

Bloom Lake Railway Article Report Amendment

Janeil Parrott

1. Section 4 – Quebec Labrador Border

The Quebec-Labrador Border is the only border in Canada that has not been physically demarcated in the field. In the process of the interpretation of Quebec-Labrador Border, N. E. Parrott Surveys Ltd. consulted Crown Lands' Dominic Howard and Mines & Energy's Ed Montague and Jim Hinchy. Both Crown Lands and Mines & Energy supplied N. E. Parrott Surveys Ltd. with their interpretations of the Quebec-Labrador Border in hard copy and digital format. As mentioned in my Article Report, field investigations were performed in great depth to produce an interpretation of the Quebec – Labrador boundary. N. E. Parrott Surveys performed topographic surveys covering a vast area of land in the project vicinity to identify the height of land. N. E. Parrott Surveys also observed above water flow directions as well as below ground water sources such as brooks and streams to verify the direction of water flow. After a vast collection of field evidence, we conducted an analysis of all the topographic data, water direction of flow data; streams, underground streams, etc. The electronic boundaries data resulted in an interpretation of the Quebec – Labrador border which concurs with the Provincial interpretation and depiction of the watershed to an accurate degree.

There were no discussions between N. E. Parrott Surveys Ltd. and Quebec jurisdictional authorities during the interpretation of the Quebec-Labrador border due to the political tensions and border issues. The interpretation of the Quebec-Labrador border boundary is N. E. Parrott Surveys Ltd. interpretation, and it is not physically demarcated in the field.

2. Section 6 – Control

In the primary stage of the project, N. E. Parrott Surveys Ltd. performed a single point position static session for 8 hours. The raw static data, rinex files, were forwarded to Natural Resources Canada's (NRCs) Precise Point Positioning (PPP). NRCs PPP returned a CSRS-PPP process summary of the static session, which included a CSRS UTM coordinate for CP1. Utilizing static survey techniques the control network was then densified to approximately every two kilometers. N. E. Parrott Surveys Ltd. processed the static surveys and compared the elevations provided by NRCs PPP process summary. There was a difference in elevation of approximately twenty centimeters between the CSRS PPP and the Federal Control Monuments, which is the normal variance for the Labrador region between CSRS values and published first order control values. N. E. Parrott Surveys Ltd. adjusted the control network by holding fixed the Northing and Easting from PPP and Provincial Control Monuments, and holding fixed the elevation from Federal Control Monuments. MMM Group then proceeded to calculate adjustments on the control network. I have contacted MMM Group to forward all adjustments performed during the Bloom Lake Project. To date I have not received a response. Please refer to the attached Amended Appendix for the CSRS-PPP processing summary, static surveys that N. E. Parrott Surveys Ltd. processed, and an adjustment performed by MMM Group.

Once the control network was in place, I setup two bases simultaneously (each on different monuments). The two bases were set on different radio frequencies; channel 1 and channel 2. The collection of data consisted of 3 measured RTK shots, 9 epochs, utilizing weighted averages for each. After the first collection was completed, the radio frequency was changed and collection of data was performed once again for redundancy purposes, in order to meet the Association of Newfoundland Land Surveyors requirements for utilization of GPS' on legal survey boundaries.

Amended Appendix

CSRS-PPP Processing Summary



CSRS-PPP (V 1.05 03812)



CP-1

| | | |
|-------------------------------------|-------------------------|---|
| Data Start | Data End | Duration of Observations |
| 2008-09-12 12:59:50.000 | 2008-09-12 19:36:10.000 | 6h 36m 20.00s |
| Apri / Aposteriori Phase Std | | Apri / Aposteriori Code Std |
| 0.015m / 0.009m | | 2.0m / 1.687m |
| Observations | Frequency | Mode |
| Phase and Code | L1 and L2 | Static |
| Elevation Cut-Off | Rejected Epochs | Observation & Estimation Steps |
| 10.000 degrees | 0.00 % | 5.00 sec / 5.00 sec |
| Antenna Model | APC to ARP | ARP to Marker |
| TPSHIPER_LS | Ant. not in PPP (0 m) | 1.391 m |

(APC = antenna phase center; ARP = antenna reference point)

Estimated Position for log0256m.08o

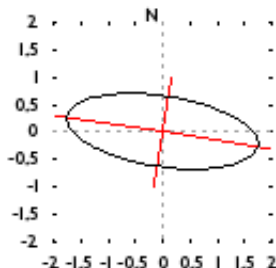
| | Latitude (+n) | Longitude (+e) | Ell. Height |
|----------------------------|----------------------|-----------------------|--------------------|
| NAD83(CSRS) (2008) | 52° 51' 26.9806'' | -67° 14' 36.4315'' | 672.213 m |
| Sigmas(95%) | 0.005 m | 0.014 m | 0.024 m |
| Apriori | 52° 51' 27.035'' | -67° 14' 36.443'' | 670.606 m |
| Estimated - Apriori | -1.689 m | 0.222 m | 1.607 m |

Orthometric Height
CGVD28 (HTv2.0)

693.941 m

(click here for model and accuracy)

95% Error Ellipse (cm)
semi-major: 1.766cm
semi-minor: 0.639cm
semi-major azimuth: 98° 45' 30.01''



UTM (North) Zone 19

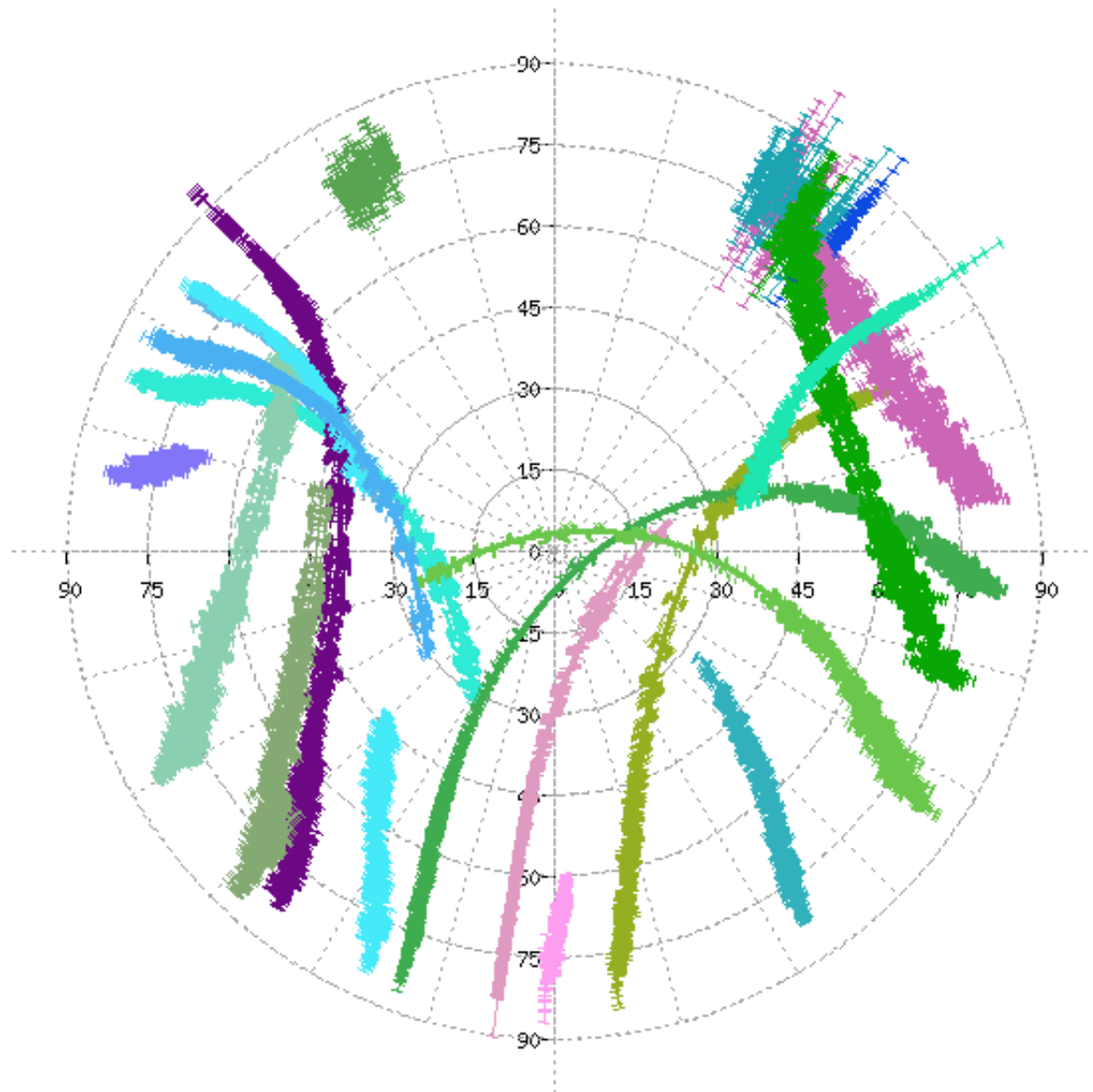
5857863.462m (N) 618265.273m (E)

Scale Factors
0.99977167 (point)
0.99966619 (combined)

(Coordinates from RINEX file used as apriori position)

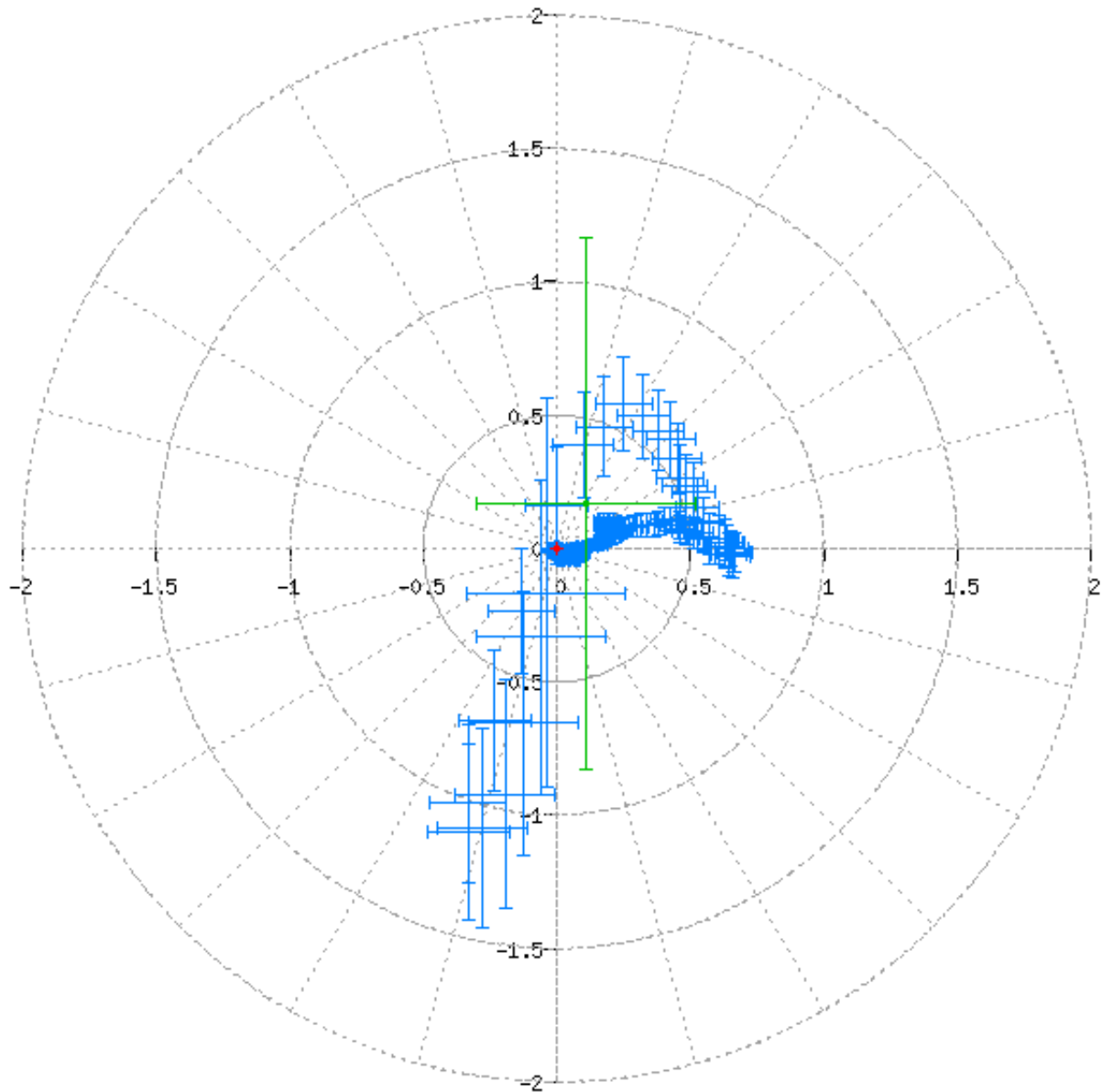
Estimated Parameters & Observations Statistics




Pseudo-Range Residuals Sky Distribution



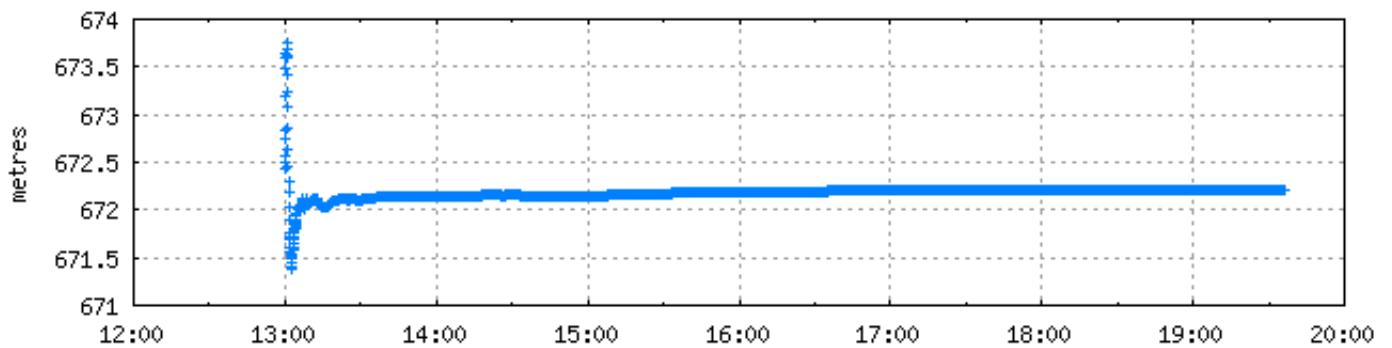
- | | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| PRN06 | PRN11 | PRN14 | PRN20 | PRN24 | PRN28 | PRN31 | PRN32 |
| PRN07 | PRN12 | PRN16 | PRN21 | PRN26 | PRN29 | PRN30 | PRN32 |
| PRN08 | PRN13 | PRN19 | PRN23 | PRN27 | PRN30 | | |

Corrections to a priori position (minus final corrections) (metres)

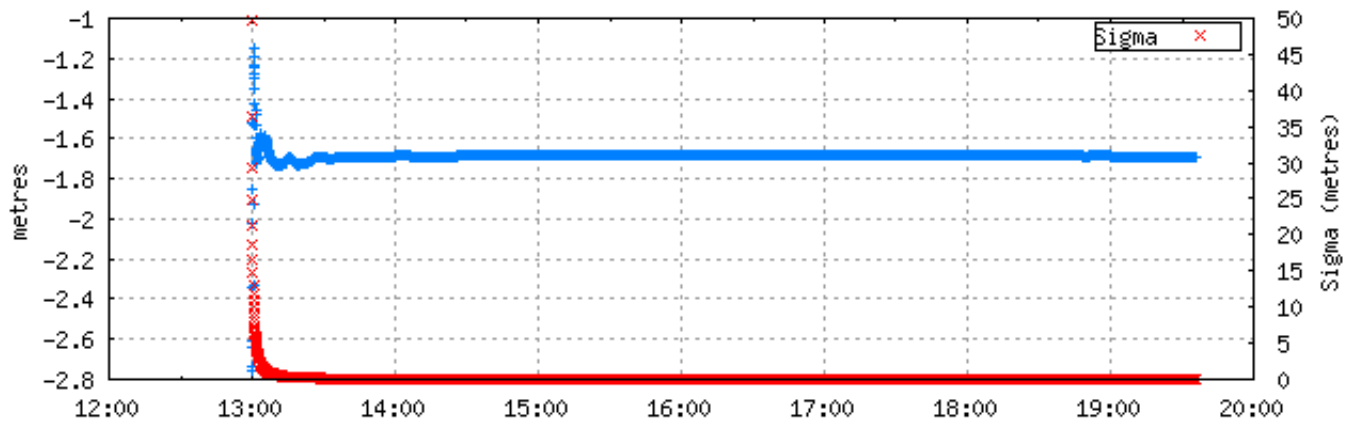


(1 sigma std of position corrections) / 50 
(1 sigma std of initial position correction) / 50 
(1 sigma std of final position correction) / 50 

