 E-Mail: amephoto@aerometric.com

LIDAR FLIGHT LOG

RB1

MISSION: Q080710 DATE: 08 07 10

PILOT: J Billington OPERATOR: R Boll AIRCRAFT: 280 MB

PROJECT NUMBER	LINE NO. & Hdg	GND SPEED (KTS)	SCAN FREQ	SCAN ANGLE	PRF	ALT (m)	TIME START	TIME STOP	Tranzpak Drive	REMARKS
1100116	~~1~~	155	~~37.8~~	22	70	1250	800	805		STATIC T/O KEGE
USGS-Grand	Test Strip	"	"	"	"		1418	1418		
Q080710.24	Test Strip	"	"	"	"		1419	1420		
	1 359	160	37.8	22	70	1250	1433	1443		
	10 179	160	37.8	22	70	1250	1446	1448		N. END reflight to 40 15 18 LAT
	12 179	160	37.8	22	70	1250	1453	1502		
	13 359	160	37.8	22	70	1250	1506	1515		PDOP: 3.05 max Send → 10 miles
	14 179	160	37.8	22	70	1250	1519	1508		
	15 359	160	37.8	22	70	1250	1531	1540		
	16 179	160	37.8	22	70	1250	1545	1554		
	17 359	160	37.8	22	70	1250	1557	16006		
	18 179	160	37.8	22	70	1250	1609	1619		Pos CLD 5m from Nead T
	19 359	160	37.8	22	70	1250	1623	1432		" T
	X t.e(W)	160	37.8	22	70	1250	1635	1637		
	X t.e E	160	37.8	22	70	1250	1642	1645		
							1107			SITE → KEGE / STATIC

STATUS	TOTAL LINES	FLOWN	LEFT	AIRCRAFT SITE	AIRCRAFT FERRY	STATIC	START:	STOP:
○ 1100116	141	10	127	~~3~~.0	1.0	3.1	10:00	11:07
○						WX high layer CU dvlp over MTN		
○								

NOTES: N. End 12, 13, 14 40 16 17.8 West of PT -105 59 8.5 N. Peak

X ties ?: 2

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LIDAR FLIGHT LOG

ALTM

181

MISSION: Q081010 DATE: 8-10-10

PILOT: J. Billington OPERATOR: R. Bolli AIRCRAFT: 350MB

PROJECT NUMBER	LINE NO. & Hdg	GND SPEED (KTS)	SCAN FREQ	SCAN ANGLE	PRF	ALT (m)	TIME START	TIME STOP	Tranzpak Drive	REMARKS
1100116 - USGS Grand Co						1250	810	815	008	STATIC / T/O EGE
	Test 1	≈160	37.8	22	70	1500	1430	1431		
	Test 2	"	"	"	"	"	1431	1432		
	20 359	≈160	37.8	22	70	1250	1445	1454		PDOP 3.06
	21 179	"	"	"	"	"	1458	1507		~~ATTALIX/GIRO~~
	22 359	"	"	"	"	"	1510	1519		
	23 179	"	"	"	"	"	1523	1532		
	24 359	"	"	"	"	"	1536	1544		
	25 179	"	"	"	"	"	1546	1557		
	26 359	"	"	"	"	"	1601	1610		T
	27 179	"	"	"	"	"	1614	1623		T cld dev. below alt
	28 359	"	"	"	"	"	1627	1635		T cld 4m from N. end
	29 179	"	"	"	"	"	1639	1648		T
	X-tie	"	"	"	"	"	1657	1652		T
							1109	1114		Land EGE/STATIC

STATUS	TOTAL LINES	FLOWN	LEFT	AIRCRAFT SITE	AIRCRAFT FERRY	STATIC	START:	STOP:	NOTES:
○ 1100116	141	10	112	2.0	1.0		810	1114	
○						WX Lake fog early east SKC			
○						LL Cu @ 10:30 MDT			

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LIDAR FLIGHT LOG

CS PR

MISSION: Q08110 DATE: 8-11-10

PILOT: J. Billington OPERATOR: R. Boll AIRCRAFT: 280 MB

RB1

PROJECT NUMBER	LINE NO. & Hdg	GND SPEED (KTS)	SCAN FREQ	SCAN ANGLE	PRF	ALT (m)	TIME START	TIME STOP	Tranzpak Drive	REMARKS
1100116							1700			SCST NR ALT
Grand Co, CO							1907			DC BUFFER OVERFLOW ON START UP / Reboot w/ Loaner Drive
							1922	1927	Optech	STATIC / T/O EGE
	Test 1	160	37.8	22	70	1250	1436	1437	Loaner	
	Test 2	160	37.8	22	70	1258	1437	1438		
	30 359	160	37.8	22	70	1250	1452	1501		PDOP 3.01
	31 179	"	"	"	"	"	1505	1514		T (NEAR)
	32 359						1519	1528		w. shifts 140 KOK
	33 179						1532	1541		
	34 359						1546	1555		T (throughout)
	35 179						1557	1608		
	36 359						1610	1621		
	37 179						1625	1635		cu dropping / Rain vic
	X-Tie	145	36	22	70	1250	1638	1639		
							1708	1708		Land EGE / STATIC

STATUS	TOTAL LINES	FLOWN	LEFT	AIRCRAFT SITE	AIRCRAFT FERRY	STATIC	START:	STOP:
○ 1100116	141	8	104	2.1	1.0		1422	1708
○						WX SCT 15K VIC Showers / Turbulent		
○								

NOTES:

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LIDAR FLIGHT LOG

RB1

ALTM

MISSION: Q081210 A DATE: 08-12-10

PILOT: J Billington OPERATOR: R. Ball AIRCRAFT: 280MB

PROJECT NUMBER	LINE NO. & Hdg		GND SPEED (KTS)	SCAN FREQ	SCAN ANGLE	PRF	ALT (m)	TIME START	TIME STOP	Tranzpak Drive	REMARKS
1100116-USGS GRAND					22	70	1250	1415	1420	008	STATIC / T/O EGE
	Test	1	160	37.8	|	|	|	1439	1440		
	Test	2	|	|	|	|	|	1440	1441		
	38	357	|	|	|	|	|	1446	1455		T PDOP: 3.03 Ground Fog/Cloud
	Test	1	|	|	|	|	|	1458	1459		|
	129	90	180	|	|	|	|	1459	1500		T Eye shut off / Clouds
	38	359	160	|	|	|	|	1532	1542		T
								1615	1620		STATIC / LAND EGE

STATUS	TOTAL LINES	FLOWN	LEFT	AIRCRAFT SITE	AIRCRAFT FERRY	STATIC	START:	STOP:
1100116	141	1	103	1.0	1.0		1415	1620
						WX		

NOTES: Severe Turbulence (T) NE SITE
Altitude NE site unsafe

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LIDAR FLIGHT LOG

RB1

MISSION: Q0813 10 | DATE: 8-13-10

PILOT: J. Billington | OPERATOR: R. Bell | AIRCRAFT: 280MB

PROJECT NUMBER	LINE NO. & Hdg		GND SPEED (KTS)	SCAN FREQ	SCAN ANGLE	PRF	ALT (m)	TIME START	TIME STOP	Tranzpak Drive	REMARKS
1100116					22	70	1050	1302	1307	008	STATIC / T-10 EGE
Grand CO, CO	Test	1	140	37.8				1320	1320		
	Test	2	160					1321	1321		
	179	90	var≈200					1338	1339		16.3 ≈ 200 GS
	178	270	150	36.6				1345	1346		read out Ranges Incorrect
	177	90	≈200	40.0				1349	1350		"
	176	270	150	36.6				1356	1357		" to high about tomorrow
	39	179	160	37.8				1403	1412		SKC
	40	359	160	37.8				1416	1425		
	41	179	160	37.8				1429	1438		
	42	359	160	37.8				1442	1451		
	43	179	160	37.8				1455	1504		
	44	359	160	37.8				1508	1517		
	45	179	160	37.8				1521	1530		10m from S. End Airplane Underneath
	46	359	160	37.8				1534	1543		T N-End
	47	179	160	37.8				1547	1556		T "
	48	359	160	37.8				1600	1609		T+ "
	49	179	160	37.8				1613	1622		T+ Throughout
	X	TIE	140	35.3				1625	1626		
								1649	1654		Land EGE / STATIC

STATUS	TOTAL LINES	FLOWN	LEFT	AIRCRAFT SITE	AIRCRAFT FERRY	STATIC	START:	STOP:
○ 1100116	141	15	88	1.0	2.5		1302	1654
○						WX		
○								

NOTES: Plan Progress auto zoom out

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LIDAR FLIGHT LOG

RB1

MISSION: Q081410A | DATE: 8-14-10

PILOT: J. Billington | OPERATOR: R. Boll | AIRCRAFT: 280MB

PROJECT NUMBER	LINE NO. & Hdg	GND SPEED (KTS)	SCAN FREQ	SCAN ANGLE	PRF	ALT (m)	TIME START	TIME STOP	Tranzpak Drive	REMARKS
1100116				22	70	1250	1358	1403	008	STATIC / [redacted]
Grand CO, CO										SCST Error / PC Buffer Overflo
										Optech Laser switch Blck / STATIC
							1406	1411		STATIC / T/O Eagle
	Test 1	160	37.0	22	70	1250	1423	1424		
	Test 2						1424	1425		
	50 359						1441	1450		SKC
	51 179						1454	1503		small AC 200' low
	52 359						1507	1516		
	53 179						1500	1509		T Ends
	54 359						1534	1543		T Ends
	55 179						1546	1555		T Ends
	56 359						1559	1608		T throughout
	57 179						1612	1621		T+
	X-Tie						1625	1636		T+
							1650	1655		Land EGE / STATIC

STATUS	TOTAL LINES	FLOWN	LEFT	AIRCRAFT SITE	AIRCRAFT FERRY	STATIC	START:	STOP:	NOTES:
○ 1100116	148	8	80	2.0	1.0		1406	1655	
○						WX SKC → SCT CU 15K			
○									

