Minimum Technical Standards Report
Control Survey &
Specific Purpose Survey for LiDAR

PREPARED FOR:
UNITED STATES GEOLOGICAL SURVEY

PREPARED BY:
NORTHROP GRUMMAN CORPORATION

FEMA REGION 2 SENECA NY WATERSHED LIDAR

CONTRACT # G10PC00150

NGC INTERNAL #B1M958221

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Technical Standards Report
Control Survey & Specific Purpose Survey for LiDAR

LiDAR Elevation Mapping
Seneca NY Watershed

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Introduction & Specifications

The purpose of this Survey was to provide ground truth data which will be used to validate LiDAR data of the Seneca NY Watershed LiDAR dataset, the area of interest is located in Central New York. The ground surveys were conducted utilizing the NYSNet real time network and follows the USGS LiDAR Base Specification Version 1.0 and the FEMA "*Guidelines and Specifications for Flood Hazard Mapping Partners*" to collect checkpoints for the main categories of ground cover in the study area. The vertical accuracy requirements meet or exceed the required RMSEz of 12.5cm and the vertical accuracy of 24.5cm at the 95% confidence level as specified by the SOW using NDEP/ASPRS methodologies referring to the NDEP_Elevation_Guidelines_Ver1_10May2004 .pdf.
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Datum & Coordinate Systems

The LiDAR data and coordinate values associated with this project are referenced to the North American Datum of 1983, Universal Transverse Mercator Coordinate System, Zone 18 North, in units of Meters. The vertical datum is North America Vertical Datum of 1988, in units of Meters. Elevations were derived by using Geoid09

Survey Area

The project area is approximately 1638 square miles and covers the area of interest: Seneca NY Watershed located in Central New York.

Control Survey

The GPS survey was tied into the NYSNet Real Time Network located in New York. The NYSNet network is a network of continuously operating GPS reference stations that provides Real Time Kinematic (RTK) capabilities within a Real Time Network (RTN). This allows corrections to be applied to the points as they are being collected, eliminating the need for an adjustment.

As a quality control measure several "check-in" points consisting of NSRS published horizontal and vertical control points were used as checks within the NYSNet network. The survey crew checked into these published points daily to validate the consistency of the network. Also to confirm that the project will meet the 5cm local network accuracy at the 95% confidence level.

Survey field work was performed on 3.30.2012-4.12.2012 by Northrop Grumman field crews using Trimble 5700 series Global Positioning System with Zephyr Geodetic antenna.

Local Network Accuracy

Several existing control monuments listed in the NSRS database were used as checks within the static network. This confirmed network accuracies were being met during the field survey as well as providing a redundancy check on the Network adjustment. The Specified local network accuracy of 5cm at the 95% confidence level was met or exceeded. The results and NSRS published point information are listed within the table below.

Name	Published			Surveyed			Differences		
	Northing	Easting	Elev.	Northing	Easting	Elev.	ΔNorth	ΔEast	ΔElev
G 110 (NB0207)	4738742.287	409599.188	377.547	4738742.264	409599.172	377.515	0.023	0.016	0.032
GENEVA (NB2146)	4756673.258	338610.664	149.269	4756673.246	338610.669	149.217	0.012	-0.005	0.052
ROMULUS (AB3846)	4731100.097	350904.477	228.4	4731100.118	350904.468	228.445	-0.021	0.009	-0.045
FLISCHMAN (NB1891)	4712224.758	295654.860	613.4	4712224.727	295654.85	613.43	0.031	0.010	-0.030
VANGELDER RESET (NB1027)	4712576.430	331804.871	487.541	4712576.404	331804.869	487.523	0.026	0.002	0.018
TT 40 R (NB2147)	4699526.108	346764.059	225.727	4699526.11	346764.018	225.693	-0.002	0.041	0.034
G 463 (NB1620)	4673740.013	370100.894	307.6	4673739.992	370100.914	307.626	0.021	-0.020	-0.026

Ground Truth Survey

Ground Truth data was collected of the major land cover classes present within the area of interest. 20 points were collected in each of the following land cover Bare-Earth (Open Terrain), Tall Weeds and Crops, and Forested and Fully Grown. Points collected in taller vegetation were collected with a total station by establishing a pair of points during the survey using the NYSNet network once completed the total station is used to collect points under the vegetation canopy.

Horizontal Accuracy Analysis

There is not a systematic method of testing when testing horizontal accuracy in LiDAR. The horizontal accuracy is checked by collecting building corners during the survey. Lines are then digitized while viewing the intensity images representing the building outline and the differences are measure from each individual survey point to the corner of the building outline. Stats are calculated to ensure horizontal tolerances are met. These measurements resulted in an RMSEr of 1.86 meters and a horizontal accuracy of 3.21 meter horizontal accuracy at the 95 % confidence interval. Method used was the NSSDA standard for horizontal accuracy assessment.

FGDC-STD-007.3-1998

RMSEnorthing = √ [∑ (CONTROLnorthing - MEASUREDnorthing)^2/n]

RMSEeasting = √ [∑ (CONTROLeasting - MEASUREDeasting)^2/n]

RMSEr = √ [RMSEeasting^2 + RMSEnorthing^2]

RMSE accuracy = 1.7308 * RMSEr

Vertical Accuracy Analysis

Data analysis was accomplished by comparing ground truth checkpoints with LIDAR points from the edited data set, which were within 1 meter horizontally from the ground truth points. Based on the number of returns and the density of points in this project, it was not necessary to compare to anything further away than 1meter horizontally from the ground truth points. Note that the edited LIDAR points are simply a subset of the raw LIDAR points. The points that fell above the ground surface on vegetation canopies, buildings, or other obstructions were removed from the data set. Comparisons were also made between the survey points and the LIDAR derived terrain surface. These comparisons provide an additional verification of the LIDAR data against the survey data. The vertical accuracy requirements meet or exceed the required RMSEz of 12.5cm and the vertical accuracy of 24.5cm at the 95% confidence level