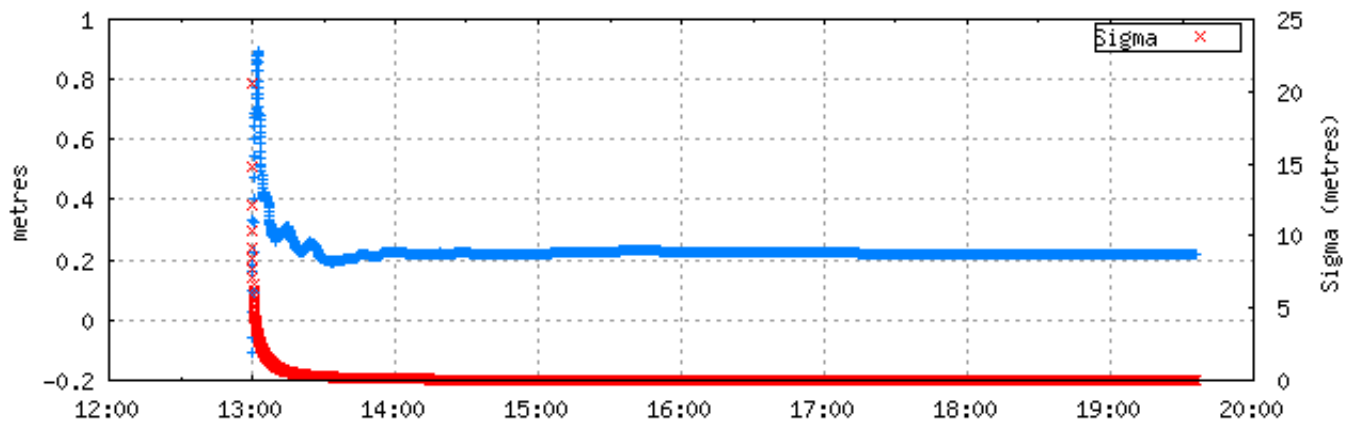
Ellipsoidal Height Profile (2008-09-12 12:59:50.000 GPS)



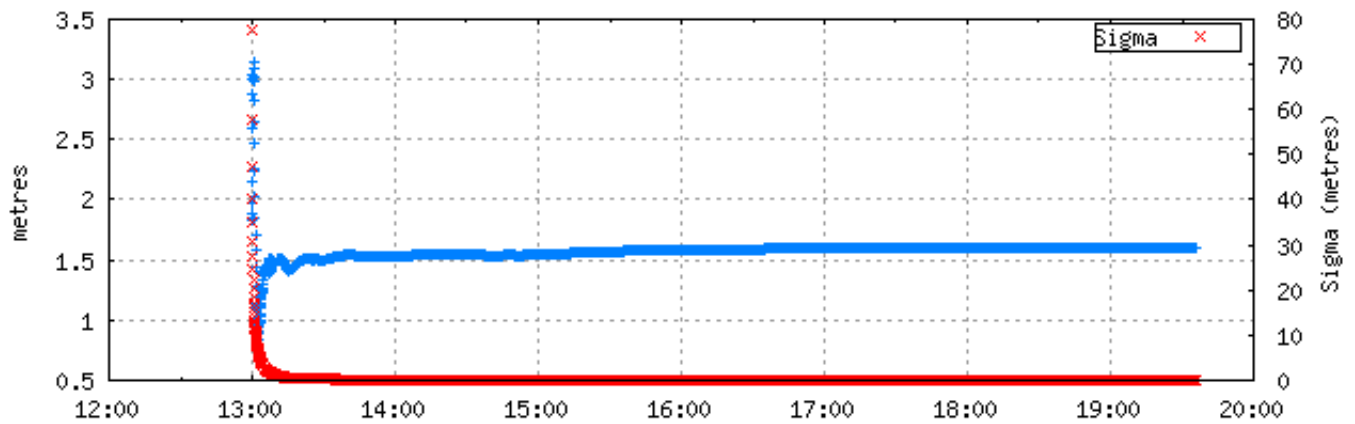
Latitude Differences (2008-09-12 12:59:50.000 GPS)



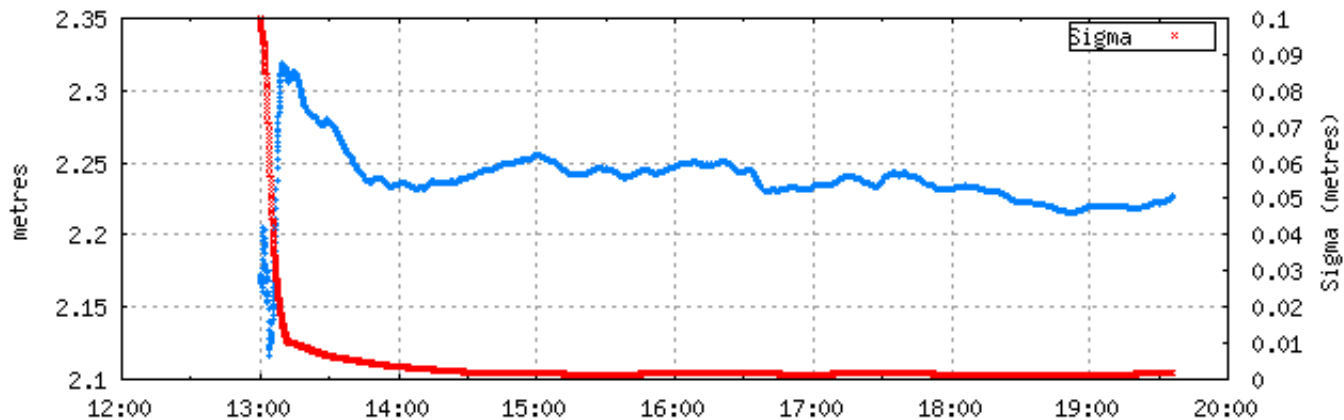
Longitude Differences (2008-09-12 12:59:50.000 GPS)



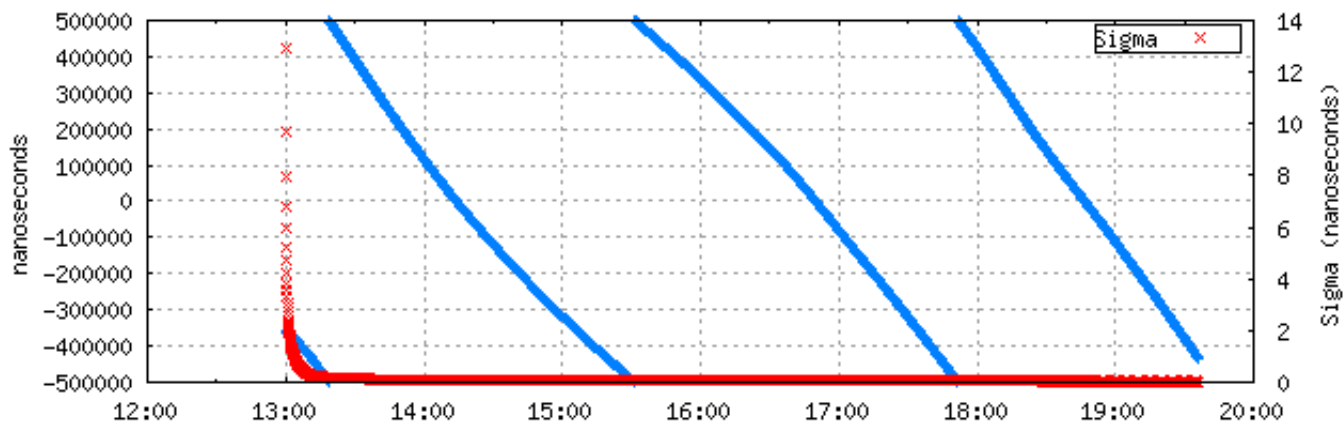
Height Differences (2008-09-12 12:59:50.000 GPS)



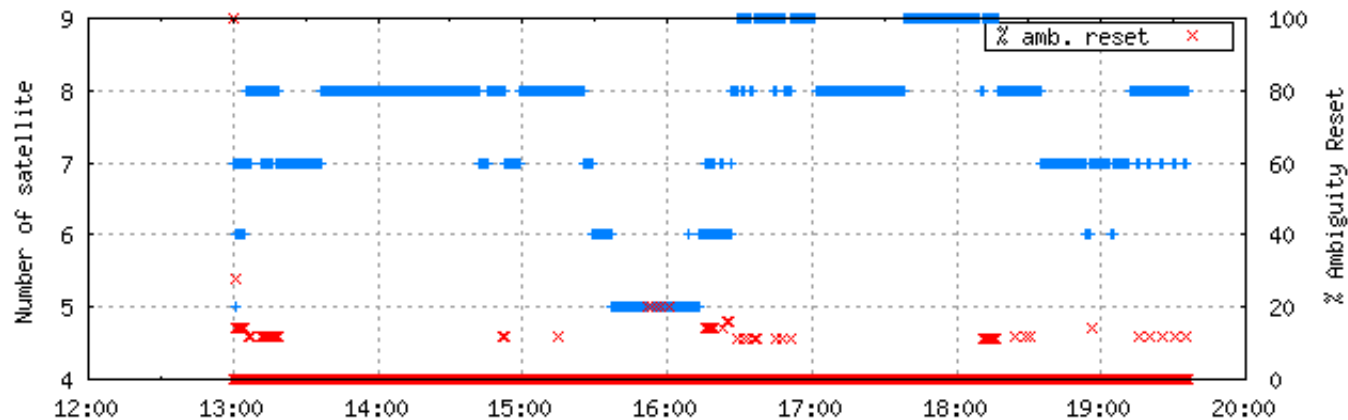
Estimated Tropospheric Zenith Delay (2008-09-12 12:59:50.000 GPS)



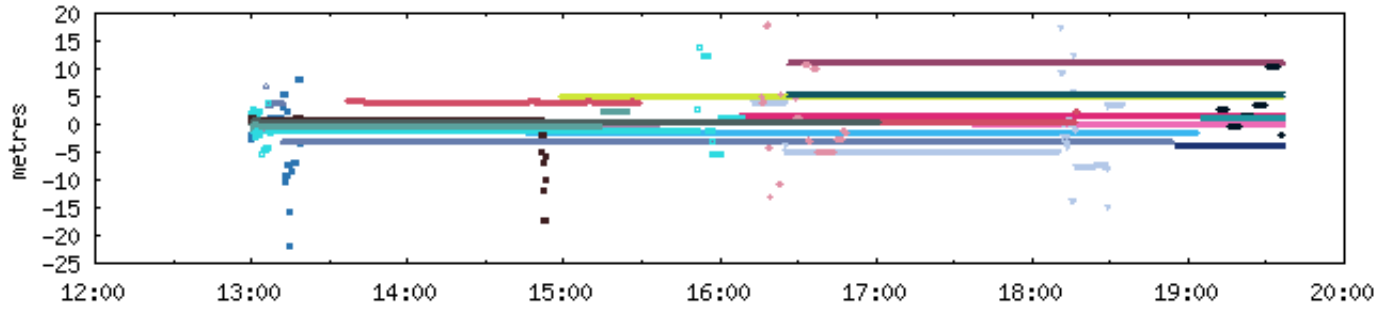
Station Clock Offset (2008-09-12 12:59:50.000 GPS)



Tracked Satellites and Reset Ambiguities (2008-09-12 12:59:50.000 GPS)

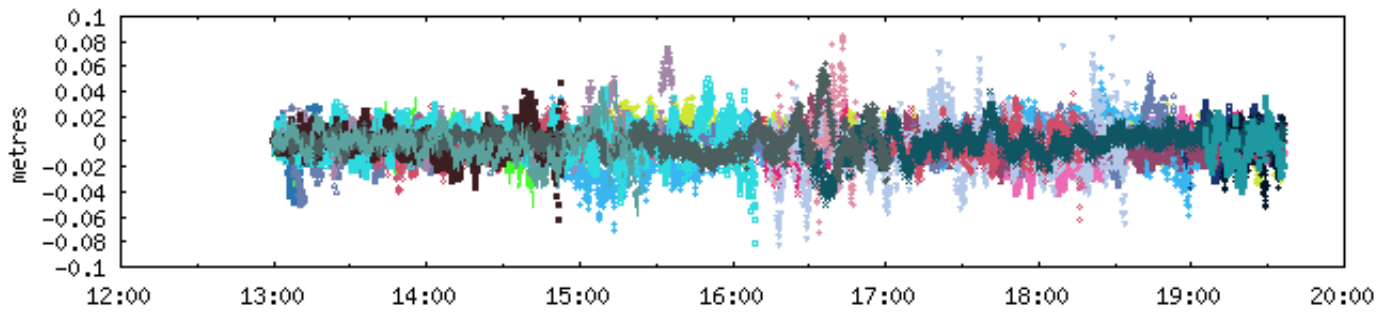


Ambiguities (2008-09-12 12:59:50.000 GPS)



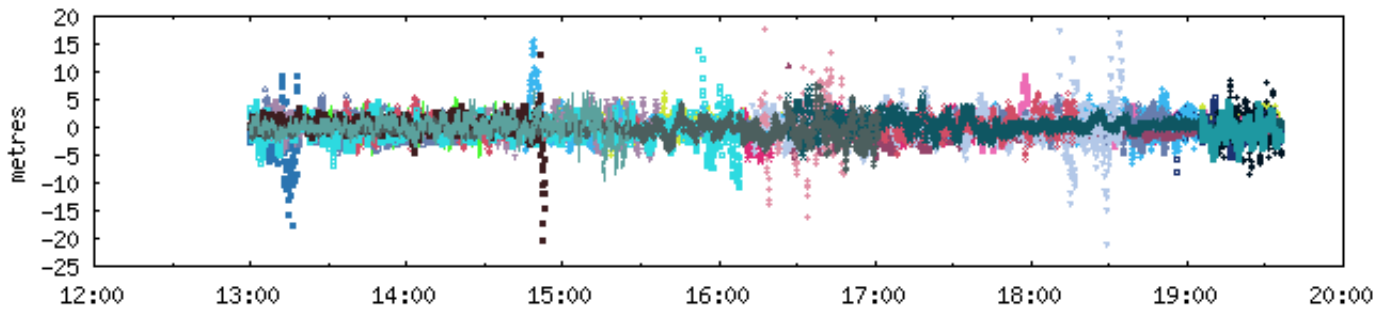
| | | | | | | | | | | | | | |
|-------|---|-------|---|-------|---|-------|---|-------|---|-------|---|-------|---|
| PRN06 | + | PRN11 | ■ | PRN14 | ● | PRN20 | × | PRN24 | + | PRN28 | ■ | PRN31 | + |
| PRN07 | × | PRN12 | ■ | PRN16 | ● | PRN21 | × | PRN26 | + | PRN29 | ■ | PRN32 | + |
| PRN08 | + | PRN13 | ■ | PRN19 | ● | PRN23 | × | PRN27 | × | PRN30 | ■ | | |

Carrier-Phase Residuals (2008-09-12 12:59:50.000 GPS)



| | | | | | | | | | | | | | |
|-------|---|-------|---|-------|---|-------|---|-------|---|-------|---|-------|---|
| PRN06 | + | PRN11 | ■ | PRN14 | ● | PRN20 | × | PRN24 | + | PRN28 | ■ | PRN31 | + |
| PRN07 | × | PRN12 | ■ | PRN16 | ● | PRN21 | × | PRN26 | + | PRN29 | ■ | PRN32 | + |
| PRN08 | + | PRN13 | ■ | PRN19 | ● | PRN23 | × | PRN27 | × | PRN30 | ■ | | |