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LIDAR FLIGHT LOG

MISSION: Q081510A | DATE: 8-15-10 | KB1

PILOT: J. Billington | OPERATOR: R. Bell | AIRCRAFT: 380MB

PROJECT NUMBER	LINE NO. & Hdg	GND SPEED (KTS)	SCAN FREQ	SCAN ANGLE	PRF	ALT (m)	TIME START	TIME STOP	Tranzpak Drive	REMARKS
1100116				22	70	1250	1301	1306	Optech Scanner	STATIC / T/O EGE
USGS-GRAND										Can't Read SCSI / PC Buffer
							1308	1313		Reboot / same disk / Static T/O
	Test 1	140	37.8				1321	1321		EGE
	Test 2						1322	1323		
							1333			Format Disk
	Test 1						1333	1333		
	Test 2						1334	1334		
	58 359						1338	1347		
	59 179						1351	1400		
	60 359						1404	1413		
	61 179						1417	1425		
	62 359						1429	1438		PDOP: 3.0
	63 179						1443	1451		shows laser off 3 seconds / 2m.n into l.e
	64 359						1455	1504		
	65 179						1508	1516		
	66 359						1520	1529		
	X tie	✓	✓	✓	✓	✓	1532	1533	✓	
							1600	1605		LAND EGE / STATIC

STATUS	TOTAL LINES	FLOWN	LEFT	AIRCRAFT SITE	AIRCRAFT FERRY	STATIC	START:	STOP:
○ 1100116	143	9 45%	77.41%	2.0	1.0		1308	
○						WX G.E.		
○								

NOTES: Omit Q081510.01 ABORTED file
9 Q081410.61 b/c DC
Buffer Error & Reboot

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LIDAR FLIGHT LOG

RB1

MISSION: [redacted] Q081610B DATE: 8-16-10

PILOT: J. Billington OPERATOR: R. Bell AIRCRAFT: 380MB

PROJECT NUMBER	LINE NO. & Hdg	GND SPEED (KTS)	SCAN FREQ	SCAN ANGLE	PRF	ALT (m)	TIME START	TIME STOP	Tranzpak Drive	REMARKS
1100116				22	70	1250	1250		008	STATIC / [redacted] DC Bafter Trying SCST
Grand Co, CO										Reboot
							1246	1251		STATIC / T/O EGE
	Test 1						1315	1315		
	Test 2						1315	1315		
	67 359	160	37.8				1317	1327		
	68 179	160	37.8				1331	1339		LT Rain 2mi from N. End
	69 359	"	"	"	"	"	1343	1351		Rain 10mile from N. End / Vis Cld M
										Rain S. End / Abort Area / Rain Throughout
							1420	1425	/	STATIC / LAND EGE

STATUS	TOTAL LINES	FLOWN	LEFT	AIRCRAFT SITE	AIRCRAFT FERRY	STATIC	START:	STOP:
○ 1100116	143	2	75	1.0	1.0		1246	1425
○						WX		
○								

NOTES: USE Q081610B ABGPS

LIDAR FLIGHT LOG

MISSION: Q082110 | DATE: 8-21-10 | 69 | RB

PILOT: A. Hero | OPERATOR: R. Boll | AIRCRAFT: 280 MS

PROJECT NUMBER	LINE NO. & Hdg	GND SPEED (KTS)	SCAN FREQ	SCAN ANGLE	PRF	ALT (m)	TIME START	TIME STOP	Tranzpak Drive	REMARKS
1100116				22	70	1250	1300	1305	Optech 2	STATIC / TO BJC
USGS-GRAND	TEST 1	140	37.8	22	70	1250	1317	1317	S/N 180	
	Test 2						1321	1322		
	~~69 359 160~~						1337			
	129 270	180					1340	1340		FOG → Reroute L129
	129						1340	1340		high / 4 runs on 129 eye
	129						1340	1341		sate
	129						1341	1341		Shut
	69 179	160					1352	1401		OFF
	70 359	160					1405	1413		PDOP 3.45 clouds between
	71 179	160					1417	1426		PDOP 3.05 over Lakes
	72 359	160					1430	1438		
	73 179						1442	1451		
	74 359						1455	1504		
	75 179						1507	1517		
	76 359						1520	1529		
	77 179						1533	1542		T
	78 359						1545	1555		T
	79 179						1558	1608		T
	80 359						1611	1620		T off on mid. line 2 sec

STATUS	TOTAL LINES	FLOWN	LEFT	AIRCRAFT SITE	AIRCRAFT FERRY	STATIC	START:	STOP:
○ 1100116	143	15	60	3.4	1.0		1300	1732
○						WX	Fog / Low Stratus Early	
○							Cumulus Late	

NOTES:

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LIDAR FLIGHT LOG

MISSION: Q0821.10 DATE: 8-21-10

PILOT: A. Hero OPERATOR: R BOLL AIRCRAFT: 380 MB

ALTM

PROJECT NUMBER	LINE NO. & Hdg	GND SPEED (KTS)	SCAN FREQ	SCAN ANGLE	PRF	ALT (m)	TIME START	TIME STOP	Tranzpak Drive	REMARKS
	81 179	160	37.0	22	70	250	1624	1633	Speed 2	T
	82 359	"	"	"	"	"	1637	1646	SN 100	T
	83 179	"	"	"	"	"	1650	1659	"	T +
	X TIE	"	"	"	"	"	1702	1703	"	T +
							1727	1732	"	STATIC / CAMB BJC

STATUS	TOTAL LINES	FLOWN	LEFT	AIRCRAFT SITE	AIRCRAFT FERRY	STATIC	START:	STOP:	NOTES:
○				3.4	1.0				
○						WX			
○									

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LIDAR FLIGHT LOG

RB1

MISSION: Q082210A | DATE: 8-22-10

PILOT: D. Hero | OPERATOR: R Bolle | AIRCRAFT: 280MB

PROJECT NUMBER	LINE NO. & Hdg	GND SPEED (KTS)	SCAN FREQ	SCAN ANGLE	PRF	ALT (m)	TIME START	TIME STOP	Tranzpak Drive	REMARKS
1100116				22	70	1250m	1335	1340	Optech?	STATIC T/O BJC
USGS-Gand	Test 1	140	37.8				1346	1347		
	Test 2	206					1400	1400		
	84 179	160	37.8	22	70	1250m	1405	1414		PPOP: 302
	85 359						1418	1427		T D. end
	86 179						1431	1440		T "
	87 359						1444	1453		T "
	88 179						1457	1506		T "
	89 359						1510	1519		T "
	90 179						1523	1532		T "
	91 359						1536	1545		T "
	92 179						1549	1558		T both ends / valley calc
	93 359						1602	1611		T "
	94 179						1615	1624		T "
	95 359						1628	1637		T "
	96 179						1641	1649		T "
	97 359						1653	1703		T "
	98 179						1706	1715		T throughout
	X Tie						1718	1719		
							1743	1748		Land BJC/STATIC

STATUS	TOTAL LINES	FLOWN	LEFT	AIRCRAFT SITE	AIRCRAFT FERRY	STATIC	START:	STOP:	NOTES:
○ 1100116	143	15	45	3.4	1.0		1335	1748	
○						WX skc → cu			
○									

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LIDAR FLIGHT LOG

MISSION: Q082510 DATE: 8-25-10

PILOT: A. Hero OPERATOR: R. Ball AIRCRAFT: 380MB

RB1

PROJECT NUMBER	LINE NO. & Hdg	GND SPEED (KTS)	SCAN FREQ	SCAN ANGLE	PRF	ALT (m)	TIME START	TIME STOP	Tranzpak Drive	REMARKS
1100116-				22	70	1250m	1304	1309	Optech 2:	STATIC T/O RJC
USGS-Grand	Test 1	160	37.8	22	70	1250	1313	1313		
	Test 2	160	37.8	22	70	1250	1313	1314		
	99 179	160	37.8	22	70	1250	1334	1343		POOP: 3.47 max / Lt. lake fog
	100 359						1347	1356		over LK. Granby in left only on water
	101 179						1400	1409		very light
	102 359						1412	1422		
	103 179						1426	1435		
	104 359						1438	1448		
	105 179						1452	1501		
	106 359						1505	1515		
	107 179						1519	1528		
	108 359						1531	1540		
	109 179						1545	1554		
	110 359						1559	1608		
	111 179						1612	1621		T
	112 359						1626	1633		T
	X tie						1637			Message OFW* / Laser Appears Stuck
							1702	1707		STATIC / Land RJC ON

STATUS	TOTAL LINES	FLOWN	LEFT	AIRCRAFT SITE	AIRCRAFT FERRY
○ 1100116	143	13	31	[redacted] 3.0	1.0
○					
○					

STATIC	START:	STOP:
	1309	1707

WX SKC

NOTES:

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LIDAR FLIGHT LOG

MISSION: Q082610A DATE: 8-26-10

PILOT: ADAM H. OPERATOR: DOUG C. AIRCRAFT: N280MB

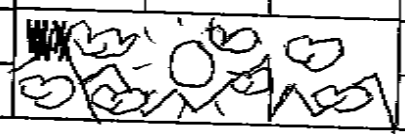
ALTM

PROJECT NUMBER	LINE NO. & Hdg		GND SPEED (KTS)	SCAN FREQ	SCAN ANGLE	PRF	ALT (m)	TIME START	TIME STOP	Tranzpak Drive	REMARKS
1100116								7:18	—	[redacted]	Comm. ERROR —
								8:48	9:26		BJC → SITE
		3 TEST FIRES						15:25	15:27		3 TEST
	143	322	145	36	22	70	1600	15:34	1535		
	142	142	160	37.8			1580	1539	1540		
	141	322	145	36			1600	1545	1546		
	140	142	160	37.8			1400	1549	1551		
	139	322	155	36.6			1500	1555	1557		
	138	142	160	37.8			1560	1600	1602		
	137	322	160	37.8			1585	1606	1607		
	136	142					1500	1611	1612		
	135	322					1550	1616	1617		
	134	142					1570	1621	1622		
	133	322					1550	1626	1628		
	132	142					1500	1631	1633		
	131	322					↓	1637	1638		
	130	142					1450	1642	1643		
		CF	↓	↓	↓	↓	↓	1646	1648		CROSSFLIGHT
								10:48	11:30		SITE → BJC

STATUS	TOTAL LINES	FLOWN	LEFT	AIRCRAFT SITE	AIRCRAFT FERRY
⊘ 1100116	143	14	17	1.4	1.3
○					
○					

STATIC START: STOP:

NOTES:



LIDAR FLIGHT LOG

MISSION: Q082710A | DATE: 8-27-10

PILOT: ADAM H. | OPERATOR: DouG C. | AIRCRAFT: N280MB

ALTM

DC1

PROJECT NUMBER	LINE NO. & Hdg		GND SPEED (KTS)	SCAN FREQ	SCAN ANGLE	PRF	ALT (m)	TIME START	TIME STOP	Tranzpak Drive	REMARKS
1100116								7:00	7:36		BJC → SITE
	3 TEST Fires							13:33	1336		TEST FIRES
	113	90	160	37.8	22	70	1380	1339	1340		P DoP: 3.06 +TURB.
	114	270	170	37.8	22	70	1420	1345	1346		P DoP: 3.03 +/- Turb.
	115	90	170±	37.8	22	70	1400±	1350	1351		P DoP: 2.97 - Turb
	116	270	"	"	"	"	"	1355	1356		
	117	90	"	"	"	"	"	1400	1401		
	118	270	"	"	"	"	"	1405	1406		
	119	90	"	"	"	"	"	1410	1411		
	120	270	"	"	"	"	"	1416	1417		
	121	90	"	"	"	"	"	1421	1422		
	122	270	"	"	"	"	"	1426	1428		
	123	90	"	"	"	"	"	1432	1433		
	124	270	"	"	"	"	"	1437	1438		
	125	90	"	"	"	"	"	1442	1443		
	126	270	"	"	"	"	"	1447	1449		
	127	90	"	"	"	"	"	1452	1453		
	128	270	"	"	"	"	"	1458	1459		
	129	90	"	"	"	"	"	1503	1503		
		CF		Cross FLIGHT				1508	1510	9:13 9:42	RIGHT ALT. Failure / INOP / SITE → BJC .5

STATUS	TOTAL LINES	FLOWN	LEFT	AIRCRAFT SITE	AIRCRAFT FERRY
1100116	143	17	0	1.6	1.1

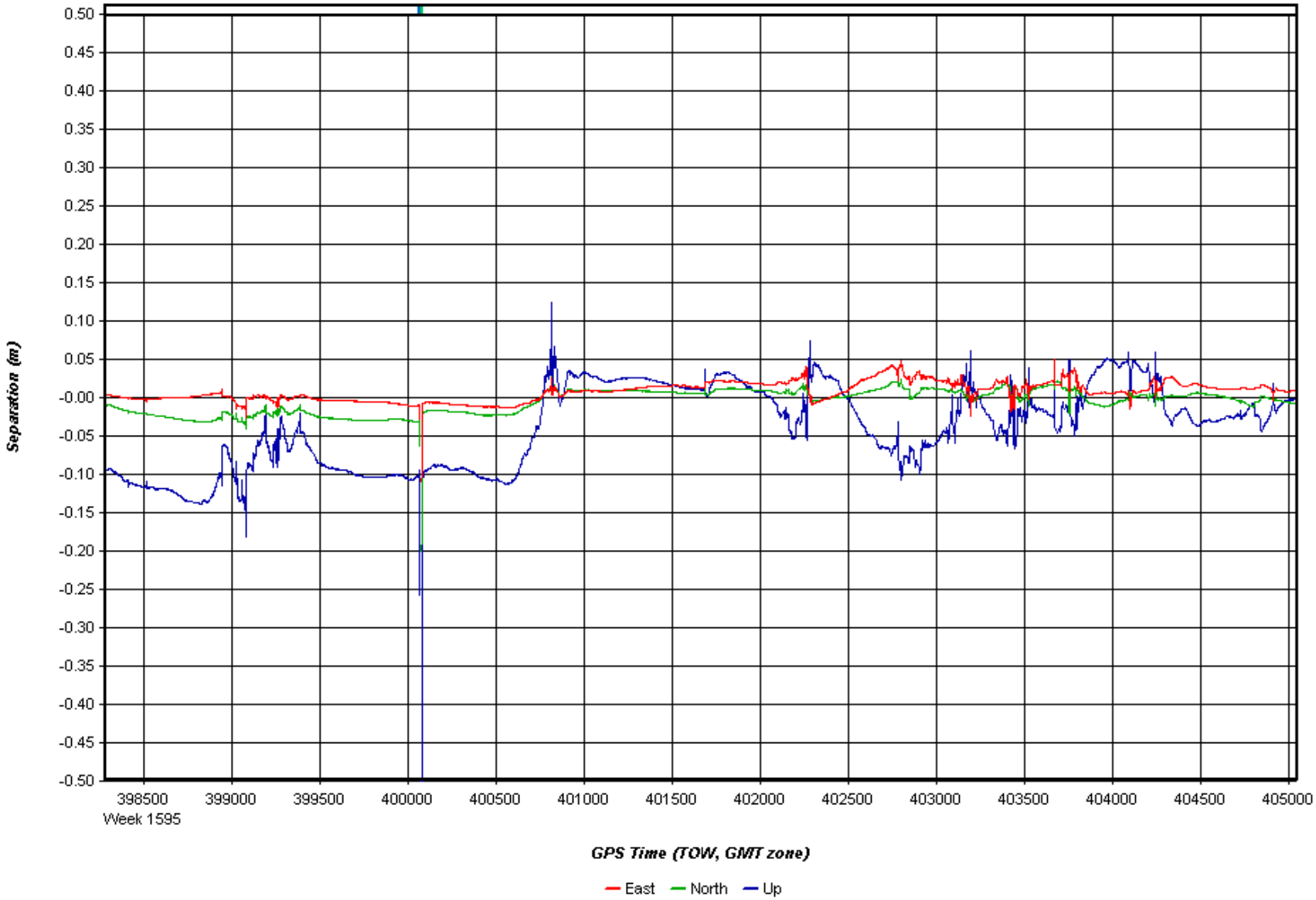
STATIC	START:	STOP:

WX

NOTES: 2nd Test Fire is Coverage for # 113 if needed

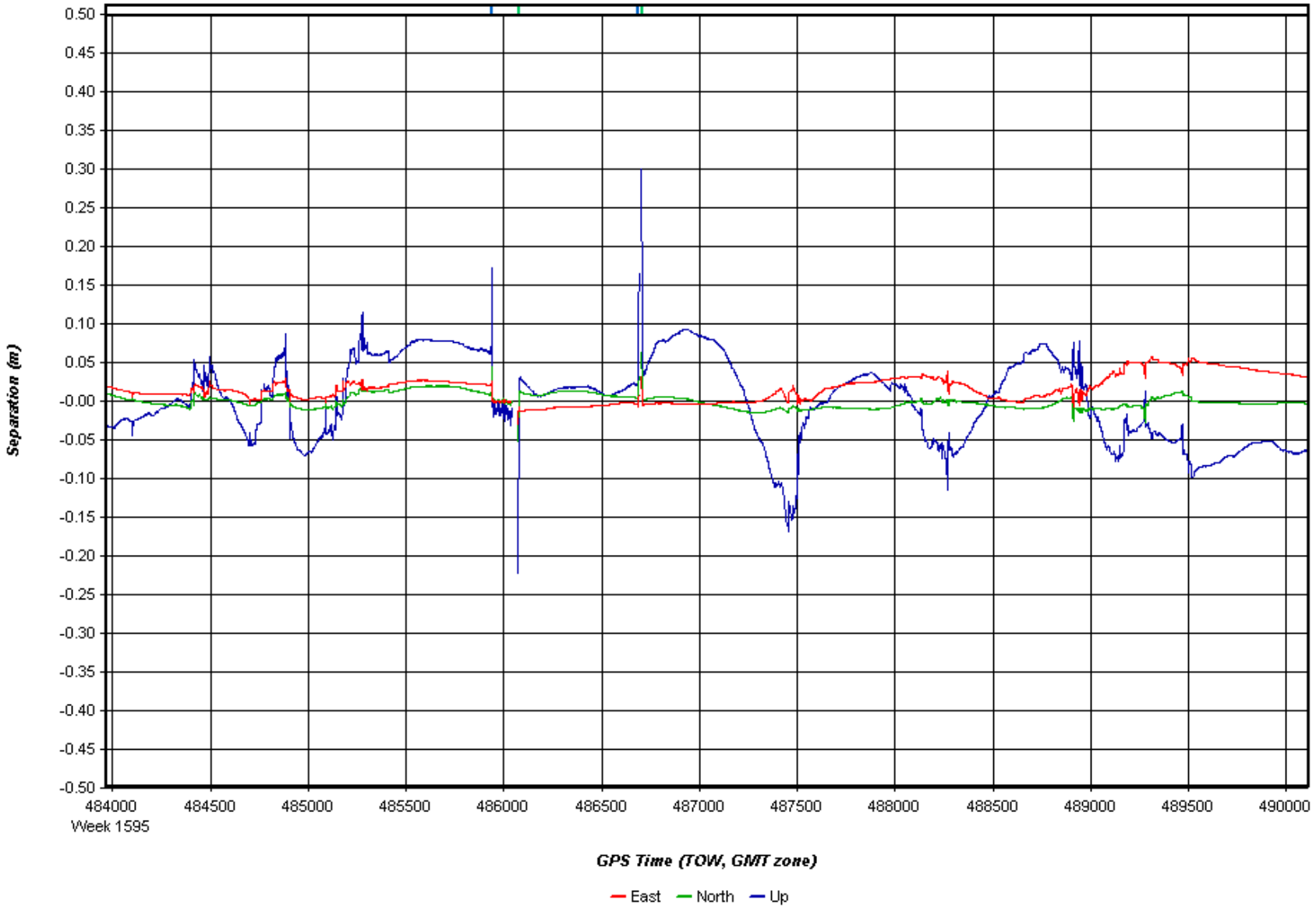
Separation Plot

08-05-10



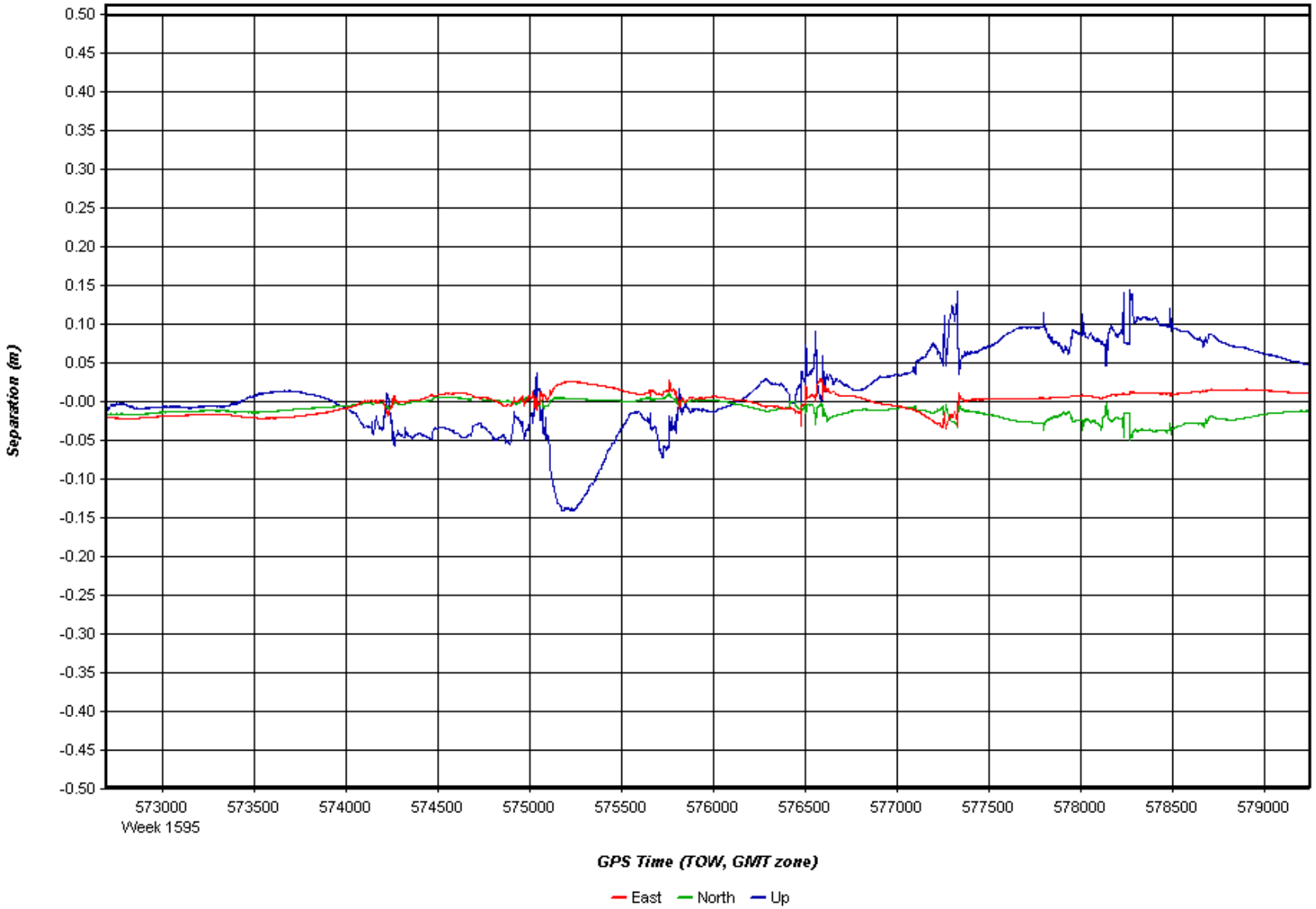
Separation Plot

08-06-10



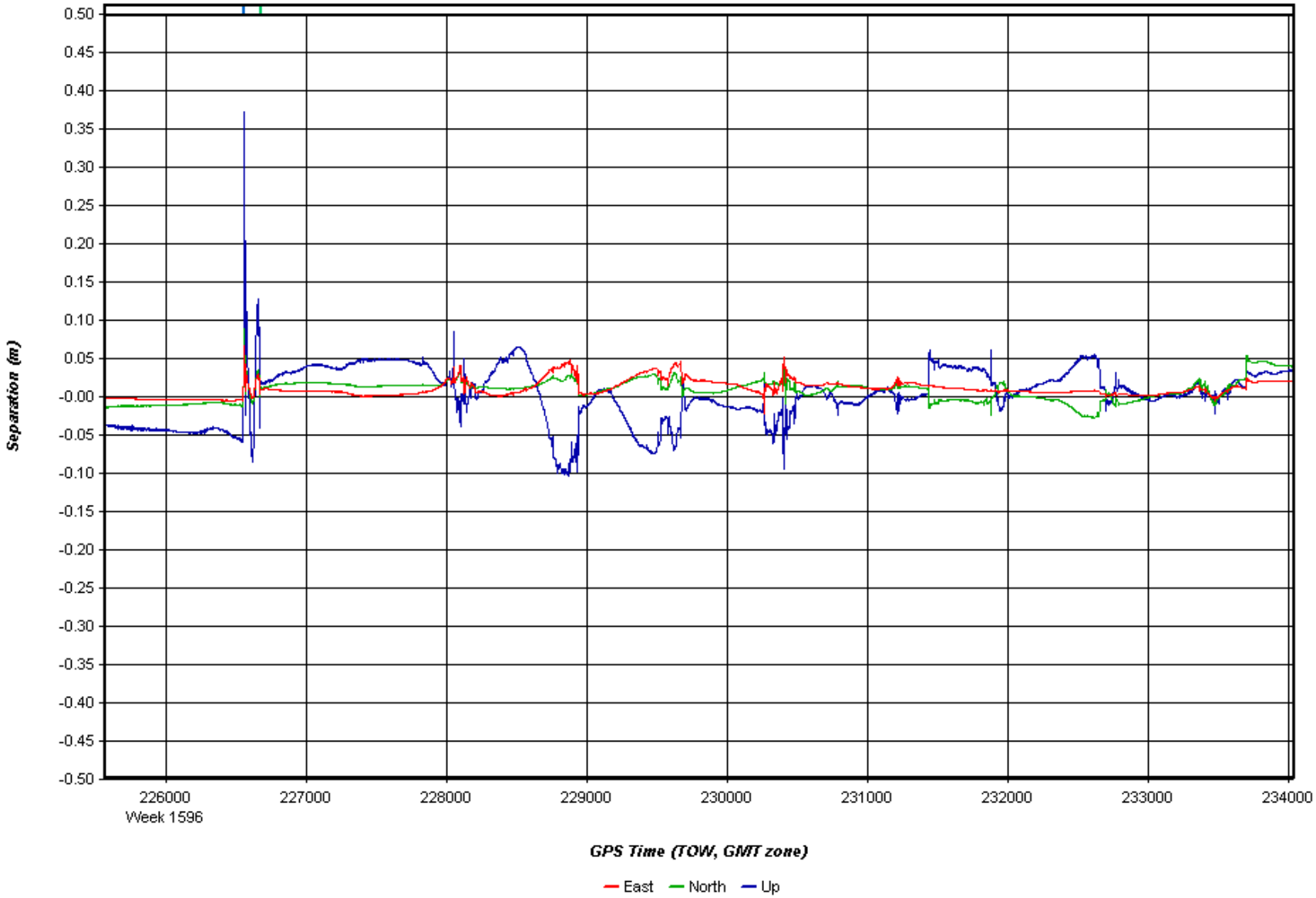
Separation Plot

08-07-10



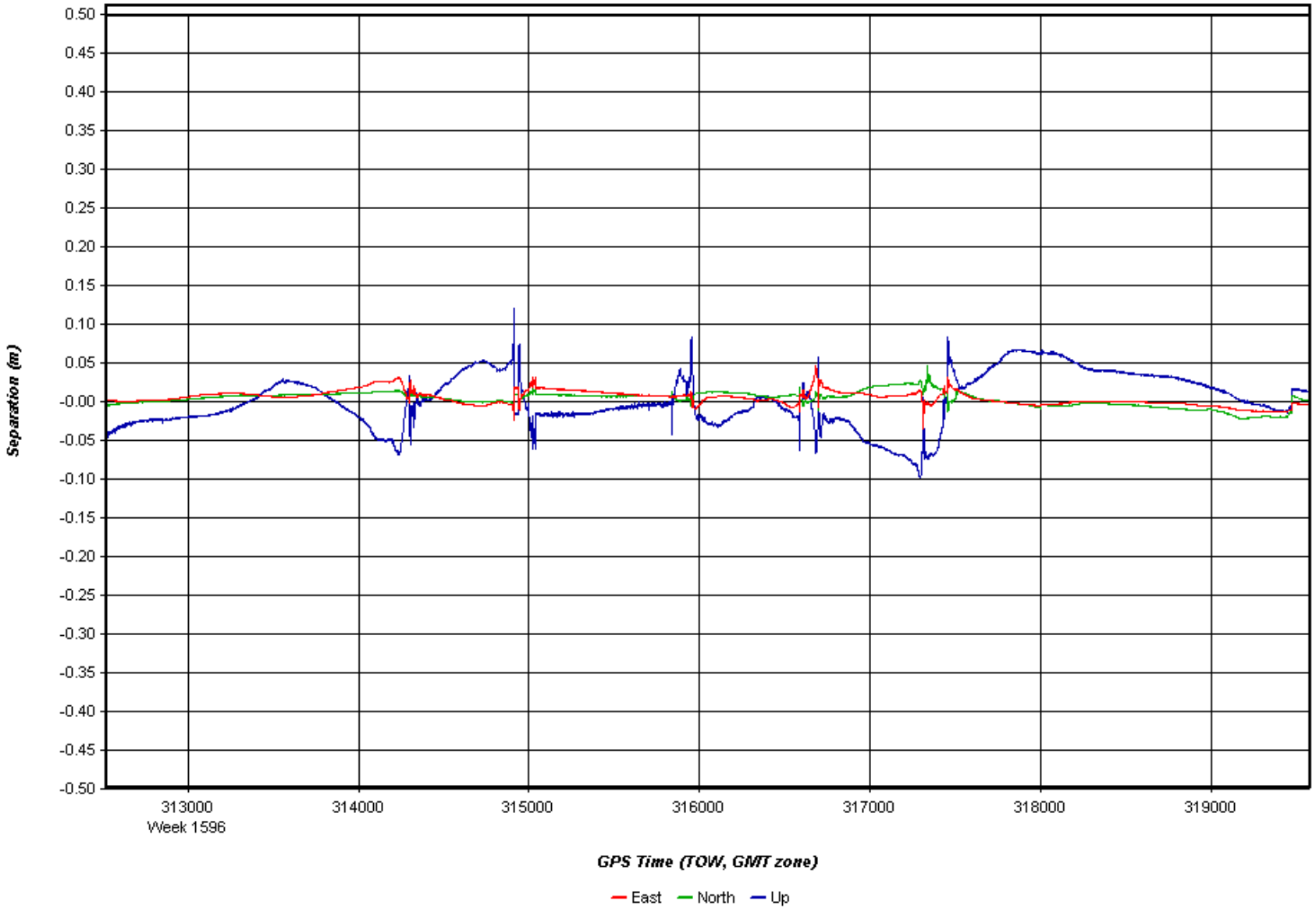
Separation Plot

08-10-10



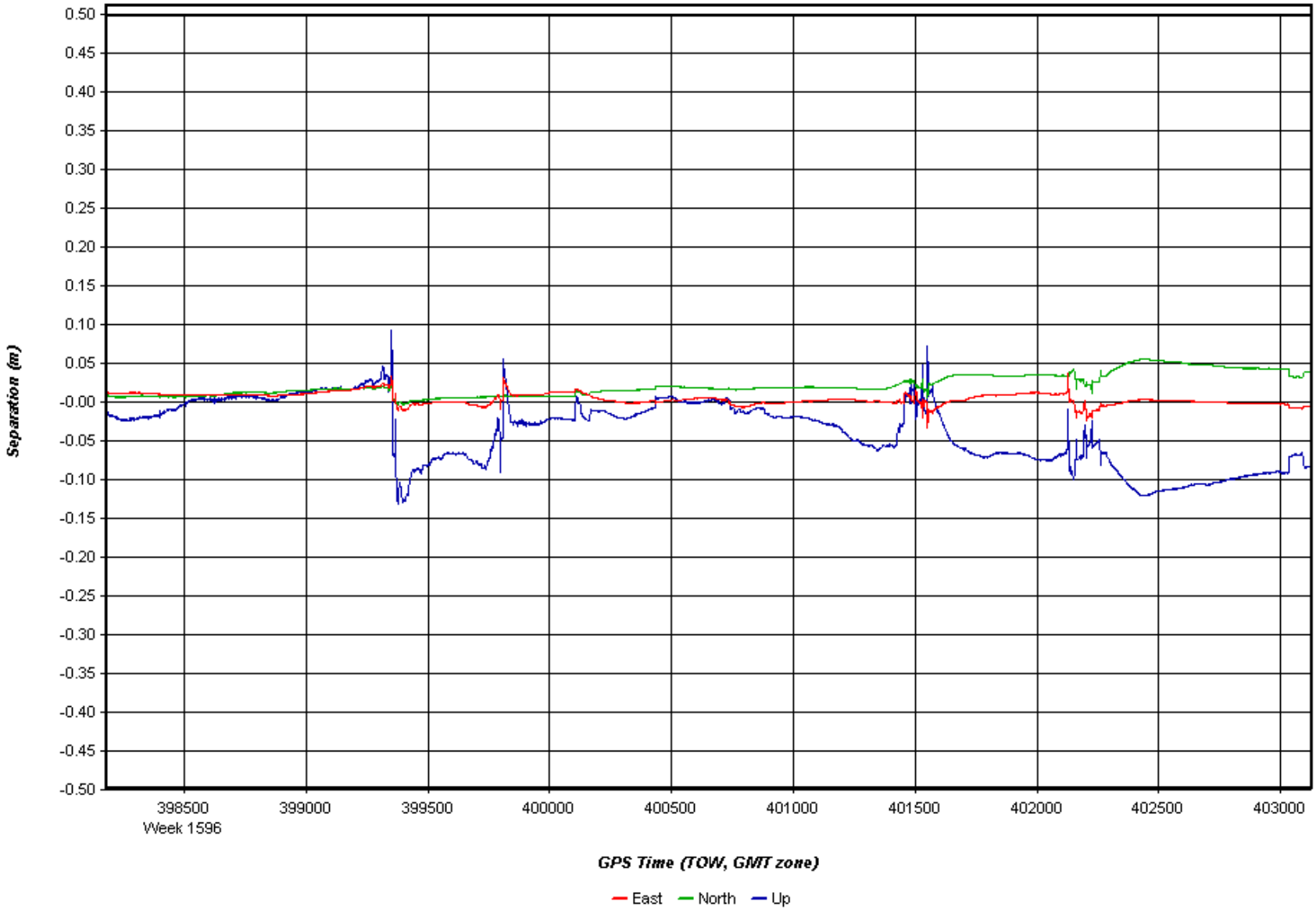
Separation Plot

08-11-10



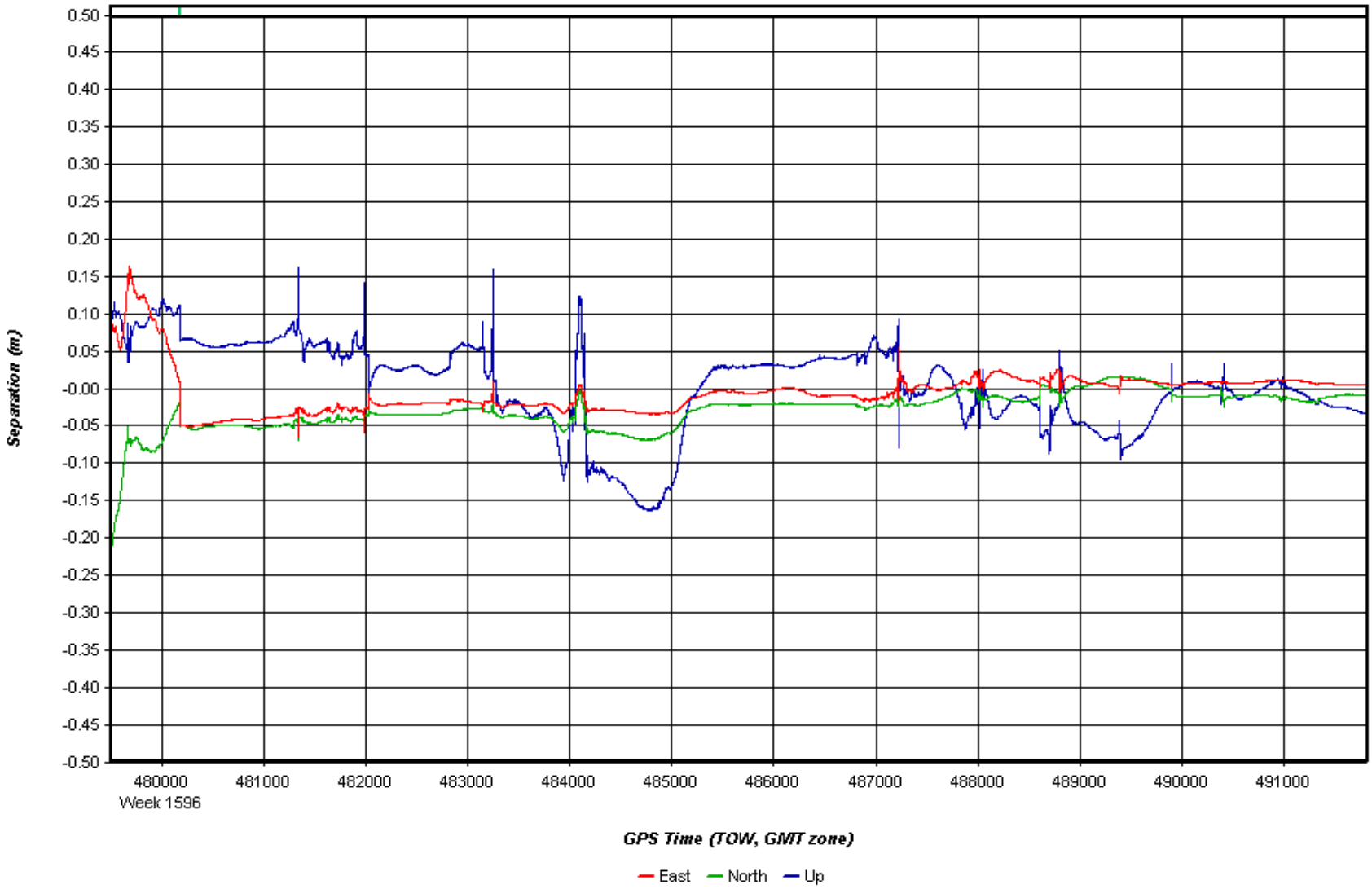
Separation Plot

08-12-10



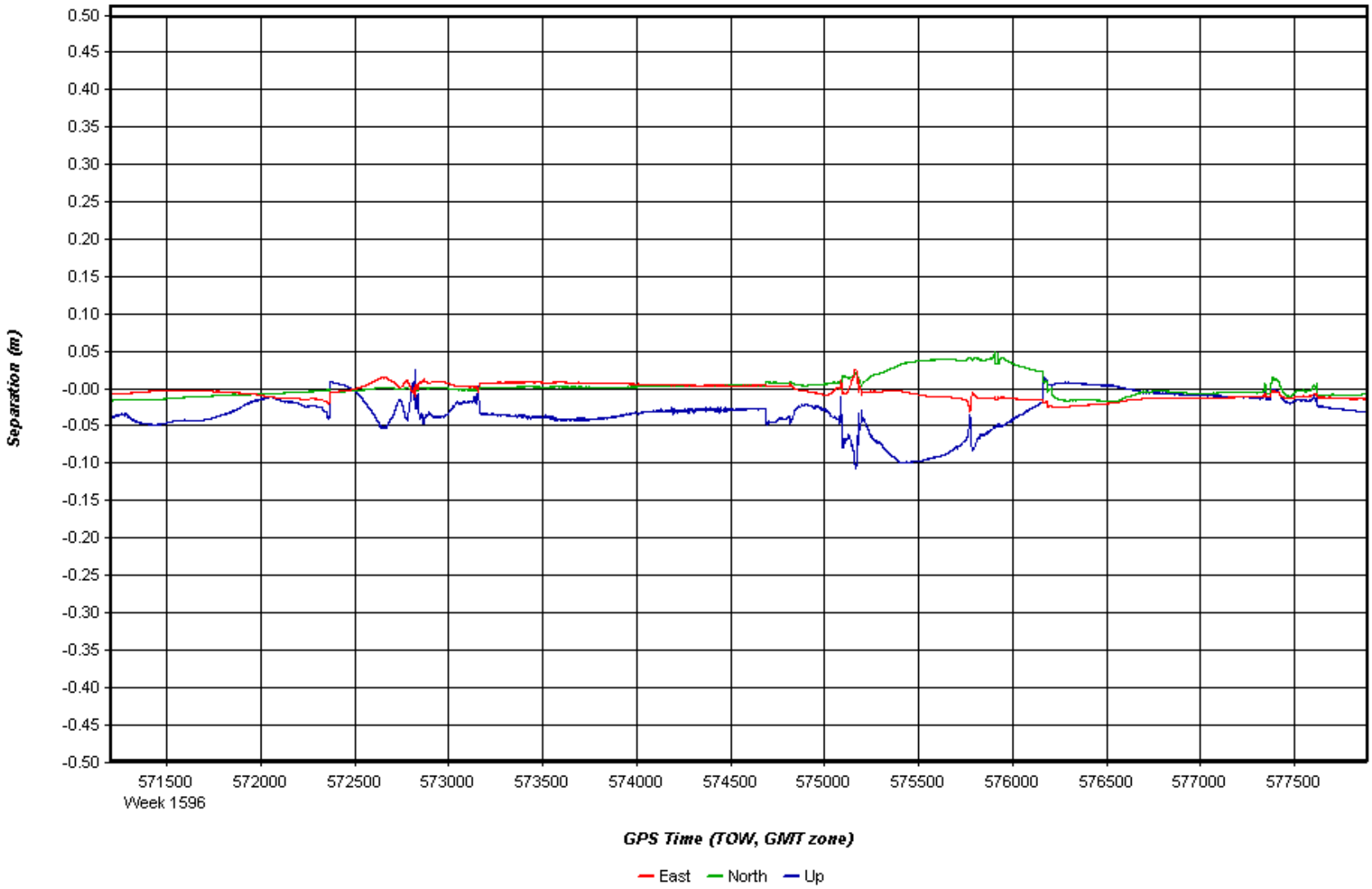
Separation Plot

08-13-10



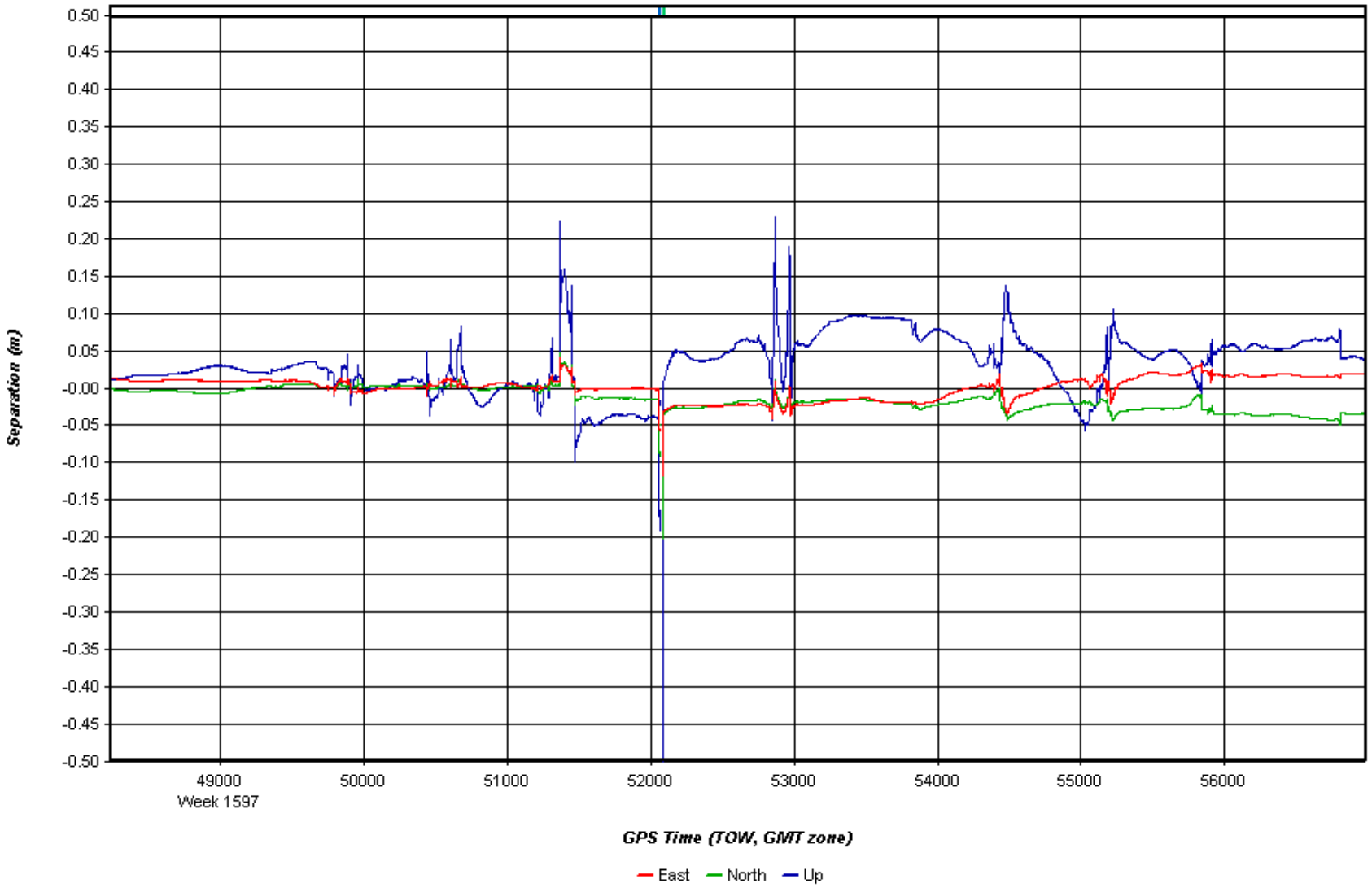
Separation Plot

08-14-10



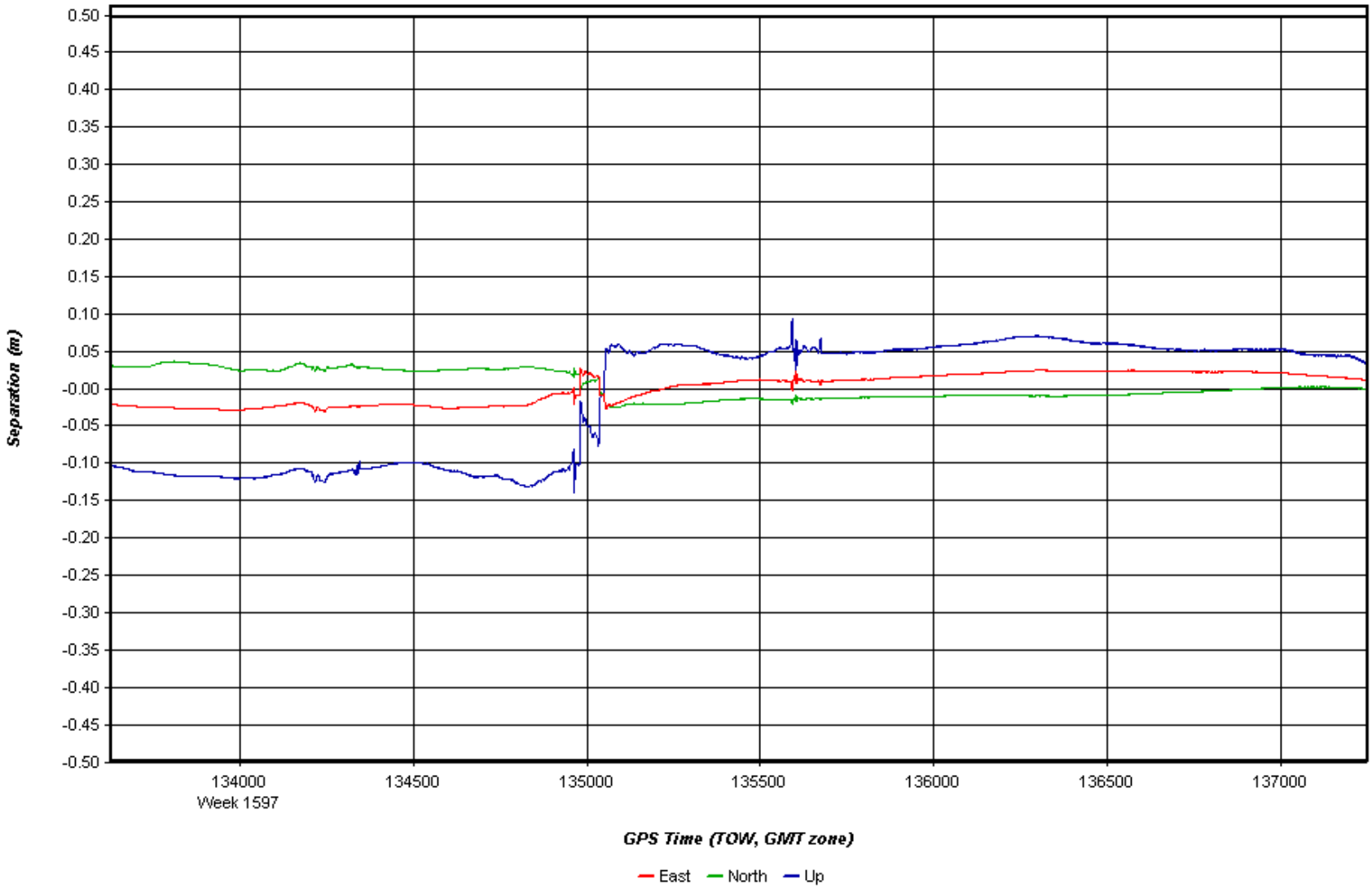