ACCURACYz=1.96 * RMSEz

Land Cover Category	# of Points	FVA vs TIN Required 24.5cm	FVA vs DEM Required 24.5cm	SVA vs DEM Target 36.0cm	CVA vs DEM Required 36.0cm
Consolidated All Classes	60				23.6cm
Bare earth (Open Terrain)	20	16.8cm	14.5cm		
Tall Weeds and Crops	20			19.6cm	
Forested and Fully Grown	20			31.9cm	

Appendix A

The NGS Data Sheet

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

```
PROGRAM = datasheet95, VERSION = 8.4
1        National Geodetic Survey,   Retrieval Date = JUNE  5, 2014
 NB0207
***********************************************************************
 NB0207  CBN          -  This is a Cooperative Base Network Control Station.
 NB0207  DESIGNATION  -  G 110
 NB0207  PID          -  NB0207
 NB0207  STATE/COUNTY-  NY/ONONDAGA
 NB0207  COUNTRY      -  US
 NB0207  USGS QUAD    -  TULLY (1955)
 NB0207
 NB0207                          *CURRENT SURVEY CONTROL
 NB0207
_______________________________________________________________________
 NB0207* NAD 83(2011) POSITION- 42 47 45.22459(N) 076 06 19.58920(W)
ADJUSTED
 NB0207* NAD 83(2011) ELLIP HT-    344.810 (meters)        (06/27/12)
ADJUSTED
 NB0207* NAD 83(2011) EPOCH    -  2010.00
 NB0207* NAVD 88 ORTHO HEIGHT -    377.547  (meters)    1238.67  (feet)
ADJUSTED
 NB0207
_______________________________________________________________________
 NB0207  NAD 83(2011) X  -  1,125,670.531 (meters)                     COMP
 NB0207  NAD 83(2011) Y  - -4,550,476.774 (meters)                     COMP
 NB0207  NAD 83(2011) Z  -  4,311,125.726 (meters)                     COMP
 NB0207  LAPLACE CORR    -          4.71  (seconds)
DEFLEC12A
 NB0207  GEOID HEIGHT    -        -32.74  (meters)
GEOID12A
 NB0207  DYNAMIC HEIGHT  -        377.429 (meters)     1238.28  (feet) COMP
 NB0207  MODELED GRAVITY -    980,297.1   (mgal)                       NAVD
88
 NB0207
 NB0207  VERT ORDER      -  SECOND    CLASS 0
 NB0207
 NB0207  FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)
 NB0207  Type                                           Horiz  Ellip  Dist(km)
 NB0207  ----------------------------------------------------------------------
 NB0207  NETWORK                                         0.37   0.94
 NB0207  ----------------------------------------------------------------------
 NB0207  MEDIAN LOCAL ACCURACY AND DIST (086 points)   0.48   1.23    113.45
 NB0207  ----------------------------------------------------------------------
 NB0207  NOTE: Click here for information on individual local accuracy
 NB0207  values and other accuracy information.
 NB0207
 NB0207
 NB0207.The horizontal coordinates were established by GPS observations
 NB0207.and adjusted by the National Geodetic Survey in June 2012.
 NB0207
 NB0207.NAD 83(2011) refers to NAD 83 coordinates where the reference
```