Pseudo-Range Residuals (2008-09-12 12:59:50.000 GPS)



| | | | | | | | | | | | | | |
|-------|---|-------|---|-------|---|-------|---|-------|---|-------|---|-------|---|
| PRN06 | + | PRN11 | ■ | PRN14 | ● | PRN20 | × | PRN24 | + | PRN28 | ■ | PRN31 | + |
| PRN07 | × | PRN12 | ■ | PRN16 | ● | PRN21 | × | PRN26 | + | PRN29 | ■ | PRN32 | + |
| PRN08 | + | PRN13 | ■ | PRN19 | ● | PRN23 | × | PRN27 | × | PRN30 | ■ | | |

~~~ Disclaimer ~~~

**Natural Resources Canada does not assume any liability deemed to have been caused directly or indirectly by any content of its PPP-On-Line positioning service.**

**If you have any questions, please feel free to contact:**

**Geodetic Survey Division  
Canada Centre for Remote Sensing  
Natural Resources Canada  
Government of Canada  
615 Booth Street, Room 440  
Ottawa, Ontario K1A 0E9  
Phone:613-995-4410 FAX: 613-995-3215  
EMail: [information@geod.nrcan.gc.ca](mailto:information@geod.nrcan.gc.ca)**










Natural Resources  
Canada








Ressources naturelles  
Canada

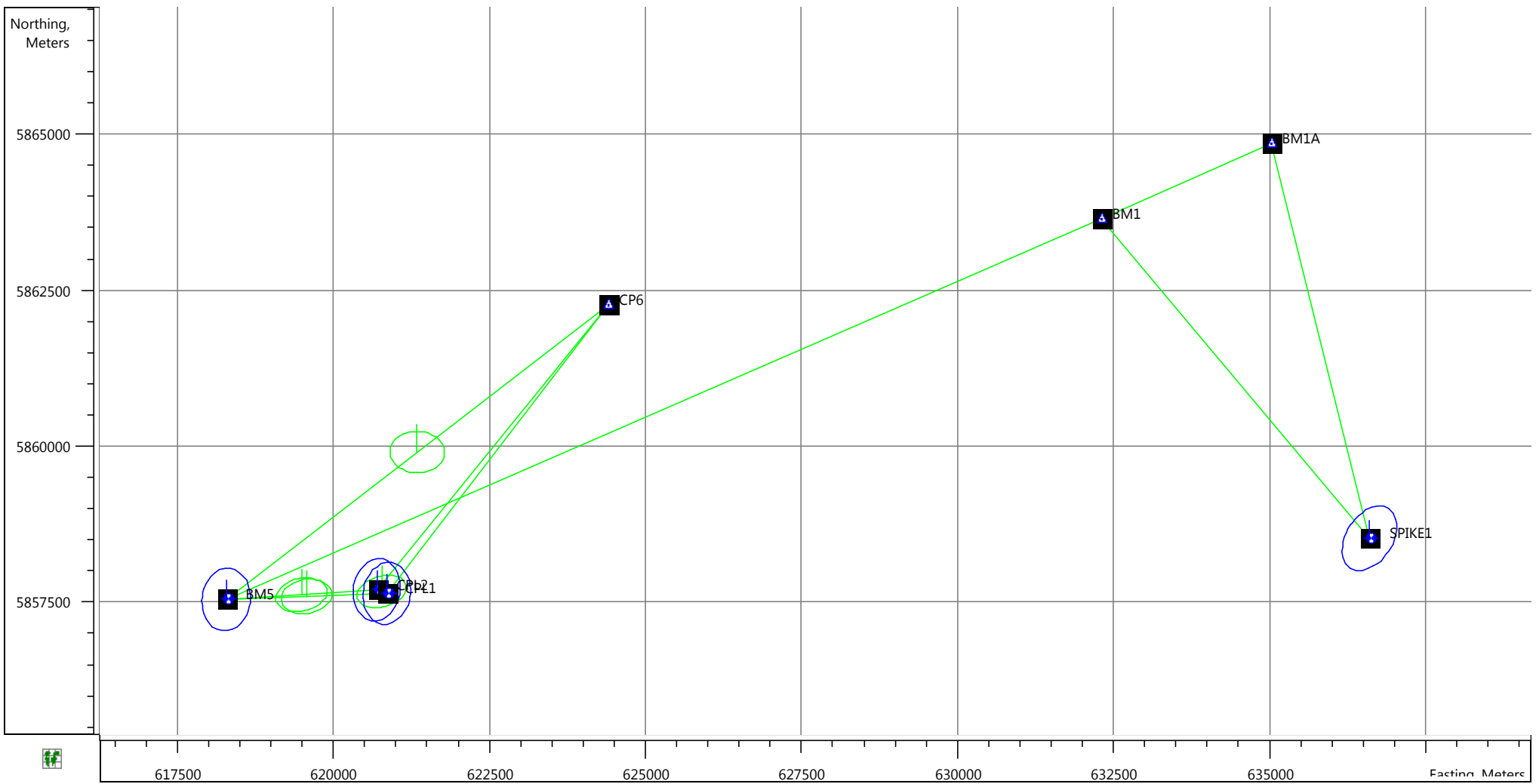
Canada

## Processed Static Files

| Icon                                                                             | Name   | Grid Northing (m) | Grid Easting (m) | Elevation (m) | Std Dev n (m) | Std Dev e (m) | Std Dev u (m) | Std Dev Hz (m) |
|----------------------------------------------------------------------------------|--------|-------------------|------------------|---------------|---------------|---------------|---------------|----------------|
|   | CPL2   | 5857698.519       | 620696.458       | 693.264       | 0.005         | 0.004         | 0.003         | 0.007          |
|  | BM5    | 5857543.419       | 618283.902       | 729.922       | 0.006         | 0.004         | 0.003         | 0.007          |
|  | CP6    | 5862264.803       | 624403.276       | 638.005       | 0.000         | 0.000         | 0.000         | 0.000          |
|  | BM1A   | 5864853.566       | 635025.094       | 590.962       | 0.000         | 0.000         | 0.000         | 0.000          |
|  | BM1    | 5863642.806       | 632310.585       | 558.044       | 0.000         | 0.000         | 0.000         | 0.000          |
|  | CPL1   | 5857643.134       | 620857.942       | 690.304       | 0.005         | 0.004         | 0.003         | 0.007          |
|  | SPIKE1 | 5858524.734       | 636605.051       | 538.352       | 0.008         | 0.007         | 0.005         | 0.011          |




| Icon | Point From | Point To | dN (m)    | dE (m)     | dHt (m) | Solution Type   | AutoReject | Adjustment Status | Duration |
|------|------------|----------|-----------|------------|---------|-----------------|------------|-------------------|----------|
|      | BM5        | CPL2     | 155.099   | 2412.555   | -36.583 | Fixed           | Allowed    | Adjusted          | 01:31:35 |
|      | CP6        | CPL2     | -4566.283 | -3706.818  | 55.168  | Fixed           | Allowed    | Adjusted          | 01:31:35 |
|      | BM5        | CP6      | 4721.384  | 6119.373   | -91.756 | Fixed           | Allowed    | Adjusted          | 02:49:50 |
|      | BM1        | BM5      | -6099.399 | -14026.690 | 171.420 | Fixed,Iono Free | Allowed    | Adjusted          | 00:11:05 |
|      | BM1        | BM1A     | 1210.752  | 2714.494   | 32.993  | Fixed           | Allowed    | Adjusted          | 01:55:25 |
|      | CPL1       | CPL2     | 55.386    | -161.484   | 2.955   | Fixed           | Allowed    | Adjusted          | 01:31:35 |
|      | BM5        | CPL1     | 99.715    | 2574.040   | -39.534 | Fixed           | Allowed    | Adjusted          | 01:57:35 |
|      | CP6        | CPL1     | -4621.669 | -3545.334  | 52.215  | Fixed           | Allowed    | Adjusted          | 01:57:35 |
|      | BM1A       | SPIKE1   | -6328.827 | 1579.965   | -52.538 | Fixed           | Allowed    | Adjusted          | 00:39:20 |
|      | BM1        | SPIKE1   | -5118.076 | 4294.458   | -19.543 | Fixed           | Allowed    | Adjusted          | 00:39:20 |



| Icon                                                                             | Point Name | Antenna Type | Antenna ... | Ant Heig... | Start Time           | Stop Time            | Duration | H RMS (m) | V RMS (m) | NEpoch |
|----------------------------------------------------------------------------------|------------|--------------|-------------|-------------|----------------------|----------------------|----------|-----------|-----------|--------|
|   | CPL2       | HiPer Ga/Gb  | 1.375       | Slant       | 8/7/2009 9:32:40 AM  | 8/7/2009 11:04:15 AM | 01:31:35 | 3.114     | 3.460     | 1099   |
|  | BM5        | HiPer Ga/Gb  | 1.385       | Slant       | 8/7/2009 7:51:40 AM  | 8/7/2009 12:29:55 PM | 04:38:15 | 3.561     | 3.203     | 3339   |
|  | CP6        | HiPer Ga/Gb  | 1.336       | Slant       | 8/7/2009 8:37:00 AM  | 8/7/2009 11:26:50 AM | 02:49:50 | 2.535     | 2.764     | 2038   |
|  | BM1A       | HiPer Ga/Gb  | 2.024       | Slant       | 8/7/2009 12:57:30 PM | 8/7/2009 3:17:15 PM  | 02:19:45 | 1.962     | 1.729     | 1677   |
|  | BM1        | HiPer Ga/Gb  | 1.477       | Slant       | 8/7/2009 12:18:50 PM | 8/7/2009 2:52:55 PM  | 02:34:05 | 2.066     | 1.881     | 1849   |
|  | CPL1       | HiPer Ga/Gb  | 1.478       | Slant       | 8/7/2009 9:21:55 AM  | 8/7/2009 11:19:30 AM | 01:57:35 | 3.349     | 3.207     | 1411   |
|  | SPIKE1     | HiPer+       | 1.334       | Slant       | 8/7/2009 1:12:35 PM  | 8/7/2009 1:51:55 PM  | 00:39:20 | 2.603     | 2.266     | 472    |






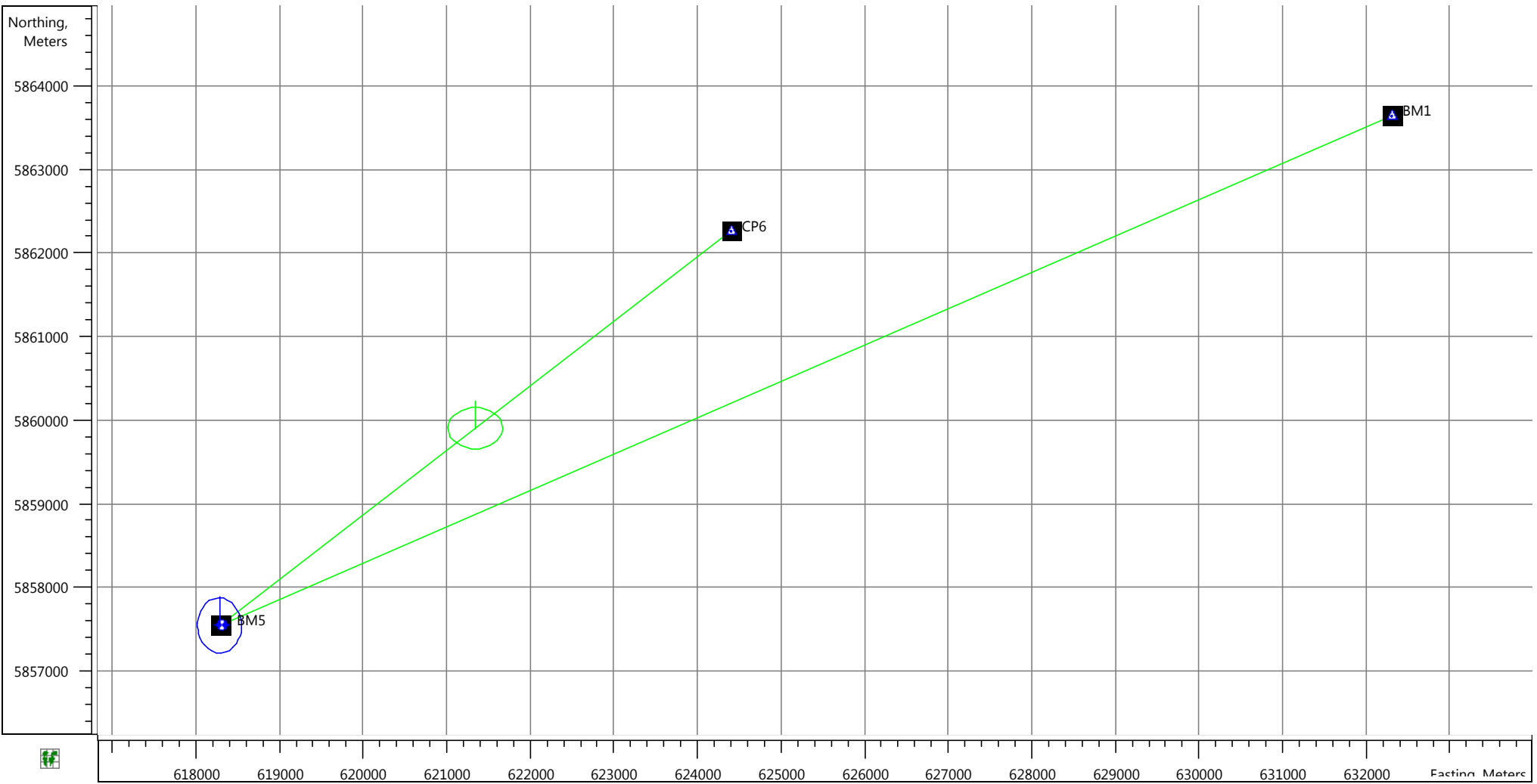
Map View - C:\Users\Roger\Desktop\bloom lake\August 7.ttp






| Icon                                                                             | Name | Grid Northing (m) | Grid Easting (m) | Elevation (m) | Std Dev n (m) | Std Dev e (m) | Std Dev u (m) | Std Dev Hz (m) |
|----------------------------------------------------------------------------------|------|-------------------|------------------|---------------|---------------|---------------|---------------|----------------|
|   | BM5  | 5857543.418       | 618283.902       | 729.925       | 0.002         | 0.002         | 0.008         | 0.003          |
|  | CP6  | 5862264.803       | 624403.276       | 638.005       | 0.000         | 0.000         | 0.000         | 0.000          |
|  | BM1  | 5863642.806       | 632310.585       | 558.044       | 0.000         | 0.000         | 0.000         | 0.000          |




| Icon                                                                             | Point From | Point To | dN (m)    | dE (m)     | dHt (m) | Solution Type   | AutoReject | Adjustment Status | Duration |
|----------------------------------------------------------------------------------|------------|----------|-----------|------------|---------|-----------------|------------|-------------------|----------|
|   | BM5        | CP6      | 4721.384  | 6119.373   | -91.756 | Fixed           | Allowed    | Adjusted          | 02:49:50 |
|  | BM1        | BM5      | -6099.399 | -14026.690 | 171.420 | Fixed,Iono Free | Allowed    | Adjusted          | 00:11:05 |




| Icon                                                                             | Point Name | Antenna Type | Antenna ... | Ant Heig... | Start Time           | Stop Time            | Duration | H RMS (m) | V RMS (m) | NEpoch |
|----------------------------------------------------------------------------------|------------|--------------|-------------|-------------|----------------------|----------------------|----------|-----------|-----------|--------|
|   | BM5        | HiPer Ga/Gb  | 1.385       | Slant       | 8/7/2009 7:51:40 AM  | 8/7/2009 12:29:55 PM | 04:38:15 | 3.561     | 3.203     | 3339   |
|  | CP6        | HiPer Ga/Gb  | 1.336       | Slant       | 8/7/2009 8:37:00 AM  | 8/7/2009 11:26:50 AM | 02:49:50 | 2.535     | 2.764     | 2038   |
|  | BM1        | HiPer Ga/Gb  | 1.477       | Slant       | 8/7/2009 12:18:50 PM | 8/7/2009 2:52:55 PM  | 02:34:05 | 2.066     | 1.881     | 1849   |

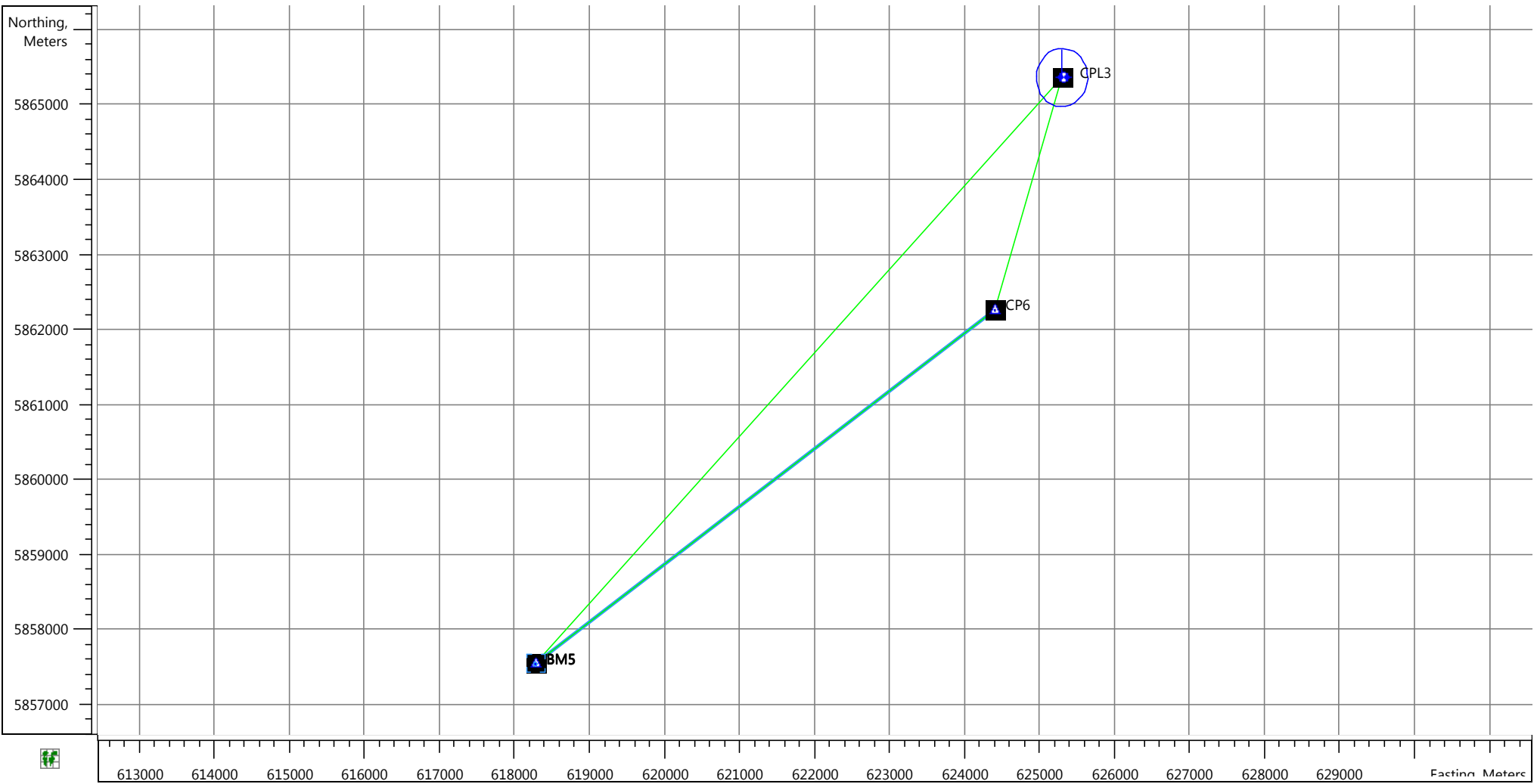


Map View - C:\Users\Roger\Desktop\bloom lake\August 7A.ttp

| Icon                                                                             | Name | Grid Northing (m) | Grid Easting (m) | Elevation (m) | Std Dev n (m) | Std Dev e (m) | Std Dev u (m) | Std Dev Hz (m) |
|----------------------------------------------------------------------------------|------|-------------------|------------------|---------------|---------------|---------------|---------------|----------------|
|   | BM5  | 5857543.419       | 618283.902       | 729.922       | 0.000         | 0.000         | 0.000         | 0.000          |
|  | CP6  | 5862264.803       | 624403.276       | 638.005       | 0.000         | 0.000         | 0.000         | 0.000          |
|  | CPL3 | 5865356.280       | 625302.882       | 600.433       | 0.004         | 0.003         | 0.005         | 0.005          |

| Icon                                                                             | Point From | Point To | dN (m)   | dE (m)   | dHt (m)  | Solution Type   | AutoReject | Adjustment Status | Duration |
|----------------------------------------------------------------------------------|------------|----------|----------|----------|----------|-----------------|------------|-------------------|----------|
|   | BM5        | CP6      | 4721.384 | 6119.383 | -91.763  | Fixed           | Allowed    | Adjusted          | 05:58:50 |
|  | BM5        | CPL3     | 7812.864 | 7018.990 | -129.317 | Fixed,Iono Free | Allowed    | Adjusted          | 04:02:15 |
|  | CP6        | CPL3     | 3091.476 | 899.605  | -37.554  | Fixed           | Allowed    | Adjusted          | 06:22:30 |

| Icon                                                                             | Point Name | Antenna Type | Antenna ... | Ant Heig... | Start Time           | Stop Time            | Duration | H RMS (m) | V RMS (m) | NEpoch |
|----------------------------------------------------------------------------------|------------|--------------|-------------|-------------|----------------------|----------------------|----------|-----------|-----------|--------|
|   | BM5        | HiPer Ga/Gb  | 1.439       | Slant       | 8/18/2009 7:37:15 AM | 8/18/2009 1:46:25 PM | 06:09:10 | 3.537     | 3.032     | 4430   |
|  | CP6        | HiPer Ga/Gb  | 1.246       | Slant       | 8/18/2009 7:47:35 AM | 8/18/2009 5:10:10 PM | 09:22:35 | 2.274     | 2.139     | 6751   |
|  | CPL3       | HiPer Ga/Gb  | 0.979       | Slant       | 8/18/2009 9:44:10 AM | 8/18/2009 4:06:40 PM | 06:22:30 | 2.848     | 2.719     | 4590   |





## **Adjustment Report**

Summary of Files Used and Option Settings  
 =====

Project Folder and Data Files

Project Name BL OCT 12 2009  
 Project Folder C:\DOCUMENTS AND SETTINGS\...\GPS\ADJUSTMENTS  
 Data File List  
 1. Raw Data\control-bl oomlake.txt  
 2. sept 10 2009  
 3. oct 04 2009  
 4. oct 05 2009  
 5. oct 10 2009  
 6. oct 12 2009

Project Option Settings

STAR\*NET Run Mode : Adjust with Error Propagation  
 Type of Adjustment : 3D  
 Project Units : Meters; DMS  
 Coordinate System : UTM; Zone 19  
 Ellipsoid : GRS-80  
 Major Axis; 1 / Flattening : 6378137.000;  
 298.257222101000  
 Geoid Height : -20.9890 (Default, Meters)  
 Longitude Sign Convention : Positive West  
 Input/Output Coordinate Order : North-East  
 Angle Data Station Order : At-From-To  
 Distance/Vertical Data Type : Slope/Zenith  
 Convergence Limit; Max Iterations : 0.001000; 10  
 Default Coefficient of Refraction : 0.070000  
 Create Coordinate File : Yes  
 Create Geodetic Position File : No  
 Create Ground Scale Coordinate File : No  
 Create Dump File : No  
 GPS Vector Standard Error Factors : None  
 GPS Vector Centering (Meters) : 0.00100  
 GPS Vector Transformations : None

Summary of Controlling Stations  
 =====

(Elevations Marked with (\*) are Ellipsoid Heights)

| Fixed Stations Description | N            | E           | Elev      |
|----------------------------|--------------|-------------|-----------|
| 88G4121                    | 5866157.0600 | 643025.1210 | 525.7930* |
| BM5                        | 5857543.4190 | 618283.9020 | 708.1960* |

Adjustment Statistical Summary  
 =====

Iterations = 3  
 Number of Stations = 16  
 Number of Observations = 225  
 Number of Unknowns = 42  
 Number of Redundant Obs = 183

| Observation | Count | Sum Squares of StdRes | Error Factor |
|-------------|-------|-----------------------|--------------|
| GPS Deltas  | 225   | 7792.537              | 6.526        |
| Total       | 225   | 7792.537              | 6.526        |

Warning: The Chi-Square Test at 5.00% Level Exceeded Upper Bound  
 Lower/Upper Bounds (0.898/1.102)

Adjusted Station Information  
 =====

BL Oct 12 2009 con.lst  
Adjusted Coordinates (Meters)

| Station | N            | E           | Elev     | Description |
|---------|--------------|-------------|----------|-------------|
| 88F013  | 5868154.1280 | 640950.0185 | 531.0905 |             |
| 88G4121 | 5866157.0600 | 643025.1210 | 546.7820 |             |
| BM1     | 5863642.8147 | 632310.6014 | 557.7207 |             |
| BM1A    | 5864853.5788 | 635025.0899 | 590.7244 |             |
| BM2     | 5863308.8950 | 632245.7264 | 557.5829 |             |
| BM5     | 5857543.4190 | 618283.9020 | 729.1850 |             |
| BM8A    | 5860048.1503 | 623540.4010 | 635.1048 |             |
| CP13    | 5866045.7020 | 629191.1744 | 575.9494 |             |
| CP16    | 5865634.5141 | 630103.2776 | 572.2464 |             |
| CP6     | 5862264.8186 | 624403.2781 | 637.4112 |             |
| CP7     | 5861907.7375 | 624369.9559 | 640.0404 |             |
| CPL4    | 5865470.2637 | 625580.2036 | 604.6852 |             |
| CPL5    | 5865464.8402 | 626824.3711 | 598.2398 |             |
| M6      | 5865903.3712 | 639777.5016 | 557.1023 |             |
| M7      | 5866020.8432 | 639718.1584 | 557.5254 |             |
| M8      | 5864637.6164 | 641698.3670 | 542.3435 |             |

Adjusted Positions and Ellipsoid Heights (Meters)  
(Average Geoid Height = -20.989 Meters)

| Station | Latitude        | Longitude       | Ellip Ht |
|---------|-----------------|-----------------|----------|
| 88F013  | 52-56-40.133165 | 66-54-08.243768 | 510.1015 |
| 88G4121 | 52-55-33.571927 | 66-52-20.317634 | 525.7930 |
| BM1     | 52-54-22.140093 | 67-01-57.434807 | 536.7317 |
| BM1A    | 52-54-58.869060 | 66-59-30.413446 | 569.7354 |
| BM2     | 52-54-11.397475 | 67-02-01.394489 | 536.5939 |
| BM5     | 52-51-16.613266 | 67-14-35.854066 | 708.1960 |
| BM8A    | 52-52-33.382368 | 67-09-51.545211 | 614.1158 |
| CP13    | 52-55-42.591435 | 67-04-40.872159 | 554.9604 |
| CP16    | 52-55-28.499347 | 67-03-52.646075 | 551.2574 |
| CP6     | 52-53-44.366360 | 67-09-02.362795 | 616.4222 |
| CP7     | 52-53-32.844085 | 67-09-04.636711 | 619.0514 |
| CPL4    | 52-55-27.062312 | 67-07-54.953630 | 583.6962 |
| CPL5    | 52-55-25.834515 | 67-06-48.373072 | 577.2508 |
| M6      | 52-55-28.445353 | 66-55-14.510060 | 536.1133 |
| M7      | 52-55-32.300103 | 66-55-17.503746 | 536.5364 |
| M8      | 52-54-45.698376 | 66-53-33.705960 | 521.3545 |

Convergence Angles (DMS) and Grid Factors at Stations  
(Grid Azimuth = Geodetic Azimuth - Convergence)  
(Elevation Factor Includes a -20.99 Meter Geoid Height Correction)

| Station           | Convergence Angle | Scale      | x | Elevation  | = | Combined   |
|-------------------|-------------------|------------|---|------------|---|------------|
| 88F013            | 1-40-27.68        | 0.99984384 |   | 0.99992010 |   | 0.99976396 |
| 88G4121           | 1-41-52.36        | 0.99985108 |   | 0.99991765 |   | 0.99976873 |
| BM1               | 1-34-10.21        | 0.99981487 |   | 0.99991593 |   | 0.99973081 |
| BM1A              | 1-36-08.31        | 0.99982377 |   | 0.99991076 |   | 0.99973455 |
| BM2               | 1-34-06.83        | 0.99981466 |   | 0.99991595 |   | 0.99973063 |
