Geodetic Control Survey Report

Dewberry
335DEW11-1

Contents

Introduction

This report describes the GPS network adjustment performed to refine the positioning of airborne acquisition data (LiDAR& imagery) by GeoDigital International at the request of Dewberry. This report will outline the in-field GPS network processing stages completed throughout the acquisition period.
Appendix A provide scanned copies of original GPS occupation logs, site photos, site descriptions and original NGS datasheets. This report will present the steps followed to establish the GPS Network and will discuss any adjustments performed.

GPS Network Survey – Personnel

GeoDigital Acquisition Manager: Craig Robertson
Ground Survey Lead: William Kowalski
Ground Surveyor(s): William Kowalski, Richard Collin, Adam Eversole
Field/Processing: William Kowalski
System Operators: Richard Collin, Adam Eversole

GPS Network Survey - Equipment and Configuration

Receiver Model(s): Sokkia GSR2600
Number of GPS Receivers Used: 5
Antenna Model(s): Sokkia SK600, SK702
Survey Method: Static Occupation (Long Term, >~4h)
Source of GPS Control: NGS – National Geodetic survey
Horizontal Datum: NAD83
Vertical Datum NAVD88
Geoid/Ellipsoid: Geoid 09
Units: Meters
Stations Used:
NGS CORS: LOYM, ZDC1
NGS Monuments: AI6312, AJ8025, DM6144, HV3503, JV4103, JV6141
Established Points: 335DEW09, 335DEW10, 335DEW20, 335DEW21, 335DEW22, 335DEW23, 335DEW24, 335DEW25
GPS Control Network Software: GrafNet (Waypoint)

Establishing the Network

GeoDigital International (GDI) field staffs were mobilized at the onset of the project to begin static occupations on NGS monuments that could be found in close proximity to the transmission lines to be surveyed. Ideally, the minimum distance to the occupied locations should be less than 20 km from the location of the aerial survey. The network was established using a total of 19 NGS monuments and 5 established points. In order to provide accurate and consistent LiDAR point-positioning over the span of the entire project, the recorded position of the airborne GPS receiver is processed against an established GPS network using a process referred to as Differential GPS. Differential GPS can be used to refine a reported 3-dimensional position to accuracies within 10 cm RMSE of the real-world position. The refinement process is referred to as Trajectory Processing. The key to accurate Trajectory Processing is to ensure the GPS network is accurately established and adequately refined. The Network was established using Continually Operating Reference Stations (CORS) provided by the National Geodetic Survey (NGS) as the source of control. The CORS positions published at the time of the survey are provided in Table 1.

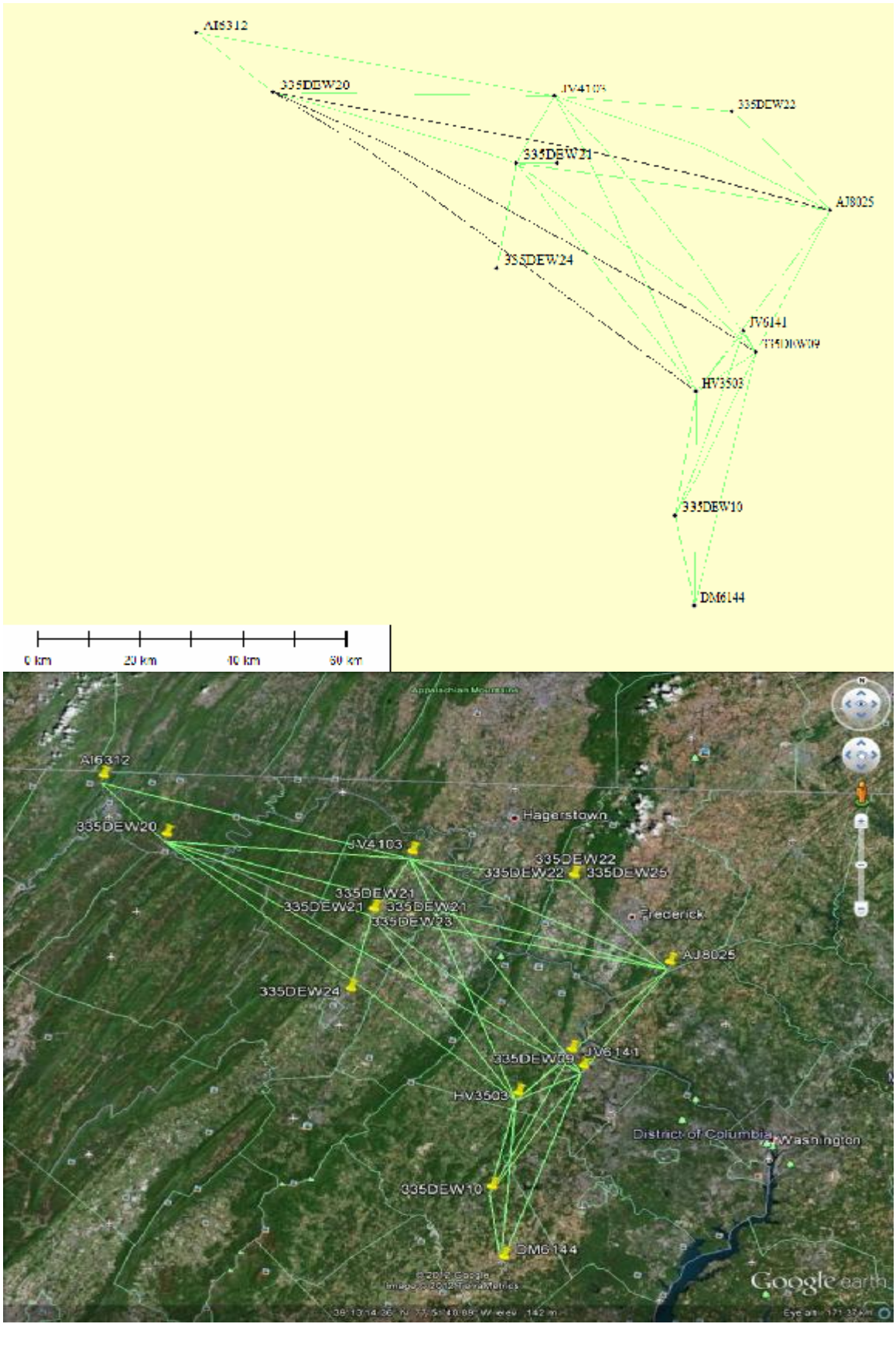
Table 1 - Control Points Used to Establish the GPS Network

ll control used

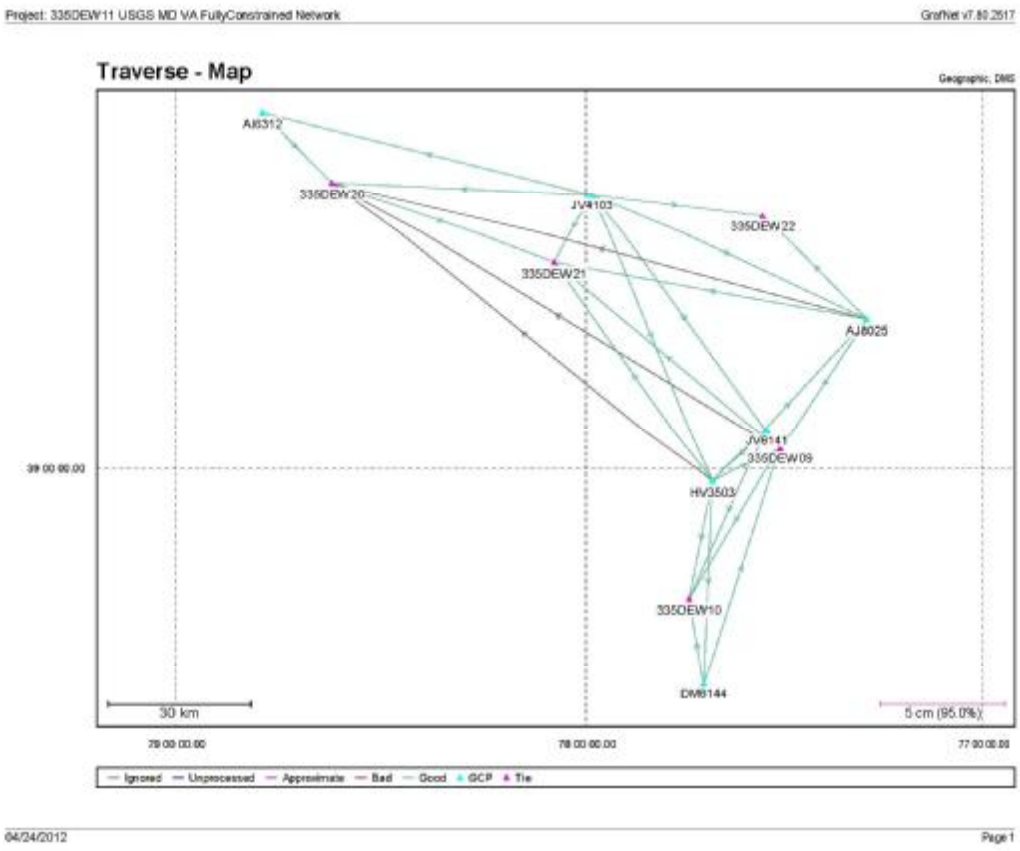
Name	State	Source	Pub/Adj	Latitude			Longitude			Ellipsoidal Height (m)
				Degrees	Minutes	Seconds	Degrees	Minutes	Seconds	
AI6312	VA	NGS	PUB	39	41	43.29695	-78	47	16.08771	182.899
AJ8025	MD	NGS	PUB	39	17	34.38482	-77	18	53.40005	146.115
DM6144	VA	NGS	PUB	38	35	08.87989	-77	42	43.87124	64.754
Hv3503	VA	NGS	PUB	38	58	29.39878	-77	41	26.89196	109.610
JV4103	VA	NGS	PUB	39	32	18.83479	-77	59	06.07077	122.801
JV6141	VA	NGS	PUB	39	04	51.93701	-77	33	30.18572	81.915
335DEW09	VA	SET	ADJ	39	02	32.49529	-77	31	34.98309	91.1625
335DEW10	VA	SET	ADJ	38	45	06.58533	-77	44	53.11093	105.8415
335DEW20	VA	SET	ADJ	39	33	44.04655	-78	37	05.79616	152.4477
335DEW21	VA	SET	ADJ	39	24	00.80394	-78	04	35.85693	204.8443
335DEW22	MD	SET	ADJ	39	29	36.03322	-77	34	08.01429	150.5777
335DEW23	VA	SET	ADJ	39	23	55.63260	-77	58	59.46109	130.9303
335DEW24	VA	SET	ADJ	39	12	37.35243	-78	07	39.29181	175.3710
335DEW25	VA	SET	ADJ	39	29	36.03536	-77	34	07.74391	150.7322
LOYM	VA	CORS	PUB							
ZDC1	VA	CORS	PUB							

Mission Name	Calendar Date Flown	Number of LiDAR Production Lines	Base Station used for Differential Processing
o112029a	29-Jan	8	335DEW20
o112029b	29-Jan	6	335DEW20
o112030a	30-Jan	26	335DEW20
o112031a	31-Jan	16	335DEW20
o112031b	31-Jan	8	335DEW20
~~o112032a~~	~~1 Feb~~	Re-flown in o112066a	335DEW20
o112034a	3-Feb	22	335DEW20
o112034b	3-Feb	10	335DEW20
o112045a	14-Feb	19	335DEW23
o112046a	15-Feb	20	335DEW21
o112046b	15-Feb	18	335DEW21
o112048a	17-Feb	13	335DEW21
o112048b	17-Feb	16	335DEW21
o112049a	18-Feb	6	335DEW21
o112050a	19-Feb	16	335DEW21
o112050b	19-Feb	6	335DEW21
o112051a	20-Feb	16	335DEW23
o112051b	20-Feb	8	335DEW21
o112053a	22-Feb	6	335DEW21
o112057a	26-Feb	18	335DEW21
o112057b	26-Feb	8	335DEW21
o112066a	6-Mar	13 + gaps	335DEW20
o112066b	6-Mar	Gaps	335DEW21
o112070a	10-Mar	13	335DEW22
o112070b	10-Mar	15	335DEW25
o112071a	11-Mar	15	335DEW25
o112071b	11-Mar	6	335DEW22
o112072a	12-Mar	19	335DEW22
o112072b	12-Mar	24	335DEW25
o112073a	13-Mar	28	335DEW22
o112073b	13-Mar	26	335DEW22
o112074a	14-Mar	gaps	335DEW23
o112082a	22-Mar	8	335DEW22
o112083a	23-Mar	10	335DEW22
o112083b	23-Mar	14	335DEW22
o112086a	26-Mar	gaps	335DEW22

o112088a	28-Mar	Test data	JV6141
o112090a	30-Mar	4	JV6141
o112092a	1-Apr	9	JV6141
o112093a	2-Apr	6	JV6141
o112093b	2-Apr	11	JV6141
o112093c	2-Apr	4	JV6141
o112094a	3-Apr	15	JV6141
o112094b	3-Apr	4	JV6141
o112094c	4-Apr	9	JV6141
o112094d	4-Apr	7	JV6141
o212094a	4-Apr	12	JV6141
o112095a	4-Apr	10	ZDC1_Cors
o112095b	5-Apr	14	ZDC1_Cors
o212095a	4-Apr	13	335DEW10
o112096a	5-Apr	5	JV6141
o212096a	5-Apr	8	335DEW10
o212096b	5-Apr	6	335DEW10
o112096b	5-Apr	12	335DEW10
o112096c	5-Apr	10	335DEW10
o212097a	6-Apr	8	335DEW10
o212097b	6-Apr	5	335DEW10
o112097a	6-Apr	10	335DEW10
o112097b	7-Apr	6	335DEW10
o112098a	7-Apr	8	335DEW10
o112100a	9-Apr	3	335DEW10\LOYM_Cors
o112101a	10-Apr	9	JV6141
o112103a	12-Apr	11	JV6141
o112103b	12-Apr	12	JV6141
o112104a	13-Apr	3	JV6141
o112104b	13-Apr	14	JV6141
o112104c	13-Apr	gaps	JV6141
o112105a	14-Apr	16	JV6141


AI6312
335DEW20
335DEW22
335DEW21
AJ8025
335DEW24
JV6141
335DEW09
HV3503
335DEW10
DM6144
0 km
20 km
40 km
60 km
Hagerstown
Frederick
District of Columbia
Washington
Google earth

Map of Main Network

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            ************************************************
            * NETWORK - WEIGHTED GPS NETWORK ADJUSTMENT    *
            *                                              *
            * (c) Copyright NovAtel Inc., (2007)           *
            *                                              *
            * Version: 7.80.2517                           *
            *                                              *
            * FILE: C:\Projects\335 DEW\2_Operations\4_Control\Grafnet
Project\335DEW11 USGS MD VA FullyConstrained Network.net
            ************************************************

DATE(m/d/y): Fri.   2/10/12   TIME: 13:10:21



************************************************************
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  DATUM:            'NAD83'
  GRID:             UTM, Zone 18
  SCALE_FACTOR:     305.0000
  CONFIDENCE LEVEL: 95.00 %   (Scale factor is 2.4479)


*****************************************************************
    INPUT CONTROL/CHECK POINTS
*****************************************************************

STA_ID     TYPE    -- LATITUDE --  -- LONGITUDE --  ELLHGT -   HZ-SD
V-SD
AI6312     GCP-3D  39 41 43.29695  -78 47 16.08771    182.899 0.00500
0.00500
AJ8025     GCP-3D  39 17 34.38482  -77 18 53.40005    146.115 0.00500
0.00500
DM6144     GCP-3D  38 35 08.87989  -77 42 43.87124     64.754 0.00500
0.00500
HV3503     GCP-3D  38 58 29.39878  -77 41 26.89196    109.610 0.01000
0.01000
JV4103     GCP-3D  39 32 18.83479  -77 59 06.07077    122.801 0.00500
0.00500
JV6141     GCP-3D  39 04 51.93701  -77 33 30.18572     81.915 0.00500
0.00500



*****************************************************************
    INPUT VECTORS
*****************************************************************

SESSION NAME           VECTOR(m)   ------ Covariance (m) [unscaled] ---
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                        DX/DY/DZ          standard deviations in
brackets
335DEW09 to 335DEW10 (1) -14448.7642  6.9730e-007 (0.0008)
                      -23911.9467  -5.7310e-007 3.2291e-006 (0.0018)
                      -25092.6896  2.4428e-007 -1.5624e-006 2.2440e-006
(0.0015)

335DEW09 to 335DEW10 (2) -14448.7566  1.7890e-006 (0.0013)
                      -23911.9082  -6.5498e-007 6.9628e-006 (0.0026)
                      -25092.7098  2.6346e-007 -4.2542e-006 7.1472e-006
(0.0027)

335DEW09 to 335DEW10 (3) -14448.7556  2.1102e-007 (0.0005)
                      -23911.9398  -1.6375e-007 8.1182e-007 (0.0009)
                      -25092.7168  1.0541e-007 -4.2425e-007 5.6595e-007
(0.0008)

335DEW09 to 335DEW21 (1) -51734.2047  8.5338e-006 (0.0029)
                      14428.4166  1.7023e-006 3.5069e-006 (0.0019)
                      30851.7199  6.3204e-007 -1.4864e-006 2.3066e-006
(0.0015)

335DEW20 to 335DEW21 (1) 47960.4680  5.1990e-006 (0.0023)
                      -1828.2062  1.0866e-006 2.0629e-006 (0.0014)
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                     -13850.2880  3.3782e-007 -8.7784e-007 1.3954e-006
(0.0012)

AI6312 to 335DEW20 (1) 16115.0652  7.5033e-007 (0.0009)
                     -6370.6202  -4.7274e-007 5.4900e-006 (0.0023)
                     -11403.5449  8.8318e-007 -3.6137e-006 7.3607e-006
(0.0027)

AJ8025 to 335DEW09 (2) -14027.3813  3.7417e-007 (0.0006)
                     -21085.2283  -2.8040e-007 1.7843e-006 (0.0013)
                     -21598.5531  1.6778e-007 -8.9501e-007 1.2194e-006
(0.0011)

AJ8025 to 335DEW09 (1) -14027.3553  8.4247e-007 (0.0009)
                     -21085.3515  -6.1639e-007 2.7334e-006 (0.0017)
                     -21598.4703  4.3360e-007 -1.3127e-006 1.7090e-006
(0.0013)

AJ8025 to 335DEW21 (1) -65761.5821  5.9097e-006 (0.0024)
                     -6656.8093  1.2592e-006 2.3697e-006 (0.0015)
                      9253.1665  3.6598e-007 -1.0429e-006 1.6338e-006
(0.0013)

AJ8025 to 335DEW22 (1) -24433.1277  4.5079e-007 (0.0007)
                      9024.3750  -3.9839e-007 1.7808e-006 (0.0013)
                     17202.4502  2.1056e-007 -8.4009e-007 1.1051e-006
(0.0011)

DM6144 to 335DEW10 (2) -5493.5384  3.1443e-006 (0.0018)
                     10557.6596  9.5026e-007 9.1396e-006 (0.0030)
                     14416.0427  -3.1212e-006 -5.9870e-006 9.2475e-006
(0.0030)