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 NB0207.frame has been affixed to the stable North American tectonic plate.
See
 NB0207.NA2011 for more information.
 NB0207
 NB0207.The horizontal coordinates are valid at the epoch date displayed
above
 NB0207.which is a decimal equivalence of Year/Month/Day.
 NB0207
 NB0207.The orthometric height was determined by differential leveling and
 NB0207.adjusted by the NATIONAL GEODETIC SURVEY
 NB0207.in June 1991.
 NB0207
 NB0207.The X, Y, and Z were computed from the position and the ellipsoidal
ht.
 NB0207
 NB0207.The Laplace correction was computed from DEFLEC12A derived
deflections.
 NB0207
 NB0207.The ellipsoidal height was determined by GPS observations
 NB0207.and is referenced to NAD 83.
 NB0207
 NB0207.The dynamic height is computed by dividing the NAVD 88
 NB0207.geopotential number by the normal gravity value computed on the
 NB0207.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 NB0207.degrees latitude (g = 980.6199 gals.).
 NB0207
 NB0207.The modeled gravity was interpolated from observed gravity values.
 NB0207
 NB0207. The following values were computed from the NAD 83(2011) position.
 NB0207
 NB0207;                    North         East     Units Scale Factor
Converg.
 NB0207;SPC NY C     -   310,608.116   289,094.092   MT  0.99995630   +0 19
28.8
 NB0207;SPC NY C     - 1,019,053.46    948,469.53   sFT  0.99995630   +0 19
28.8
 NB0207;UTM  18      - 4,738,742.287   409,599.188   MT  0.99970054   -0 45
03.9
 NB0207
 NB0207!             -  Elev Factor  x  Scale Factor =   Combined Factor
 NB0207!SPC NY C     -   0.99994593  x   0.99995630  =   0.99990223
 NB0207!UTM  18      -   0.99994593  x   0.99970054  =   0.99964648
 NB0207
 NB0207                          SUPERSEDED SURVEY CONTROL
 NB0207
 NB0207  NAD 83(2007)-  42 47 45.22486(N)    076 06 19.59006(W) AD(2002.00) 0
 NB0207  ELLIP H (02/10/07)  344.828  (m)                      GP(2002.00)
 NB0207  ELLIP H (09/18/02)  344.841  (m)                      GP(       ) 4
2
 NB0207  NAD 83(1996)-  42 47 45.22494(N)    076 06 19.59074(W) AD(       ) B
 NB0207  ELLIP H (07/24/97)  344.848  (m)                      GP(       ) 1
1
 NB0207  NAD 83(1992)-  42 47 45.22416(N)    076 06 19.59002(W) AD(       ) B
 NB0207  NAD 83(1992)-  42 47 45.22408(N)    076 06 19.58987(W) AD(       ) B
 NB0207  ELLIP H (08/31/95)  344.794  (m)                      GP(       ) 1
1
 NB0207  NAVD 88 (08/07/96)  377.55   (m)         1238.7    (f) LEVELING    3
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 NB0207  NAVD 88 (08/31/95)  377.54   (m)          1238.6    (f) LEVELING    3
 NB0207  NGVD 29 (??/??/92)  377.670  (m)          1239.07   (f) ADJ UNCH    2
0
 NB0207
 NB0207.Superseded values are not recommended for survey control.
 NB0207
 NB0207.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 NB0207.See file dsdata.txt to determine how the superseded data were
derived.
 NB0207
 NB0207_U.S. NATIONAL GRID SPATIAL ADDRESS: 18TVN0959938742(NAD 83)
 NB0207
 NB0207_MARKER: DB = BENCH MARK DISK
 NB0207_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 NB0207_SP_SET: SET IN TOP OF CONCRETE MONUMENT
 NB0207_STAMPING: G 110 1935
 NB0207_MARK LOGO: CGS
 NB0207_PROJECTION: FLUSH
 NB0207_MAGNETIC: N = NO MAGNETIC MATERIAL
 NB0207_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
 NB0207+STABILITY: SURFACE MOTION
 NB0207_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 NB0207+SATELLITE: SATELLITE OBSERVATIONS - March 27, 2008
 NB0207
 NB0207  HISTORY     - Date     Condition        Report By
 NB0207  HISTORY     - 1935     MONUMENTED       CGS
 NB0207  HISTORY     - 1942     GOOD             CGS
 NB0207  HISTORY     - 19940818 GOOD             NYDT
 NB0207  HISTORY     - 19981021 GOOD             FA
 NB0207  HISTORY     - 19991208 GOOD             POPLI
 NB0207  HISTORY     - 20000426 GOOD             NGS
 NB0207  HISTORY     - 20010716 GOOD             NYDT
 NB0207  HISTORY     - 20050930 GOOD             NYSDEC
 NB0207  HISTORY     - 20080327 GOOD             GPSSS
 NB0207
 NB0207                          STATION DESCRIPTION
 NB0207
 NB0207'DESCRIBED BY COAST AND GEODETIC SURVEY 1942
 NB0207'AT TULLY.
 NB0207'AT TULLY, ONONDAGA COUNTY, ON THE ERIE-LACKAWANNA RAILROAD, 94 FEET
 NB0207'SOUTHWEST OF THE SOUTHWEST END OF THE STATION, 56 FEET NORTH OF
 NB0207'MILEPOST 249, 41 FEET SOUTHWEST OF THE SOUTHWEST END OF THE CONCRETE
 NB0207'PLATFORM, 14 FEET NORTHWEST OF THE NORTHWEST RAIL, 3 FEET NORTHEAST
 NB0207'OF A WHITE WOODEN WITNESS POST, AND 0.1 FOOT BELOW THE TOP OF THE
 NB0207'GROUND. A STANDARD DISK, STAMPED G 110 1935 AND SET IN THE TOP OF
 NB0207'A CONCRETE POST.
 NB0207
 NB0207                          STATION RECOVERY (1994)
 NB0207
 NB0207'RECOVERY NOTE BY NY DEPT OF TRANSP 1994 (RWB)
 NB0207'RECOVERED AS DESCRIBED WITH THE FOLLOWING UP-TO-DATE TIES.  IT IS
29.1
 NB0207'M (95.5 FT) WEST OF THE SOUTHWEST CORNER OF THE RAILROAD STATION,
16.2
 NB0207'M (53.1 FT) NORTHEAST OF MILEPOST 249, AND 4.7 M (15.4 FT) NORTH OF
 NB0207'THE NORTHERLY RAIL.
 NB0207
```

NB0207 STATION RECOVERY (1998)
NB0207
NB0207'RECOVERY NOTE BY FISHER ASSOCIATES 1998 (KR)
NB0207'GOOD.
NB0207
NB0207 STATION RECOVERY (1999)
NB0207
NB0207'RECOVERY NOTE BY POPLI CONSULTING ENGRS/SURVEYORS 1999 (KEC)
NB0207'GOOD.
NB0207
NB0207 STATION RECOVERY (2000)
NB0207
NB0207'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2000 (AJL)
NB0207'THE STATION IS LOCATED ABOUT 20 MI (32.2 KM) SOUTH OF SYRACUSE AND 20
NB0207'MI (32.2 KM) NORTH OF CORTLAND IN THE VILLAGE OF TULLY NEAR THE OLD
NB0207'ERIE-LACKAWANA RAILROAD STATION. OWNERSHIP-- ERIE-LACKAWANA
RAILROAD.
NB0207'TO REACH FROM THE JUNCTION OF INTERSTATE HIGHWAY 81 (EXIT 14) AND
NB0207'COMBINED US HIGHWAY 11 SOUTH AND STATE ROUTE 80 EAST, GO EAST ON
NB0207'COMBINED HIGHWAYS 11 AND 80 FOR 0.7 MI (1.1 KM) TO THE JUNCTION OF
NB0207'STATE ROUTE 80 EAST AND US HIGHWAY 11 SOUTH. TURN RIGHT, ON US
NB0207'HIGHWAY 11 SOUTH AND GO 0.1 MI (0.2 KM) TO ONONDAGA ST ON THE LEFT.
NB0207'TURN SOUTHEAST ON ONONDAGA ST AND GO O.25 MI TO GROVE ST ON THE
RIGHT.
NB0207'TURN SOUTHWEST ON GROVE ST FOR 0.02 MI (0.03 KM) TO JUST BEFORE
NB0207'RAILROAD CROSSING AND TURN RIGHT, AND GO WEST FOR 0.05 MI (0.08 KM)