| BM5               | 1-24-01.59        | 0.99977172 |   | 0.99988908 |   | 0.99966083 |
| BM8A              | 1-27-49.78        | 0.99978733 |   | 0.99990381 |   | 0.99969116 |
| CP13              | 1-32-01.42        | 0.99980485 |   | 0.99991308 |   | 0.99971795 |
| CP16              | 1-32-39.63        | 0.99980776 |   | 0.99991366 |   | 0.99972143 |
| CP6               | 1-28-30.40        | 0.99978995 |   | 0.99990345 |   | 0.99969342 |
| CP7               | 1-28-28.36        | 0.99978985 |   | 0.99990304 |   | 0.99969291 |
| CPL4              | 1-29-26.20        | 0.99979356 |   | 0.99990858 |   | 0.99970216 |
| CPL5              | 1-30-19.31        | 0.99979742 |   | 0.99990959 |   | 0.99970702 |
| M6                | 1-39-33.20        | 0.99983980 |   | 0.99991603 |   | 0.99975585 |
| M7                | 1-39-30.90        | 0.99983960 |   | 0.99991596 |   | 0.99975558 |
| M8                | 1-40-52.72        | 0.99984644 |   | 0.99991834 |   | 0.99976479 |
| Project Averages: | 1-33-44.93        | 0.99981353 |   | 0.99991094 |   | 0.99972449 |

Adjusted Observations and Residuals  
=====

Adjusted GPS Vector Observations (Meters)

| From                                          | Component | Adj Value | Residual | StdErr |
|-----------------------------------------------|-----------|-----------|----------|--------|
| StdRes                                        |           |           |          |        |
| To                                            |           |           |          |        |
| (V4670 sept 10 2009. asc 10.09.2009 11:59:40) |           |           |          |        |
| 88G4121                                       | Delta-N   | 2058.1605 | 0.0061   | 0.0014 |
| 4.3*                                          |           |           |          |        |

|                                               |          | BL Oct 12 2009 con.1st |         |        |
|-----------------------------------------------|----------|------------------------|---------|--------|
| 88F013                                        | Del ta-E | -2015.4809             | -0.0028 | 0.0014 |
| 2.0                                           |          |                        |         |        |
|                                               | Del ta-U | -16.3414               | 0.0154  | 0.0015 |
| 10.6*                                         |          |                        |         |        |
|                                               | Length   | 2880.7039              |         |        |
| (V4671 sept 10 2009. asc 10.09.2009 11:22:35) |          |                        |         |        |
| 88F013                                        | Del ta-N | -4258.1043             | -0.0060 | 0.0014 |
| 4.3*                                          |          |                        |         |        |
| BM1                                           | Del ta-E | -8769.7419             | 0.0181  | 0.0014 |
| 12.7*                                         |          |                        |         |        |
|                                               | Del ta-U | 19.1928                | -0.0015 | 0.0014 |
| 1.0                                           |          |                        |         |        |
|                                               | Length   | 9748.8560              |         |        |
| (V4672 sept 10 2009. asc 10.09.2009 11:22:35) |          |                        |         |        |
| BM1A                                          | Del ta-N | -1134.6943             | 0.0000  | 0.0014 |
| 0.0                                           |          |                        |         |        |
| BM1                                           | Del ta-E | -2748.0073             | 0.0123  | 0.0014 |
| 8.7*                                          |          |                        |         |        |
|                                               | Del ta-U | -33.6953               | 0.0029  | 0.0014 |
| 2.0                                           |          |                        |         |        |
|                                               | Length   | 2973.2492              |         |        |
| (V4673 sept 10 2009. asc 10.09.2009 11:22:35) |          |                        |         |        |
| CP6                                           | Del ta-N | 1174.2973              | -0.0068 | 0.0014 |
| 4.8*                                          |          |                        |         |        |
| BM1                                           | Del ta-E | 7942.4138              | 0.0121  | 0.0014 |
| 8.5*                                          |          |                        |         |        |
|                                               | Del ta-U | -84.7329               | 0.0018  | 0.0014 |
| 1.2                                           |          |                        |         |        |
|                                               | Length   | 8029.2023              |         |        |
| (V4674 sept 10 2009. asc 10.09.2009 11:59:40) |          |                        |         |        |
| 88G4121                                       | Del ta-N | -2196.2760             | 0.0000  | 0.0014 |
| 0.0                                           |          |                        |         |        |
| BM1                                           | Del ta-E | -10787.0057            | 0.0151  | 0.0014 |
| 10.7*                                         |          |                        |         |        |
|                                               | Del ta-U | 1.4589                 | 0.0108  | 0.0014 |
| 7.5*                                          |          |                        |         |        |
|                                               | Length   | 11008.3206             |         |        |
| (V4675 sept 10 2009. asc 10.09.2009 08:29:30) |          |                        |         |        |
| 88F013                                        | Del ta-N | -3126.8529             | -0.0081 | 0.0014 |
| 5.7*                                          |          |                        |         |        |
| BM1A                                          | Del ta-E | -6020.3558             | 0.0041  | 0.0014 |
| 2.9                                           |          |                        |         |        |
|                                               | Del ta-U | 56.0322                | -0.0010 | 0.0014 |
| 0.7                                           |          |                        |         |        |
|                                               | Length   | 6784.1752              |         |        |
| (V4676 sept 10 2009. asc 10.09.2009 11:59:40) |          |                        |         |        |
| 88G4121                                       | Del ta-N | -1066.1606             | 0.0005  | 0.0014 |
| 0.4                                           |          |                        |         |        |
| BM1A                                          | Del ta-E | -8037.1592             | 0.0043  | 0.0014 |
| 3.0*                                          |          |                        |         |        |
|                                               | Del ta-U | 38.8006                | 0.0106  | 0.0014 |
| 7.5*                                          |          |                        |         |        |
|                                               | Length   | 8107.6589              |         |        |
| (V4677 sept 10 2009. asc 10.09.2009 14:38:40) |          |                        |         |        |
| 88G4121                                       | Del ta-N | -2528.2168             | 0.0025  | 0.0014 |
| 1.7                                           |          |                        |         |        |
| BM2                                           | Del ta-E | -10861.7627            | 0.0029  | 0.0014 |
| 2.0                                           |          |                        |         |        |
|                                               | Del ta-U | 1.0715                 | 0.0025  | 0.0014 |
| 1.7                                           |          |                        |         |        |
|                                               | Length   | 11152.1195             |         |        |
| (V4678 sept 10 2009. asc 10.09.2009 14:38:40) |          |                        |         |        |
| BM1A                                          | Del ta-N | -1466.7592             | 0.0027  | 0.0014 |
| 1.9                                           |          |                        |         |        |
| BM2                                           | Del ta-E | -2822.2124             | -0.0019 | 0.0014 |
| 1.3                                           |          |                        |         |        |
|                                               | Del ta-U | -33.9332               | -0.0082 | 0.0014 |
| 5.8*                                          |          |                        |         |        |
|                                               | Length   | 3180.7887              |         |        |
| (V4679 sept 10 2009. asc 10.09.2009 14:38:40) |          |                        |         |        |
| CP6                                           | Del ta-N | 842.0691               | -0.0049 | 0.0014 |
| 3.5*                                          |          |                        |         |        |
| BM2                                           | Del ta-E | 7868.9431              | 0.0004  | 0.0014 |
| 0.3                                           |          |                        |         |        |
|                                               | Del ta-U | -84.7273               | 0.0013  | 0.0014 |
| 0.9                                           |          |                        |         |        |

|         |              |                 |             |         |        |
|---------|--------------|-----------------|-------------|---------|--------|
|         |              | Length          | 7914.3240   |         |        |
| (V4680  | sept 10 2009 | .asc 10.09.2009 | 08:06:45)   |         |        |
| BM1A    |              | Del ta-N        | -2291.4499  | 0.0081  | 0.0014 |
| 5.7*    |              |                 |             |         |        |
| CP6     |              | Del ta-E        | -10693.1292 | -0.0011 | 0.0014 |
| 0.8     |              |                 |             |         |        |
|         |              | Del ta-U        | 37.3315     | -0.0033 | 0.0014 |
| 2.3     |              |                 |             |         |        |
|         |              | Length          | 10935.9566  |         |        |
| (V4681  | sept 10 2009 | .asc 10.09.2009 | 08:29:30)   |         |        |
| 88F013  |              | Del ta-N        | -5404.9901  | 0.0001  | 0.0014 |
| 0.1     |              |                 |             |         |        |
| CP6     |              | Del ta-E        | -16716.3623 | 0.0040  | 0.0014 |
| 2.8     |              |                 |             |         |        |
|         |              | Del ta-U        | 82.1730     | 0.0083  | 0.0015 |
| 5.6*    |              |                 |             |         |        |
|         |              | Length          | 17568.6494  |         |        |
| (V4682  | sept 10 2009 | .asc 10.09.2009 | 11:59:40)   |         |        |
| 88G4121 |              | Del ta-N        | -3339.8237  | 0.0135  | 0.0014 |
| 9.5*    |              |                 |             |         |        |
| CP6     |              | Del ta-E        | -18734.1238 | -0.0004 | 0.0014 |
| 0.3     |              |                 |             |         |        |
|         |              | Del ta-U        | 62.3025     | 0.0151  | 0.0015 |
| 10.4*   |              |                 |             |         |        |
|         |              | Length          | 19029.6006  |         |        |
| (V4683  | sept 10 2009 | .asc 10.09.2009 | 15:00:05)   |         |        |
| 88G4121 |              | Del ta-N        | -3695.8720  | 0.0030  | 0.0014 |
| 2.1     |              |                 |             |         |        |
| CP7     |              | Del ta-E        | -18778.0273 | 0.0028  | 0.0014 |
| 1.9     |              |                 |             |         |        |
|         |              | Del ta-U        | 64.6064     | 0.0028  | 0.0015 |
| 1.9     |              |                 |             |         |        |
|         |              | Length          | 19138.3895  |         |        |
| (V4684  | sept 10 2009 | .asc 10.09.2009 | 15:00:05)   |         |        |
| BM1A    |              | Del ta-N        | -2647.5702  | 0.0016  | 0.0014 |
| 1.1     |              |                 |             |         |        |
| CP7     |              | Del ta-E        | -10736.4373 | -0.0027 | 0.0014 |
| 1.9     |              |                 |             |         |        |
|         |              | Del ta-U        | 39.7501     | -0.0083 | 0.0014 |
| 5.8*    |              |                 |             |         |        |
|         |              | Length          | 11058.1325  |         |        |
| (V4686  | sept 10 2009 | .asc 10.09.2009 | 15:00:05)   |         |        |
| BM2     |              | Del ta-N        | -1185.4145  | -0.0015 | 0.0014 |
| 1.1     |              |                 |             |         |        |
| CP7     |              | Del ta-E        | -7913.5008  | 0.0002  | 0.0014 |
| 0.2     |              |                 |             |         |        |
|         |              | Del ta-U        | 77.4490     | 0.0001  | 0.0014 |
| 0.1     |              |                 |             |         |        |
|         |              | Length          | 8002.1685   |         |        |
| (V4687  | sept 10 2009 | .asc 10.09.2009 | 15:02:30)   |         |        |
| 88G4121 |              | Del ta-N        | 298.6548    | 0.0053  | 0.0014 |
| 3.7*    |              |                 |             |         |        |
| CP13    |              | Del ta-E        | -13834.7480 | 0.0033  | 0.0014 |
| 2.3     |              |                 |             |         |        |
|         |              | Del ta-U        | 14.1893     | 0.0006  | 0.0015 |
| 0.4     |              |                 |             |         |        |
|         |              | Length          | 13837.9785  |         |        |
| (V4688  | sept 10 2009 | .asc 10.09.2009 | 15:02:30)   |         |        |
| BM1A    |              | Del ta-N        | 1355.1653   | 0.0049  | 0.0014 |
| 3.5*    |              |                 |             |         |        |
| CP13    |              | Del ta-E        | -5799.8777  | -0.0009 | 0.0014 |
| 0.7     |              |                 |             |         |        |
|         |              | Del ta-U        | -17.5501    | -0.0118 | 0.0015 |
| 8.1*    |              |                 |             |         |        |
|         |              | Length          | 5956.1197   |         |        |
| (V4689  | sept 10 2009 | .asc 10.09.2009 | 15:02:30)   |         |        |
| CP6     |              | Del ta-N        | 3657.4074   | -0.0028 | 0.0014 |
| 2.0     |              |                 |             |         |        |
| CP13    |              | Del ta-E        | 4885.0743   | 0.0014  | 0.0014 |
| 1.0     |              |                 |             |         |        |
|         |              | Del ta-U        | -64.3773    | -0.0012 | 0.0015 |
| 0.8     |              |                 |             |         |        |
|         |              | Length          | 6102.8456   |         |        |
| (V4690  | sept 10 2009 | .asc 10.09.2009 | 15:02:30)   |         |        |
| BM2     |              | Del ta-N        | 2820.1892   | 0.0018  | 0.0014 |