DM6144 to 335DEW09 (1)  8955.2325  2.5167e-005 (0.0050)
                     34469.6011  -7.6597e-006 5.6377e-006 (0.0024)
                     39508.7653  5.2112e-006 -2.9639e-006 3.1321e-006
(0.0018)

DM6144 to 335DEW10 (1) -5493.5208  4.1589e-007 (0.0006)
                     10557.6614  -3.6949e-007 2.0288e-006 (0.0014)
                     14416.0708  1.7912e-007 -9.4266e-007 1.1530e-006
(0.0011)

HV3503 to 335DEW10 (2) -1554.6416  2.8351e-006 (0.0017)
                     -16233.1453  -2.1428e-006 9.3554e-006 (0.0031)
                     -19279.0208  8.9878e-007 -3.4137e-006 3.5670e-006
(0.0019)

HV3503 to 335DEW09 (1) 12894.1329  1.2477e-006 (0.0011)
                      7678.7867  -1.3667e-006 5.2334e-006 (0.0023)
                      5813.6918  1.0952e-006 -2.5603e-006 2.9348e-006
(0.0017)

HV3503 to 335DEW09 (2) 12894.1313  1.0175e-006 (0.0010)
                      7678.7982  -2.0196e-007 3.6835e-006 (0.0019)
                      5813.6851  -3.6652e-007 -2.5036e-006 3.4384e-006
(0.0019)
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HV3503 to 335DEW09 (3) 12894.1069  2.2896e-007 (0.0005)
                       7678.8690  -1.9244e-007 9.4228e-007 (0.0010)
                       5813.6490  9.7327e-008 -4.5442e-007 6.1384e-007
(0.0008)

HV3503 to 335DEW09 (4) 12894.1315  4.2047e-007 (0.0006)
                       7678.7794  -1.3475e-007 1.5361e-006 (0.0012)
                       5813.6959  1.5202e-007 -9.7027e-007 1.1681e-006
(0.0011)

HV3503 to 335DEW10 (1) -1554.6288  8.6068e-007 (0.0009)
                      -16233.1498  -4.9468e-007 2.9153e-006 (0.0017)
                      -19279.0000  4.3654e-008 -1.6243e-006 2.3313e-006
(0.0015)

HV3503 to 335DEW10 (3) -1554.6354  2.0864e-005 (0.0046)
                      -16233.2041  -5.3094e-006 4.7023e-005 (0.0069)
                      -19279.0323  5.2913e-006 -2.7955e-005 4.2988e-005
(0.0066)

HV3503 to 335DEW21 (1) -38840.1042  8.3137e-006 (0.0029)
                       22107.2839  1.6392e-006 3.4886e-006 (0.0019)
                       36665.3676  6.1924e-007 -1.4940e-006 2.2724e-006
(0.0015)

HV3503 to AJ8025 (1)  26921.4828  4.7665e-006 (0.0022)
                      28764.0922  1.2395e-006 2.7766e-006 (0.0017)
                      27412.2035  2.1486e-007 -1.1820e-006 1.4545e-006
(0.0012)

HV3503 to AJ8025 (2)  26921.5020  3.4354e-005 (0.0059)
                      28764.1402  6.3772e-006 7.5094e-006 (0.0027)
                      27412.1576  2.6479e-006 -2.7202e-006 7.0874e-006
(0.0027)

HV3503 to AJ8025 (3)  26921.4724  4.1035e-006 (0.0020)
                      28764.0799  1.8517e-006 2.9208e-006 (0.0017)
                      27412.1760  1.5187e-007 -9.3600e-007 1.2150e-006
(0.0011)

HV3503 to DM6144 (1)   3938.8848  1.9431e-005 (0.0044)
                      -26790.8062  -5.1253e-006 4.6096e-006 (0.0021)
                      -33695.0697  3.7001e-006 -2.3642e-006 2.7406e-006
(0.0017)

HV3503 to DM6144 (2)   3938.8719  2.3354e-005 (0.0048)
                      -26790.7965  1.7082e-006 5.9798e-006 (0.0024)
                      -33695.0688  1.0282e-006 -1.8189e-006 2.4271e-006
(0.0016)

JV4103 to 335DEW22 (1) 35654.7012  5.5640e-007 (0.0007)
                       4433.0245  -4.6128e-007 2.2638e-006 (0.0015)
                      -3855.7510  2.4073e-007 -1.1327e-006 1.5819e-006
(0.0013)

JV4103 to 335DEW09 (1) 46060.4548  5.1875e-006 (0.0023)
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                     -25676.5890  7.5345e-007 2.4566e-006 (0.0016)
                     -42656.7215  5.5604e-007 -1.0872e-006 1.5172e-006
(0.0012)

JV4103 to 335DEW20 (1) -53634.2178  3.2100e-006 (0.0018)
                     -9419.9664  5.6822e-007 1.5979e-006 (0.0013)
                      2045.2873  2.6473e-007 -6.9872e-007 9.2531e-007
(0.0010)

JV4103 to 335DEW20 (2) -53634.1629  8.2502e-006 (0.0029)
                     -9419.8244  4.4000e-006 5.5847e-006 (0.0024)
                      2045.1339  1.9927e-006 -6.1345e-008 2.5462e-006
(0.0016)

JV4103 to 335DEW20 (3) -53634.2304  4.8320e-006 (0.0022)
                     -9419.9940  1.9678e-006 3.2807e-006 (0.0018)
                      2045.2860  3.1796e-007 -1.0724e-006 1.5466e-006
(0.0012)

JV4103 to 335DEW21 (1) -5673.7443  1.1093e-006 (0.0011)
                     -11248.1796  -9.2691e-007 3.9899e-006 (0.0020)
                     -11805.0080  9.5695e-007 -2.7469e-006 3.7291e-006
(0.0019)

JV4103 to AI6312 (1)  -69749.2999  9.4881e-006 (0.0031)
                     -3049.3828  5.1701e-006 7.3247e-006 (0.0027)
                     13448.8309  4.9597e-007 -1.6778e-006 2.3859e-006
(0.0015)

JV4103 to AJ8025 (1)  60087.8358  3.8395e-006 (0.0020)
                     -4591.3609  8.7854e-007 2.0247e-006 (0.0014)
                     -21058.1689  2.2625e-007 -8.8398e-007 1.1382e-006
(0.0011)

JV4103 to AJ8025 (2)  60087.8315  3.5757e-006 (0.0019)
                     -4591.3538  1.2217e-006 2.2801e-006 (0.0015)
                     -21058.2007  1.1422e-007 -9.4512e-007 1.2262e-006
(0.0011)

JV4103 to HV3503 (1)  33166.3511  3.5068e-006 (0.0019)
                     -33355.4547  5.7314e-007 1.7967e-006 (0.0013)
                     -48470.3719  3.1959e-007 -7.9282e-007 1.0283e-006
(0.0010)

JV6141 to 335DEW10 (1) -11158.1323  6.2048e-007 (0.0008)
                     -25967.4693  -3.4242e-008 3.3711e-007 (0.0006)
                     -28425.8076  9.8045e-008 -1.7501e-007 2.1427e-007
(0.0005)

JV6141 to 335DEW09 (1)  3290.6225  8.4023e-008 (0.0003)
                     -2055.5328  -6.7816e-008 3.1749e-007 (0.0006)
                     -3333.0890  4.1165e-008 -1.6469e-007 2.1766e-007
(0.0005)

JV6141 to HV3503 (1)  -9603.5119  1.4256e-007 (0.0004)
                     -9734.3102  -1.0204e-007 5.3062e-007 (0.0007)
```

-9146.7862 6.9264e-008 -2.8348e-007 3.8983e-007
(0.0006)

****
OUTPUT VECTOR RESIDUALS (East, North, Height - Local Level)
****

SESSION NAME	-- RE -- (m)	-- RN -- (m)	-- RH -- (m)	- PPM - DIST (km)	- STD - (m)
335DEW09 to 335DEW10 (1)	0.0091	-0.0159	-0.0061	0.515	37.6 0.0434
335DEW09 to 335DEW10 (2)	-0.0065	-0.0228	0.0346	1.117	37.6 0.0696
335DEW09 to 335DEW10 (3)	-0.0007	0.0022	0.0147	0.397	37.6 0.0220
335DEW09 to 335DEW21 (1)	0.0066	0.0054	-0.0639	1.041	61.9 0.0662
335DEW20 to 335DEW21 (1)	-0.0061	0.0023	0.0251	0.519	50.0 0.0514
AI6312 to 335DEW20 (1)	0.0093	-0.0013	-0.0703	3.418	20.7 0.0644
AJ8025 to 335DEW09 (2)	-0.0017	-0.0044	0.0771	2.321	33.3 0.0321
AJ8025 to 335DEW09 (1)	-0.0003	0.0109	-0.0728	2.211	33.3 0.0401
AJ8025 to 335DEW21 (1)	0.0010	0.0002	0.0146	0.219	66.7 0.0550
AJ8025 to 335DEW22 (1)	-0.0009	-0.0029	-0.0071	0.246	31.2 0.0319
DM6144 to 335DEW10 (2)	0.0124	0.0070	0.0273	1.645	18.7 0.0810
DM6144 to 335DEW09 (1)	-0.0023	0.0012	0.0076	0.152	53.2 0.1017
DM6144 to 335DEW10 (1)	-0.0052	-0.0137	0.0081	0.895	18.7 0.0331
HV3503 to 335DEW10 (2)	0.0120	-0.0022	-0.0084	0.588	25.3 0.0693
HV3503 to 335DEW09 (1)	-0.0039	0.0062	-0.0297	1.901	16.1 0.0536
HV3503 to 335DEW09 (2)	-0.0049	0.0042	-0.0165	1.099	16.1 0.0498
HV3503 to 335DEW09 (3)	0.0038	-0.0146	0.0641	4.093	16.1 0.0233
HV3503 to 335DEW09 (4)	-0.0010	0.0074	-0.0375	2.376	16.1 0.0309
HV3503 to 335DEW10 (1)	0.0005	-0.0139	-0.0271	1.207	25.3 0.0432
HV3503 to 335DEW10 (3)	0.0186	0.0436	-0.0470	2.644	25.3 0.1839
HV3503 to 335DEW21 (1)	0.0172	-0.0081	0.0007	0.329	57.8 0.0655

```
HV3503 to AJ8025 (1)         0.0116    -0.0091    -0.0169       0.468
48.0  0.0524
HV3503 to AJ8025 (2)        -0.0175    -0.0004     0.0452       1.009
48.0  0.1222
HV3503 to AJ8025 (3)         0.0245     0.0184    -0.0070       0.655
48.0  0.0501
HV3503 to DM6144 (1)         0.0118    -0.0052    -0.0308       0.772
43.2  0.0904
HV3503 to DM6144 (2)         0.0222    -0.0135    -0.0218       0.786
43.2  0.0984
JV4103 to 335DEW22 (1)       0.0010     0.0043     0.0099       0.300
36.1  0.0366
JV4103 to 335DEW09 (1)      -0.0043    -0.0154     0.0643       0.978
67.8  0.0529
JV4103 to 335DEW20 (1)       0.0084    -0.0128    -0.0254       0.544
54.5  0.0418
JV4103 to 335DEW20 (2)      -0.0741     0.0240     0.1709       3.447
54.5  0.0707
JV4103 to 335DEW20 (3)       0.0264     0.0038    -0.0435       0.935
54.5  0.0543
JV4103 to 335DEW21 (1)      -0.0017     0.0002    -0.0018       0.144
17.3  0.0519
JV4103 to AI6312 (1)         0.0227     0.0102     0.0206       0.455
71.1  0.0765
JV4103 to AJ8025 (1)        -0.0026    -0.0103    -0.0126       0.258
63.8  0.0462
JV4103 to AJ8025 (2)         0.0001     0.0092     0.0137       0.258
63.8  0.0465
JV4103 to HV3503 (1)        -0.0121    -0.0011     0.0032       0.186
67.5  0.0439
JV6141 to 335DEW10 (1)      -0.0027     0.0040    -0.0076       0.224
40.1  0.0189
JV6141 to 335DEW09 (1)      -0.0004     0.0024    -0.0259       5.081
5.1  0.0137
JV6141 to HV3503 (1)         0.0030    -0.0055     0.0146       0.964
16.5  0.0180
                        ---------------------------------
               RMS           0.0160     0.0121     0.0438

 $ - This session is flagged as a 3-sigma outlier


*****************************************************************
    CONTROL POINT RESIDUALS (ADJUSTMENT MADE)
*****************************************************************

STA. NAME    -- RE --    -- RN --    -- RH --
                (m)         (m)         (m)
AI6312         0.0005    -0.0003    -0.0011
AJ8025         0.0001    -0.0004     0.0012
DM6144        -0.0008     0.0001     0.0018
HV3503        -0.0044    -0.0025    -0.0063
JV4103        -0.0009    -0.0007     0.0038
JV6141         0.0022     0.0020    -0.0042
           --------------------------------
RMS            0.0021     0.0014     0.0036
```

```
*************************************************************
    OUTPUT STATION COORDINATES (LAT/LONG/HT)
*************************************************************

STA_ID      -- LATITUDE --   -- LONGITUDE -- - ELLHGT -   ORTHOHGT
335DEW09    39 02 32.49529  -77 31 34.98309    91.1625   123.3164
335DEW10    38 45 06.58533  -77 44 53.11093   105.8415   138.0279
335DEW20    39 33 44.04655  -78 37 05.79616   152.4477   185.5792
335DEW21    39 24 00.80394  -78 04 35.85693   204.8443   238.8695
335DEW22    39 29 36.03322  -77 34 08.01429   150.5777   183.7722
AI6312      39 41 43.29694  -78 47 16.08769   182.8978   215.3993
AJ8025      39 17 34.38480  -77 18 53.40005   146.1161   178.2409
DM6144      38 35 08.87989  -77 42 43.87127    64.7557    96.8580
HV3503      38 58 29.39869  -77 41 26.89214   109.6036   141.9908
JV4103      39 32 18.83476  -77 59 06.07081   122.8047   157.0112
JV6141      39 04 51.93707  -77 33 30.18563    81.9107   114.2138


*************************************************************
    OUTPUT STATION COORDINATES (GRID)
*************************************************************

STA_ID       - EASTING -   - NORTHING - - ELLHGT -   ORTHOHGT
                  (m)           (m)         (m)         (m)
335DEW09     281351.6789  4324514.8213    91.1625   123.3164
335DEW10     261189.3462  4292823.7739   105.8415   138.0279
335DEW20     189142.3937  4385427.6505   152.4477   185.5792
335DEW21     235071.8521  4365708.5578   204.8443   238.8695
335DEW22     279093.7592  4374676.3925   150.5777   183.7722
AI6312       175198.1374  4400808.8900   182.8978   215.3993
AJ8025       300372.6513  4351833.6939   146.1161   178.2409
DM6144       263764.1360  4274302.6687    64.7557    96.8580
HV3503       266898.0228  4317427.9833   109.6036   141.9908
JV4103       243470.6190  4380800.6288   122.8047   157.0112
JV6141       278702.8198  4328891.5632    81.9107   114.2138


*************************************************************
    OUTPUT VARIANCE/COVARIANCE
*************************************************************
                                              2
STA_ID      SE/SN/SUP  --------- CX matrix (m )----------
            (95.00 %)  (not scaled by confidence level)
               (m)          (ECEF, XYZ cartesian)
335DEW09       0.0108  2.1250e-005
               0.0108  -6.5737e-006 4.5892e-005
               0.0192  4.6828e-006 -1.9542e-005 3.3629e-005

335DEW10       0.0138  3.4052e-005
               0.0124  -9.4990e-006 6.7258e-005
               0.0232  6.3041e-006 -2.9655e-005 4.5971e-005
```

```
335DEW20        0.0299  1.3774e-004
                0.0193  2.5936e-005 1.7176e-004
                0.0361  2.1107e-005 -7.2052e-005 1.1866e-004

335DEW21        0.0333  1.8271e-004
                0.0194  6.2943e-006 1.7661e-004
                0.0389  3.2260e-005 -8.8551e-005 1.4086e-004

335DEW22        0.0204  8.6422e-005
                0.0256  -6.5254e-005 3.1468e-004
                0.0508  3.4686e-005 -1.4771e-004 2.0868e-004

AI6312          0.0119  2.3545e-005
                0.0117  4.0399e-007 2.3932e-005
                0.0121  4.5685e-007 -6.9305e-007 2.3460e-005

AJ8025          0.0102  1.7322e-005
                0.0094  5.2451e-008 1.8768e-005
                0.0112  8.5258e-007 -2.9036e-006 1.6854e-005

DM6144          0.0111  2.0930e-005
                0.0108  -6.4669e-007 2.2009e-005
                0.0118  1.4166e-007 -1.7445e-006 2.0352e-005

HV3503          0.0116  2.3117e-005
                0.0104  -2.4710e-006 3.3872e-005
                0.0160  2.7348e-006 -1.1565e-005 2.6339e-005

JV4103          0.0110  1.9900e-005
                0.0094  7.8475e-007 1.9255e-005
                0.0113  1.0538e-006 -2.9140e-006 1.7176e-005

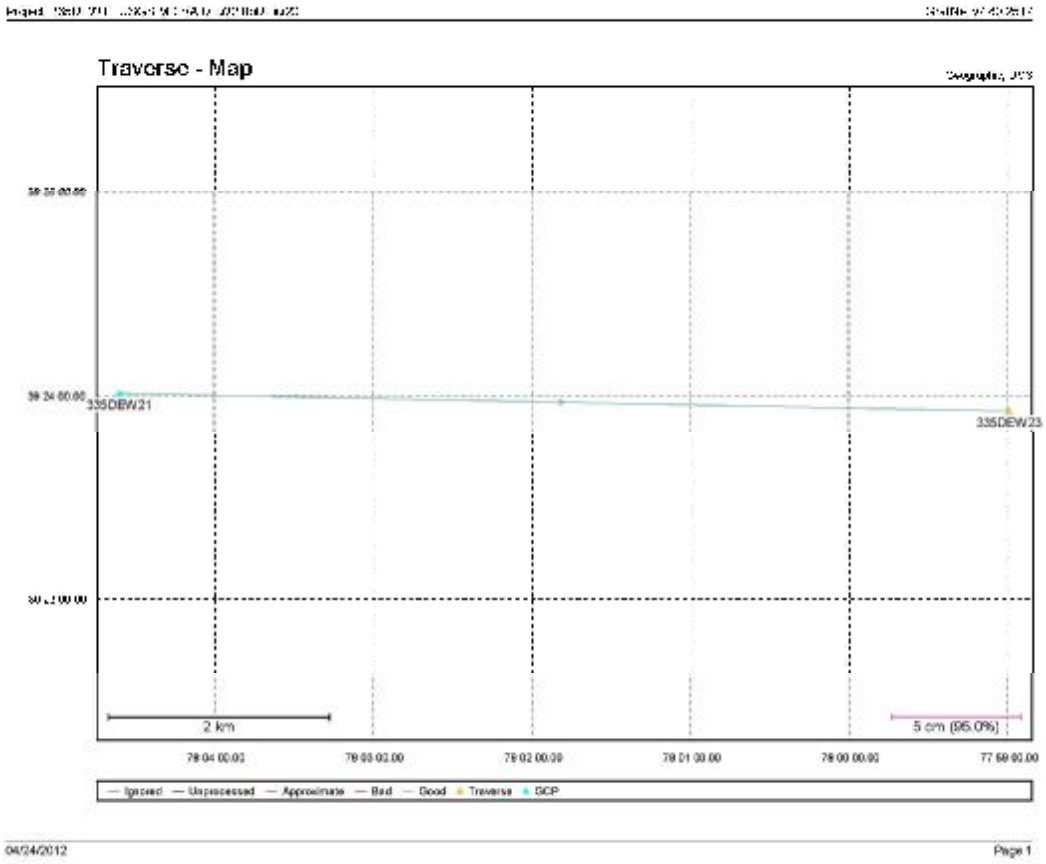
JV6141          0.0097  1.5943e-005
                0.0094  -7.1982e-007 1.8573e-005
                0.0112  6.7384e-007 -2.8226e-006 1.6702e-005