NB0207'PASSING BETWEEN RAILROAD STATION AND RAILROAD TRACKS TO STATION ON
THE
NB0207'RIGHT. THE STATION IS LOCATED 29.15 M (95.64 FT) SOUTHWEST OF THE
NB0207'SOUTHWEST CORNER OF THE RAILROAD STATION, 16.0 M (52.5 FT)
NB0207'SOUTH-SOUTHWEST OF THE TRIANGLE SHAPED CEMENT RAILROAD MILAGE MARKER
NB0207'249, 8.8 M (28.9 FT) NORTHWEST OF THE NORTHEAST RAIL OF A SPUR TRACK,
NB0207'AND 4.65 M (15.26 FT) SOUTHEAST OF THE NORTHWEST RAIL OF THE MAIN
NB0207'TRACK.
NB0207
NB0207 STATION RECOVERY (2001)
NB0207
NB0207'RECOVERY NOTE BY NY DEPT OF TRANSP 2001 (AMA)
NB0207'RECOVERED AS DESCRIBED.
NB0207'
NB0207
NB0207 STATION RECOVERY (2005)
NB0207
NB0207'RECOVERY NOTE BY NEW YORK DEPT ENVIRONAL CONSER 2005 (RLC)
NB0207'RECOVERED AS DESCRIBED
NB0207'PERMISSION IS REQUIRED FROM RR DISPATCH AS IT IS ON RR PROPERTY.
NB0207'CALL 800-366-6979 EXT. 505
NB0207
NB0207 STATION RECOVERY (2008)
NB0207
NB0207'RECOVERY NOTE BY GPS SALES AND SERVICES 2008 (CJC)
NB0207'A DRAINAGE PROBLEM IS SILTING THE MANHOLE

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1        National Geodetic Survey,    Retrieval Date = JUNE  5, 2014
 NB2146
**********************************************************************
 NB2146  CBN         -  This is a Cooperative Base Network Control Station.
 NB2146  DESIGNATION -  GENEVA
 NB2146  PID         -  NB2146
 NB2146  STATE/COUNTY-  NY/ONTARIO
 NB2146  COUNTRY     -  US
 NB2146  USGS QUAD   -  GENEVA NORTH (1978)
 NB2146
 NB2146                         *CURRENT SURVEY CONTROL
 NB2146
_____________________________________________________________________
 NB2146* NAD 83(2011) POSITION- 42 56 44.18745(N) 076 58 41.74099(W)
ADJUSTED
 NB2146* NAD 83(2011) ELLIP HT-   114.695 (meters)        (06/27/12)
ADJUSTED
 NB2146* NAD 83(2011) EPOCH   -  2010.00
 NB2146* NAVD 88 ORTHO HEIGHT -   149.269  (meters)     489.73  (feet)
ADJUSTED
 NB2146
_____________________________________________________________________
 NB2146  NAD 83(2011) X  -  1,053,634.900 (meters)                    COMP
 NB2146  NAD 83(2011) Y  - -4,555,907.178 (meters)                    COMP
 NB2146  NAD 83(2011) Z  -  4,323,158.691 (meters)                    COMP
 NB2146  LAPLACE CORR    -          2.19  (seconds)
DEFLEC12A
 NB2146  GEOID HEIGHT    -        -34.57  (meters)
GEOID12A
 NB2146  DYNAMIC HEIGHT  -        149.229 (meters)     489.60  (feet) COMP
 NB2146  MODELED GRAVITY -    980,350.0   (mgal)                     NAVD
88
 NB2146
 NB2146  VERT ORDER      -  SECOND    CLASS II
 NB2146
 NB2146  FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)
 NB2146  Type                                           Horiz  Ellip  Dist(km)
 NB2146  ----------------------------------------------------------------------
 NB2146  NETWORK                                         0.44   1.08
 NB2146  ----------------------------------------------------------------------
 NB2146  MEDIAN LOCAL ACCURACY AND DIST (079 points)   0.55   1.37    129.42
 NB2146  ----------------------------------------------------------------------
 NB2146  NOTE: Click here for information on individual local accuracy
 NB2146  values and other accuracy information.
 NB2146
 NB2146
 NB2146.The horizontal coordinates were established by GPS observations
 NB2146.and adjusted by the National Geodetic Survey in June 2012.
 NB2146
 NB2146.NAD 83(2011) refers to NAD 83 coordinates where the reference
 NB2146.frame has been affixed to the stable North American tectonic plate.
See
 NB2146.NA2011 for more information.
 NB2146
 NB2146.The horizontal coordinates are valid at the epoch date displayed
above
 NB2146.which is a decimal equivalence of Year/Month/Day.
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```
 NB2146
 NB2146.The orthometric height was determined by differential leveling and
 NB2146.adjusted by the NATIONAL GEODETIC SURVEY
 NB2146.in August 2006.
 NB2146
 NB2146.No vertical observational check was made to the station.
 NB2146
 NB2146.The X, Y, and Z were computed from the position and the ellipsoidal
ht.
 NB2146
 NB2146.The Laplace correction was computed from DEFLEC12A derived
deflections.
 NB2146
 NB2146.The ellipsoidal height was determined by GPS observations
 NB2146.and is referenced to NAD 83.
 NB2146
 NB2146.The dynamic height is computed by dividing the NAVD 88
 NB2146.geopotential number by the normal gravity value computed on the
 NB2146.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 NB2146.degrees latitude (g = 980.6199 gals.).
 NB2146
 NB2146.The modeled gravity was interpolated from observed gravity values.
 NB2146
 NB2146. The following values were computed from the NAD 83(2011) position.
 NB2146
 NB2146;                    North         East     Units Scale Factor
Converg.
 NB2146;SPC NY C     -   327,203.514   217,770.789   MT  0.99995027   -0 16
08.6
 NB2146;SPC NY C     - 1,073,500.20    714,469.66   sFT  0.99995027   -0 16
08.6
 NB2146;UTM  18      - 4,756,673.258   338,610.664   MT  0.99992044   -1 20
53.1
 NB2146
 NB2146!             -  Elev Factor  x  Scale Factor =   Combined Factor
 NB2146!SPC NY C     -   0.99998201  x   0.99995027  =   0.99993228
 NB2146!UTM  18      -   0.99998201  x   0.99992044  =   0.99990245
 NB2146
 NB2146                          SUPERSEDED SURVEY CONTROL
 NB2146
 NB2146  NAD 83(2007)-  42 56 44.18774(N)    076 58 41.74183(W) AD(2002.00) 0
 NB2146  ELLIP H (02/10/07)  114.709  (m)                      GP(2002.00)
 NB2146  ELLIP H (09/18/02)  114.700  (m)                      GP(       ) 4
2
 NB2146  NAD 83(1996)-  42 56 44.18773(N)    076 58 41.74259(W) AD(       ) B
 NB2146  ELLIP H (07/24/97)  114.743  (m)                      GP(       ) 1
1
 NB2146  NAD 83(1992)-  42 56 44.18731(N)    076 58 41.74212(W) AD(       ) B
 NB2146  NAD 83(1986)-  42 56 44.19467(N)    076 58 41.74071(W) AD(       ) B
 NB2146  NAD 83(1992)-  42 56 44.18732(N)    076 58 41.74230(W) AD(       ) B
 NB2146  ELLIP H (04/16/93)  114.659  (m)                      GP(       ) 4
1
 NB2146  NAVD 88 (09/18/02)  149.2    (m)  GEOID99 model used   GPS OBS
 NB2146  NAVD 88 (06/10/96)  149.1    (m)  UNKNOWN model used   GPS OBS
 NB2146  NAVD 88 (04/16/93)  149.0    (m)  UNKNOWN model used   GPS OBS
 NB2146
 NB2146.Superseded values are not recommended for survey control.
```