| 1.2     |              |                 |             |         |        |

|                      |                          | BL Oct 12 2009 con.lst |         |        |
|----------------------|--------------------------|------------------------|---------|--------|
| CP13                 | Del ta-E                 | -2979.3051             | 0.0012  | 0.0014 |
| 0.8                  |                          |                        |         |        |
|                      | Del ta-U                 | 17.0487                | -0.0047 | 0.0015 |
| 3.2*                 |                          |                        |         |        |
|                      | Length                   | 4102.4404              |         |        |
| (V4691 sept 10 2009. | asc 10.09.2009 15:02:30) |                        |         |        |
| CP7                  | Del ta-N                 | 4013.6614              | 0.0031  | 0.0014 |
| 2.1                  |                          |                        |         |        |
| CP13                 | Del ta-E                 | 4927.5547              | 0.0003  | 0.0014 |
| 0.2                  |                          |                        |         |        |
|                      | Del ta-U                 | -67.2533               | -0.0059 | 0.0015 |
| 4.1*                 |                          |                        |         |        |
|                      | Length                   | 6355.6901              |         |        |
| (V4692 oct 04 2009.  | asc 04.10.2009 09:00:45) |                        |         |        |
| 88G4121              | Del ta-N                 | -157.3919              | 0.0041  | 0.0014 |
| 2.9                  |                          |                        |         |        |
| M6                   | Del ta-E                 | -3254.4860             | -0.0027 | 0.0014 |
| 1.9                  |                          |                        |         |        |
|                      | Del ta-U                 | 9.4899                 | 0.0071  | 0.0014 |
| 5.0*                 |                          |                        |         |        |
|                      | Length                   | 3258.3034              |         |        |
| (V4693 oct 04 2009.  | asc 04.10.2009 13:30:00) |                        |         |        |
| 88G4121              | Del ta-N                 | -157.3919              | 0.0056  | 0.0014 |
| 3.9*                 |                          |                        |         |        |
| M6                   | Del ta-E                 | -3254.4860             | -0.0028 | 0.0014 |
| 2.0                  |                          |                        |         |        |
|                      | Del ta-U                 | 9.4899                 | 0.0107  | 0.0014 |
| 7.5*                 |                          |                        |         |        |
|                      | Length                   | 3258.3034              |         |        |
| (V4694 oct 04 2009.  | asc 04.10.2009 08:18:05) |                        |         |        |
| M6                   | Del ta-N                 | 119.1702               | 0.0017  | 0.0014 |
| 1.2                  |                          |                        |         |        |
| M7                   | Del ta-E                 | -55.9305               | -0.0029 | 0.0014 |
| 2.1                  |                          |                        |         |        |
|                      | Del ta-U                 | 0.4217                 | 0.0079  | 0.0014 |
| 5.5*                 |                          |                        |         |        |
|                      | Length                   | 131.6432               |         |        |
| (V4695 oct 04 2009.  | asc 04.10.2009 09:00:45) |                        |         |        |
| 88G4121              | Del ta-N                 | -38.1841               | 0.0060  | 0.0014 |
| 4.2*                 |                          |                        |         |        |
| M7                   | Del ta-E                 | -3310.3364             | -0.0057 | 0.0014 |
| 4.0*                 |                          |                        |         |        |
|                      | Del ta-U                 | 9.8861                 | 0.0149  | 0.0014 |
| 10.4*                |                          |                        |         |        |
|                      | Length                   | 3310.5714              |         |        |
| (V4696 oct 04 2009.  | asc 04.10.2009 11:59:05) |                        |         |        |
| 88G4121              | Del ta-N                 | -1479.8142             | 0.0089  | 0.0014 |
| 6.3*                 |                          |                        |         |        |
| M8                   | Del ta-E                 | -1371.5068             | -0.0011 | 0.0014 |
| 0.8                  |                          |                        |         |        |
|                      | Del ta-U                 | -4.7573                | 0.0097  | 0.0014 |
| 6.8*                 |                          |                        |         |        |
|                      | Length                   | 2017.6480              |         |        |
| (V4697 oct 04 2009.  | asc 04.10.2009 13:30:00) |                        |         |        |
| M6                   | Del ta-N                 | -1321.1536             | 0.0032  | 0.0014 |
| 2.3                  |                          |                        |         |        |
| M8                   | Del ta-E                 | 1883.8623              | 0.0022  | 0.0014 |
| 1.6                  |                          |                        |         |        |
|                      | Del ta-U                 | -15.1733               | -0.0004 | 0.0014 |
| 0.3                  |                          |                        |         |        |
|                      | Length                   | 2301.0029              |         |        |
| (V4698 oct 05 2009.  | asc 05.10.2009 09:37:45) |                        |         |        |
| BM1A                 | Del ta-N                 | -2291.4499             | -0.0004 | 0.0014 |
| 0.3                  |                          |                        |         |        |
| CP6                  | Del ta-E                 | -10693.1292            | 0.0020  | 0.0014 |
| 1.4                  |                          |                        |         |        |
|                      | Del ta-U                 | 37.3315                | 0.0093  | 0.0014 |
| 6.6*                 |                          |                        |         |        |
|                      | Length                   | 10935.9566             |         |        |
| (V4699 oct 05 2009.  | asc 05.10.2009 09:39:10) |                        |         |        |
| M6                   | Del ta-N                 | -3192.8597             | 0.0012  | 0.0014 |
| 0.8                  |                          |                        |         |        |
| CP6                  | Del ta-E                 | -15477.4611            | -0.0039 | 0.0014 |
| 2.8                  |                          |                        |         |        |
|                      | Del ta-U                 | 60.7723                | 0.0095  | 0.0014 |
| 6.6*                 |                          |                        |         |        |

|        |              |                  |             |                       |              |                  |
|--------|--------------|------------------|-------------|-----------------------|--------------|------------------|
| (V4700 | oct 05 2009. | asc 05. 10. 2009 | 08: 38: 25) | Length<br>15803. 4759 |              |                  |
| BM1A   |              |                  |             | Del ta-N              | 918. 5081    | -0. 0044 0. 0014 |
| 3. 1*  |              |                  |             |                       |              |                  |
| CP16   |              |                  |             | Del ta-E              | -4899. 3750  | 0. 0004 0. 0014  |
| 0. 3   |              |                  |             |                       |              |                  |
|        |              |                  |             | Del ta-U              | -20. 4217    | 0. 0060 0. 0014  |
| 4. 2*  |              |                  |             |                       |              |                  |
| (V4701 | oct 05 2009. | asc 05. 10. 2009 | 09: 37: 45) | Length<br>4984. 7718  |              |                  |
| CP6    |              |                  |             | Del ta-N              | 3222. 7417   | -0. 0049 0. 0014 |
| 3. 5*  |              |                  |             |                       |              |                  |
| CP16   |              |                  |             | Del ta-E              | 5786. 5346   | -0. 0031 0. 0014 |
| 2. 2   |              |                  |             |                       |              |                  |
|        |              |                  |             | Del ta-U              | -68. 5983    | -0. 0025 0. 0014 |
| 1. 8   |              |                  |             |                       |              |                  |
| (V4702 | oct 05 2009. | asc 05. 10. 2009 | 09: 39: 10) | Length<br>6623. 8020  |              |                  |
| M6     |              |                  |             | Del ta-N              | 11. 3699     | 0. 0018 0. 0014  |
| 1. 3   |              |                  |             |                       |              |                  |
| CP16   |              |                  |             | Del ta-E              | -9680. 4912  | -0. 0008 0. 0014 |
| 0. 5   |              |                  |             |                       |              |                  |
|        |              |                  |             | Del ta-U              | 7. 8141      | 0. 0022 0. 0014  |
| 1. 6   |              |                  |             |                       |              |                  |
| (V4703 | oct 05 2009. | asc 05. 10. 2009 | 13: 34: 40) | Length<br>9680. 5010  |              |                  |
| BM1A   |              |                  |             | Del ta-N              | 880. 7993    | -0. 0094 0. 0014 |
| 6. 6*  |              |                  |             |                       |              |                  |
| CPL4   |              |                  |             | Del ta-E              | -9426. 6112  | -0. 0011 0. 0014 |
| 0. 7   |              |                  |             |                       |              |                  |
|        |              |                  |             | Del ta-U              | 6. 9494      | 0. 0146 0. 0015  |
| 9. 9*  |              |                  |             |                       |              |                  |
| (V4704 | oct 05 2009. | asc 05. 10. 2009 | 13: 34: 40) | Length<br>9467. 6742  |              |                  |
| M6     |              |                  |             | Del ta-N              | -21. 8615    | -0. 0046 0. 0014 |
| 3. 3*  |              |                  |             |                       |              |                  |
| CPL4   |              |                  |             | Del ta-E              | -14207. 7817 | 0. 0012 0. 0014  |
| 0. 9   |              |                  |             |                       |              |                  |
|        |              |                  |             | Del ta-U              | 31. 7935     | 0. 0001 0. 0014  |
| 0. 1   |              |                  |             |                       |              |                  |
| (V4705 | oct 05 2009. | asc 05. 10. 2009 | 13: 34: 40) | Length<br>14207. 8341 |              |                  |
| CP6    |              |                  |             | Del ta-N              | 3175. 0311   | -0. 0063 0. 0014 |
| 4. 4*  |              |                  |             |                       |              |                  |
| CPL4   |              |                  |             | Del ta-E              | 1259. 4450   | -0. 0057 0. 0014 |
| 4. 0*  |              |                  |             |                       |              |                  |
|        |              |                  |             | Del ta-U              | -33. 6406    | -0. 0003 0. 0015 |
| 0. 2   |              |                  |             |                       |              |                  |
| (V4706 | oct 05 2009. | asc 05. 10. 2009 | 13: 34: 40) | Length<br>3415. 8682  |              |                  |
| CP16   |              |                  |             | Del ta-N              | -42. 3048    | -0. 0081 0. 0014 |
| 5. 7*  |              |                  |             |                       |              |                  |
| CPL4   |              |                  |             | Del ta-E              | -4527. 1733  | -0. 0021 0. 0014 |
| 1. 5   |              |                  |             |                       |              |                  |
|        |              |                  |             | Del ta-U              | 30. 8355     | 0. 0111 0. 0015  |
| 7. 4*  |              |                  |             |                       |              |                  |
| (V4707 | oct 05 2009. | asc 05. 10. 2009 | 09: 39: 10) | Length<br>4527. 4760  |              |                  |
| BM1A   |              |                  |             | Del ta-N              | 916. 7182    | -0. 0063 0. 0014 |
| 4. 5*  |              |                  |             |                       |              |                  |
| M6     |              |                  |             | Del ta-E              | 4781. 1141   | 0. 0004 0. 0014  |
| 0. 3   |              |                  |             |                       |              |                  |
|        |              |                  |             | Del ta-U              | -35. 4760    | 0. 0036 0. 0014  |
| 2. 6   |              |                  |             |                       |              |                  |
| (V4708 | oct 05 2009. | asc 05. 10. 2009 | 08: 12: 35) | Length<br>4868. 3347  |              |                  |
| BM1A   |              |                  |             | Del ta-N              | -402. 5724   | -0. 0044 0. 0014 |
| 3. 1*  |              |                  |             |                       |              |                  |
| M8     |              |                  |             | Del ta-E              | 6666. 2714   | 0. 0009 0. 0014  |
| 0. 6   |              |                  |             |                       |              |                  |
|        |              |                  |             | Del ta-U              | -51. 8696    | 0. 0052 0. 0014  |
| 3. 7*  |              |                  |             |                       |              |                  |
| (V4709 | oct 05 2009. | asc 05. 10. 2009 | 08: 38: 25) | Length<br>6678. 6173  |              |                  |
| CP16   |              |                  |             | Del ta-N              | -1309. 3439  | 0. 0004 0. 0014  |
| 0. 3   |              |                  |             |                       |              |                  |

|                     |                          | BL Oct 12 2009 con.lst |         |        |
|---------------------|--------------------------|------------------------|---------|--------|
| M8                  | Del ta-E                 | 11566.9528             | -0.0013 | 0.0014 |
| 0.9                 |                          |                        |         |        |
|                     | Del ta-U                 | -40.5026               | -0.0043 | 0.0014 |
| 3.0*                |                          |                        |         |        |