**************************************************************
    VARIANCE FACTOR = 1.0169

    Note: Values < 1.0 indicate statistics are pessimistic, while
          values > 1.0 indicate optimistic statistics. Entering this
          value as the network adjustment scale factor will bring
          variance factor to one.
**************************************************************
```

Map of Traverse 335DEW21 to 335DEW23




```
              ************************************************
              * NETWORK - WEIGHTED GPS NETWORK ADJUSTMENT      *
              *                                                *
              * (c) Copyright NovAtel Inc., (2007)             *
              *                                                *
              * Version: 7.80.2517                             *
              *                                                *
              * FILE: C:\Projects\335 DEW\2_Operations\4_Control\Grafnet
Project\335DEW11 USGS MD VA DEW21toDEW23.net
              ************************************************

DATE(m/d/y): Fri.   2/17/12   TIME: 17:42:05



************************************************************

  DATUM:            'NAD83'
```

```
  GRID:             UTM, Zone 17
  SCALE_FACTOR:     1.0000
  CONFIDENCE LEVEL: 95.00 %   (Scale factor is 2.4479)


***************************************************************
    INPUT CONTROL/CHECK POINTS
***************************************************************

STA_ID     TYPE    -- LATITUDE --  -- LONGITUDE --  ELLHGT -   HZ-SD
V-SD
335DEW21   GCP-3D  39 24 00.80394  -78 04 35.85693    204.844 0.01000
0.01000



***************************************************************
    INPUT VECTORS
***************************************************************

SESSION NAME           VECTOR(m)   ------ Covariance (m) [unscaled] ---
---
                        DX/DY/DZ          standard deviations in
brackets
335DEW21 to 335DEW23 (1)  7883.2781  1.0015e-007 (0.0003)
                        1626.2476  -6.7396e-008 3.5816e-007 (0.0006)
                        -170.1566  4.6698e-008 -1.9661e-007 2.6014e-007
(0.0005)



***************************************************************
    OUTPUT VECTOR RESIDUALS (East, North, Height - Local Level)
***************************************************************

SESSION NAME               -- RE --   -- RN --   -- RH --     - PPM -
DIST - STD -
                              (m)        (m)        (m)
(km)   (m)
335DEW21 to 335DEW23 (1)    -0.0000     0.0000    -0.0000       0.000
8.1  0.0008
                          --------------------------------
               RMS           0.0000     0.0000     0.0000

 $ - This session is flagged as a 3-sigma outlier



***************************************************************
    CONTROL POINT RESIDUALS (ADJUSTMENT MADE)
***************************************************************

STA. NAME    -- RE --   -- RN --   -- RH --
               (m)        (m)        (m)
335DEW21       0.0000     0.0000    -0.0000
            --------------------------------
```

```
RMS            0.0000     0.0000     0.0000


*************************************************************
    OUTPUT STATION COORDINATES (LAT/LONG/HT)
*************************************************************

STA_ID      -- LATITUDE --   -- LONGITUDE -- - ELLHGT -   ORTHOHGT
335DEW21    39 24 00.80394  -78 04 35.85693   204.8439   238.8691
335DEW23    39 23 55.63260  -77 58 59.46109   130.9303   164.9805


*************************************************************
    OUTPUT STATION COORDINATES (GRID)
*************************************************************

STA_ID       - EASTING -   - NORTHING - - ELLHGT -   ORTHOHGT
                  (m)           (m)        (m)        (m)
335DEW21     751729.1660  4365269.4907   204.8439   238.8691
335DEW23     759782.2569  4365375.0651   130.9303   164.9805

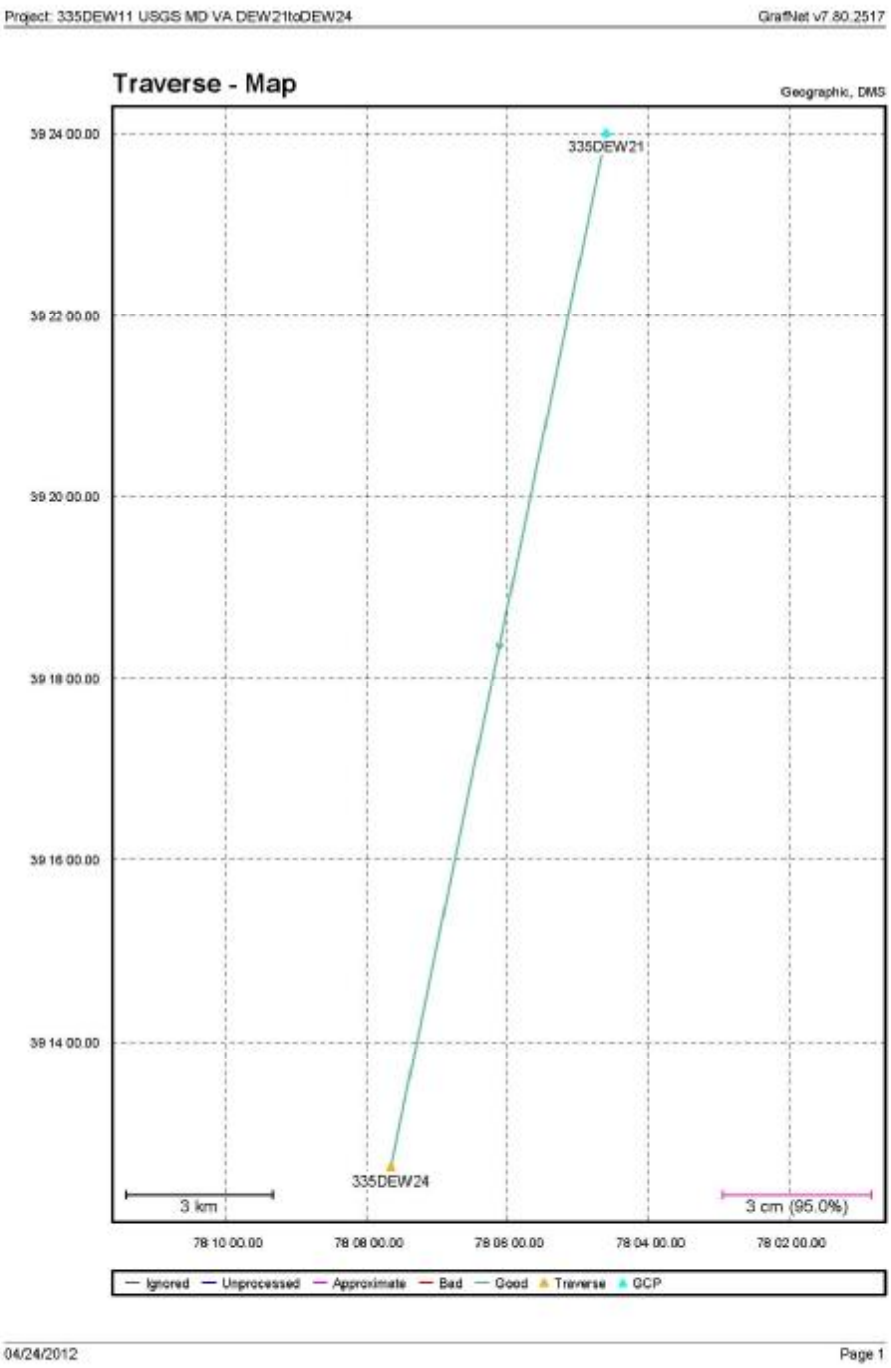

*************************************************************
    OUTPUT VARIANCE/COVARIANCE
*************************************************************
                                                 2
STA_ID      SE/SN/SUP  --------- CX matrix (m )-----------
            (95.00 %)  (not scaled by confidence level)
               (m)          (ECEF, XYZ cartesian)
335DEW21       0.0245  1.0000e-004
               0.0245  2.6752e-021 1.0000e-004
               0.0245  -1.3638e-021 9.5066e-021 1.0000e-004

335DEW23       0.0245  1.0010e-004
               0.0245  -6.7396e-008 1.0036e-004
               0.0245  4.6698e-008 -1.9661e-007 1.0026e-004



*************************************************************
*************************************************************
```

Map of Traverse 335DEW21 to 335DEW24



```
             ************************************************
             * NETWORK - WEIGHTED GPS NETWORK ADJUSTMENT      *
             *                                                *
             * (c) Copyright NovAtel Inc., (2007)             *
             *                                                *
             * Version: 7.80.2517                             *
             *                                                *
             * FILE: D:\Projects\335 DEW\2_Operations\4_Control\Grafnet
Project\335DEW11 USGS MD VA DEW21toDEW24.net
             ************************************************

DATE(m/d/y): Thur.   3/01/12   TIME: 11:15:42




************************************************************

  DATUM:            'NAD83'
  GRID:             UTM, Zone 17
  SCALE_FACTOR:     1.0000
  CONFIDENCE LEVEL: 95.00 %   (Scale factor is 2.4479)


************************************************************
    INPUT CONTROL/CHECK POINTS
************************************************************

STA_ID     TYPE    -- LATITUDE --  -- LONGITUDE --  ELLHGT -   HZ-SD
V-SD
335DEW21   GCP-3D  39 24 00.80394  -78 04 35.85693    204.844 0.00500
0.00500



************************************************************
    INPUT VECTORS
************************************************************

SESSION NAME           VECTOR(m)   ------ Covariance (m) [unscaled] ---
---
                        DX/DY/DZ          standard deviations in
brackets
335DEW21 to 335DEW24 (1) -1552.6393  2.9428e-007 (0.0005)
                     -13948.7200  -2.2869e-007 5.2835e-007 (0.0007)
                     -16328.2488  1.5785e-007 -2.8563e-007 3.7197e-007
(0.0006)



************************************************************
    OUTPUT VECTOR RESIDUALS (East, North, Height - Local Level)
************************************************************
```

```
SESSION NAME                -- RE --    -- RN --    -- RH --      - PPM -
DIST - STD -
                               (m)         (m)         (m)
(km)   (m)
335DEW21 to 335DEW24 (1)     -0.0000     -0.0000     -0.0000        0.000
21.5  0.0011
                           --------------------------------
               RMS            0.0000      0.0000      0.0000

 $ - This session is flagged as a 3-sigma outlier


*****************************************************************
    CONTROL POINT RESIDUALS (ADJUSTMENT MADE)
*****************************************************************

STA. NAME     -- RE --    -- RN --    -- RH --
                 (m)         (m)         (m)
335DEW21        0.0000      0.0000     -0.0000
             --------------------------------
RMS             0.0000      0.0000      0.0000



*****************************************************************
    OUTPUT STATION COORDINATES (LAT/LONG/HT)
*****************************************************************

STA_ID       -- LATITUDE --   -- LONGITUDE -- - ELLHGT -    ORTHOHGT
335DEW21    39 24 00.80394   -78 04 35.85693    204.8439    238.8691
335DEW24    39 12 37.35243   -78 07 39.29181    175.3710    209.1606



*****************************************************************
    OUTPUT STATION COORDINATES (GRID)
*****************************************************************

STA_ID        - EASTING -    - NORTHING - - ELLHGT -    ORTHOHGT
                   (m)            (m)         (m)         (m)
335DEW21      751729.1660   4365269.4907    204.8439    238.8691
335DEW24      748010.6330   4344054.5060    175.3710    209.1606



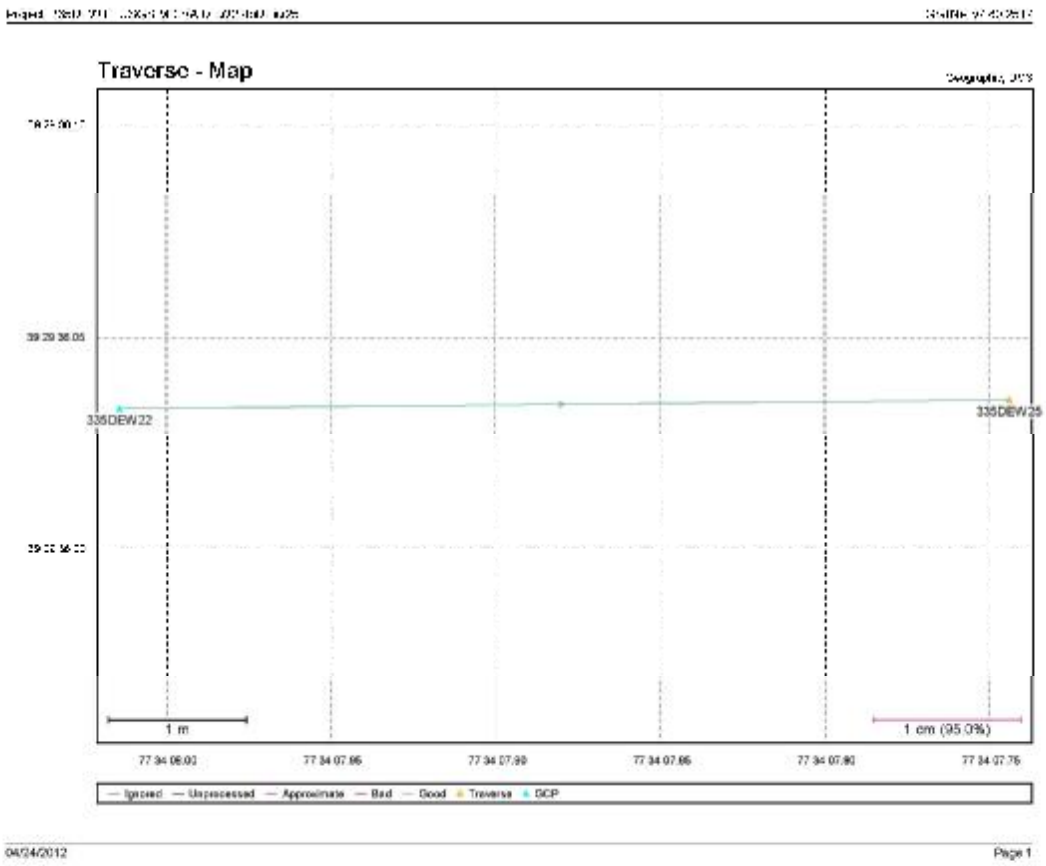
*****************************************************************
    OUTPUT VARIANCE/COVARIANCE
*****************************************************************
                                                 2
STA_ID       SE/SN/SUP   --------- CX matrix (m )-----------
             (95.00 %)   (not scaled by confidence level)
                (m)           (ECEF, XYZ cartesian)
335DEW21        0.0122   2.5000e-005
                0.0122   3.2300e-022 2.5000e-005
                0.0122   -1.2674e-021 -3.6466e-021 2.5000e-005
```

```
335DEW24        0.0123  2.5294e-005
                0.0123  -2.2869e-007 2.5528e-005
                0.0124  1.5785e-007 -2.8563e-007 2.5372e-005



************************************************************
************************************************************
```

Map of Traverse 335DEW22 to 335DEW25




```
            ************************************************
            * NETWORK - WEIGHTED GPS NETWORK ADJUSTMENT      *
            *                                                *
            * (c) Copyright NovAtel Inc., (2007)             *
            *                                                *
            * Version: 7.80.2517                             *
            *                                                *
            * FILE: D:\Projects\335 DEW\2_Operations\4_Control\Grafnet
Project\335DEW11 USGS MD VA DEW22toDEW25.net
            ************************************************

DATE(m/d/y): Fri.   3/16/12   TIME:  9:48:01



*************************************************************

  DATUM:            'NAD83'
  GRID:             UTM, Zone 18
  SCALE_FACTOR:     51.8000
```

CONFIDENCE LEVEL: 95.00 % (Scale factor is 2.4479)

****
INPUT CONTROL/CHECK POINTS
****

STA_ID TYPE -- LATITUDE -- -- LONGITUDE -- ELLHGT - HZ-SD V-SD
335DEW22 GCP-3D 39 29 36.03322 -77 34 08.01429 150.578 0.00500 0.00500

****
INPUT VECTORS
****

SESSION NAME VECTOR(m) ------ Covariance (m) [unscaled] ------
                DX/DY/DZ standard deviations in brackets
335DEW22 to 335DEW25 (1) 6.3227 2.0197e-007 (0.0004)
                1.3164 -1.7845e-007 7.1649e-007 (0.0008)
                0.1472 1.1717e-007 -4.2769e-007 5.5882e-007 (0.0007)

335DEW22 to 335DEW25 (2) 6.3308 3.1319e-007 (0.0006)
                1.3128 -3.2514e-007 1.0181e-006 (0.0010)
                0.1519 1.4281e-007 -5.2986e-007 6.8378e-007 (0.0008)

****
OUTPUT VECTOR RESIDUALS (East, North, Height - Local Level)
****

SESSION NAME	-- RE -- (m)	-- RN -- (m)	-- RH -- (m)	- PPM - DIST (km)	STD - (m)
335DEW22 to 335DEW25 (1)	0.0030	0.0005	0.0027	636.649	0.0 0.0087
335DEW22 to 335DEW25 (2)	-0.0041	0.0003	-0.0043	922.490	0.0 0.0102
RMS	0.0036	0.0004	0.0036		

$ - This session is flagged as a 3-sigma outlier

****
CONTROL POINT RESIDUALS (ADJUSTMENT MADE)
****

```
STA. NAME     -- RE --    -- RN --    -- RH --
                (m)         (m)         (m)
335DEW22        0.0000      0.0000      0.0000
              -------------------------------
RMS             0.0000      0.0000      0.0000


****************************************************************
    OUTPUT STATION COORDINATES (LAT/LONG/HT)
****************************************************************

STA_ID       -- LATITUDE --   -- LONGITUDE -- - ELLHGT -
335DEW22    39 29 36.03322  -77 34 08.01429   150.5776
335DEW25    39 29 36.03536  -77 34 07.74391   150.7322


****************************************************************
    OUTPUT STATION COORDINATES (GRID)
****************************************************************

STA_ID        - EASTING -   - NORTHING - - ELLHGT -
                   (m)           (m)         (m)
335DEW22     279093.7592  4374676.3925   150.5776
335DEW25     279100.2205  4374676.2743   150.7322


****************************************************************
    OUTPUT VARIANCE/COVARIANCE
****************************************************************
                                          2
STA_ID       SE/SN/SUP  --------- CX matrix (m )-----------
             (95.00 %)  (not scaled by confidence level)
                (m)          (ECEF, XYZ cartesian)
335DEW22        0.0122  2.5000e-005
                0.0122  -8.3723e-022 2.5000e-005
                0.0122  -2.1176e-022 -8.4703e-022 2.5000e-005