NB2146
NB2146.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
NB2146.See file dsdata.txt to determine how the superseded data were derived.
NB2146
NB2146_U.S. NATIONAL GRID SPATIAL ADDRESS: 18TUN3861056673(NAD 83)
NB2146
NB2146_MARKER: I = METAL ROD
NB2146_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)
NB2146_SP_SET: STAINLESS STEEL ROD IN SLEEVE
NB2146_STAMPING: GENEVA 1992
NB2146_MARK LOGO: NGS
NB2146_PROJECTION: FLUSH
NB2146_MAGNETIC: N = NO MAGNETIC MATERIAL
NB2146_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
NB2146+STABILITY: POSITION/ELEVATION WELL
NB2146_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
NB2146+SATELLITE: SATELLITE OBSERVATIONS - May 14, 2010
NB2146_ROD/PIPE-DEPTH: 8.50 meters
NB2146_SLEEVE-DEPTH : 1.00 meters
NB2146

NB2146	HISTORY	- Date	Condition	Report By
NB2146	HISTORY	- 1992	MONUMENTED	NGS
NB2146	HISTORY	- 19950525	GOOD	NYDT
NB2146	HISTORY	- 19951120	SEE DESCRIPTION	FA
NB2146	HISTORY	- 19960618	GOOD	NYDT
NB2146	HISTORY	- 20010716	GOOD	NYDT
NB2146	HISTORY	- 2003	GOOD	TVGA
NB2146	HISTORY	- 20061028	GOOD	USPSQD
NB2146	HISTORY	- 20080327	GOOD	GPSSS
NB2146	HISTORY	- 20100514	GOOD	JCLS

NB2146
NB2146 STATION DESCRIPTION
NB2146
NB2146'DESCRIBED BY NATIONAL GEODETIC SURVEY 1992
NB2146'THE STATION IS LOCATED ABOUT 69.0 KM (42.85 MI) WEST OF SYRACUSE, 8.0
NB2146'KM (4.95 MI) NORTH OF GENEVA, 1.0 KM (0.60 MI) SOUTH FROM INTERSTATE
NB2146'HIGHWAY 90 AND IN A TRIANGULAR SHAPED GRASS AREA MADE FROM THE ON AND
NB2146'OFF BOUND RAMPS OF STATE ROUTE 14 AND STATE ROUTE 96.
NB2146'OWNERSHIP--HIGHWAY RIGHT-OF-WAY.
NB2146'TO REACH THE STATION FROM THE OVERPASS OF INTERSTATE HIGHWAY 90 AND
NB2146'STATE HIGHWAY 14 (EXIT 42) ABOUT 8.0 KM (4.95 MI) NORTH FROM GENEVA,
NB2146'GO SOUTH ON STATE HIGHWAY 14 FOR 0.8 KM (0.50 MI) TO THE OVERPASS OF
NB2146'STATE ROUTE 96. CONTINUE SOUTH ON STATE ROUTE 14 FOR 0.16 KM
NB2146'(0.10 MI) TO THE STATION ON THE RIGHT.
NB2146'LOCATED 31.1 M (102.0 FT) WEST FROM THE CENTERLINE OF HIGHWAY 14, 26.2
NB2146'M (86.0 FT) SOUTHEAST FROM THE EASTBOUND ON RAMP OF STATE ROUTE 96,
NB2146'26.0 M (85.3 FT) NORTHEAST FROM THE SOUTHBOUND RAMP OF STATE HIGHWAY
NB2146'14 AND ABOUT THE CENTER OF A TRIANGLE OF THE RAMPS FOR HIGHWAYS.
NB2146
NB2146 STATION RECOVERY (1995)
NB2146
NB2146'RECOVERY NOTE BY NY DEPT OF TRANSP 1995 (RWB)
NB2146'RECOVERED AS DESCRIBED.
NB2146
NB2146 STATION RECOVERY (1995)

NB2146
NB2146'RECOVERY NOTE BY FISHER ASSOCIATES 1995 (KR)
NB2146'MARKER DESTROYED.
NB2146
NB2146 STATION RECOVERY (1996)
NB2146
NB2146'RECOVERY NOTE BY NY DEPT OF TRANSP 1996 (KDS)
NB2146'RECOVERED AS DESCRIBED.
NB2146
NB2146 STATION RECOVERY (2001)
NB2146
NB2146'RECOVERY NOTE BY NY DEPT OF TRANSP 2001 (TF)
NB2146'RECOVERED AS DESCRIBED.
NB2146'
NB2146
NB2146 STATION RECOVERY (2003)
NB2146
NB2146'RECOVERY NOTE BY TVGA ENGINEERING SURVEYING PC 2003 (JHD)
NB2146'RECOVERED AS DESCRIBED.
NB2146
NB2146 STATION RECOVERY (2006)
NB2146
NB2146'RECOVERY NOTE BY US POWER SQUADRON 2006 (DLB)
NB2146'RECOVERED IN GOOD CONDITION.
NB2146
NB2146 STATION RECOVERY (2008)
NB2146
NB2146'RECOVERY NOTE BY GPS SALES AND SERVICES 2008 (CJC)
NB2146'RECOVERED IN GOOD CONDITION.
NB2146
NB2146 STATION RECOVERY (2010)
NB2146
NB2146'RECOVERY NOTE BY JOHN CHANCE LAND SURVEYS INC 2010
NB2146'RECOVERED IN GOOD CONDITION.