Separation Plot

08-15-10



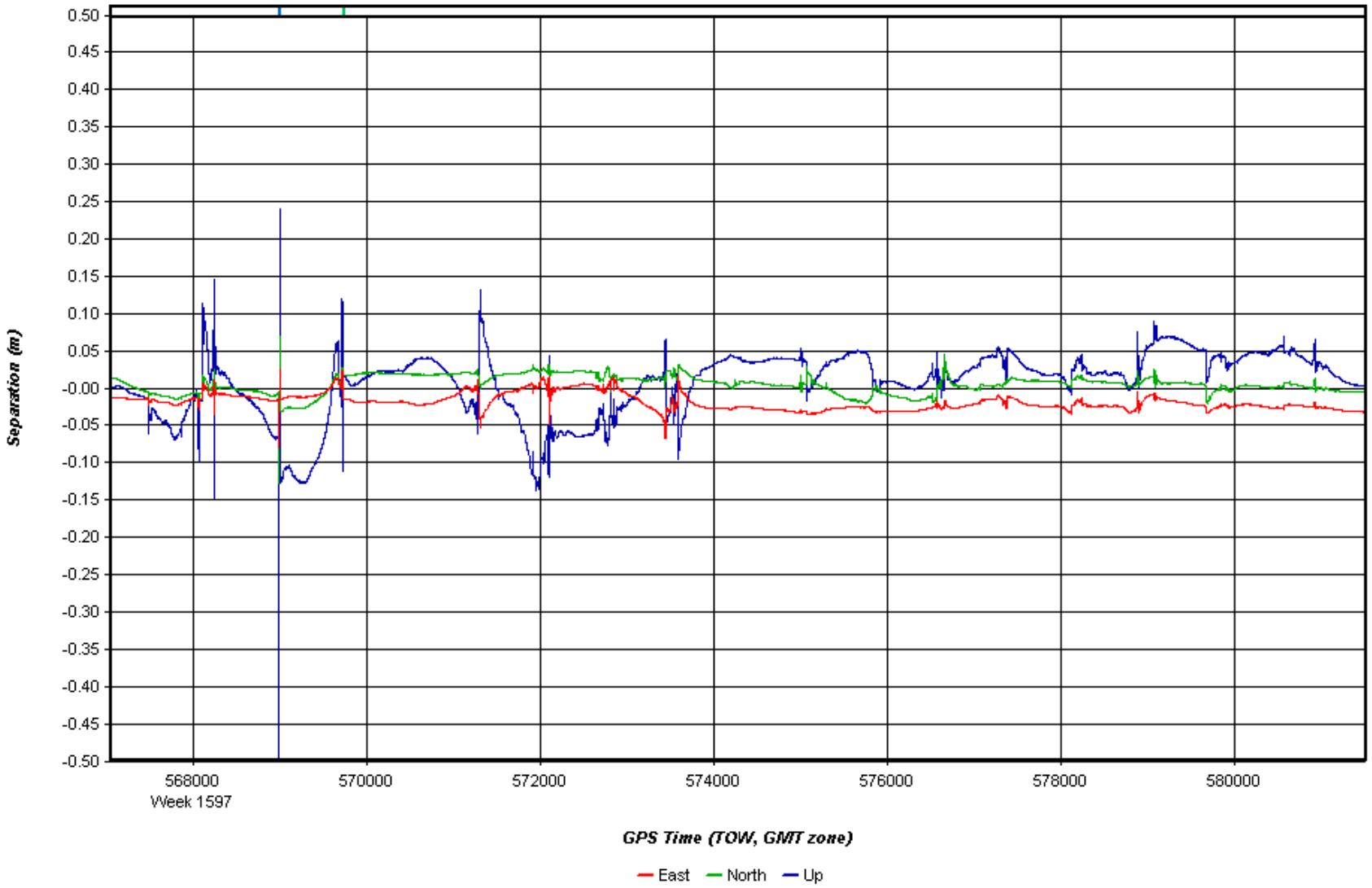
Separation Plot

08-16-10



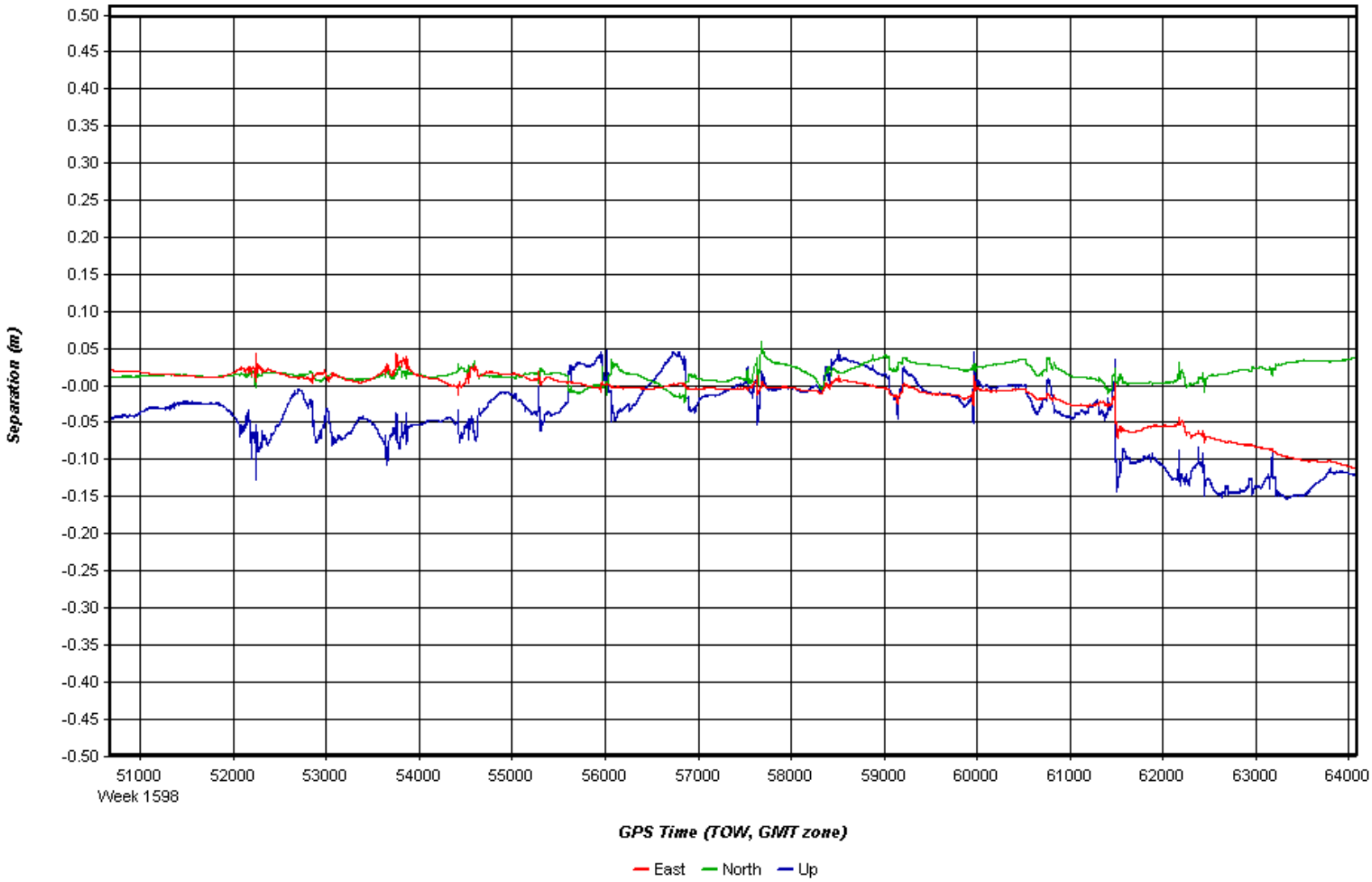
Separation Plot

08-21-10



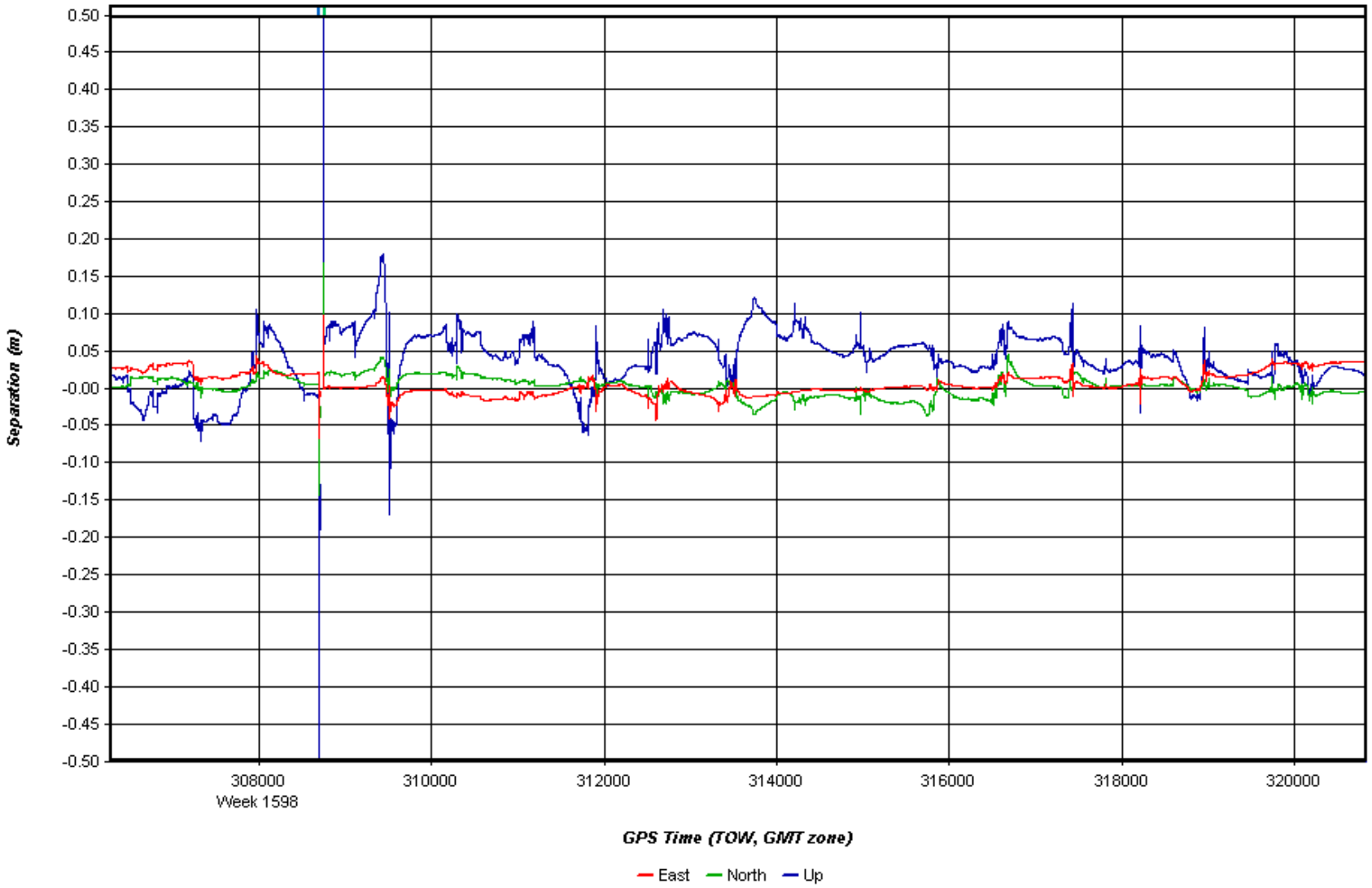
Separation Plot

08-22-10



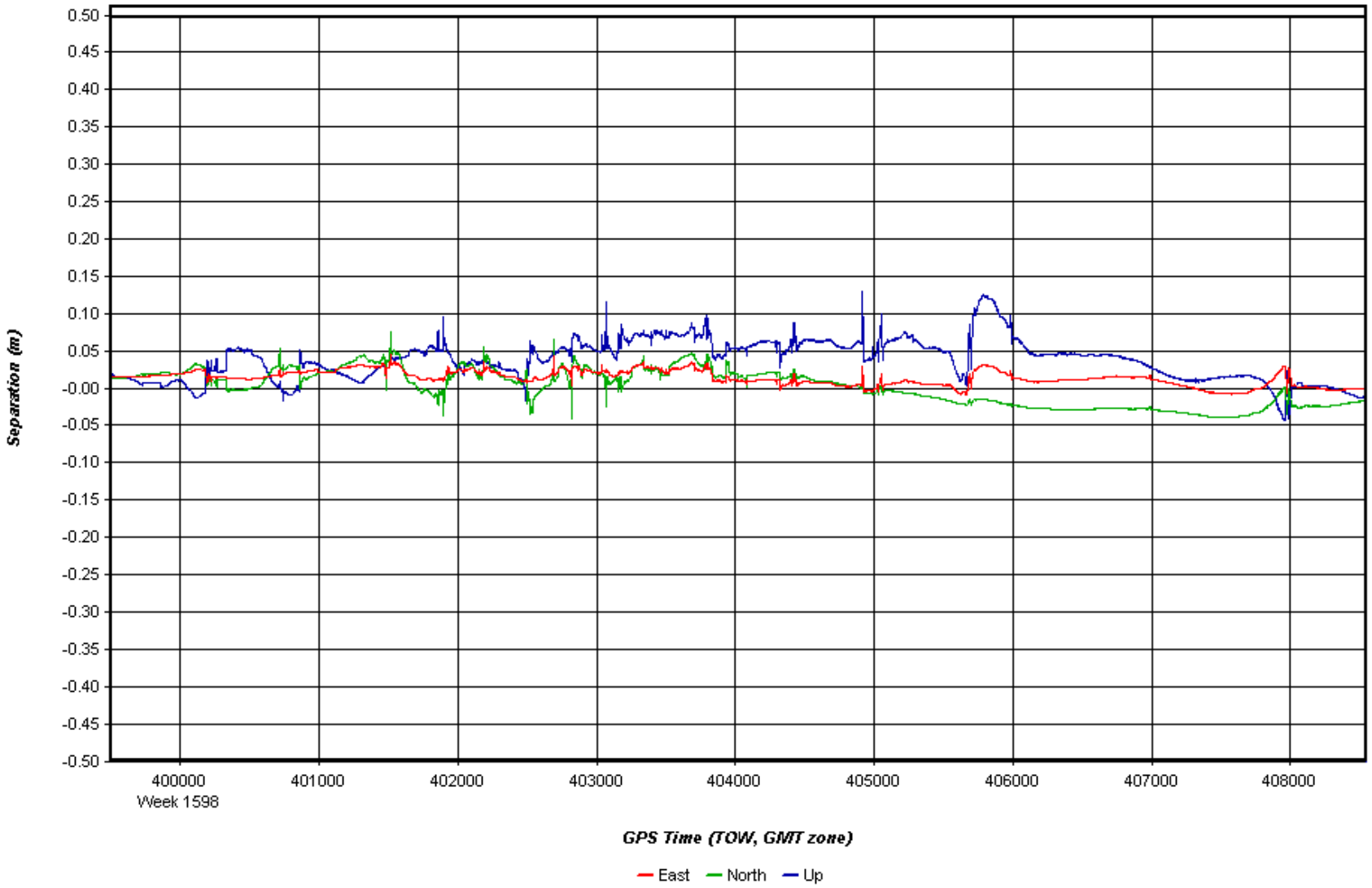
Separation Plot

08-25-10



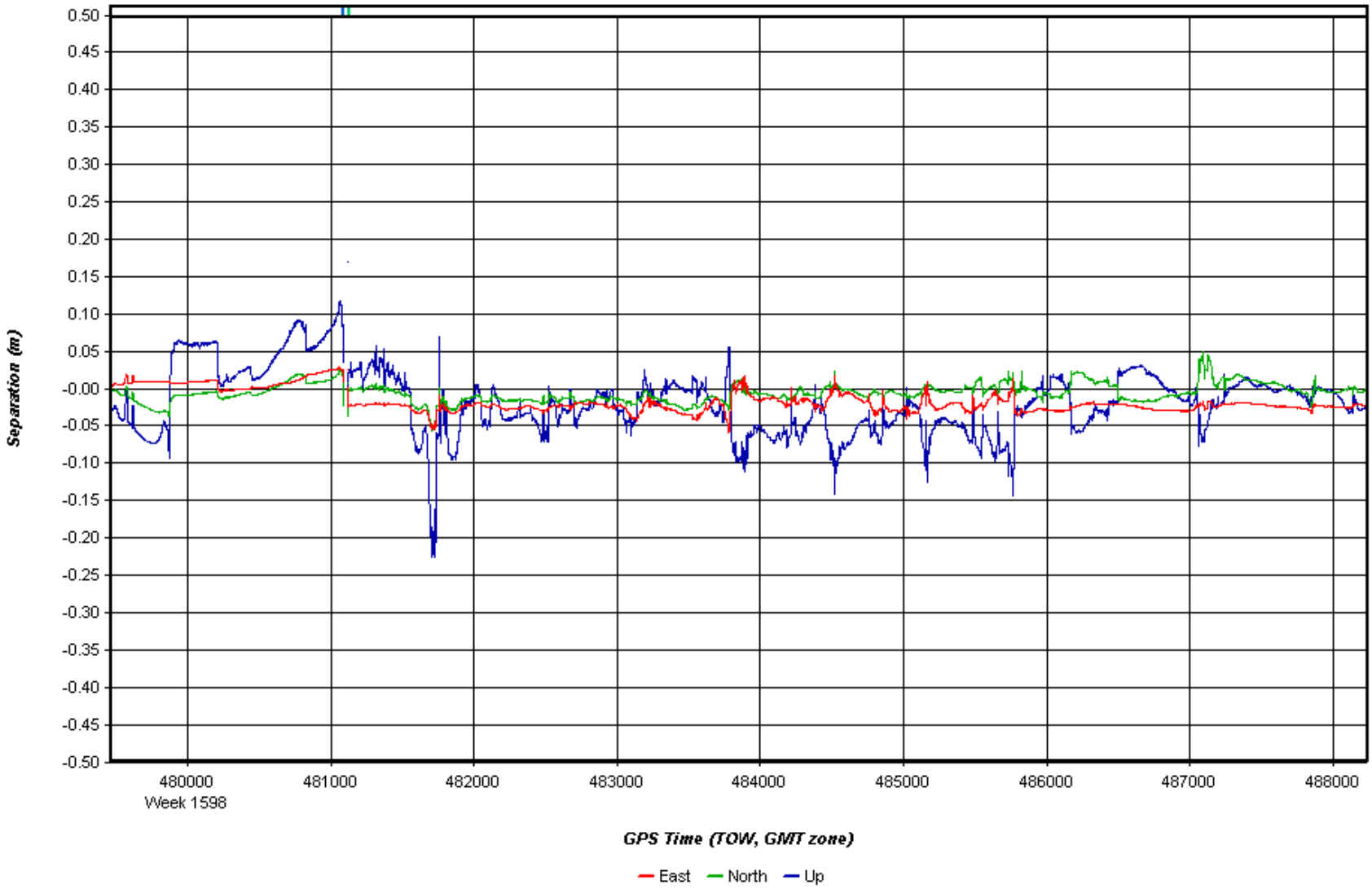
Separation Plot

08-26-10



Separation Plot

08-27-10



R:\1100116\Lidar\QAQC\1100116gnd_UTM13m.txt

Number	Easting	Northing	Known Z	Laser Z	Dz
1	428723.152	4459433.599	2653.569	removed	*
2	429212.687	4457642.824	2658.460	removed	*
3	427301.895	4459834.153	2654.865	2654.910	+0.045