335DEW25        0.0133  3.1296e-005
                0.0137  -5.9907e-006 4.6593e-005
                0.0186  3.3290e-006 -1.2255e-005 4.0928e-005



****************************************************************
    VARIANCE FACTOR = 1.0005

    Note: Values < 1.0 indicate statistics are pessimistic, while
          values > 1.0 indicate optimistic statistics. Entering this
          value as the network adjustment scale factor will bring
          variance factor to one.
****************************************************************
```

APPENDIX A

The NGS Data Sheet

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

```
DATABASE = NGSIDB , PROGRAM = datasheet95, VERSION = 7.87.6.1
1        National Geodetic Survey,   Retrieval Date = APRIL 24, 2012
 AI6312
**********************************************************************
 AI6312  DESIGNATION -  C12 050
 AI6312  PID         -  AI6312
 AI6312  STATE/COUNTY-  MD/ALLEGANY
 AI6312  USGS QUAD   -  CUMBERLAND (1993)
 AI6312
 AI6312                        *CURRENT SURVEY CONTROL
 AI6312
_____________________________________________________________________
 AI6312* NAD 83(2007)-  39 41 43.29695(N)    078 47 16.08771(W)
ADJUSTED
 AI6312* NAVD 88     -       215.41   (meters)     706.7    (feet)
LEVELING
 AI6312
_____________________________________________________________________
 AI6312  EPOCH DATE  -        2002.00
 AI6312  X           -     955,595.199 (meters)
COMP
 AI6312  Y           -  -4,820,721.797 (meters)
COMP
 AI6312  Z           -   4,052,133.512 (meters)
COMP
 AI6312  LAPLACE CORR-          -6.45  (seconds)
DEFLEC09
 AI6312  ELLIP HEIGHT-         182.899 (meters)          (02/10/07)
ADJUSTED
 AI6312  GEOID HEIGHT-         -32.50  (meters)
GEOID09
 AI6312
 AI6312  ------- Accuracy Estimates (at 95% Confidence Level in cm) ---
-----
 AI6312  Type    PID    Designation                       North   East
Ellip
 AI6312  ------------------------------------------------------------
-----
 AI6312  NETWORK AI6312 C12 050                            0.76   0.63
1.72
 AI6312  ------------------------------------------------------------
-----
 AI6312  VERT ORDER  -  THIRD ?
 AI6312
 AI6312.The horizontal coordinates were established by GPS observations
 AI6312.and adjusted by the National Geodetic Survey in February 2007.
```

```
 AI6312
 AI6312.The datum tag of NAD 83(2007) is equivalent to NAD
83(NSRS2007).
 AI6312.See www.ngs.noaa.gov/NationalReadjustment for more information.
 AI6312
 AI6312.The horizontal coordinates are valid at the epoch date
displayed above
 AI6312.which is a decimal equivalence of Year/Month/Day.
 AI6312
 AI6312.The orthometric height was determined by differential leveling.
 AI6312.The vertical network tie was performed by a horz. field party
for horz.
 AI6312.obs reductions. Reset procedures were used to establish the
elevation.
 AI6312
 AI6312.Photographs are available for this station.
 AI6312
 AI6312.The X, Y, and Z were computed from the position and the
ellipsoidal ht.
 AI6312
 AI6312.The Laplace correction was computed from DEFLEC09 derived
deflections.
 AI6312
 AI6312.The ellipsoidal height was determined by GPS observations
 AI6312.and is referenced to NAD 83.
 AI6312
 AI6312.The geoid height was determined by GEOID09.
 AI6312
 AI6312;                    North         East     Units Scale Factor
Converg.
 AI6312;SPC MD       -   226,707.378   246,658.220   MT  1.00005214   -
1 07 19.5
 AI6312;SPC MD       -   743,789.12    809,244.51    sFT  1.00005214   -
1 07 19.5
 AI6312;UTM  17      - 4,396,285.493   689,677.789   MT  1.00004296
+1 24 48.1
 AI6312
 AI6312!             -  Elev Factor  x  Scale Factor =   Combined
Factor
 AI6312!SPC MD       -   0.99997131  x   1.00005214  =   1.00002345
 AI6312!UTM  17      -   0.99997131  x   1.00004296  =   1.00001427
 AI6312
 AI6312:                Primary Azimuth Mark                    Grid
Az
 AI6312:SPC MD       -  C12 010                                  250 03
11.0
 AI6312:UTM  17      -  C12 010                                  247 31
03.4
 AI6312
 AI6312|-----------------------------------------------------------------
------|
 AI6312| PID    Reference Object                    Distance
Geod. Az  |
 AI6312|
dddmmss.s |
 AI6312| AI6315 C12 040                           238.130 METERS
21535     |
```

```
 AI6312| AI6319 C12 010                              APPROX. 1.2 KM
2485551.5 |
 AI6312| AI6324 C12 020                              APPROX. 1.4 KM
2532328.9 |
 AI6312|-----------------------------------------------------------------
------|
 AI6312
 AI6312                           SUPERSEDED SURVEY CONTROL
 AI6312
 AI6312  ELLIP H (08/30/02)  182.901  (m)                        GP(
) 4 2
 AI6312  NAD 83(1991)-  39 41 43.29716(N)    078 47 16.08744(W) AD(
) 1
 AI6312  ELLIP H (04/20/00)  182.851  (m)                        GP(
) 4 1
 AI6312
 AI6312.Superseded values are not recommended for survey control.
 AI6312.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 AI6312.See file dsdata.txt to determine how the superseded data were
derived.
 AI6312
 AI6312_U.S. NATIONAL GRID SPATIAL ADDRESS: 17SPD8967796285(NAD 83)
 AI6312
 AI6312_MARKER: DD = SURVEY DISK
 AI6312_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 AI6312_SP_SET: SET IN A CONCRETE MONUMENT
 AI6312_STAMPING: C12 050
 AI6312_MARK LOGO: MD-001
 AI6312_MAGNETIC: R = STEEL ROD IMBEDDED IN MONUMENT
 AI6312_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
 AI6312_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 AI6312+SATELLITE: SATELLITE OBSERVATIONS - March 19, 2011
 AI6312
 AI6312  HISTORY     - Date     Condition        Report By
 AI6312  HISTORY     - 1999     MONUMENTED       MD-001
 AI6312  HISTORY     - 20110319 GOOD             MDLPP
 AI6312
 AI6312                            STATION DESCRIPTION
 AI6312
 AI6312'DESCRIBED BY ALLEGANY COUNTY MARYLAND 1999
 AI6312'TO REACH 5 MI (8.0 KM) NORTH OF CUMBERLAND.  IN ALLEGANY
COUNTY,
 AI6312'MARYLAND, FROM CITY HALL IN CUMBERLAND, 0.2 MI (0.3 KM) NORTH
ON
 AI6312'BEDFORD STREET TO HENDERSON BOULEVARD, 0.8 MI (1.3 KM)
NORTHEASTERLY
 AI6312'TO OLD ROUTE 40, 2 MI (3.2 KM) THROUGH THE NARROWS TO MARYLAND
ROUTE
 AI6312'36, 2.2 MI (3.5 KM) NORTH TO MARYLAND ROUTE 35 AT
CORRIGANVILLE, 200
 AI6312'FEET (61.0 M) NORTH TO KRIEGBAUM ROAD, 500 FEET (152.4 M) SOUTH
TO
 AI6312'CORRIGAN DRIVE, 600 FEET (182.9 M) TO ATHLETIC FIELD, CONCRETE
 AI6312'MONUMENT NEAR WASTEWATER MANHOLE, STANDARD DISK MARKED C12 050.
 AI6312                            STATION RECOVERY (2011)
 AI6312'RECOVERY NOTE BY  MASON DIXON LN PRES PART 2011 (PAS)
 AI6312'RECOVERED IN GOOD CONDITION.
```


DO NOT DISTURB
012 050

The NGS Data Sheet

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

```
DATABASE = NGSIDB , PROGRAM = datasheet95, VERSION = 7.87.6.1
1        National Geodetic Survey,   Retrieval Date = APRIL 24, 2012
 AJ8025
**********************************************************************
 AJ8025  CBN         -  This is a Cooperative Base Network Control
Station.
 AJ8025  DESIGNATION -  CLEWIS
 AJ8025  PID         -  AJ8025
 AJ8025  STATE/COUNTY-  MD/FREDERICK
 AJ8025  USGS QUAD   -  URBANA (1986)
 AJ8025
 AJ8025                        *CURRENT SURVEY CONTROL
 AJ8025
_____________________________________________________________________
 AJ8025* NAD 83(2007)-  39 17 34.38482(N)    077 18 53.40005(W)
ADJUSTED
 AJ8025* NAVD 88     -       178.221  (meters)     584.71   (feet)
ADJUSTED
 AJ8025
_____________________________________________________________________
 AJ8025  EPOCH DATE  -        2002.00
 AJ8025  X           -   1,085,432.307 (meters)
COMP
 AJ8025  Y           -  -4,822,263.767 (meters)
COMP
 AJ8025  Z           -   4,017,626.474 (meters)
COMP
 AJ8025  LAPLACE CORR-           6.12  (seconds)
DEFLEC09
 AJ8025  ELLIP HEIGHT-         146.115 (meters)          (02/10/07)
ADJUSTED
 AJ8025  GEOID HEIGHT-         -32.13  (meters)
GEOID09
 AJ8025  DYNAMIC HT  -         178.126 (meters)     584.40  (feet)
COMP
 AJ8025
 AJ8025  ------- Accuracy Estimates (at 95% Confidence Level in cm) ---
-----
 AJ8025  Type    PID    Designation                        North   East
Ellip
 AJ8025  ------------------------------------------------------------
-----
 AJ8025  NETWORK AJ8025 CLEWIS                              0.73   0.57
2.04
 AJ8025  ------------------------------------------------------------
-----
 AJ8025  MODELED GRAV-     980,088.5   (mgal)
NAVD 88
 AJ8025
```

```
 AJ8025  VERT ORDER  -  SECOND    CLASS I
 AJ8025
 AJ8025.The horizontal coordinates were established by GPS observations
 AJ8025.and adjusted by the National Geodetic Survey in February 2007.
 AJ8025
 AJ8025.The datum tag of NAD 83(2007) is equivalent to NAD
83(NSRS2007).
 AJ8025.See www.ngs.noaa.gov/NationalReadjustment for more information.
 AJ8025
 AJ8025.The horizontal coordinates are valid at the epoch date
displayed above
 AJ8025.which is a decimal equivalence of Year/Month/Day.
 AJ8025
 AJ8025.The orthometric height was determined by differential leveling
and
 AJ8025.adjusted in November 2003.
 AJ8025
 AJ8025.No vertical observational check was made to the station.
 AJ8025
 AJ8025.Photographs are available for this station.
 AJ8025
 AJ8025.The X, Y, and Z were computed from the position and the
ellipsoidal ht.
 AJ8025
 AJ8025.The Laplace correction was computed from DEFLEC09 derived
deflections.
 AJ8025
 AJ8025.The ellipsoidal height was determined by GPS observations
 AJ8025.and is referenced to NAD 83.
 AJ8025
 AJ8025.The geoid height was determined by GEOID09.
 AJ8025
 AJ8025.The dynamic height is computed by dividing the NAVD 88
 AJ8025.geopotential number by the normal gravity value computed on the
 AJ8025.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 AJ8025.degrees latitude (g = 980.6199 gals.).
 AJ8025
 AJ8025.The modeled gravity was interpolated from observed gravity
values.
 AJ8025
 AJ8025;                   North         East     Units Scale Factor
Converg.
 AJ8025;SPC MD       -   180,567.360   372,840.612   MT  0.99997629   -
0 11 51.4
 AJ8025;SPC MD       -   592,411.41  1,223,227.91   sFT  0.99997629   -
0 11 51.4
 AJ8025;UTM  18      - 4,351,833.694   300,372.651   MT  1.00009070   -
1 27 59.2
 AJ8025
 AJ8025!             -  Elev Factor  x  Scale Factor =   Combined
Factor
 AJ8025!SPC MD       -   0.99997708  x   0.99997629  =   0.99995337
 AJ8025!UTM  18      -   0.99997708  x   1.00009070  =   1.00006777
 AJ8025
 AJ8025                          SUPERSEDED SURVEY CONTROL
 AJ8025
```

```
 AJ8025  NAD 83(1991)-  39 17 34.38494(N)    077 18 53.40027(W) AD(
) A
 AJ8025  ELLIP H (02/12/02)  146.117  (m)                       GP(
) 4 1
 AJ8025  NAVD 88 (02/12/02)  178.2    (m)          585.     (f) GPS OBS
 AJ8025
 AJ8025.Superseded values are not recommended for survey control.
 AJ8025.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 AJ8025.See file dsdata.txt to determine how the superseded data were
derived.
 AJ8025
 AJ8025_U.S. NATIONAL GRID SPATIAL ADDRESS: 18SUJ0037251833(NAD 83)
 AJ8025
 AJ8025_MARKER: DD = SURVEY DISK
 AJ8025_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 AJ8025_STAMPING: CLEWIS 2000
 AJ8025_MARK LOGO: MD-021
 AJ8025_MAGNETIC: O = OTHER; SEE DESCRIPTION
 AJ8025_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
 AJ8025+STABILITY: SURFACE MOTION
 AJ8025_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 AJ8025+SATELLITE: SATELLITE OBSERVATIONS - July 15, 2009
 AJ8025
 AJ8025  HISTORY     - Date     Condition        Report By
 AJ8025  HISTORY     - 2000     MONUMENTED       MD-021
 AJ8025  HISTORY     - 20010615 GOOD             MDSHA
 AJ8025  HISTORY     - 20021031 GOOD             POWELL
 AJ8025  HISTORY     - 20050405 GOOD             USPSQD
 AJ8025  HISTORY     - 20090715 GOOD             GPSSS
 AJ8025
 AJ8025                          STATION DESCRIPTION
 AJ8025
 AJ8025'DESCRIBED BY FREDERICK COUNTY MARYLAND 2000 (JE)
 AJ8025'THE STATION IS LOCATED ABOUT 10.0 MILES (16.1 KM) SOUTHEAST OF
 AJ8025'FREDERICK, 10.1 MILES (16.3 KM) SOUTHWEST OF MOUNT AIRY, AND
1.0 MILES
 AJ8025'(1.6 KM) NORTH OF HYATTSTOWN.  TO REACH THE STATION FROM THE
 AJ8025'INTERSTATE 270 BRIDGE OVER STATE HIGHWAY 109 IN HYATTSTOWN, GO
EAST
 AJ8025'ALONG STATE HIGHWAY 109 FOR 0.5 MILES (0.8 KM) TO STATE HIGHWAY
355.
 AJ8025'TURN LEFT AND GO NORTH ALONG STATE HIGHWAY 355 FOR 0.6 TO STATE
 AJ8025'HIGHWAY 75 LEADING NORTHEAST.  CONTINUE NORTH ALONG STATE
HIGHWAY 355
 AJ8025'FOR 0.25 MILES (0.40 KM) TO THE TOP OF THE GRADE AND THE
STATION ON
 AJ8025'THE LEFT.  THE STATION IS A FREDERICK COUNTY SURVEY DISK SET IN
THE
 AJ8025'TOP OF A 10 INCH ROUND CONCRETE MONUMENT WHICH IS FLUSH WITH
THE
 AJ8025'GROUND.  IT IS 32.0 FEET (9.8 M) WEST OF THE CENTER LINE OF THE
ROAD,
 AJ8025'25.5 FEET (7.8 M) SOUTH OF POWER POLE NUMBER 1097, 112.5
NORTHWEST AND
 AJ8025'ACROSS THE ROAD FROM TELEPHONE POLE NUMBER 1231, 142.7 FEET
(43.5 M)
 AJ8025'NORTH OF POWER POLE NUMBER 1098, AND 1 FOOT (0.3 M) EAST OF A
```

```
AJ8025'CARSONITE WITNESS POST.
AJ8025
AJ8025                          STATION RECOVERY (2001)
AJ8025
AJ8025'RECOVERY NOTE BY MARYLAND DOT HIGHWAY ADMINISTRATION 2001 (SFK)
AJ8025'RECOVERED AS DESCRIBED.
AJ8025
AJ8025                          STATION RECOVERY (2002)
AJ8025
AJ8025'RECOVERY NOTE BY N A POWELL AND ASSOCIATES 2002 (BAP)
AJ8025'RECOVERED IN GOOD CONDITION.
AJ8025
AJ8025                          STATION RECOVERY (2005)
AJ8025
AJ8025'RECOVERY NOTE BY US POWER SQUADRON 2005 (FM)
AJ8025'RECOVERED IN GOOD CONDITION.
AJ8025
AJ8025                          STATION RECOVERY (2009)
AJ8025
AJ8025'RECOVERY NOTE BY GPS SALES AND SERVICES 2009 (MB)
AJ8025'RECOVERED BY MIKE BUTLER OF NORTHERN BAY SURVEYS
```

The NGS Data Sheet

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

```
DATABASE = NGSIDB , PROGRAM = datasheet95, VERSION = 7.87.6.1
1        National Geodetic Survey,   Retrieval Date = APRIL 24, 2012
 DM6144
**********************************************************************
 DM6144  PACS        -  This is a Primary Airport Control Station.
 DM6144  DESIGNATION -  HWY 1
 DM6144  PID         -  DM6144
 DM6144  STATE/COUNTY-  VA/FAUQUIER
 DM6144  USGS QUAD   -  MIDLAND (1983)
 DM6144
 DM6144                        *CURRENT SURVEY CONTROL
 DM6144
______________________________________________________________________
 DM6144* NAD 83(2007)-  38 35 08.87989(N)    077 42 43.87124(W)
ADJUSTED
 DM6144* NAVD 88     -        96.87   (meters)     317.8    (feet)  GPS
OBS
 DM6144
______________________________________________________________________
 DM6144  EPOCH DATE  -        2002.00
 DM6144  X           -   1,062,449.708 (meters)
COMP
 DM6144  Y           -  -4,877,818.652 (meters)
COMP
 DM6144  Z           -   3,956,519.194 (meters)
COMP
 DM6144  LAPLACE CORR-           0.63  (seconds)
DEFLEC09
 DM6144  ELLIP HEIGHT-          64.754 (meters)          (03/03/11)
ADJUSTED
 DM6144  GEOID HEIGHT-         -32.10  (meters)
GEOID09
 DM6144  HORZ ORDER  -  B
 DM6144  ELLP ORDER  -  FOURTH    CLASS II
 DM6144
 DM6144.This mark is at Warrenton-Fauquier Airport  (HWY)
 DM6144
 DM6144.The horizontal coordinates were established by GPS observations
 DM6144.and adjusted by the AERO-METRIC ENG INC in March 2011.
 DM6144
 DM6144.The datum tag of NAD 83(2007) is equivalent to NAD
83(NSRS2007).
 DM6144.See www.ngs.noaa.gov/NationalReadjustment for more information.
 DM6144
 DM6144.The horizontal coordinates are valid at the epoch date
displayed above
 DM6144.which is a decimal equivalence of Year/Month/Day.
 DM6144
 DM6144.The orthometric height was determined by GPS observations and a
```