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1        National Geodetic Survey,   Retrieval Date = JUNE  5, 2014
 AB3846
**********************************************************************
 AB3846  CBN         -  This is a Cooperative Base Network Control Station.
 AB3846  DESIGNATION -  ROMULUS
 AB3846  PID         -  AB3846
 AB3846  STATE/COUNTY-  NY/SENECA
 AB3846  COUNTRY     -  US
 AB3846  USGS QUAD   -  OVID (1970)
 AB3846
 AB3846                         *CURRENT SURVEY CONTROL
 AB3846
_____________________________________________________________________________
 AB3846* NAD 83(2011) POSITION- 42 43 04.56203(N) 076 49 15.14452(W)
ADJUSTED
 AB3846* NAD 83(2011) ELLIP HT-   194.611 (meters)        (06/27/12)
ADJUSTED
 AB3846* NAD 83(2011) EPOCH   -  2010.00
 AB3846* NAVD 88 ORTHO HEIGHT -   228.4    (meters)     749.    (feet) GPS
OBS
 AB3846
_____________________________________________________________________________
 AB3846  NAVD 88 orthometric height was determined with geoid model
GEOID93
 AB3846  GEOID HEIGHT    -        -33.85  (meters)
GEOID93
 AB3846  GEOID HEIGHT    -        -33.86  (meters)
GEOID12A
 AB3846  NAD 83(2011) X  -  1,070,079.508 (meters)                    COMP
 AB3846  NAD 83(2011) Y  - -4,569,795.127 (meters)                    COMP
 AB3846  NAD 83(2011) Z  -  4,304,664.508 (meters)                    COMP
 AB3846  LAPLACE CORR    -          1.99  (seconds)
DEFLEC12A
 AB3846
 AB3846  FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)
 AB3846  Type                                           Horiz  Ellip  Dist(km)
 AB3846  ----------------------------------------------------------------------
 AB3846  NETWORK                                         0.57   1.47
 AB3846  ----------------------------------------------------------------------
 AB3846  MEDIAN LOCAL ACCURACY AND DIST (007 points)   0.60   1.63     31.53
 AB3846  ----------------------------------------------------------------------
 AB3846  NOTE: Click here for information on individual local accuracy
 AB3846  values and other accuracy information.
 AB3846
 AB3846
 AB3846.The horizontal coordinates were established by GPS observations
 AB3846.and adjusted by the National Geodetic Survey in June 2012.
 AB3846
 AB3846.NAD 83(2011) refers to NAD 83 coordinates where the reference
 AB3846.frame has been affixed to the stable North American tectonic plate.
See
 AB3846.NA2011 for more information.
 AB3846
 AB3846.The horizontal coordinates are valid at the epoch date displayed
above
 AB3846.which is a decimal equivalence of Year/Month/Day.
 AB3846
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AB3846.The orthometric height was determined by GPS observations and a
AB3846.high-resolution geoid model.
AB3846
AB3846.The X, Y, and Z were computed from the position and the ellipsoidal
ht.
AB3846
AB3846.The Laplace correction was computed from DEFLEC12A derived
deflections.
AB3846
AB3846.The ellipsoidal height was determined by GPS observations
AB3846.and is referenced to NAD 83.
AB3846
AB3846. The following values were computed from the NAD 83(2011) position.
AB3846
AB3846;   North   East   Units Scale Factor
Converg.
AB3846;SPC NY C   -   301,864.628   230,543.595   MT 0.99994216   -0 09
40.1
AB3846;SPC NY C   -   990,367.53   756,375.11   sFT 0.99994216   -0 09
40.1
AB3846;UTM 18   - 4,731,100.097   350,904.477   MT 0.99987349   -1 14
07.8
AB3846
AB3846!   - Elev Factor x Scale Factor =   Combined Factor
AB3846!SPC NY C   -   0.99996948 x   0.99994216 =   0.99991164
AB3846!UTM 18   -   0.99996948 x   0.99987349 =   0.99984297
AB3846
AB3846   SUPERSEDED SURVEY CONTROL
AB3846
AB3846 NAD 83(2007)- 42 43 04.56231(N)   076 49 15.14534(W) AD(2002.00) 0
AB3846 ELLIP H (02/10/07) 194.629 (m)   GP(2002.00)
AB3846 ELLIP H (12/03/02) 194.656 (m)   GP(   ) 3
1
AB3846 NAD 83(1996)- 42 43 04.56229(N)   076 49 15.14623(W) AD(   ) B
AB3846 ELLIP H (07/24/97) 194.670 (m)   GP(   ) 1
1
AB3846 NAD 83(1992)- 42 43 04.56180(N)   076 49 15.14554(W) AD(   ) B
AB3846 NAD 83(1992)- 42 43 04.56181(N)   076 49 15.14555(W) AD(   ) B
AB3846 ELLIP H (06/10/96) 194.607 (m)   GP(   ) 1
1
AB3846
AB3846.Superseded values are not recommended for survey control.
AB3846
AB3846.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AB3846.See file dsdata.txt to determine how the superseded data were
derived.
AB3846
AB3846_U.S. NATIONAL GRID SPATIAL ADDRESS: 18TUN5090431100(NAD 83)
AB3846
AB3846_MARKER: I = METAL ROD
AB3846_SETTING: 60 = ALUMINUM ALLOY ROD IN SLEEVE (10 FT.+)
AB3846_STAMPING: ROMULUS CBN 1995
AB3846_MARK LOGO: NYDT
AB3846_PROJECTION: FLUSH
AB3846_MAGNETIC: N = NO MAGNETIC MATERIAL
AB3846_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
AB3846+STABILITY: POSITION/ELEVATION WELL