4	431312.763	4455354.030	2570.728	2570.750	+0.022
5	428663.673	4450506.151	2538.600	2538.540	-0.060
6	426244.755	4452852.224	2585.507	2585.500	-0.007
7	424939.954	4454893.278	2778.428	removed	*
8	420374.178	4452771.174	2730.532	2730.510	-0.022
9	424610.627	4451528.620	2620.656	removed	*
10	418873.040	4448990.093	2657.937	2657.890	-0.047
11	423307.270	4447349.014	2533.983	removed	*
12	419661.499	4444458.632	2484.116	removed	*
13	422355.523	4441992.298	2424.812	2424.790	-0.022
14	415354.379	4448002.782	2516.179	removed	*
15	415049.339	4445599.340	2551.416	2551.280	-0.136
16	414580.477	4440217.573	2378.270	removed	*
17	418491.414	4438639.817	2406.766	2406.720	-0.046
18	430455.848	4456072.052	2558.540	removed	*
19	425564.539	4445018.090	2533.210	2533.220	+0.010
20	434421.806	4442386.457	2526.419	2526.500	+0.081
21	430153.223	4442938.063	2556.182	removed	*
22	425949.906	4438486.713	2596.993	removed	*
23	420735.557	4435343.202	2441.981	2441.960	-0.021
24	423798.627	4433870.744	2596.138	removed	*
25	414611.190	4432457.886	2548.843	2548.790	-0.053
26	419819.121	4431618.213	2484.253	removed	*
27	435749.306	4434055.787	3053.915	3053.950	+0.035
28	420811.480	4429493.045	2583.335	removed	*
29	430052.861	4428540.537	2558.681	2558.650	-0.031
30	425787.994	4425994.482	2577.914	removed	*
31	427627.718	4423431.588	2639.133	2639.080	-0.053
32	423178.298	4421177.573	2731.537	2731.510	-0.027
33	426603.500	4419914.274	2695.114	removed	*
34	430173.170	4422237.032	2610.842	removed	*
35	432691.881	4420057.463	2656.175	removed	*
36	428850.108	4419103.305	2707.104	2707.090	-0.014
37	422196.759	4434409.362	2536.779	removed	*
38	432917.474	4421652.749	2740.245	2740.350	+0.105
39	416695.831	4421124.260	3022.970	3022.930	-0.040
40	433006.860	4424064.829	2608.979	2609.020	+0.041
41	428445.169	4376062.238	3688.126	3688.250	+0.124
42	428443.961	4376076.535	3688.249	removed	*

Average dz	-0.005
Minimum dz	-0.136
Maximum dz	+0.124
Average magnitude	0.047
Root mean square	0.059
Std deviation	0.060