```
 DM6144.high-resolution geoid model.
 DM6144
 DM6144.GPS derived orthometric heights for airport stations designated
as
 DM6144.PACS or SACS are published to 2 decimal places.  This maintains
 DM6144.centimeter relative accuracy between the PACS and SACS.  It
does
 DM6144.not indicate centimeter accuracy relative to other marks which
are
 DM6144.part of the NAVD 88 network.
 DM6144
 DM6144.The X, Y, and Z were computed from the position and the
ellipsoidal ht.
 DM6144
 DM6144.The Laplace correction was computed from DEFLEC09 derived
deflections.
 DM6144
 DM6144.The ellipsoidal height was determined by GPS observations
 DM6144.and is referenced to NAD 83.
 DM6144
 DM6144.The geoid height was determined by GEOID09.
 DM6144
 DM6144;                     North         East     Units Scale Factor
Converg.
 DM6144;SPC VA N     - 2,102,316.812 3,568,637.179   MT  0.99994854
+0 29 30.1
 DM6144;SPC VA N     - 6,897,351.07 11,708,103.81   sFT  0.99994854
+0 29 30.1
 DM6144;UTM  18      - 4,274,302.668   263,764.137   MT  1.00028730   -
1 41 32.4
 DM6144
 DM6144!             -  Elev Factor  x  Scale Factor =   Combined
Factor
 DM6144!SPC VA N     -   0.99998984  x   0.99994854  =   0.99993838
 DM6144!UTM  18      -   0.99998984  x   1.00028730  =   1.00027714
 DM6144
 DM6144                          SUPERSEDED SURVEY CONTROL
 DM6144
 DM6144.No superseded survey control is available for this station.
 DM6144
 DM6144_U.S. NATIONAL GRID SPATIAL ADDRESS: 18STH6376474302(NAD 83)
 DM6144
 DM6144_MARKER: F = FLANGE-ENCASED ROD
 DM6144_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)
 DM6144_STAMPING: HWY 1 2009
 DM6144_MARK LOGO: LOCSUR
 DM6144_PROJECTION: FLUSH
 DM6144_MAGNETIC: I = MARKER IS A STEEL ROD
 DM6144_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
 DM6144_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 DM6144+SATELLITE: SATELLITE OBSERVATIONS - October 12, 2009
 DM6144_ROD/PIPE-DEPTH: 3.2  meters
 DM6144_SLEEVE-DEPTH  : 1.0 meters
 DM6144
 DM6144  HISTORY     - Date     Condition        Report By
 DM6144  HISTORY     - 20091012 MONUMENTED       AME
 DM6144
```

```
 DM6144                          STATION DESCRIPTION
 DM6144
 DM6144'DESCRIBED BY AERO-METRIC ENGINEERING INCORPORATED 2009 (CPF)
 DM6144'STATION IS LOCATED ABOUT 17 KM (10.6 MI) SOUTHEAST OF
WARRENTON, 2
 DM6144'KM(1.25 MI) SOUTHEAST OF THE MIDLAND COMMUNITY, 5 KM (3.1 MI)
EAST OF
 DM6144'THE JUNCTION OF US HIGHWAY 17 AND STATE HIGHWAY 28, AT THE
 DM6144'WARRENTON-FAUQUIER COUNTY AIRPORT, ALONG THE RUNWAY 15-33.
 DM6144'OWNERSHIP--FAUQUIER COUNTY AIRPORT, C/0 AIRPORT MANAGER MICHAEL
P
 DM6144'ANDERSON, 5075 AIRPORT ROAD, MIDLAND VA 22728, PHONE 540-347-
2421.
 DM6144'
 DM6144'TO REACH FROM THE JUNCTION OF HIGHWAYS 17 AND 28, GO NORTHEAST
ON
 DM6144'HIGHWAY 28 FOR 5.09 KM (3.2 MI) TO GERMANTOWN ROAD.  TURN
RIGHT,
 DM6144'SOUTHEAST, ON GERMANTOWN ROAD FOR 0.83 KM (0.5 MI) TO SR 610
MIDLAND
 DM6144'ROAD, CONTINUE SOUTHEASTERLY FOR 1.18 KM (0.7 MI) (0.7 MI) TO
AIRPORT
 DM6144'ROAD ON THE RIGHT.  TURN RIGHT, WESTERLY, ON AIRPORT ROAD TO
THE
 DM6144'AIRPORT ENTRANCE ON THE RIGHT.  TURN RIGHT INTO THE AIRPORT AND
 DM6144'PROCEED 0.22 KM (0.1 MI) TO A ROAD BETWEEN THE HANGERS.  TURN
LEFT AND
 DM6144'GO 0.11 KM (0.1 MI) TO THE OFFICE ON THE RIGHT.  FROM THE
OFFICE GO
 DM6144'SOUTHWEST 0.16 KM (0.1 MI) ACROSS THE RAMP TO THE TAXIWAY.
TURN LEFT
 DM6144'ALONG THE TAXIWAY 0.21 KM (0.1 MI) TO RUNWAY EXIT RAMP.  TURN
RIGHT
 DM6144'AND GO 0.12 KM (0.1 MI) TO RUNWAY 15-33.  TURN LEFT AND PROCEED
 DM6144'SOUTHEAST 0.36 KM (0.2 MI) ALONG THE RUNWAY TO THE WINDSOCK ON
THE
 DM6144'RIGHT.  TURN RIGHT AND GO 0.13 KM (0.1 MI) ACROSS THE GRASS TO
THE
 DM6144'WIND SOCK AND THE MARK.
 DM6144'
 DM6144'THE STATION IS A PUNCH MARK IN THE TOP OF A STAINLESS STEEL ROD
DRIVEN
 DM6144'TO A REFUSAL DEPTH OF 3.2 M.  12.37 M (40.6 FT) SOUTH OF THE
WIND
 DM6144'SOCK.  122.32 M (401.3 FT) WEST OF THE WEST EDGE OF RUNWAY 15-
33.
 DM6144'58.31 M (191.3 FT) EAST OF A FENCE SUPPORT POST.  0.45 M (1.5
FT) EAST
 DM6144'OF A FIBERGLASS WITNESS POST. HAND HELD GPS POSITION N38-35-09
W
 DM6144'077-42-44.  THIS STATION IS DESIGNATED AS A PRIMARY AIRPORT
CONTROL
 DM6144'STATION.
```


AIR BP

The NGS Data Sheet

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

```
DATABASE = NGSIDB , PROGRAM = datasheet95, VERSION = 7.87.6.1
1        National Geodetic Survey,   Retrieval Date = APRIL 24, 2012
 HV3503
***********************************************************************
 HV3503  CBN         -  This is a Cooperative Base Network Control
Station.
 HV3503  DESIGNATION -  J 91
 HV3503  PID         -  HV3503
 HV3503  STATE/COUNTY-  VA/LOUDOUN
 HV3503  USGS QUAD   -  MIDDLEBURG (1981)
 HV3503
 HV3503                        *CURRENT SURVEY CONTROL
 HV3503
_____________________________________________________________________
 HV3503* NAD 83(2007)-  38 58 29.39878(N)    077 41 26.89196(W)
ADJUSTED
 HV3503* NAVD 88     -       141.991  (meters)     465.85   (feet)
ADJUSTED
 HV3503
_____________________________________________________________________
 HV3503  EPOCH DATE  -        2002.00
 HV3503  X           -   1,058,510.820 (meters)
COMP
 HV3503  Y           -  -4,851,027.872 (meters)
COMP
 HV3503  Z           -   3,990,214.294 (meters)
COMP
 HV3503  LAPLACE CORR-           6.35  (seconds)
DEFLEC09
 HV3503  ELLIP HEIGHT-         109.610 (meters)          (02/10/07)
ADJUSTED
 HV3503  GEOID HEIGHT-         -32.39  (meters)
GEOID09
 HV3503  DYNAMIC HT  -         141.909 (meters)     465.58  (feet)
COMP
 HV3503
 HV3503  ------- Accuracy Estimates (at 95% Confidence Level in cm) ---
-----
 HV3503  Type    PID    Designation                        North   East
Ellip
 HV3503  ------------------------------------------------------------
-----
 HV3503  NETWORK HV3503 J 91                                 0.53   0.43
1.69
 HV3503  ------------------------------------------------------------
-----
 HV3503  MODELED GRAV-     980,051.0   (mgal)
NAVD 88
 HV3503
```

```
 HV3503  VERT ORDER  -  SECOND    CLASS 0
 HV3503
 HV3503.The horizontal coordinates were established by GPS observations
 HV3503.and adjusted by the National Geodetic Survey in February 2007.
 HV3503
 HV3503.The datum tag of NAD 83(2007) is equivalent to NAD
83(NSRS2007).
 HV3503.See www.ngs.noaa.gov/NationalReadjustment for more information.
 HV3503
 HV3503.The horizontal coordinates are valid at the epoch date
displayed above
 HV3503.which is a decimal equivalence of Year/Month/Day.
 HV3503
 HV3503.The orthometric height was determined by differential leveling
and
 HV3503.adjusted in June 1991.
 HV3503
 HV3503.Photographs are available for this station.
 HV3503
 HV3503.The X, Y, and Z were computed from the position and the
ellipsoidal ht.
 HV3503
 HV3503.The Laplace correction was computed from DEFLEC09 derived
deflections.
 HV3503
 HV3503.The ellipsoidal height was determined by GPS observations
 HV3503.and is referenced to NAD 83.
 HV3503
 HV3503.The geoid height was determined by GEOID09.
 HV3503
 HV3503.The dynamic height is computed by dividing the NAVD 88
 HV3503.geopotential number by the normal gravity value computed on the
 HV3503.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 HV3503.degrees latitude (g = 980.6199 gals.).
 HV3503
 HV3503.The modeled gravity was interpolated from observed gravity
values.
 HV3503
 HV3503;                    North         East     Units Scale Factor
Converg.
 HV3503;SPC VA N     - 2,145,516.425 3,570,119.457   MT  0.99996779
+0 30 18.1
 HV3503;SPC VA N     - 7,039,081.80 11,712,966.92   sFT  0.99996779
+0 30 18.1
 HV3503;UTM  18      - 4,317,427.986   266,898.027   MT  1.00026913   -
1 41 35.6
 HV3503
 HV3503!             -  Elev Factor  x  Scale Factor =   Combined
Factor
 HV3503!SPC VA N     -   0.99998280  x   0.99996779  =   0.99995059
 HV3503!UTM  18      -   0.99998280  x   1.00026913  =   1.00025193
 HV3503
 HV3503                          SUPERSEDED SURVEY CONTROL
 HV3503
 HV3503  NAD 83(1993)-  38 58 29.39904(N)    077 41 26.89183(W) AD(
) A
```

```
 HV3503  ELLIP H (07/14/04)  109.609  (m)                        GP(
) 3 2
 HV3503  NAD 83(1993)-  38 58 29.39910(N)    077 41 26.89198(W) AD(
) A
 HV3503  ELLIP H (08/14/01)  109.541  (m)                        GP(
) 4 1
 HV3503  NAD 83(1995)-  38 58 29.39926(N)    077 41 26.89169(W) AD(
) 1
 HV3503  ELLIP H (04/23/01)  109.561  (m)                        GP(
) 4 1
 HV3503  NAVD 88 (04/23/01)  141.99   (m)          465.8    (f)
LEVELING    3
 HV3503  NGVD 29 (??/??/??)  142.190  (m)          466.50   (f)
ADJUSTED    2 0
 HV3503
 HV3503.Superseded values are not recommended for survey control.
 HV3503.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 HV3503.See file dsdata.txt to determine how the superseded data were
derived.
 HV3503
 HV3503_U.S. NATIONAL GRID SPATIAL ADDRESS: 18STJ6689817427(NAD 83)
 HV3503
 HV3503_MARKER: DB = BENCH MARK DISK
 HV3503_SETTING: 66 = SET IN ROCK OUTCROP
 HV3503_SP_SET: ROCK OUTCROP
 HV3503_STAMPING: J 91 1935
 HV3503_MARK LOGO: CGS
 HV3503_MAGNETIC: O = OTHER; SEE DESCRIPTION
 HV3503_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
 HV3503+STABILITY: POSITION/ELEVATION WELL
 HV3503_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 HV3503+SATELLITE: SATELLITE OBSERVATIONS - December 08, 2011
 HV3503
 HV3503  HISTORY     - Date     Condition        Report By
 HV3503  HISTORY     - 1935     MONUMENTED       CGS
 HV3503  HISTORY     - 1943     GOOD             CGS
 HV3503  HISTORY     - 20000223 GOOD             VADHT
 HV3503  HISTORY     - 20000315 GOOD             VADOT
 HV3503  HISTORY     - 20020214 GOOD             DEWDAV
 HV3503  HISTORY     - 20030422 GOOD             BOWMAN
 HV3503  HISTORY     - 20030521 GOOD             ENGGRO
 HV3503  HISTORY     - 20030813 GOOD             INDIV
 HV3503  HISTORY     - 20050319 GOOD             GEOCAC
 HV3503  HISTORY     - 20050920 GOOD             GEOMET
 HV3503  HISTORY     - 20111208 GOOD             JCLS
 HV3503
 HV3503                          STATION DESCRIPTION
 HV3503
 HV3503'DESCRIBED BY COAST AND GEODETIC SURVEY 1935
 HV3503'2.4 MI E FROM MIDDLEBURG.
 HV3503'ABOUT 2.4 MILES EAST ALONG U.S. HIGHWAY 50 FROM THE NATIONAL
 HV3503'BANK AT MIDDLEBURG, LOUDOUN COUNTY, ABOUT 250 FEET WEST OF A
 HV3503'SIDE ROAD LEADING TO A LARGE YELLOW HOUSE, ABOUT 125 FEET EAST
OF
 HV3503'A CONCRETE WATERING TROUGH IN A FIELD, 39.0 FEET SOUTH OF THE
 HV3503'CENTER LINE OF THE HIGHWAY, 18.5 FEET SOUTH OF A ROCK FENCE,
 HV3503'IN THE TOP OF A ROCK OUTCROP, 20.8 FEET SOUTH OF A WHITE WOODEN
```

```
 HV3503'POST STENCILED U.S.B.M., AND ABOUT 1/2 FOOT ABOVE GROUND.  A
 HV3503'STANDARD DISK, STAMPED J 91 1935.
 HV3503
 HV3503                          STATION RECOVERY (1943)
 HV3503
 HV3503'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1943
 HV3503'RECOVERED IN GOOD CONDITION.
 HV3503
 HV3503                          STATION RECOVERY (2000)
 HV3503
 HV3503'RECOVERY NOTE BY VA DEPT HWYS-TRANSP 2000 (MWZ)
 HV3503'RECOVERED AS DESCRIBED.
 HV3503
 HV3503                          STATION RECOVERY (2000)
 HV3503
 HV3503'RECOVERY NOTE BY VIRGINIA DEPARTMENT OF TRANSPORTATION 2000
(RB)
 HV3503'RECOVERED AS DESCRIBED.
 HV3503
 HV3503                          STATION RECOVERY (2002)
 HV3503
 HV3503'RECOVERY NOTE BY DEWBERRY DAVIS 2002 (CSW)
 HV3503'STATION AT THE 'OLD OAK FARM' - 38011 JOHN MOSBY HIGHWAY (US
ROUTE
 HV3503'50).
 HV3503
 HV3503                          STATION RECOVERY (2003)
 HV3503
 HV3503'RECOVERY NOTE BY BOWMAN CONSULTING GROUP 2003
 HV3503'RECOVERED AS DESCRIBED
 HV3503
 HV3503                          STATION RECOVERY (2003)
 HV3503
 HV3503'RECOVERY NOTE BY THE ENGINEERING GROUPE INC 2003 (BWJ)
 HV3503'STATION RECOVERED. DISCRIPTION IS INADEQUATE. NEW DESCRIPTION
FOLLOWS.
 HV3503'FROM THE POST OFFICE AT MIDDLEBURG PROCEED WEST ALONG ROUTE 50
2.6
 HV3503'MILES TO A GRAVEL DRIVEWAY ON THE RIGHT, WHICH IS THE ENTRANCE
TO OLD
 HV3503'OAK FARM,  ADDRESS 38011 JOHN MOSBY HIGHWAY. THE STATION IS 130
FEET
 HV3503'WEST OF THE DRIVEWAY. THE ORIGINAL CALLS TO THE ROCK FENCE AND
 HV3503'CENTERLINE ARE STILL GOOD.
 HV3503
 HV3503                          STATION RECOVERY (2003)
 HV3503
 HV3503'RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2003 (SM)
 HV3503'RECOVERED - CHANGE DESCRIPTION TO 'PROCEED EAST ALONG ROUTE 50
...
 HV3503
 HV3503                          STATION RECOVERY (2005)
 HV3503
 HV3503'RECOVERY NOTE BY GEOCACHING 2005 (LWB)
 HV3503'RECOVERED AS DESCRIBED
 HV3503
 HV3503                          STATION RECOVERY (2005)
```

HV3503
HV3503'RECOVERY NOTE BY GEOMETRICS GPS INCORPORATED 2005 (KRO)
HV3503'RECOVERED AS DESCRIBED, WITH ADDITIONAL TIES OF 14.42 METERS (47.3
HV3503'FEET) SOUTHWEST OF UTILITY POLE NUMBERED JL59, AND THE WHITE WOODEN
HV3503'POST STENCILED U.S.B.M. IS NO LONGER THERE.
HV3503
HV3503 STATION RECOVERY (2011)
HV3503
HV3503'RECOVERY NOTE BY JOHN CHANCE LAND SURVEYS INC 2011
HV3503'RECOVERED IN GOOD CONDITION.

The NGS Data Sheet

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

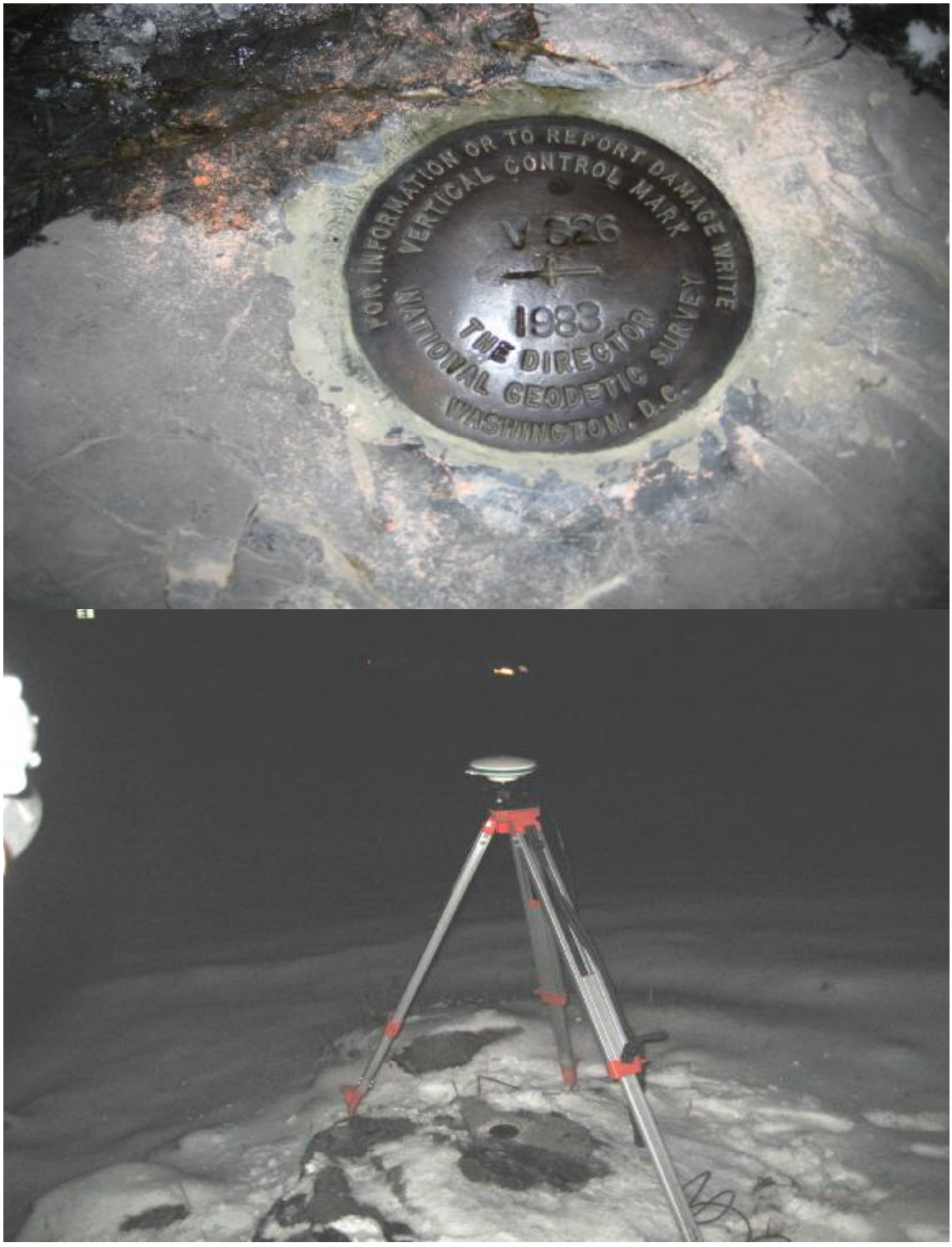
```
DATABASE = NGSIDB , PROGRAM = datasheet95, VERSION = 7.87.6.1
1        National Geodetic Survey,   Retrieval Date = APRIL 24, 2012
 JV4103
***********************************************************************
 JV4103  CBN         -  This is a Cooperative Base Network Control
Station.
 JV4103  DESIGNATION -  V 326
 JV4103  PID         -  JV4103
 JV4103  STATE/COUNTY-  WV/BERKELEY
 JV4103  USGS QUAD   -  HEDGESVILLE (1979)
 JV4103
 JV4103                        *CURRENT SURVEY CONTROL
 JV4103
_____________________________________________________________________
 JV4103* NAD 83(2007)-  39 32 18.83479(N)    077 59 06.07077(W)
ADJUSTED
 JV4103* NAVD 88     -       157.015  (meters)     515.14   (feet)
ADJUSTED
 JV4103
_____________________________________________________________________
 JV4103  EPOCH DATE  -        2002.00
 JV4103  X           -   1,025,344.475 (meters)
COMP
 JV4103  Y           -  -4,817,672.406 (meters)
COMP
 JV4103  Z           -   4,038,684.657 (meters)
COMP
 JV4103  LAPLACE CORR-          -1.00  (seconds)
DEFLEC09
 JV4103  ELLIP HEIGHT-         122.801 (meters)          (02/10/07)
ADJUSTED
 JV4103  GEOID HEIGHT-         -34.21  (meters)
GEOID09
 JV4103  DYNAMIC HT  -         156.922 (meters)     514.83  (feet)
COMP
 JV4103
 JV4103  ------- Accuracy Estimates (at 95% Confidence Level in cm) ---
-----
 JV4103  Type    PID    Designation                        North   East
Ellip
 JV4103  ------------------------------------------------------------
-----
 JV4103  NETWORK JV4103 V 326                               0.82   0.71
1.71
 JV4103  ------------------------------------------------------------
-----
 JV4103  MODELED GRAV-     980,031.8   (mgal)
NAVD 88
 JV4103
```