AB3846_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AB3846+SATELLITE: SATELLITE OBSERVATIONS - October 30, 2000
AB3846_ROD/PIPE-DEPTH: 2.9 meters
AB3846_SLEEVE-DEPTH : 0.9 meters
AB3846
AB3846 HISTORY   - Date   Condition   Report By
AB3846 HISTORY   - 1995   MONUMENTED   NYDT
AB3846 HISTORY   - 19960618 GOOD   NYDT
AB3846 HISTORY   - 19990804 GOOD   NYDT
AB3846 HISTORY   - 20001030 GOOD   NYSE+S
AB3846 HISTORY   - 20050926 GOOD   USPSQD
AB3846 HISTORY   - 20110406 GOOD   ERDMAN
AB3846
AB3846   STATION DESCRIPTION
AB3846
AB3846'DESCRIBED BY NY DEPT OF TRANSP 1995 (RWB)
AB3846'THE STATION IS LOCATED ABOUT 21 KM (13.0 MI) SOUTH OF SENECA FALLS,
AB3846'BETWEEN CAYUGA AND SENECA LAKES AT THE NORTHERN JUNCTION OF STATE
AB3846'HIGHWAYS 96 AND 414. TO REACH THE STATION FROM THE SOUTHERN JUNCTION
AB3846'OF STATE HIGHWAYS 414 AND 96 IN THE VILLAGE OF OVID, GO NORTH ON
AB3846'HIGHWAYS 96/414 FOR 4.0 KM (2.5 MI) TO THE STATION ON THE LEFT IN THE
AB3846'TRIANGLE FORMED BY THE NORTHERN JUNCTION OF HIGHWAYS 96 AND 414 AT
AB3846'REFERENCE MARKER 414/3504/1131. THE STATION IS THE TOP CENTER OF AN
AB3846'ALUMINUM ROD DRIVEN TO REFUSAL AT A DEPTH OF 2.9 M (9.5 FT) ENCASED
IN
AB3846'A 2.7 CM GREASE FILLED PVC SLEEVE THAT IS 90 CM LONG ENCASED IN A
12.7
AB3846'CM PVC PIPE WITH LOGO CAP SURROUNDED WITH CONCRETE FLUSH WITH THE
AB3846'GROUND. IT IS 12.1 M (39.7 FT) WEST OF THE CENTER OF HIGHWAY 414,
7.9
AB3846'M (25.9 FT) NORTHWEST OF REFERENCE MARKER 414/3504/1131, 28.2 M (92.5
AB3846'FT) SOUTH OF THE HIGHWAY 414 SOUTH CONNECTOR TO HIGHWAY 96, AND 1 M
AB3846'(3.3 FT) EAST OF A WITNESS POST.
AB3846
AB3846   STATION RECOVERY (1996)
AB3846
AB3846'RECOVERY NOTE BY NY DEPT OF TRANSP 1996 (KDS)
AB3846'RECOVERED AS DESCRIBED.
AB3846
AB3846   STATION RECOVERY (1999)
AB3846
AB3846'RECOVERY NOTE BY NY DEPT OF TRANSP 1999 (KR)
AB3846'RECOVERED AS DESCRIBED
AB3846
AB3846   STATION RECOVERY (2000)
AB3846
AB3846'RECOVERY NOTE BY NEW YORK STATE ENGINEER AND SURVEYOR 2000 (RLC)
AB3846'RECOVERED IN GOOD CONDITION.
AB3846
AB3846   STATION RECOVERY (2005)
AB3846
AB3846'RECOVERY NOTE BY US POWER SQUADRON 2005
AB3846'RECOVERED IN GOOD CONDITION.
AB3846
AB3846   STATION RECOVERY (2011)
AB3846
AB3846'RECOVERY NOTE BY ERDMAN ANTHONY AND ASSOCIATES 2011 (GJB)

1 National Geodetic Survey, Retrieval Date = JUNE 5, 2014
NB1891
****
NB1891 CBN - This is a Cooperative Base Network Control Station.
NB1891 DESIGNATION - FLISCHMAN
NB1891 PID - NB1891
NB1891 STATE/COUNTY- NY/STEUBEN
NB1891 COUNTRY - US
NB1891 USGS QUAD - NAPLES (1976)
NB1891
NB1891 *CURRENT SURVEY CONTROL
NB1891

NB1891* NAD 83(2011) POSITION- 42 32 07.44358(N) 077 29 17.91926(W) ADJUSTED
NB1891* NAD 83(2011) ELLIP HT- 580.069 (meters) (06/27/12) ADJUSTED
NB1891* NAD 83(2011) EPOCH - 2010.00
NB1891* NAVD 88 ORTHO HEIGHT - 613.4 (meters) 2012. (feet) GPS OBS
NB1891

NB1891 NAVD 88 orthometric height was determined with geoid model GEOID96
NB1891 GEOID HEIGHT - -33.28 (meters) GEOID96
NB1891 GEOID HEIGHT - -33.34 (meters) GEOID12A
NB1891 NAD 83(2011) X - 1,019,811.113 (meters) COMP
NB1891 NAD 83(2011) Y - -4,595,633.501 (meters) COMP
NB1891 NAD 83(2011) Z - 4,290,005.376 (meters) COMP
NB1891 LAPLACE CORR - -1.76 (seconds) DEFLEC12A
NB1891
NB1891 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)

NB1891 Type	Horiz	Ellip	Dist(km)
NB1891 NETWORK	0.54	1.27	
NB1891 MEDIAN LOCAL ACCURACY AND DIST (019 points)	0.81	1.98	54.97