|                     | Length                   | 11640.8943             |         |        |
| (V4710 oct 05 2009. | asc 05.10.2009 09:37:45) |                        |         |        |
| CP6                 | Del ta-N                 | 1927.2304              | -0.0092 | 0.0015 |
| 6.2*                |                          |                        |         |        |
| M8                  | Del ta-E                 | 17355.0063             | 0.0000  | 0.0015 |
| 0.0                 |                          |                        |         |        |
|                     | Del ta-U                 | -118.9184              | -0.0163 | 0.0016 |
| 10.2*               |                          |                        |         |        |
|                     | Length                   | 17462.0905             |         |        |
| (V4711 oct 05 2009. | asc 05.10.2009 09:39:10) |                        |         |        |
| M6                  | Del ta-N                 | -1321.1536             | 0.0000  | 0.0014 |
| 0.0                 |                          |                        |         |        |
| M8                  | Del ta-E                 | 1883.8623              | -0.0010 | 0.0014 |
| 0.7                 |                          |                        |         |        |
|                     | Del ta-U                 | -15.1733               | 0.0024  | 0.0014 |
| 1.7                 |                          |                        |         |        |
|                     | Length                   | 2301.0029              |         |        |
| (V4712 oct 10 2009. | asc 10.10.2009 14:13:45) |                        |         |        |
| BM1                 | Del ta-N                 | -3354.1438             | -0.0045 | 0.0014 |
| 3.2*                |                          |                        |         |        |
| BM8A                | Del ta-E                 | -8867.9611             | 0.0359  | 0.0014 |
| 25.4*               |                          |                        |         |        |
|                     | Del ta-U                 | 70.3508                | -0.0022 | 0.0014 |
| 1.5                 |                          |                        |         |        |
|                     | Length                   | 9481.3482              |         |        |
| (V4713 oct 10 2009. | asc 10.10.2009 14:13:45) |                        |         |        |
| CP13                | Del ta-N                 | -5845.9660             | 0.0027  | 0.0014 |
| 1.9                 |                          |                        |         |        |
| BM8A                | Del ta-E                 | -5810.9628             | 0.0089  | 0.0014 |
| 6.3*                |                          |                        |         |        |
|                     | Del ta-U                 | 53.8344                | -0.0093 | 0.0014 |
| 6.4*                |                          |                        |         |        |
|                     | Length                   | 8242.9064              |         |        |
| (V4714 oct 10 2009. | asc 10.10.2009 14:13:45) |                        |         |        |
| CPL5                | Del ta-N                 | -5330.1966             | 0.0025  | 0.0014 |
| 1.8                 |                          |                        |         |        |
| BM8A                | Del ta-E                 | -3426.1316             | 0.0021  | 0.0014 |
| 1.5                 |                          |                        |         |        |
|                     | Del ta-U                 | 33.7191                | -0.0044 | 0.0014 |
| 3.0*                |                          |                        |         |        |
|                     | Length                   | 6336.4430              |         |        |
| (V4715 oct 10 2009. | asc 10.10.2009 08:29:10) |                        |         |        |
| BM1                 | Del ta-N                 | 2488.1270              | -0.0048 | 0.0014 |
| 3.4*                |                          |                        |         |        |
| CP13                | Del ta-E                 | -3053.2785             | 0.0298  | 0.0014 |
| 21.0*               |                          |                        |         |        |
|                     | Del ta-U                 | 17.0142                | 0.0054  | 0.0014 |
| 3.8*                |                          |                        |         |        |
|                     | Length                   | 3938.7276              |         |        |
| (V4716 oct 10 2009. | asc 10.10.2009 14:42:45) |                        |         |        |
| BM1                 | Del ta-N                 | 2011.7034              | -0.0012 | 0.0014 |
| 0.8                 |                          |                        |         |        |
| CPL4                | Del ta-E                 | -6679.7308             | 0.0297  | 0.0014 |
| 20.9*               |                          |                        |         |        |
|                     | Del ta-U                 | 43.1572                | -0.0030 | 0.0014 |
| 2.1                 |                          |                        |         |        |
|                     | Length                   | 6976.2180              |         |        |
| (V4717 oct 10 2009. | asc 10.10.2009 14:42:45) |                        |         |        |
| CP13                | Del ta-N                 | -478.7263              | 0.0042  | 0.0014 |
| 2.9                 |                          |                        |         |        |
| CPL4                | Del ta-E                 | -3626.1376             | 0.0011  | 0.0014 |
| 0.7                 |                          |                        |         |        |
|                     | Del ta-U                 | 27.6893                | -0.0025 | 0.0015 |
| 1.7                 |                          |                        |         |        |
|                     | Length                   | 3657.7068              |         |        |
| (V4718 oct 10 2009. | asc 10.10.2009 14:42:45) |                        |         |        |
| CPL5                | Del ta-N                 | 38.1179                | 0.0063  | 0.0014 |
| 4.4*                |                          |                        |         |        |
| CPL4                | Del ta-E                 | -1243.9636             | -0.0056 | 0.0014 |
| 4.0*                |                          |                        |         |        |
|                     | Del ta-U                 | 6.3242                 | 0.0001  | 0.0015 |
| 0.0                 |                          |                        |         |        |



|        |              |                |           |          |            |         |        |
|--------|--------------|----------------|-----------|----------|------------|---------|--------|
| (V4719 | oct 10 2009. | asc 10.10.2009 | 14:42:45) | Length   | 1244.5636  |         |        |
| BM8A   |              |                |           | Del ta-N | 5369.8334  | 0.0038  | 0.0014 |
| 2.6    |              |                |           |          |            |         |        |
| CPL4   |              |                |           | Del ta-E | 2178.3489  | -0.0092 | 0.0014 |
| 6.5*   |              |                |           |          |            |         |        |
|        |              |                |           | Del ta-U | -33.0518   | 0.0026  | 0.0014 |
| 1.8    |              |                |           |          |            |         |        |
| (V4720 | oct 10 2009. | asc 10.10.2009 | 08:43:00) | Length   | 5794.9467  |         |        |
| BM1    |              |                |           | Del ta-N | 1972.1840  | -0.0061 | 0.0014 |
| 4.3*   |              |                |           |          |            |         |        |
| CPL5   |              |                |           | Del ta-E | -5435.8059 | 0.0356  | 0.0014 |
| 25.1*  |              |                |           |          |            |         |        |
|        |              |                |           | Del ta-U | 37.9029    | 0.0010  | 0.0014 |
| 0.7    |              |                |           |          |            |         |        |
| (V4721 | oct 10 2009. | asc 10.10.2009 | 08:43:00) | Length   | 5782.6406  |         |        |
| CP13   |              |                |           | Del ta-N | -517.4572  | -0.0002 | 0.0014 |
| 0.1    |              |                |           |          |            |         |        |
| CPL5   |              |                |           | Del ta-E | -2382.1906 | 0.0062  | 0.0014 |
| 4.4*   |              |                |           |          |            |         |        |
|        |              |                |           | Del ta-U | 21.8255    | -0.0045 | 0.0014 |
| 3.2*   |              |                |           |          |            |         |        |
| (V4722 | oct 12 2009. | asc 12.10.2009 | 15:30:50) | Length   | 2437.8413  |         |        |
| BM5    |              |                |           | Del ta-N | 10055.9281 | -0.0210 | 0.0015 |
| 14.2*  |              |                |           |          |            |         |        |
| 88F013 |              |                |           | Del ta-E | 22925.0368 | 0.0096  | 0.0014 |
| 6.7*   |              |                |           |          |            |         |        |
|        |              |                |           | Del ta-U | -247.1325  | -0.0202 | 0.0016 |
| 12.7*  |              |                |           |          |            |         |        |
| (V4723 | oct 12 2009. | asc 12.10.2009 | 15:30:50) | Length   | 25034.7773 |         |        |
| CP6    |              |                |           | Del ta-N | 5462.6767  | 0.0039  | 0.0015 |
| 2.6    |              |                |           |          |            |         |        |
| 88F013 |              |                |           | Del ta-E | 16697.2927 | 0.0090  | 0.0014 |
| 6.2*   |              |                |           |          |            |         |        |
|        |              |                |           | Del ta-U | -130.4681  | 0.0096  | 0.0016 |
| 6.0*   |              |                |           |          |            |         |        |
| (V4724 | oct 12 2009. | asc 12.10.2009 | 15:30:50) | Length   | 17568.6494 |         |        |
| M7     |              |                |           | Del ta-N | 2097.2314  | -0.0044 | 0.0014 |
| 3.1*   |              |                |           |          |            |         |        |
| 88F013 |              |                |           | Del ta-E | 1293.4047  | 0.0108  | 0.0014 |
| 7.6*   |              |                |           |          |            |         |        |
|        |              |                |           | Del ta-U | -26.9107   | -0.0013 | 0.0014 |
| 0.9    |              |                |           |          |            |         |        |
| (V4725 | oct 12 2009. | asc 12.10.2009 | 08:11:00) | Length   | 2464.1427  |         |        |
| CP6    |              |                |           | Del ta-N | 1174.2973  | 0.0011  | 0.0014 |
| 0.8    |              |                |           |          |            |         |        |
| BM1    |              |                |           | Del ta-E | 7942.4138  | 0.0127  | 0.0014 |
| 9.0*   |              |                |           |          |            |         |        |
|        |              |                |           | Del ta-U | -84.7329   | 0.0014  | 0.0014 |
| 1.0    |              |                |           |          |            |         |        |
| (V4726 | oct 12 2009. | asc 12.10.2009 | 08:19:25) | Length   | 8029.2023  |         |        |
| BM5    |              |                |           | Del ta-N | 5756.3032  | 0.0048  | 0.0014 |
| 3.3*   |              |                |           |          |            |         |        |
| BM1    |              |                |           | Del ta-E | 14175.7437 | 0.0145  | 0.0014 |
| 10.2*  |              |                |           |          |            |         |        |
|        |              |                |           | Del ta-U | -189.7808  | -0.0122 | 0.0015 |
| 8.2*   |              |                |           |          |            |         |        |
| (V4727 | oct 12 2009. | asc 12.10.2009 | 08:30:30) | Length   | 15301.0703 |         |        |
| CPL5   |              |                |           | Del ta-N | -1966.0538 | -0.0073 | 0.0014 |
| 5.1*   |              |                |           |          |            |         |        |
| BM1    |              |                |           | Del ta-E | 5437.9872  | 0.0199  | 0.0014 |
| 14.1*  |              |                |           |          |            |         |        |
|        |              |                |           | Del ta-U | -43.1353   | 0.0008  | 0.0014 |
| 0.5    |              |                |           |          |            |         |        |
| (V4728 | oct 12 2009. | asc 12.10.2009 | 08:57:10) | Length   | 5782.6406  |         |        |
| BM5    |              |                |           | Del ta-N | 2376.2477  | 0.0029  | 0.0014 |
| 2.0    |              |                |           |          |            |         |        |

|                     |                          | BL Oct 12 2009 con.1st |         |        |
|---------------------|--------------------------|------------------------|---------|--------|
| BM8A                | Del ta-E                 | 5317.8358              | -0.0101 | 0.0014 |
| 7.2*                |                          |                        |         |        |
|                     | Del ta-U                 | -96.7349               | 0.0001  | 0.0014 |
| 0.1                 |                          |                        |         |        |
|                     | Length                   | 5825.4003              |         |        |
| (V4729 oct 12 2009. | asc 12.10.2009 08:57:10) |                        |         |        |
| CP6                 | Del ta-N                 | -2194.3991             | 0.0034  | 0.0014 |
| 2.4                 |                          |                        |         |        |
| BM8A                | Del ta-E                 | -919.9295              | -0.0140 | 0.0014 |
| 9.9*                |                          |                        |         |        |
|                     | Del ta-U                 | -2.7502                | 0.0075  | 0.0014 |
| 5.2*                |                          |                        |         |        |
|                     | Length                   | 2379.4254              |         |        |
| (V4730 oct 12 2009. | asc 12.10.2009 08:57:10) |                        |         |        |
| CPL5                | Del ta-N                 | -5330.1966             | -0.0056 | 0.0014 |
| 3.9*                |                          |                        |         |        |
| BM8A                | Del ta-E                 | -3426.1316             | -0.0054 | 0.0014 |
| 3.8*                |                          |                        |         |        |
|                     | Del ta-U                 | 33.7191                | 0.0069  | 0.0014 |
| 4.8*                |                          |                        |         |        |
|                     | Length                   | 6336.4430              |         |        |
| (V4731 oct 12 2009. | asc 12.10.2009 08:57:10) |                        |         |        |
| BM1                 | Del ta-N                 | -3354.1438             | 0.0022  | 0.0014 |
| 1.5                 |                          |                        |         |        |