```
 JV4103  VERT ORDER  -  FIRST     CLASS II
 JV4103
 JV4103.The horizontal coordinates were established by GPS observations
 JV4103.and adjusted by the National Geodetic Survey in February 2007.
 JV4103
 JV4103.The datum tag of NAD 83(2007) is equivalent to NAD
83(NSRS2007).
 JV4103.See www.ngs.noaa.gov/NationalReadjustment for more information.
 JV4103
 JV4103.The horizontal coordinates are valid at the epoch date
displayed above
 JV4103.which is a decimal equivalence of Year/Month/Day.
 JV4103
 JV4103.The orthometric height was determined by differential leveling
and
 JV4103.adjusted in June 1991.
 JV4103
 JV4103.Photographs are available for this station.
 JV4103
 JV4103.The X, Y, and Z were computed from the position and the
ellipsoidal ht.
 JV4103
 JV4103.The Laplace correction was computed from DEFLEC09 derived
deflections.
 JV4103
 JV4103.The ellipsoidal height was determined by GPS observations
 JV4103.and is referenced to NAD 83.
 JV4103
 JV4103.The geoid height was determined by GEOID09.
 JV4103
 JV4103.The dynamic height is computed by dividing the NAVD 88
 JV4103.geopotential number by the normal gravity value computed on the
 JV4103.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 JV4103.degrees latitude (g = 980.6199 gals.).
 JV4103
 JV4103.The modeled gravity was interpolated from observed gravity
values.
 JV4103
 JV4103;                    North         East     Units Scale Factor
Converg.
 JV4103;SPC WV N     -   116,396.391   730,222.857   MT  0.99994190
+0 57 58.4
 JV4103;SPC WV N     -   381,877.16  2,395,739.49   sFT  0.99994190
+0 57 58.4
 JV4103;UTM  18      - 4,380,800.629   243,470.620   MT  1.00041030   -
1 54 04.6
 JV4103;UTM  17      - 4,380,886.547   759,104.621   MT  1.00042665
+1 55 13.4
 JV4103
 JV4103!             -  Elev Factor  x  Scale Factor =   Combined
Factor
 JV4103!SPC WV N     -   0.99998073  x   0.99994190  =   0.99992264
 JV4103!UTM  18      -   0.99998073  x   1.00041030  =   1.00039103
 JV4103!UTM  17      -   0.99998073  x   1.00042665  =   1.00040738
 JV4103
 JV4103                          SUPERSEDED SURVEY CONTROL
 JV4103
```

```
 JV4103  NAD 83(1995)-  39 32 18.83513(N)    077 59 06.07078(W) AD(
) A
 JV4103  ELLIP H (04/23/01)  122.795  (m)                      GP(
) 4 1
 JV4103  NAVD 88 (04/23/01)  157.02   (m)          515.2    (f)
LEVELING    3
 JV4103
 JV4103.Superseded values are not recommended for survey control.
 JV4103.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 JV4103.See file dsdata.txt to determine how the superseded data were
derived.
 JV4103
 JV4103_U.S. NATIONAL GRID SPATIAL ADDRESS: 18STJ4347080800(NAD 83)
 JV4103
 JV4103_MARKER: DB = BENCH MARK DISK
 JV4103_SETTING: 66 = SET IN ROCK OUTCROP
 JV4103_SP_SET: ROCK OUTCROP
 JV4103_STAMPING: V 326 1983
 JV4103_MARK LOGO: NGS
 JV4103_MAGNETIC: N = NO MAGNETIC MATERIAL
 JV4103_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
 JV4103+STABILITY: POSITION/ELEVATION WELL
 JV4103_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 JV4103+SATELLITE: SATELLITE OBSERVATIONS - March 02, 2011
 JV4103
 JV4103  HISTORY     - Date     Condition        Report By
 JV4103  HISTORY     - 1983     MONUMENTED       NGS
 JV4103  HISTORY     - 20000329 GOOD             WVALS
 JV4103  HISTORY     - 20020410 GOOD             DEWDAV
 JV4103  HISTORY     - 20030312 GOOD             INDIV
 JV4103  HISTORY     - 20040326 GOOD             DEWDAV
 JV4103  HISTORY     - 20051027 GOOD             NAGEL
 JV4103  HISTORY     - 20070607 GOOD             NAGEL
 JV4103  HISTORY     - 20080611 GOOD             GEOCAC
 JV4103  HISTORY     - 20090831 GOOD             PB
 JV4103  HISTORY     - 20101020 GOOD             JCLS
 JV4103  HISTORY     - 20110302 GOOD             NOGUCO
 JV4103
 JV4103                          STATION DESCRIPTION
 JV4103
 JV4103'DESCRIBED BY NATIONAL GEODETIC SURVEY 1983
 JV4103'2.0 KM (1.2 MI) SE FROM HEDGESVILLE.
 JV4103'2.0 KM (1.25 MI) SOUTHEAST ALONG STATE HIGHWAY 9 FROM THE POST
OFFICE
 JV4103'IN HEDGESVILLE TO THE MARK ON THE RIGHT, IN AN OPEN FIELD IN
THE NORTH
 JV4103'END OF AN EXPOSED ROCK OUTCROP, 23.01 METERS (75.5 FT) WEST OF
THE
 JV4103'CENTERLINE OF THE HIGHWAY, 19.35 METERS (63.5 FT FT) NORTHWEST
OF
 JV4103'TELEPHONE POLE 1703-170, 17.06 METERS (56.0 FT) WEST OF A WIRE
FENCE.
 JV4103'THE MARK IS 0.61 METERS  SE FROM A WITNESS POST.
 JV4103'THE MARK IS 1.21 M ABOVE HIGHWAY.
 JV4103
 JV4103                          STATION RECOVERY (2000)
 JV4103
```

```
 JV4103'RECOVERY NOTE BY WV ASSOCIATION OF LAND SURVEYORS 2000 (JM)
 JV4103'RECOVERED AS DESCRIBED WITH THE FOLLOWING ADDITIONS.
 JV4103'
 JV4103'THE STATION IS LOCATED ABOUT 11.7 KM (7.3 MI) NORTH OF
MARTINSBURG,
 JV4103'7.5 KM (4.7 MI) WEST OF FALLING WATERS AND ACROSS STATE HIGHWAY
9
 JV4103'FROM THE LOWER ENTRANCE TO HEDGESVILLE HIGH SCHOOL.
 JV4103'
 JV4103'TO REACH THE STATION FROM THE INTERSECTION OF STATE HIGHWAYS 9
 JV4103'AND 901 IN HEDGESVILLE GO NORTHEAST ON HIGHWAY 9 FOR 2.0 KM
(1.25
 JV4103'MI) TO THE STATION ON THE RIGHT.
 JV4103
 JV4103                          STATION RECOVERY (2002)
 JV4103
 JV4103'RECOVERY NOTE BY DEWBERRY DAVIS 2002 (CSW)
 JV4103'RECOVERED IN GOOD CONDITION.
 JV4103
 JV4103                          STATION RECOVERY (2003)
 JV4103
 JV4103'RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2003 (TJM)
 JV4103'RECOVERED AS DESCRIBED ACROSS FROM HEDGESVILLE HIGH SCHOOLS
LOWER
 JV4103'ENTRANCE IN A FENCED IN PASTURE. DISC SET IN A ROCK OUTCROP
MARKED
 JV4103'WITH ORANGE SURVEY MARKER.
 JV4103
 JV4103                          STATION RECOVERY (2004)
 JV4103
 JV4103'RECOVERY NOTE BY DEWBERRY DAVIS 2004 (KEC)
 JV4103'RECOVERED IN GOOD CONDITION.
 JV4103
 JV4103                          STATION RECOVERY (2005)
 JV4103
 JV4103'RECOVERY NOTE BY GEORGE E NAGEL AND ASSCOIATES INC 2005 (GEN)
 JV4103'RECOVERED IN GOOD CONDITION.
 JV4103
 JV4103                          STATION RECOVERY (2007)
 JV4103
 JV4103'RECOVERY NOTE BY GEORGE E NAGEL AND ASSCOIATES INC 2007 (REN)
 JV4103'RECOVERED IN GOOD CONDITION.
 JV4103
 JV4103                          STATION RECOVERY (2008)
 JV4103
 JV4103'RECOVERY NOTE BY GEOCACHING 2008 (DPB)
 JV4103'RECOVERED IN GOOD CONDITION.
 JV4103
 JV4103                          STATION RECOVERY (2009)
 JV4103
 JV4103'RECOVERY NOTE BY PBS&J 2009 (RDM)
 JV4103'RECOVERED AS DESCRIBED.
 JV4103
 JV4103                          STATION RECOVERY (2010)
 JV4103
 JV4103'RECOVERY NOTE BY JOHN CHANCE LAND SURVEYS INC 2010
 JV4103'RECOVERED IN GOOD CONDITION.
```

JV4103
JV4103 STATION RECOVERY (2011)
JV4103
JV4103'RECOVERY NOTE BY NORTHROP GRUMMON CORPORATION 2011 (ND)
JV4103'RECOVERED IN GOOD CONDITION.



The NGS Data Sheet

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

```
DATABASE = NGSIDB , PROGRAM = datasheet95, VERSION = 7.87.6.1
1        National Geodetic Survey,   Retrieval Date = APRIL 24, 2012
 JV6141
**********************************************************************
 JV6141  SACS         -  This is a Secondary Airport Control Station.
 JV6141  DESIGNATION  -  CHARLIE AZ MK
 JV6141  PID          -  JV6141
 JV6141  STATE/COUNTY-  VA/LOUDOUN
 JV6141  USGS QUAD    -  LEESBURG (1994)
 JV6141
 JV6141                        *CURRENT SURVEY CONTROL
 JV6141
_____________________________________________________________________
 JV6141* NAD 83(2007)-  39 04 51.93701(N)    077 33 30.18572(W)
ADJUSTED
 JV6141* NAVD 88      -       114.24   (meters)     374.8    (feet)  GPS
OBS
 JV6141
_____________________________________________________________________
 JV6141  EPOCH DATE   -        2002.00
 JV6141  X            -   1,068,114.320 (meters)
COMP
 JV6141  Y            -  -4,841,293.550 (meters)
COMP
 JV6141  Z            -   3,999,361.071 (meters)
COMP
 JV6141  LAPLACE CORR-           3.38  (seconds)
DEFLEC09
 JV6141  ELLIP HEIGHT-          81.915 (meters)          (02/10/07)
ADJUSTED
 JV6141  GEOID HEIGHT-         -32.30  (meters)
GEOID09
 JV6141
 JV6141  ------- Accuracy Estimates (at 95% Confidence Level in cm) ---
-----
 JV6141  Type    PID    Designation                       North   East
Ellip
 JV6141  ----------------------------------------------------------------
-----
 JV6141  NETWORK JV6141 CHARLIE AZ MK                      0.27   0.31
0.92
 JV6141  ----------------------------------------------------------------
-----
 JV6141
 JV6141.This mark is at Leesburg Mun/godfrey Fld Airport (JYO)
 JV6141
 JV6141.The horizontal coordinates were established by GPS observations
 JV6141.and adjusted by the National Geodetic Survey in February 2007.
 JV6141
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 JV6141.The datum tag of NAD 83(2007) is equivalent to NAD
83(NSRS2007).
 JV6141.See www.ngs.noaa.gov/NationalReadjustment for more information.
 JV6141
 JV6141.The horizontal coordinates are valid at the epoch date
displayed above
 JV6141.which is a decimal equivalence of Year/Month/Day.
 JV6141
 JV6141.The orthometric height was determined by GPS observations and a
 JV6141.high-resolution geoid model.
 JV6141
 JV6141.GPS derived orthometric heights for airport stations designated
as
 JV6141.PACS or SACS are published to 2 decimal places.  This maintains
 JV6141.centimeter relative accuracy between the PACS and SACS.  It
does
 JV6141.not indicate centimeter accuracy relative to other marks which
are
 JV6141.part of the NAVD 88 network.
 JV6141
 JV6141.Photographs are available for this station.
 JV6141
 JV6141.The X, Y, and Z were computed from the position and the
ellipsoidal ht.
 JV6141
 JV6141.The Laplace correction was computed from DEFLEC09 derived
deflections.
 JV6141
 JV6141.The ellipsoidal height was determined by GPS observations
 JV6141.and is referenced to NAD 83.
 JV6141
 JV6141.The geoid height was determined by GEOID09.
 JV6141
 JV6141;                    North         East     Units Scale Factor
Converg.
 JV6141;SPC VA N     - 2,157,421.547 3,581,472.565   MT  0.99998106
+0 35 15.6
 JV6141;SPC VA N     - 7,078,140.53 11,750,214.57   sFT  0.99998106
+0 35 15.6
 JV6141;SPC MD       -   157,156.263   351,686.800   MT  0.99995625   -
0 21 01.7
 JV6141;SPC MD       -   515,603.51  1,153,825.78   sFT  0.99995625   -
0 21 01.7
 JV6141;UTM  18      - 4,328,891.561   278,702.818   MT  1.00020305   -
1 36 48.6
 JV6141
 JV6141!             -  Elev Factor  x  Scale Factor =   Combined
Factor
 JV6141!SPC VA N     -   0.99998715  x   0.99998106  =   0.99996821
 JV6141!SPC MD       -   0.99998715  x   0.99995625  =   0.99994340
 JV6141!UTM  18      -   0.99998715  x   1.00020305  =   1.00019020
 JV6141
 JV6141:                Primary Azimuth Mark                    Grid
Az
 JV6141:SPC VA N     -  CHARLIE                                 160 45
28.3
```

```
 JV6141:SPC MD       -  CHARLIE                                    161 41
45.6
 JV6141:UTM  18      -  CHARLIE                                    162 57
32.5
 JV6141
 JV6141|-----------------------------------------------------------------
------|
 JV6141| PID    Reference Object                     Distance
Geod. Az  |
 JV6141|
dddmmss.s |
 JV6141| JV6140 CHARLIE                              APPROX. 0.7 KM
1612043.9 |
 JV6141| DE9220 JYO B                                441.548 METERS
3422411.5 |
 JV6141| AA9251 JYO A                                APPROX. 0.5 KM
3435750.1 |
 JV6141|-----------------------------------------------------------------
------|
 JV6141
 JV6141                           SUPERSEDED SURVEY CONTROL
 JV6141
 JV6141  ELLIP H (05/15/02)   81.893  (m)                      GP(
) 5 2
 JV6141  NAD 83(1993)-  39 04 51.93680(N)    077 33 30.18545(W) AD(
) 1
 JV6141  ELLIP H (04/02/98)   81.910  (m)                      GP(
) 4 2
 JV6141  NAD 83(1993)-  39 04 51.93677(N)    077 33 30.18541(W) AD(
) 1
 JV6141  ELLIP H (11/30/95)   81.915  (m)                      GP(
) 4 2
 JV6141  NAD 83(1993)-  39 04 51.93780(N)    077 33 30.18576(W) AD(
) 3
 JV6141  ELLIP H (11/14/94)   81.851  (m)                      GP(
) 4 2
 JV6141  NAD 83(1991)-  39 04 51.93698(N)    077 33 30.18711(W) AD(
) 3
 JV6141  ELLIP H (01/27/92)   81.914  (m)                      GP(
) 4 1
 JV6141  NAD 83(1986)-  39 04 51.93729(N)    077 33 30.19573(W) AD(
) 3
 JV6141  NAD 27      -  39 04 51.55128(N)    077 33 31.23127(W) AD(
) 3
 JV6141  NAVD 88 (04/02/98)  114.18   (m)          374.6    (f) GPS OBS
 JV6141  NAVD 88 (11/30/95)  114.19   (m)          374.6    (f) GPS OBS
 JV6141  NGVD 29 (11/20/87)  114.31   (m)          375.0    (f) GPS OBS
 JV6141
 JV6141.Superseded values are not recommended for survey control.
 JV6141.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 JV6141.See file dsdata.txt to determine how the superseded data were
derived.
 JV6141
 JV6141_U.S. NATIONAL GRID SPATIAL ADDRESS: 18STJ7870228891(NAD 83)
 JV6141
 JV6141_MARKER: DZ = AZIMUTH MARK DISK
 JV6141_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
```