| BM8A                | Del ta-E                 | -8867.9611             | -0.0265 | 0.0014 |
| 18.7*               |                          |                        |         |        |
|                     | Del ta-U                 | 70.3508                | 0.0039  | 0.0014 |
| 2.7                 |                          |                        |         |        |
|                     | Length                   | 9481.3482              |         |        |
| (V4732 oct 12 2009. | asc 12.10.2009 08:19:25) |                        |         |        |
| BM5                 | Del ta-N                 | 4571.8319              | -0.0128 | 0.0014 |
| 9.0*                |                          |                        |         |        |
| CP6                 | Del ta-E                 | 6234.9372              | -0.0018 | 0.0014 |
| 1.2                 |                          |                        |         |        |
|                     | Del ta-U                 | -96.4534               | -0.0150 | 0.0014 |
| 10.5*               |                          |                        |         |        |
|                     | Length                   | 7732.1014              |         |        |
| (V4733 oct 12 2009. | asc 12.10.2009 10:48:40) |                        |         |        |
| BM5                 | Del ta-N                 | 8235.4850              | -0.0071 | 0.0014 |
| 5.0*                |                          |                        |         |        |
| CP13                | Del ta-E                 | 11115.2262             | -0.0077 | 0.0014 |
| 5.4*                |                          |                        |         |        |
|                     | Del ta-U                 | -168.2174              | -0.0143 | 0.0014 |
| 10.0*               |                          |                        |         |        |
|                     | Length                   | 13834.7303             |         |        |
| (V4734 oct 12 2009. | asc 12.10.2009 10:48:40) |                        |         |        |
| CP6                 | Del ta-N                 | 3657.4074              | 0.0086  | 0.0014 |
| 6.1*                |                          |                        |         |        |
| CP13                | Del ta-E                 | 4885.0743              | -0.0048 | 0.0014 |
| 3.4*                |                          |                        |         |        |
|                     | Del ta-U                 | -64.3773               | 0.0051  | 0.0014 |
| 3.6*                |                          |                        |         |        |
|                     | Length                   | 6102.8456              |         |        |
| (V4735 oct 12 2009. | asc 12.10.2009 10:48:40) |                        |         |        |
| CPL5                | Del ta-N                 | 518.6302               | 0.0013  | 0.0014 |
| 0.9                 |                          |                        |         |        |
| CP13                | Del ta-E                 | 2381.9268              | 0.0018  | 0.0014 |
| 1.2                 |                          |                        |         |        |
|                     | Del ta-U                 | -22.7552               | -0.0002 | 0.0014 |
| 0.2                 |                          |                        |         |        |
|                     | Length                   | 2437.8413              |         |        |
| (V4736 oct 12 2009. | asc 12.10.2009 11:32:50) |                        |         |        |
| BM5                 | Del ta-N                 | 7748.4585              | -0.0048 | 0.0014 |
| 3.3*                |                          |                        |         |        |
| CPL4                | Del ta-E                 | 7490.2536              | -0.0076 | 0.0014 |
| 5.3*                |                          |                        |         |        |
|                     | Del ta-U                 | -133.5959              | -0.0215 | 0.0014 |
| 14.9*               |                          |                        |         |        |
|                     | Length                   | 10777.7714             |         |        |
| (V4737 oct 12 2009. | asc 12.10.2009 11:32:50) |                        |         |        |
| CP6                 | Del ta-N                 | 3175.0311              | 0.0114  | 0.0014 |
| 8.0*                |                          |                        |         |        |
| CPL4                | Del ta-E                 | 1259.4450              | -0.0039 | 0.0014 |
| 2.7                 |                          |                        |         |        |
|                     | Del ta-U                 | -33.6406               | 0.0026  | 0.0014 |
| 1.9                 |                          |                        |         |        |

| Point   | Date        | Time                         | Length      | Delta-N     | Delta-E     | Delta-U    |
|---------|-------------|------------------------------|-------------|-------------|-------------|------------|
| (V4738) | oct 12 2009 | asc 12. 10. 2009 11: 32: 50) | 3415. 8682  | 38. 1179    | -1243. 9636 | 6. 3242    |
| CPL5    |             |                              |             |             | 0. 0041     | 0. 0014    |
| 2. 9    |             |                              |             |             |             |            |
| CPL4    |             |                              |             |             | 0. 0027     | 0. 0014    |
| 1. 9    |             |                              |             |             |             |            |
| 1. 4    |             |                              |             |             | -0. 0020    | 0. 0014    |
| (V4739) | oct 12 2009 | asc 12. 10. 2009 11: 32: 50) | 1244. 5636  | -478. 7263  | -3626. 1376 | 27. 6893   |
| CP13    |             |                              |             |             | 0. 0046     | 0. 0014    |
| 3. 2*   |             |                              |             |             |             |            |
| CPL4    |             |                              |             |             | 0. 0005     | 0. 0014    |
| 0. 3    |             |                              |             |             |             |            |
| 0. 4    |             |                              |             |             | -0. 0005    | 0. 0014    |
| (V4740) | oct 12 2009 | asc 12. 10. 2009 08: 30: 30) | 3657. 7068  | 7712. 5804  | 8734. 2744  | -141. 5765 |
| BM5     |             |                              |             |             | -0. 0033    | 0. 0014    |
| 2. 3    |             |                              |             |             |             |            |
| CPL5    |             |                              |             |             | -0. 0089    | 0. 0014    |
| 6. 3*   |             |                              |             |             |             |            |
| 7. 6*   |             |                              |             |             | -0. 0109    | 0. 0014    |
| (V4741) | oct 12 2009 | asc 12. 10. 2009 08: 30: 30) | 11652. 9605 | 3137. 5545  | 2503. 4257  | -40. 4335  |
| CP6     |             |                              |             |             | 0. 0082     | 0. 0014    |
| 5. 8*   |             |                              |             |             |             |            |
| CPL5    |             |                              |             |             | -0. 0073    | 0. 0014    |
| 5. 1*   |             |                              |             |             |             |            |
| 3. 0*   |             |                              |             |             | 0. 0043     | 0. 0014    |
| (V4742) | oct 12 2009 | asc 12. 10. 2009 13: 01: 30) | 4014. 1031  | 7952. 9631  | 21641. 1405 | -213. 2522 |
| BM5     |             |                              |             |             | -0. 0165    | 0. 0014    |
| 11. 5*  |             |                              |             |             |             |            |
| M7      |             |                              |             |             | -0. 0005    | 0. 0014    |
| 0. 4    |             |                              |             |             |             |            |
| 7. 9*   |             |                              |             |             | -0. 0117    | 0. 0015    |
| (V4743) | oct 12 2009 | asc 12. 10. 2009 13: 01: 30) | 23057. 1911 | 3361. 3453  | 15410. 6547 | -99. 3479  |
| CP6     |             |                              |             |             | 0. 0075     | 0. 0014    |
| 5. 3*   |             |                              |             |             |             |            |
| M7      |             |                              |             |             | 0. 0022     | 0. 0014    |
| 1. 5    |             |                              |             |             |             |            |
| 5. 4*   |             |                              |             |             | 0. 0080     | 0. 0015    |
| (V4744) | oct 12 2009 | asc 12. 10. 2009 13: 01: 30) | 15773. 2936 | 217. 1302   | 12907. 3653 | -53. 7494  |
| CPL5    |             |                              |             |             | -0. 0025    | 0. 0014    |
| 1. 7    |             |                              |             |             |             |            |
| M7      |             |                              |             |             | 0. 0102     | 0. 0014    |
| 7. 2*   |             |                              |             |             |             |            |
| 8. 0*   |             |                              |             |             | -0. 0115    | 0. 0014    |
| (V4745) | oct 12 2009 | asc 12. 10. 2009 13: 01: 30) | 12909. 3034 | -306. 6886  | 10525. 2994 | -27. 0967  |
| CP13    |             |                              |             |             | -0. 0009    | 0. 0014    |
| 0. 6    |             |                              |             |             |             |            |
| M7      |             |                              |             |             | 0. 0076     | 0. 0014    |
| 5. 3*   |             |                              |             |             |             |            |
| 6. 8*   |             |                              |             |             | -0. 0098    | 0. 0014    |
|         |             |                              | Length      | 10529. 8015 |             |            |

Adjusted Bearings (DMS) and Horizontal Distances (Meters)  
 =====  
 (Relative Confidence of Bearing is in Seconds)  
 NOTE - Adjustment Failed the Chi-Square Test  
 Angular and Distance Errors are Scaled by Total Error Factor

| From   | To      | Grid Bearing  | Grid Dist | 95% Rel Confidence |
|--------|---------|---------------|-----------|--------------------|
|        |         |               | Grnd Dist | Brg Dist PPM       |
| 88F013 | 88G4121 | S46-05-52.14E | 2879.9880 | 0.69 0.0096 3.3261 |
|        |         |               | 2880.6611 |                    |

|         |      | BL Oct 12 2009 con. l st |            |      |        |        |
|---------|------|--------------------------|------------|------|--------|--------|
| 88F013  | BM1  | S62-25-38.74W            | 9746.3570  | 0.22 | 0.0106 | 1.0865 |
|         |      |                          | 9748.8197  |      |        |        |
| 88F013  | BM1A | S60-52-46.22W            | 6782.2123  | 0.32 | 0.0106 | 1.5644 |
|         |      |                          | 6783.9131  |      |        |        |
| 88F013  | BM5  | S64-54-51.32W            | 25026.7853 | 0.08 | 0.0096 | 0.3819 |
|         |      |                          | 25033.9937 |      |        |        |
| 88F013  | CP6  | S70-24-30.09W            | 17563.5584 | 0.11 | 0.0096 | 0.5450 |
|         |      |                          | 17568.3277 |      |        |        |
| 88F013  | M7   | S30-00-15.05W            | 2463.4089  | 0.97 | 0.0116 | 4.6924 |
|         |      |                          | 2464.0009  |      |        |        |
| 88G4121 | BM1  | S76-47-38.52W            | 11005.5604 | 0.15 | 0.0081 | 0.7386 |
|         |      |                          | 11008.3152 |      |        |        |
| 88G4121 | BM1A | S80-44-45.10W            | 8105.5265  | 0.21 | 0.0083 | 1.0181 |
|         |      |                          | 8107.5398  |      |        |        |
| 88G4121 | BM2  | S75-11-57.74W            | 11149.3225 | 0.21 | 0.0113 | 1.0146 |
|         |      |                          | 11152.1143 |      |        |        |
| 88G4121 | CP13 | S89-32-19.68W            | 13834.3948 | 0.12 | 0.0077 | 0.5573 |
|         |      |                          | 13837.9478 |      |        |        |
| 88G4121 | CP6  | S78-11-39.46W            | 19024.2629 | 0.08 | 0.0071 | 0.3717 |
|         |      |                          | 19029.3848 |      |        |        |
| 88G4121 | CP7  | S77-10-04.64W            | 19133.0062 | 0.13 | 0.0124 | 0.6496 |
|         |      |                          | 19138.1624 |      |        |        |
| 88G4121 | M6   | S85-32-00.22W            | 3257.5129  | 0.57 | 0.0090 | 2.7674 |
|         |      |                          | 3258.2871  |      |        |        |
| 88G4121 | M7   | S87-38-28.57W            | 3309.7668  | 0.59 | 0.0095 | 2.8561 |
|         |      |                          | 3310.5539  |      |        |        |
| 88G4121 | M8   | S41-07-37.01W            | 2017.1725  | 1.11 | 0.0109 | 5.3835 |
|         |      |                          | 2017.6431  |      |        |        |
| BM1     | BM1A | N65-57-40.78E            | 2972.2714  | 0.65 | 0.0093 | 3.1416 |
|         |      |                          | 2973.0660  |      |        |        |
| BM1     | BM5  | S66-29-54.89W            | 15295.4544 | 0.11 | 0.0081 | 0.5316 |
|         |      |                          | 15300.1096 |      |        |        |
| BM1     | BM8A | S67-42-45.44W            | 9478.2924  | 0.21 | 0.0095 | 1.0036 |
|         |      |                          | 9481.0324  |      |        |        |
| BM1     | CP13 | N52-23-34.89W            | 3937.5999  | 0.46 | 0.0087 | 2.2207 |
|         |      |                          | 3938.6854  |      |        |        |
| BM1     | CP6  | S80-06-51.97W            | 8026.4959  | 0.21 | 0.0081 | 1.0043 |
|         |      |                          | 8028.8069  |      |        |        |
| BM1     | CPL4 | N74-48-33.10W            | 6974.0824  | 0.27 | 0.0090 | 1.2943 |
|         |      |                          | 6976.0599  |      |        |        |
| BM1     | CPL5 | N71-37-41.58W            | 5780.8736  | 0.32 | 0.0088 | 1.5275 |
|         |      |                          | 5782.4986  |      |        |        |
| BM1A    | BM2  | S60-56-09.80W            | 3179.7657  | 0.76 | 0.0117 | 3.6672 |
|         |      |                          | 3180.6160  |      |        |        |
| BM1A    | CP13 | N78-27-03.50W            | 5954.4713  | 0.31 | 0.0089 | 1.4909 |
|         |      |                          | 5956.1014  |      |        |        |
| BM1A    | CP16 | N80-59-02.90W            | 4983.3820  | 0.48 | 0.0117 | 2.3449 |
|         |      |                          | 4984.7375  |      |        |        |
| BM1A    | CP6  | S76-18-10.24W            | 10932.7291 | 0.15 | 0.0080 | 0.7310 |
|         |      |                          | 10935.8570 |      |        |        |
| BM1A    | CP7  | S74-32-43.42W            | 11054.8569 | 0.24 | 0.0127 | 1.1484 |
|         |      |                          | 11058.0226 |      |        |        |
| BM1A    | CPL4 | N86-15-51.44W            | 9464.9975  | 0.20 | 0.0092 | 0.9705 |
|         |      |                          | 9467.6639  |      |        |        |
| BM1A    | M6   | N77-32-36.89E            | 4866.9786  | 0.42 | 0.0098 | 2.0217 |
|         |      |                          | 4868.2186  |      |        |        |