```
 JV6141_SP_SET: SET IN TOP OF CONCRETE MONUMENT
 JV6141_STAMPING: CHARLIE 1986
 JV6141_MARK LOGO: NGS
 JV6141_PROJECTION: FLUSH
 JV6141_MAGNETIC: N = NO MAGNETIC MATERIAL
 JV6141_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
 JV6141+STABILITY: SURFACE MOTION
 JV6141_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 JV6141+SATELLITE: SATELLITE OBSERVATIONS - November 23, 2002
 JV6141
 JV6141  HISTORY     - Date     Condition        Report By
 JV6141  HISTORY     - 1986     MONUMENTED       NGS
 JV6141  HISTORY     - 19870804 GOOD
 JV6141  HISTORY     - 19930615 GOOD             NGS
 JV6141  HISTORY     - 19940818 GOOD             NOS
 JV6141  HISTORY     - 19961001 GOOD             NGS
 JV6141  HISTORY     - 20021123 GOOD             NGS
 JV6141  HISTORY     - 20021123 GOOD             NGS
 JV6141
 JV6141                          STATION DESCRIPTION
 JV6141
 JV6141'DESCRIBED BY NATIONAL GEODETIC SURVEY 1986 (HDM)
 JV6141'THE STATION IS LOCATED ABOUT 4 KILOMETERS (2.5 MILES) SOUTH-
SOUTHEAST
 JV6141'OF LEESBURG ON THE LEESBURG MUNICIPAL-GODFREY FIELD AIRPORT, IN
THE
 JV6141'GRASS MEDIAN BETWEEN THE TAXIWAY AND THE RUNWAY, APPROXIMATELY
0.24
 JV6141'KILOMETER (0.15 MILE) SOUTH OF THE NORTH END OF THE RUNWAY.
 JV6141'
 JV6141'OWNERSHIP--TOWN OF LEESBURG, P.O. BOX 2278, LEESBURG, VA 22075.
 JV6141'PERMISSION OBTAINED FROM THE AIRPORT MANAGER MR. JAMES N.
HAYNES, JR.
 JV6141'PHONE (703) 777-2420.
 JV6141'
 JV6141'TO REACH THE STATION FROM THE INTERSECTION OF U.S. HIGHWAY 15
AND
 JV6141'STATE HIGHWAY 7 AT THE SOUTHEAST EDGE OF LEESBURG, GO SOUTHWEST
ON
 JV6141'U.S. 15 FOR 0.88 KILOMETER (0.55 MILE) TO COUNTY ROAD 643,
SYCOLIN
 JV6141'ROAD, TURN LEFT AND GO SOUTHEASTERLY ON COUNTY 643 FOR 2.4
KILOMETERS
 JV6141'(1.5 MILES) TO THE AIRPORT ENTRANCE AND THE MARK APPROXIMATELY
0.48
 JV6141'KILOMETER (0.3 MILE) NORTHWEST OF THE AIRPORT OFFICE.
 JV6141'
 JV6141'THE STATION IS A STANDARD NATIONAL GEODETIC SURVEY DISK
 JV6141'STAMPED---CHARLIE 1986---SET INTO THE TOP OF A ROUND CONCRETE
 JV6141'MONUMENT 32 CM IN DIAMETER RECESSED 2 CM BELOW THE GROUND
LOCATED
 JV6141'28.20 METERS (92.52 FEET) SOUTH-SOUTHEAST FROM THE SOUTHEAST
CORNER
 JV6141'OF VASI LAMP (FIRST LAMP FROM NORTH END OF RUNWAY), 20.65
METERS
 JV6141'(67.75 FEET) EAST FROM THE THIRD RUNWAY LIGHT FROM THE NORTH
END OF
```

JV6141'RUNWAY, 35.10 METERS (115.16 FEET) EAST FROM THE CENTERLINE OF
JV6141'RUNWAY, 26.0 METERS (85.30 FEET) WEST FROM THE CENTERLINE OF
TAXIWAY,
JV6141'AND 63.7 METERS (208.99 FEET) NORTH FROM THE NORTHEAST CORNER
OF THE
JV6141'SECOND VASI LAMP FROM THE NORTH END OF RUNWAY.
JV6141'
JV6141'THE UNDERGROUND MARK IS A STANDARD NATIONAL GEODETIC SURVEY
DISK
JV6141'STAMPED---CHARLIE 1986---1.0 METER BELOW THE SURFACE.
JV6141
JV6141 STATION RECOVERY (1987)
JV6141
JV6141'RECOVERED 1987
JV6141'RECOVERED IN GOOD CONDITION.
JV6141
JV6141 STATION RECOVERY (1993)
JV6141
JV6141'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1993
JV6141'THE STATION IS LOCATED AT THE LEESBURG MUNI/GODFREY FIELD ABOUT
1,600
JV6141'FT SOUTH OF THE RUNWAY END 17. IT IS 115.2 FT (35.1 M) EAST OF
THE
JV6141'CENTERLINE OF THE RUNWAY, 92.5 FT (28.2 M) SOUTH-SOUTHEAST OF
THE
JV6141'SOUTHEAST CORNER OF THE NORTHERLY ONE OF TWO CONCRETE BASES OF
FORMER
JV6141'VASI, 85.3 FT (26.0 M) WEST OF THE CENTERLINE OF TEH PARALLEL
TAXIWAY
JV6141'AND 72.4 FT (22.1 M) EAST OF THE THIRD RUNWAY LIGHT SOUTH OF
THE FIRST
JV6141'TAXIWAY LEADING TO THE RUNWAY SOUTH OF THE RUNWAY END. THE
STATION IS
JV6141'A STANDARD NGS AZIMUTH MARK DISK STAMPED CHARIE 1986 SET IN THE
TOP OF
JV6141'A ROUND CONCRETE POST WHICH IS 0.2-FT BELOW THE SURFACE.
JV6141
JV6141 STATION RECOVERY (1994)
JV6141
JV6141'RECOVERY NOTE BY NATIONAL OCEAN SERVICE 1994 (RAH)
JV6141'THE STATION IS LOCATED ABOUT 18.0 MI (29.0 KM) NW OF RESTON,
2.5 MI
JV6141'(4.0 KM) SOUTH SOUTHEAST OF LEESBURG AND ON THE LEESBURG
MUNICIPAL
JV6141'AIRPORT IN THE GRASS MEDIAN BETWEEN THE TAXIWAY AND THE RUNWAY,
JV6141'APPROXIMATELY 0.3 MI (0.5 KM) SOUTH OF THE NORTH END OF RUNWAY
17-35.
JV6141'ACCESS TO THE AIRPORT AND THE STATIONS MUST BE OBTAINED FROM
THE
JV6141'AIRPORT OPERATIONS OFFICE, 1001 SYCOLIN ROAD, P. O. BOX 88,
JV6141'LEESBURG, VA 22075, PHONE (703) 777-9252.
JV6141'
JV6141'TO REACH THE STATION FROM THE INTERSECTION OF US HIGHWAY 15 AND
STATE
JV6141'HIGHWAY 7 ON THE SOUTHEAST EDGE OF LEESBURG, GO SOUTHWEST ON US
JV6141'HIGHWAY 15 FOR 0.55 MI (0.89 KM) TO THE INTERSECTION OF COUNTY
ROAD

```
 JV6141'643 (SYCOLIN ROAD) TURN LEF AND GO SOUTHEASTERLY ON COUNTY ROAD
643
 JV6141'FOR 1.5 MI (2.4 KM) TO THE AIRPORT ENTRANCE ROAD ON THE RIGHT,
TURN
 JV6141'RIGHT AND GO WESTERLY ON THE ENTRANCE ROAD FOR 0.05 MI (0.08
KM) TO A
 JV6141'POLE GATE ON THE LEFT, PASS THROUGH THE GATE AND TURN RIGHT AND
GO
 JV6141'WEST ON THE APRON FOR 0.1 MI (0.2 KM) TO A TAXIWAY, TURN RIGHT
AND GO
 JV6141'NORTH ON THE TAXIWAY FOR 0.3 MI (0.5 KM) TO THE STATION ON THE
LEFT.
 JV6141'
 JV6141'THE STATION IS 115.2 FT (35.1 M) EAST OF THE CENTERLINE OF THE
RUNWAY,
 JV6141'91.3 FT (27.8 M) SOUTH SOUTHEAST OF THE SOUTHEAST CORNER OF THE
 JV6141'CONCRETE PAD OF THE NORTHERLY ONE OF TWO FORMER VASI, 85.3 FT
(26.0 M)
 JV6141'WEST OF THE CENTERLINE OF THE PARALLEL TAXIWAY, 72.4 FT (22.1
M) EAST
 JV6141'OF THE THIRD RUNWAY LIGHT SOUTH OF THE FIRST CONNECTOR SOUTH OF
THE
 JV6141'RUNWAY END AND 0.2 BELOW GROUND LEVEL.
 JV6141'
 JV6141'DESCRIBED BY CFS.
 JV6141
 JV6141                          STATION RECOVERY (1996)
 JV6141
 JV6141'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1996 (AJL)
 JV6141'RECOVERED IN GOOD CONDITION.  THIS STATION IS DESIGNATED AS A
 JV6141'SECONDARY AIRPORT CONTROL STATION.  THE STATION IS A STANDARD
NGS
 JV6141'AZIMUTH DISK STAMPED CHARLIE 1986,SET IN A CONCRETE POST.
 JV6141
 JV6141                          STATION RECOVERY (2002)
 JV6141
 JV6141'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2002 (DLA)
 JV6141'RECOVERED AS DESCRIBED
 JV6141'THE AIRPORT NAME HAS BEEN CHANGED TO 'LEESBURG EXECUTIVE
AIRPORT'
 JV6141'
 JV6141'
 JV6141
 JV6141                          STATION RECOVERY (2002)
 JV6141
 JV6141'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2002 (DLA)
 JV6141'RECOVERED AS DESCRIBED
 JV6141'THE AIRPORT NAME HAS BEEN CHANGED TO 'LEESBURG EXECUTIVE
AIRPORT'
 JV6141'
 JV6141'
```

The NGS Data Sheet

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

```
DATABASE = NGSIDB , PROGRAM = datasheet95, VERSION = 7.87.6.1
1        National Geodetic Survey,   Retrieval Date = APRIL 24, 2012
 DL3474
***********************************************************************
 DL3474  CORS         -  This is a GPS Continuously Operating Reference
Station.
 DL3474  DESIGNATION  -  LOYOLA M CORS ARP
 DL3474  CORS_ID      -  LOYM
 DL3474  PID          -  DL3474
 DL3474  STATE/COUNTY-  MD/ST MARYS
 DL3474  USGS QUAD    -  LEONARDTOWN (1984)
 DL3474
 DL3474                        *CURRENT SURVEY CONTROL
 DL3474
______________________________________________________________________
 DL3474* NAD 83(CORS)-  38 18 38.11936(N)    076 37 57.97456(W)
ADJUSTED
 DL3474* NAVD 88      -              **(meters)           **(feet)
 DL3474
______________________________________________________________________
 DL3474  EPOCH DATE   -        2002.00
 DL3474  X            -   1,158,531.847 (meters)
COMP
 DL3474  Y            -  -4,875,375.228 (meters)
COMP
 DL3474  Z            -   3,932,556.904 (meters)
COMP
 DL3474  ELLIP HEIGHT-           6.124 (meters)          (06/??/09)
ADJUSTED
 DL3474  GEOID HEIGHT-         -33.86  (meters)
GEOID09
 DL3474  HORZ ORDER   -  SPECIAL (CORS)
 DL3474  ELLP ORDER   -  SPECIAL (CORS)
 DL3474
 DL3474.ITRF positions  are available for this station.
 DL3474
 DL3474.The coordinates were established by GPS observations
 DL3474.and adjusted by the National Geodetic Survey in June 2009.
 DL3474
 DL3474.The datum tag of NAD 83(CORS) is equivalent to NAD 83(CORS96).
 DL3474
 DL3474.The coordinates are valid at the epoch date displayed above
 DL3474.which is a decimal equivalence of Year/Month/Day.
 DL3474
 DL3474.The PID for the CORS L1 Phase Center is DL3475.
 DL3474
 DL3474.The XYZ, and position/ellipsoidal ht. are equivalent.
 DL3474
 DL3474.The ellipsoidal height was determined by GPS observations
```

DL3474.and is referenced to NAD 83.
DL3474
DL3474.The geoid height was determined by GEOID09.
DL3474
DL3474;   North   East   Units Scale Factor
Converg.
DL3474;SPC MD   -   71,542.826   432,117.997   MT 0.99999817
+0 13 49.7
DL3474;SPC MD   -   234,720.09 1,417,707.13   sFT 0.99999817
+0 13 49.7
DL3474
DL3474!   - Elev Factor x Scale Factor =   Combined
Factor
DL3474!SPC MD   -   0.99999904 x   0.99999817 =   0.99999721
DL3474
DL3474   SUPERSEDED SURVEY CONTROL
DL3474
DL3474.No superseded survey control is available for this station.
DL3474
DL3474_U.S. NATIONAL GRID SPATIAL ADDRESS: 18SUH5724941537(NAD 83)
DL3474
DL3474_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS
ANTENNA
DL3474
DL3474   STATION DESCRIPTION
DL3474
DL3474'DESCRIBED BY NATIONAL GEODETIC SURVEY 2009
DL3474'STATION IS A GPS CORS. LATEST INFORMATION INCLUDING POSITIONS
AND
DL3474'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES
ACCESSIBLE
DL3474'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
DL3474'   ftp://cors.ngs.noaa.gov/cors/README.txt
DL3474'   ftp://cors.ngs.noaa.gov/cors/coord/coord_08
DL3474'   ftp://cors.ngs.noaa.gov/cors/station_log
DL3474'   http://geodesy.noaa.gov/CORS

The NGS Data Sheet

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

```
DATABASE = NGSIDB , PROGRAM = datasheet95, VERSION = 7.87.6.1
1        National Geodetic Survey,   Retrieval Date = APRIL 24, 2012
 DF9217
***********************************************************************
 DF9217  CORS         -  This is a GPS Continuously Operating Reference
Station.
 DF9217  DESIGNATION  -  DC WAAS 1 CORS ARP
 DF9217  CORS_ID      -  ZDC1
 DF9217  PID          -  DF9217
 DF9217  STATE/COUNTY-  VA/LOUDOUN
 DF9217  USGS QUAD    -  LEESBURG (1994)
 DF9217
 DF9217                         *CURRENT SURVEY CONTROL
 DF9217
______________________________________________________________________
 DF9217* NAD 83(CORS)-  39 06 05.71496(N)    077 32 33.86748(W)
ADJUSTED
 DF9217* NAVD 88      -              **(meters)           **(feet)
 DF9217
______________________________________________________________________
 DF9217  EPOCH DATE   -        2002.00
```

```
 DF9217  X           -   1,069,126.500 (meters)
COMP
 DF9217  Y           -  -4,839,600.091 (meters)
COMP
 DF9217  Z           -   4,001,126.309 (meters)
COMP
 DF9217  ELLIP HEIGHT-          80.899 (meters)          (12/??/03)
ADJUSTED
 DF9217  GEOID HEIGHT-         -32.33  (meters)
GEOID09
 DF9217  HORZ ORDER  -  SPECIAL (CORS)
 DF9217  ELLP ORDER  -  SPECIAL (CORS)
 DF9217
 DF9217.ITRF positions are available for this station.
 DF9217
 DF9217.The coordinates were established by GPS observations
 DF9217.and adjusted by the National Geodetic Survey in December 2003.
 DF9217
 DF9217.The datum tag of NAD 83(CORS) is equivalent to NAD 83(CORS96).
 DF9217
 DF9217.The coordinates are valid at the epoch date displayed above
 DF9217.which is a decimal equivalence of Year/Month/Day.
 DF9217
 DF9217.The PID for the CORS L1 Phase Center is DI9511.
 DF9217
 DF9217.The XYZ, and position/ellipsoidal ht. are equivalent.
 DF9217
 DF9217.The ellipsoidal height was determined by GPS observations
 DF9217.and is referenced to NAD 83.
 DF9217
 DF9217.The geoid height was determined by GEOID09.
 DF9217
 DF9217;                    North         East     Units Scale Factor
Converg.
 DF9217;SPC VA N     - 2,159,710.556 3,582,802.375   MT  0.99998402
+0 35 50.8
 DF9217;SPC VA N     - 7,085,650.38 11,754,577.46   sFT  0.99998402
+0 35 50.8
 DF9217
 DF9217!             -  Elev Factor  x  Scale Factor =   Combined
Factor
 DF9217!SPC VA N     -   0.99998731  x   0.99998402  =   0.99997133
 DF9217
 DF9217                           SUPERSEDED SURVEY CONTROL
 DF9217
 DF9217.No superseded survey control is available for this station.
 DF9217
 DF9217_U.S. NATIONAL GRID SPATIAL ADDRESS: 18STJ8011931128(NAD 83)
 DF9217
 DF9217_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS
ANTENNA
 DF9217
 DF9217                           STATION DESCRIPTION
 DF9217
 DF9217'DESCRIBED BY NATIONAL GEODETIC SURVEY 2003
 DF9217'STATION IS A GPS CORS.  LATEST INFORMATION INCLUDING POSITIONS
AND
```