| BM1A    | M8   | S88-08-47.13E            | 6676.7707  | 0.35 | 0.0111 | 1.6684 |
|         |      |                          | 6678.4421  |      |        |        |
| BM2     | CP13 | N48-08-25.46W            | 4101.2682  | 0.58 | 0.0115 | 2.8137 |
|         |      |                          | 4102.3992  |      |        |        |
| BM2     | CP6  | S82-25-00.20W            | 7911.6428  | 0.30 | 0.0114 | 1.4385 |
|         |      |                          | 7913.9214  |      |        |        |
| BM2     | CP7  | S79-54-43.94W            | 7999.4377  | 0.36 | 0.0138 | 1.7211 |
|         |      |                          | 8001.7437  |      |        |        |
| BM5     | BM8A | N64-31-19.62E            | 5822.7537  | 0.34 | 0.0096 | 1.6521 |
|         |      |                          | 5824.6406  |      |        |        |
| BM5     | CP13 | N52-03-48.15E            | 13829.5845 | 0.12 | 0.0077 | 0.5578 |
|         |      |                          | 13833.8817 |      |        |        |
| BM5     | CP6  | N52-20-52.97E            | 7729.0606  | 0.19 | 0.0071 | 0.9158 |
|         |      |                          | 7731.5568  |      |        |        |
| BM5     | CPL4 | N42-37-41.39E            | 10773.6198 | 0.16 | 0.0084 | 0.7753 |
|         |      |                          | 10777.0524 |      |        |        |
| BM5     | CPL5 | N47-09-12.92E            | 11648.5419 | 0.15 | 0.0087 | 0.7436 |
|         |      |                          | 11652.2249 |      |        |        |
| BM5     | M7   | N68-25-14.87E            | 23049.8171 | 0.08 | 0.0095 | 0.4102 |
|         |      |                          | 23056.5522 |      |        |        |

| BL Oct 12 2009 con.lst |      |               |            |       |        |         |
|------------------------|------|---------------|------------|-------|--------|---------|
| BM8A                   | CP13 | N43-17-41.17E | 8240.2589  | 0.25  | 0.0098 | 1.1935  |
|                        |      |               | 8242.6942  |       |        |         |
| BM8A                   | CP6  | N21-16-09.66E | 2378.6919  | 0.83  | 0.0096 | 4.0261  |
|                        |      |               | 2379.4243  |       |        |         |
| BM8A                   | CPL4 | N20-36-58.80E | 5793.1087  | 0.36  | 0.0101 | 1.7367  |
|                        |      |               | 5794.8669  |       |        |         |
| BM8A                   | CPL5 | N31-13-37.65E | 6334.4289  | 0.31  | 0.0096 | 1.5193  |
|                        |      |               | 6336.3358  |       |        |         |
| CP13                   | CP6  | S51-42-09.80W | 6100.7402  | 0.26  | 0.0077 | 1.2664  |
|                        |      |               | 6102.5361  |       |        |         |
| CP13                   | CP7  | S49-21-39.98W | 6353.4949  | 0.41  | 0.0126 | 1.9812  |
|                        |      |               | 6355.3670  |       |        |         |
| CP13                   | CPL4 | S80-56-44.06W | 3656.5338  | 0.48  | 0.0085 | 2.3134  |
|                        |      |               | 3657.5940  |       |        |         |
| CP13                   | CPL5 | S76-12-39.52W | 2437.0388  | 0.73  | 0.0087 | 3.5501  |
|                        |      |               | 2437.7394  |       |        |         |
| CP13                   | M7   | S89-51-52.92E | 10527.0134 | 0.20  | 0.0103 | 0.9794  |
|                        |      |               | 10529.7854 |       |        |         |
| CP16                   | CP6  | S59-24-34.18W | 6621.5438  | 0.35  | 0.0113 | 1.7136  |
|                        |      |               | 6623.4815  |       |        |         |
| CP16                   | CPL4 | S87-55-13.01W | 4526.0554  | 0.54  | 0.0119 | 2.6242  |
|                        |      |               | 4527.3598  |       |        |         |
| CP16                   | M6   | N88-24-29.15E | 9677.9591  | 0.25  | 0.0119 | 1.2323  |
|                        |      |               | 9680.4892  |       |        |         |
| CP16                   | M8   | S85-05-09.71E | 11637.8650 | 0.23  | 0.0127 | 1.0931  |
|                        |      |               | 11640.8559 |       |        |         |
| CP6                    | CPL4 | N20-09-41.19E | 3414.6789  | 0.48  | 0.0080 | 2.3520  |
|                        |      |               | 3415.7114  |       |        |         |
| CP6                    | CPL5 | N37-06-38.36E | 4012.7086  | 0.44  | 0.0086 | 2.1501  |
|                        |      |               | 4013.9120  |       |        |         |
| CP6                    | M6   | N76-41-06.13E | 15798.9181 | 0.12  | 0.0092 | 0.5843  |
|                        |      |               | 15803.2718 |       |        |         |
| CP6                    | M7   | N76-13-12.04E | 15768.7438 | 0.13  | 0.0099 | 0.6248  |
|                        |      |               | 15773.0913 |       |        |         |
| CP6                    | M8   | N82-11-17.09E | 17457.0980 | 0.13  | 0.0108 | 0.6183  |
|                        |      |               | 17461.8317 |       |        |         |
| CPL4                   | CPL5 | S89-45-00.87E | 1244.1794  | 1.48  | 0.0089 | 7.1576  |
|                        |      |               | 1244.5469  |       |        |         |
| CPL4                   | M6   | N88-15-09.57E | 14203.9027 | 0.15  | 0.0101 | 0.7088  |
|                        |      |               | 14207.7544 |       |        |         |
| CPL5                   | M7   | N87-31-51.00E | 12905.7696 | 0.17  | 0.0108 | 0.8375  |
|                        |      |               | 12909.2392 |       |        |         |
| M6                     | M7   | N26-48-05.25W | 131.6103   | 17.60 | 0.0112 | 85.4284 |
|                        |      |               | 131.6425   |       |        |         |
| M6                     | M8   | S56-37-01.58E | 2300.4041  | 0.96  | 0.0107 | 4.6489  |
|                        |      |               | 2300.9556  |       |        |         |

Error Propagation  
=====

Station Coordinate Standard Deviations (Meters)  
NOTE - Adjustment Failed the Chi-Square Test  
Standard Deviations are Scaled by Total Error Factor

| Station | N        | E        | El ev    |
|---------|----------|----------|----------|
| 88F013  | 0.003930 | 0.003899 | 0.004063 |
| 88G4121 | 0.000001 | 0.000001 | 0.000001 |
| BM1     | 0.003327 | 0.003320 | 0.003382 |
| BM1A    | 0.003376 | 0.003372 | 0.003418 |
| BM2     | 0.004630 | 0.004622 | 0.004698 |
| BM5     | 0.000001 | 0.000001 | 0.000001 |
| BM8A    | 0.003937 | 0.003928 | 0.003989 |
| CP13    | 0.003157 | 0.003150 | 0.003212 |
| CP16    | 0.004839 | 0.004834 | 0.004905 |
| CP6     | 0.002897 | 0.002888 | 0.002952 |
| CP7     | 0.005091 | 0.005078 | 0.005199 |
| CPL4    | 0.003418 | 0.003409 | 0.003484 |
| CPL5    | 0.003543 | 0.003535 | 0.003590 |
| M6      | 0.003687 | 0.003683 | 0.003721 |
| M7      | 0.003872 | 0.003862 | 0.003937 |
| M8      | 0.004436 | 0.004423 | 0.004508 |

Station Coordinate Error Ellipses (Meters)  
NOTE - Adjustment Failed the Chi-Square Test  
Error Ellipses are Scaled by Total Error Factor  
Confidence Region = 95%

| Station | Semi -Major Axis | Semi -Minor Axis | Azimuth of Major Axis | Elev     |
|---------|------------------|------------------|-----------------------|----------|
| 88F013  | 0.009620         | 0.009543         | 1-00                  | 0.007962 |
| 88G4121 | 0.000002         | 0.000002         | 0-00                  | 0.000001 |
| BM1     | 0.008143         | 0.008127         | 5-27                  | 0.006629 |
| BM1A    | 0.008265         | 0.008252         | 172-47                | 0.006699 |
| BM2     | 0.011333         | 0.011312         | 168-01                | 0.009207 |
| BM5     | 0.000002         | 0.000002         | 0-00                  | 0.000001 |
| BM8A    | 0.009637         | 0.009614         | 3-52                  | 0.007819 |
| CP13    | 0.007728         | 0.007709         | 173-28                | 0.006295 |
| CP16    | 0.011846         | 0.011832         | 169-53                | 0.009614 |
| CP6     | 0.007091         | 0.007070         | 1-41                  | 0.005785 |
| CP7     | 0.012464         | 0.012428         | 167-00                | 0.010190 |
| CPL4    | 0.008367         | 0.008344         | 170-46                | 0.006828 |
| CPL5    | 0.008672         | 0.008654         | 178-25                | 0.007035 |
| M6      | 0.009025         | 0.009015         | 3-53                  | 0.007294 |
| M7      | 0.009478         | 0.009453         | 175-03                | 0.007716 |
| M8      | 0.010865         | 0.010822         | 20-46                 | 0.008835 |

Relative Error Ellipses (Meters)  
 NOTE - Adjustment Failed the Chi-Square Test  
 Relative Error Ellipses are Scaled by Total Error Factor  
 Confidence Region = 95%

| Stations From | To      | Semi -Major Axis | Semi -Minor Axis | Azimuth of Major Axis | Vertical |
|---------------|---------|------------------|------------------|-----------------------|----------|
| 88F013        | 88G4121 | 0.009620         | 0.009543         | 1-00                  | 0.007962 |
| 88F013        | BM1     | 0.010634         | 0.010575         | 2-26                  | 0.008738 |
| 88F013        | BM1A    | 0.010653         | 0.010596         | 0-42                  | 0.008734 |
| 88F013        | BM5     | 0.009620         | 0.009543         | 1-00                  | 0.007962 |
| 88F013        | CP6     | 0.009643         | 0.009562         | 1-11                  | 0.007989 |
| 88F013        | M7      | 0.011575         | 0.011516         | 178-48                | 0.009483 |
| 88G4121       | BM1     | 0.008143         | 0.008127         | 5-27                  | 0.006629 |
| 88G4121       | BM1A    | 0.008265         | 0.008252         | 172-47                | 0.006699 |
| 88G4121       | BM2     | 0.011333         | 0.011312         | 168-01                | 0.009207 |
| 88G4121       | CP13    | 0.007728         | 0.007709         | 173-28                | 0.006295 |
| 88G4121       | CP6     | 0.007091         | 0.007070         | 1-41                  | 0.005785 |
| 88G4121       | CP7     | 0.012464         | 0.012428         | 167-00                | 0.010190 |
| 88G4121       | M6      | 0.009025         | 0.009015         | 3-53                  | 0.007294 |
| 88G4121       | M7      | 0.009478         | 0.009453         | 175-03                | 0.007716 |
| 88G4121       | M8      | 0.010865         | 0.010822         | 20-46                 | 0.008835 |
| BM1           | BM1A    | 0.009347         | 0.009336         | 179-36                | 0.007572 |
| BM1           | BM5     | 0.008143         | 0.008127         | 5-27                  | 0.006629 |
| BM1           | BM8A    | 0.009528         | 0.009509         | 4-25                  | 0.007722 |
| BM1           | CP13    | 0.008754         | 0.008738         | 179-20                | 0.007100 |
| BM1           | CP6     | 0.008074         | 0.008060         | 4-48                  | 0.006555 |
| BM1           | CPL4    | 0.009046         | 0.009024         | 173-37                | 0.007358 |
| BM1           | CPL5    | 0.008844         | 0.008829         | 3-22                  | 0.007160 |
| BM1A          | BM2     | 0.011677         | 0.011659         | 167-14                | 0.009466 |
| BM1A          | CP13    | 0.008891         | 0.008875         | 169-49                | 0.007219 |
| BM1A          | CP16    | 0.011695         | 0.011684         | 165-15                | 0.009470 |
| BM1A          | CP6     | 0.008004         | 0.007991         | 0-44                  | 0.006490 |
| BM1A          | CP7     | 0.012724         | 0.012695         | 167-18                | 0.010360 |
| BM1A          | CPL4    | 0.009202         | 0.009183         | 164-32                | 0.007504 |
| BM1A          | M6      | 0.009847         | 0.009839         | 178-16                | 0.007948 |
| BM1A          | M8      | 0.011173         | 0.011135         | 20-48                 | 0.009068 |
| BM2           | CP13    | 0.011547         | 0.011524         | 166-12                | 0.009393 |
| BM2           | CP6     | 0.011401         | 0.011381         | 169-38                | 0.009259 |
| BM2           | CP7     | 0.013799         | 0.013768         | 167-02                | 0.011228 |
| BM5           | BM8A    | 0.009637         | 0.009614         | 3-52                  | 0.007819 |
| BM5           | CP13    | 0.007728         | 0.007709         | 173-28                | 0.006295 |
| BM5           | CP6     | 0.007091         | 0.007070         | 1-41                  | 0.005785 |
| BM5           | CPL4    | 0.008367         | 0.008344         | 170-46                | 0.006828 |
| BM5           | CPL5    | 0.008672         | 0.008654         | 178-25                | 0.007035 |
| BM5           | M7      | 0.009478         | 0.009453         | 175-03                | 0.007716 |
| BM8A          | CP13    | 0.009845         | 0.009822         | 1-32                  | 0.007980 |
| BM8A          | CP6     | 0.009579         | 0.009557         | 3-36                  | 0.007765 |
| BM8A          | CPL4    | 0.010065         | 0.010035         | 177-38                | 0.008173 |
| BM8A          | CPL5    | 0.009629         | 0.009604         | 3-09                  | 0.007802 |
| CP13          | CP6     | 0.007738         | 0.007721         | 174-52                | 0.006295 |
| CP13          | CP7     | 0.012615         | 0.012580         | 166-58                | 0.010305 |
| CP13          | CPL4    | 0.008484         | 0.008459         | 170-51                | 0.006909 |
| CP13          | CPL5    | 0.008669         | 0.008651         | 176-54                | 0.007018 |
| CP13          | M7      | 0.010335         | 0.010310         | 173-56                | 0.008405 |
| CP16          | CP6     | 0.011358         | 0.011343         | 178-48                | 0.009227 |

|      |      | BL Oct 12 2009 con.lst |          |        |          |
|------|------|------------------------|----------|--------|----------|
| CP16 | CPL4 | 0.011896               | 0.011876 | 163-27 | 0.009717 |
| CP16 | M6   | 0.011936               | 0.011926 | 169-53 | 0.009654 |
| CP16 | M8   | 0.012747               | 0.012720 | 15-15  | 0.010338 |
| CP6  | CPL4 | 0.008037               | 0.008015 | 170-05 | 0.006568 |
| CP6  | CPL5 | 0.008635               | 0.008616 | 178-43 | 0.006999 |
| CP6  | M6   | 0.009247               | 0.009229 | 11-33  | 0.007503 |
| CP6  | M7   | 0.009880               | 0.009852 | 176-18 | 0.008051 |
| CP6  | M8   | 0.010843               | 0.010778 | 22-13  | 0.008869 |
| CPL4 | CPL5 | 0.008934               | 0.008905 | 174-17 | 0.007255 |
| CPL4 | M6   | 0.010084               | 0.010067 | 173-08 | 0.008198 |
| CPL5 | M7   | 0.010833               | 0.010808 | 175-52 | 0.008796 |
| M6   | M7   | 0.011247               | 0.011228 | 178-45 | 0.009108 |
| M6   | M8   | 0.010722               | 0.010693 | 21-34  | 0.008682 |

Elapsed Time = 00:00:00

```

19
47
01 00000000 Top of File
01 00000006 Summary of Files Used and Option Settings
02 00000009 Project Folder and Data Files
02 00000020 Project Option Settings
01 00000043 Summary of Controlling Stations
02 00000047 Fixed Coordinates
01 00000051 Adjustment Statistical Summary
01 00000071 Adjusted Station Information
02 00000074 Adjusted Coordinates
02 00000094 Adjusted Positions and Ellipsoid Heights
02 00000115 Convergence Angles and Grid Factors at Stations
01 00000139 Adjusted Observations and Residuals
02 00000142 Adjusted GPS Vector Observations
01 00000522 Adjusted Bearings and Horizontal Distances
01 00000655 Error Propagation
02 00000658 Station Coordinate Standard Deviations
02 00000680 Station Coordinate Error Ellipses
02 00000704 Relative Error Ellipses
01 00000773 End of File
0000BD0E
STARPLUS
00019F1C

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