```
 DF9217'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES
ACCESSIBLE
 DF9217'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
 DF9217'   ftp://cors.ngs.noaa.gov/cors/README.txt
 DF9217'   ftp://cors.ngs.noaa.gov/cors/coord/coord_08
 DF9217'   ftp://cors.ngs.noaa.gov/cors/station_log
 DF9217'   http://geodesy.noaa.gov/CORS
```

335DEW09

GeoDigital

STATION DESCRIPTION FORM

PROJECT No.: 335DEW11 PHOTOS TAKEN:

PROJECT NAME: USGS MDMV

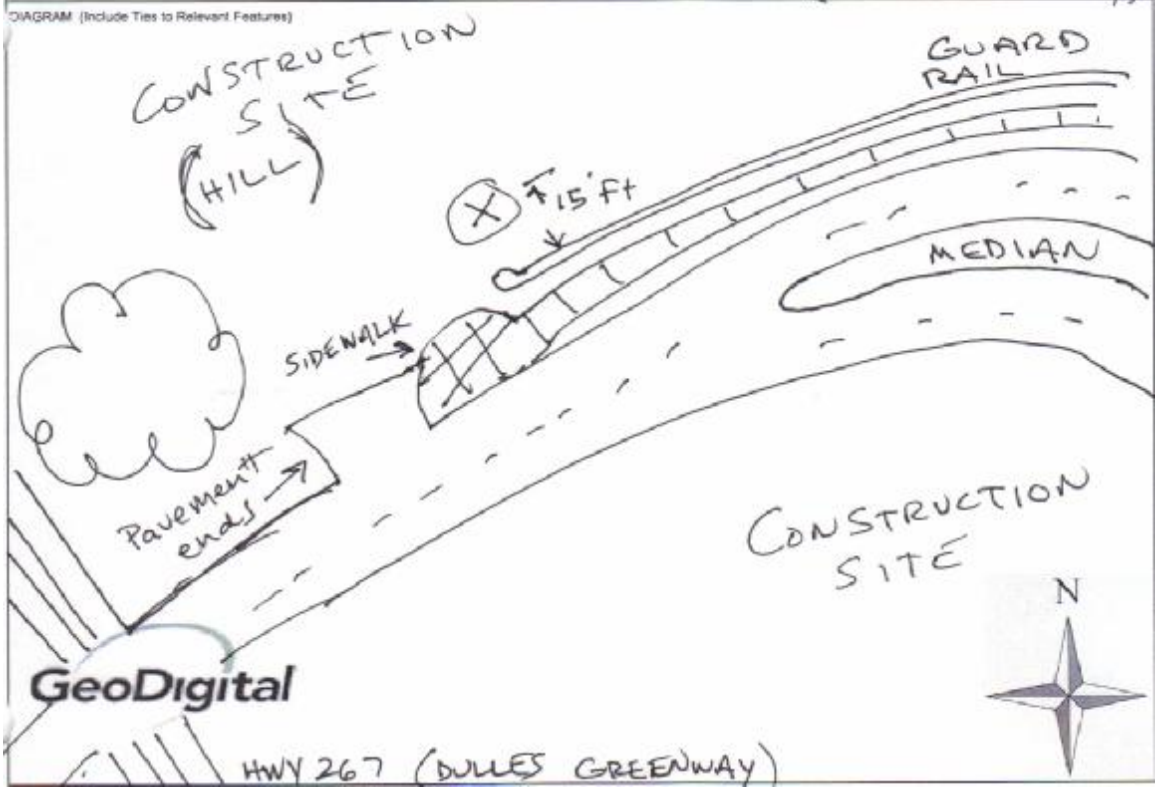
LOCATION: MARYLAND / VIRGINIA

STATION NAME:	MARKER TYPE:	DATE:
335DEW09	NAIL / WASHER	1/9/12
STATION NUMBER:	STATION LOCALITY:	LEGAL DESCRIPTION:
DATUM:	CENTRAL MERIDIAN:	UTM ZONE:
LATITUDE: 39 02 32,5	LONGITUDE: 077 31 35,07	ELLIPSOID HEIGHT metres (h):
UTM NORTHING metres:	UTM EASITNG metres:	GEOID HEIGHT metres (MSL):

MONUMENT IS: ☒ FLUSH WITH GROUND ☐ ABOVE GROUND _____ cm ☐ BELOW GROUND _____ cm

MARKER LOCATION: Just off "Sycolin Rd", near HWY 267 (DULLES GREENWAY)

DIAGRAM (Include Ties to Relevant Features)



335DEW10

GeoDigital

STATION DESCRIPTION FORM

PROJECT No.: 335DEW11

PROJECT NAME: USGS MDVA

LOCATION: MARYLAND, VIRGINA

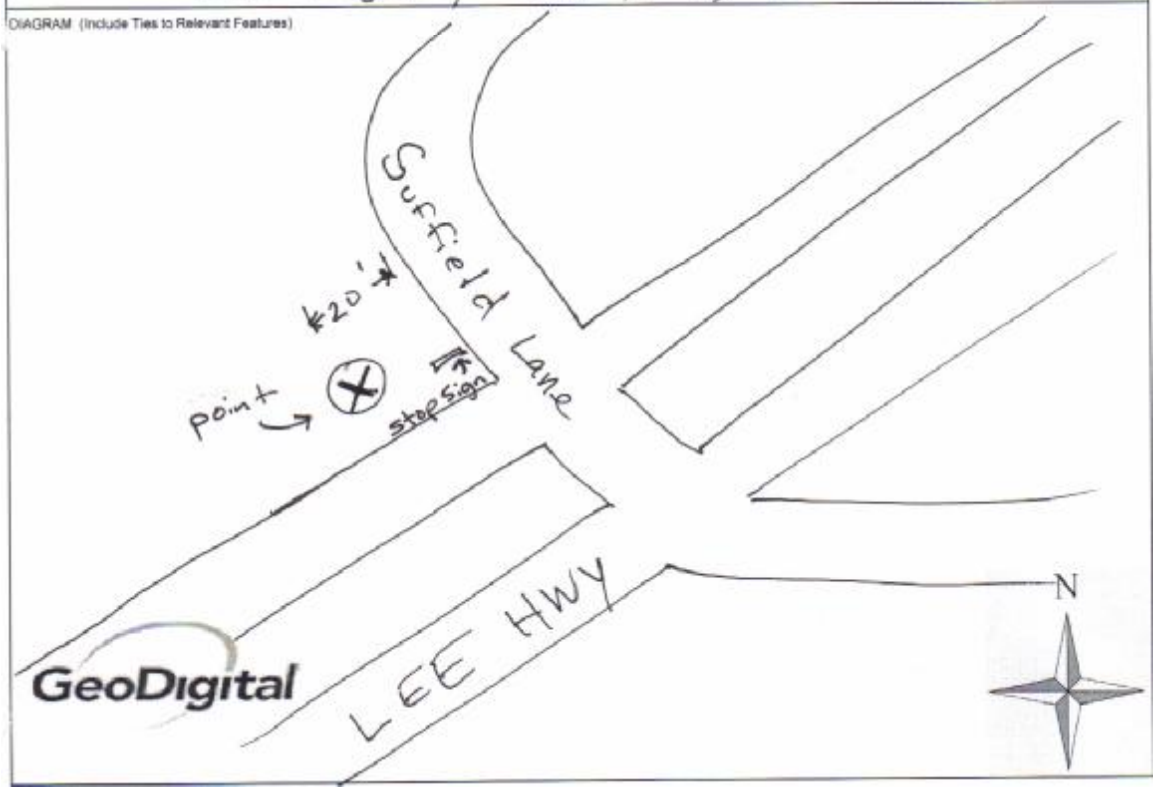
PHOTOS TAKEN:

STATION NAME: 335DEW10	MARKER TYPE: NAIL / WASHER	DATE: 1/10/12
STATION NUMBER:	STATION LOCALITY:	LEGAL DESCRIPTION:
DATUM:	CENTRAL MERIDIAN:	UTM ZONE:
LATITUDE: 38 45 06.6	LONGITUDE: 077 44 53.3	ELLIPSOID HEIGHT metres (h):
UTM NORTHING metres:	UTM EASTING metres:	GEOID HEIGHT metres (MSL):

MONUMENT IS: ☐ FLUSH WITH GROUND ☐ ABOVE GROUND _____ cm ☐ BELOW GROUND _____ cm

MARKER LOCATION: Just WEST of "Suffield Lane" at "LEE Highway" (HWY 15/29) ON NORTH SIDE

DIAGRAM (Include Ties to Relevant Features)



335DEW20

335DEW21

GeoDigital

STATION DESCRIPTION FORM

PROJECT No.: 335DEW11

PROJECT NAME: USGS MD VA

LOCATION: Near Arden, WV

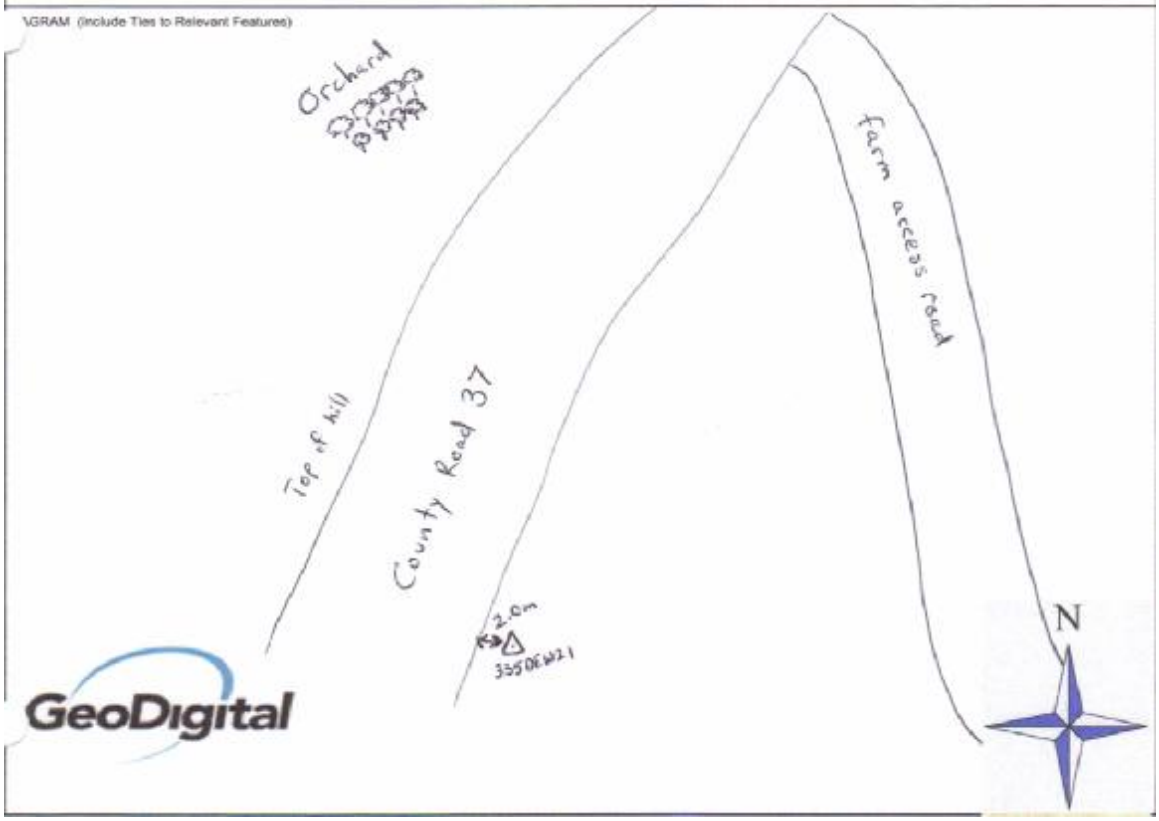
PHOTOS TAKEN:

STATION NAME:	MARKER TYPE:	DATE:
335DEW21	Carriage bolt w/washer	22 Jan 2013
STATION NUMBER:	STATION LOCALITY:	LEGAL DESCRIPTION:
DATUM:	CENTRAL MERIDIAN:	UTM ZONE:
LATITUDE: 39°24'01.0"	LONGITUDE: 078°04'35.8"	ELLIPSOID HEIGHT metres (h):
UTM NORTHING metres:	UTM EASITNG metres:	GEOID HEIGHT metres (MSL):

MONUMENT IS: ☑ FLUSH WITH GROUND ☐ ABOVE GROUND _____ cm ☐ BELOW GROUND _____ cm

MARKER LOCATION:
Carriage bolt with washer and orange flagging set flush with ground at crest of hill on Co Road 37 near Arden, WV
2.0m ESE of road

SKETCH (Include Ties to Relevant Features)



GeoDigital

335DEW22

GeoDigital

STATION DESCRIPTION FORM

PROJECT No.: 335DEW11

PROJECT NAME: Dewberry MD VA

LOCATION: Myersville MD

PHOTOS TAKEN:

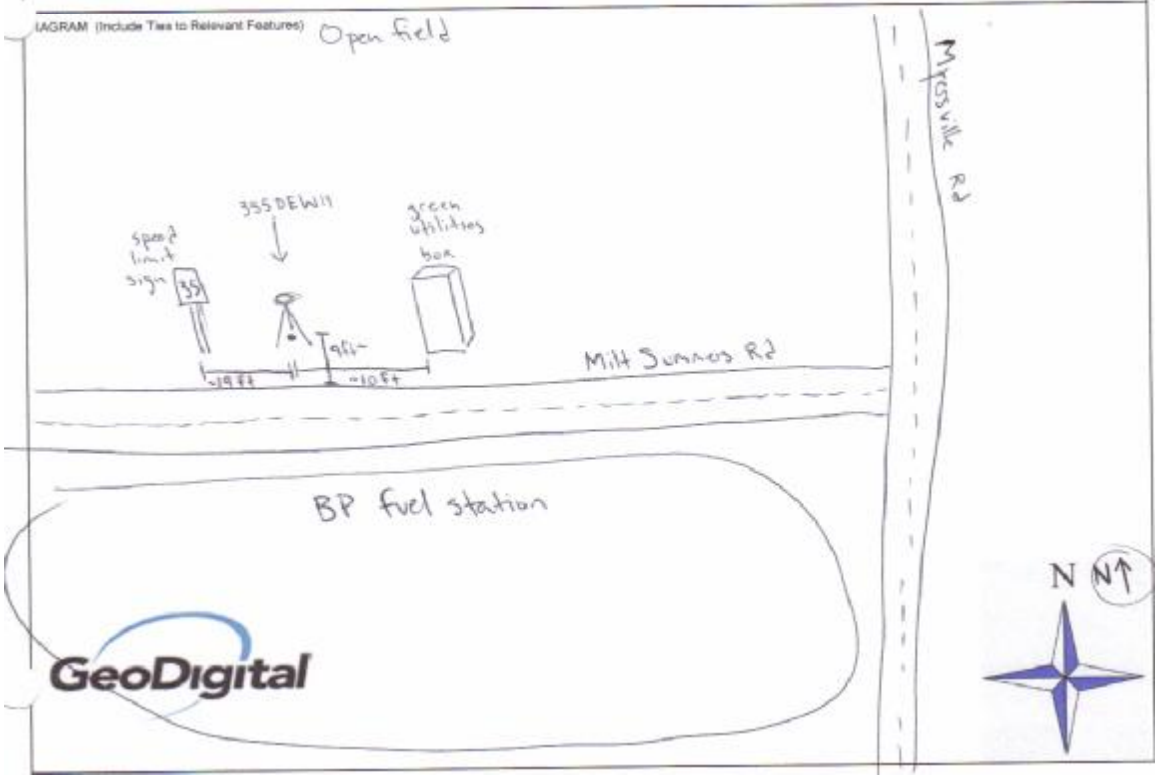
STATION NAME: 335DEW22	MARKER TYPE: Carriage bolt w/ washer	DATE: 1/30/12
STATION NUMBER:	STATION LOCALITY:	LEGAL DESCRIPTION:
DATUM:	CENTRAL MERIDIAN:	UTM ZONE:
LATITUDE: 39°29'36"	LONGITUDE: 77°34'08"	ELLIPSOID HEIGHT metres (h):
UTM NORTHING metres:	UTM EASTING metres:	GEOID HEIGHT metres (MSL):

MONUMENT IS: ☑ FLUSH WITH GROUND ☐ ABOVE GROUND _____ cm ☐ BELOW GROUND _____ cm

MARKER LOCATION:

On Milt Summers Rd, just west of Myersville Rd Intersection

DIAGRAM (Include Ties to Relevant Features)



GeoDigital

335DEW23

GeoDigital

STATION DESCRIPTION FORM

PROJECT No.: 335DEW11
PROJECT NAME: USGS MD VA
LOCATION: Martinsburg, WV

PHOTOS TAKEN: 3
335DEW23-1
" -2
" -3

STATION NAME:	MARKER TYPE:	DATE:
335DEW23	nail set (carriage bolt w/washer)	14-Feb-2012
STATION NUMBER:	STATION LOCALITY:	LEGAL DESCRIPTION:
DATUM:	CENTRAL MERIDIAN:	UTM ZONE: 17
LATITUDE: 39°23'55.6"	LONGITUDE: 77°58'59.3"	ELLIPSOID HEIGHT metres (ft):
UTM NORTHING metres:	UTM EASTING metres:	GEOID HEIGHT metres (MSL):

MONUMENT IS: ☑ FLUSH WITH GROUND ☐ ABOVE GROUND _____ cm ☐ BELOW GROUND _____ cm

MARKER LOCATION:
Marker is located inside airport fence south of a large hanger approximately 41 meters south (208') of the southernmost corner of hangar building and 7.5m east of the edge of ramp. It sits 2.0m east of a light cover that is flush with ground between ramp and marker. 68 meters west of a taxiway

DIAGRAM (Include Ties to Relevant Features)

GeoDigital

335DEW24

GeoDigital

STATION DESCRIPTION FORM

PROJECT No.: Dewberry MD VA PHOTOS TAKEN:

PROJECT NAME: 335DEW11

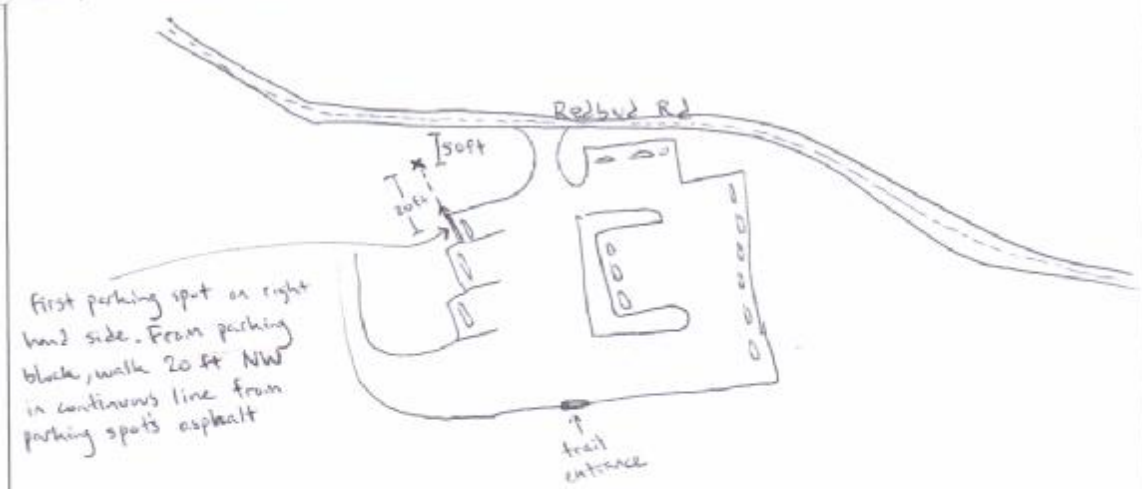
LOCATION: Third Winchester Battlefield parking lot

STATION NAME:	MARKER TYPE:	DATE:
335 DEW 24	Carriage bolt w/ washer	2/9/12
STATION NUMBER:	STATION LOCALITY: Third Winchester Battlefield parking lot	LEGAL DESCRIPTION:
DATUM:	CENTRAL MERIDIAN:	UTM ZONE:
LATITUDE: 39 12 37.34	LONGITUDE: 78 07 39.34	ELLIPSOID HEIGHT metres (h):
UTM NORTHING metres:	UTM EASTING metres:	GEOID HEIGHT metres (MSL):

MONUMENT IS: ☑ FLUSH WITH GROUND ☐ ABOVE GROUND _____ cm ☐ BELOW GROUND _____ cm

MARKER LOCATION:

DIAGRAM (Include Ties to Relevant Features)



GeoDigital