NB1891 NOTE: Click here for information on individual local accuracy
NB1891 values and other accuracy information.
NB1891
NB1891
NB1891.The horizontal coordinates were established by GPS observations
NB1891.and adjusted by the National Geodetic Survey in June 2012.
NB1891
NB1891.NAD 83(2011) refers to NAD 83 coordinates where the reference
NB1891.frame has been affixed to the stable North American tectonic plate. See
NB1891.NA2011 for more information.
NB1891
NB1891.The horizontal coordinates are valid at the epoch date displayed above
NB1891.which is a decimal equivalence of Year/Month/Day.
NB1891

```
 NB1891.The orthometric height was determined by GPS observations and a
 NB1891.high-resolution geoid model.
 NB1891
 NB1891.The X, Y, and Z were computed from the position and the ellipsoidal
ht.
 NB1891
 NB1891.The Laplace correction was computed from DEFLEC12A derived
deflections.
 NB1891
 NB1891.The ellipsoidal height was determined by GPS observations
 NB1891.and is referenced to NAD 83.
 NB1891
 NB1891. The following values were computed from the NAD 83(2011) position.
 NB1891
 NB1891;                    North         East     Units Scale Factor
Converg.
 NB1891;SPC NY C     -   281,958.712   175,658.090   MT  1.00000547   -0 36
42.6
 NB1891;SPC NY C     -   925,059.54    576,304.92   sFT  1.00000547   -0 36
42.6
 NB1891;SPC NY W     -   282,142.939   439,953.828   MT  1.00003702   +0 44
25.2
 NB1891;SPC NY W     -   925,663.96  1,443,415.18   sFT  1.00003702   +0 44
25.2
 NB1891;UTM  18      - 4,712,224.758   295,654.860   MT  1.00011378   -1 40
58.1
 NB1891
 NB1891!             -  Elev Factor  x  Scale Factor =   Combined Factor
 NB1891!SPC NY C     -   0.99990903  x   1.00000547  =   0.99991450
 NB1891!SPC NW W     -   0.99990903  x   1.00003702  =   0.99994605
 NB1891!UTM  18      -   0.99990903  x   1.00011378  =   1.00002280
 NB1891
 NB1891:                Primary Azimuth Mark                    Grid Az
 NB1891:SPC NY C     -  FLISCHMAN AZ MK                        029 52 58.9
 NB1891:SPC NY W     -  FLISCHMAN AZ MK                        028 31 51.1
 NB1891:UTM  18      -  FLISCHMAN AZ MK                        030 57 14.4
 NB1891
 NB1891|-----------------------------------------------------------------
|
 NB1891| PID    Reference Object                     Distance      Geod. Az
|
 NB1891|                                                           dddmmss.s
|
 NB1891| DA1644 FLISCHMAN AZ MK                                    0291616.3
|
 NB1891| DA1645 FLISCHMAN RM 1                     38.920 METERS 16829
|
 NB1891| DA1646 FLISCHMAN RM 2                     34.586 METERS 34701
|
 NB1891|-----------------------------------------------------------------
|
 NB1891
 NB1891                         SUPERSEDED SURVEY CONTROL
 NB1891
 NB1891  NAD 83(2007)-  42 32 07.44383(N)    077 29 17.92004(W) AD(2002.00) 0
 NB1891  ELLIP H (02/10/07)  580.085  (m)                       GP(2002.00)
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 NB1891  ELLIP H (12/03/02)  580.095  (m)                          GP(       ) 3
1
 NB1891  NAD 83(1996)-  42 32 07.44353(N)    077 29 17.92061(W) AD(       ) B
 NB1891  ELLIP H (07/24/97)  580.118  (m)                          GP(       ) 1
1
 NB1891  NAD 83(1992)-  42 32 07.44325(N)    077 29 17.91984(W) AD(       ) B
 NB1891  ELLIP H (04/16/93)  580.062  (m)                          GP(       ) 4
1
 NB1891  NAD 83(1986)-  42 32 07.45195(N)    077 29 17.91308(W) AD(       ) 1
 NB1891  NAD 27      -  42 32 07.20700(N)    077 29 18.95700(W) AD(       ) 1
 NB1891  NAVD 88 (04/16/93)  613.3    (m)  UNKNOWN model used   GPS OBS
 NB1891  NGVD 29 (07/19/86)  613.0    (m)         2011.     (f) VERT ANG
 NB1891
 NB1891.Superseded values are not recommended for survey control.
 NB1891
 NB1891.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 NB1891.See file dsdata.txt to determine how the superseded data were
derived.
 NB1891
 NB1891_U.S. NATIONAL GRID SPATIAL ADDRESS: 18TTN9565412224(NAD 83)
 NB1891
 NB1891_MARKER: DS = TRIANGULATION STATION DISK
 NB1891_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 NB1891_SP_SET: CONCRETE POST
 NB1891_STAMPING: FLISCHMAN 1939
 NB1891_MARK LOGO: CGS
 NB1891_MAGNETIC: N = NO MAGNETIC MATERIAL
 NB1891_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
 NB1891+STABILITY: SURFACE MOTION
 NB1891_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 NB1891+SATELLITE: SATELLITE OBSERVATIONS - April 15, 2009
 NB1891
 NB1891  HISTORY     - Date     Condition        Report By
 NB1891  HISTORY     - 1939     MONUMENTED       CGS
 NB1891  HISTORY     - 1939     GOOD             CGS
 NB1891  HISTORY     - 1970     SEE DESCRIPTION  LOCSUR
 NB1891  HISTORY     - 19920728 GOOD             NGS
 NB1891  HISTORY     - 19960709 GOOD             NYDT
 NB1891  HISTORY     - 19990302 GOOD             FA
 NB1891  HISTORY     - 20090415 GOOD             INDIV
 NB1891
 NB1891                          STATION DESCRIPTION
 NB1891
 NB1891'DESCRIBED BY COAST AND GEODETIC SURVEY 1939 (PLB)
 NB1891'LOCATED ON A HIGH ROUND CULTIVATED HILL BY AIR LINE ABOUT
 NB1891'1-1/2 MILES SOUTHWEST OF ATLANTA.  2-1/2 MILES NORTH OF COHOCTON
 NB1891'AND 6 MILES EAST-SOUTHEAST OF WAYLAND.  ON THE PROPERTY BELONGING
 NB1891'TO STEUBEN COUNTY, FORMERLY OWNED BY MR. GEORGE FLISCHMAN.
 NB1891'STATION IS IN WHAT WAS FORMERLY AN OLD FENCE ROW, ABOUT 1/2 MILE
 NB1891'SOUTHWEST OF MR. FLISCHMANS HOUSE.
 NB1891'
 NB1891'SURFACE, UNDERGROUND, REFERENCE AND AZIMUTH MARKS ARE STANDARD
 NB1891'BRONZE DISKS SET IN CONCRETE AS DESCRIBED IN NOTES 1A, 7A, AND 11A.
 NB1891'
 NB1891'REFERENCE MARKS NO.1 AND NO.2 ARE IN WHAT WAS FORMERLY AN OLD
 NB1891'FENCE ROW.
 NB1891'
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NB1891'THE AZIMUTH MARK IS 1 FOOT SOUTH OF AN EAST-WEST FENCE,
NB1891'40 YARDS WEST OF A FENCE CORNER, 20 FEET NORTH OF THE CENTER
NB1891'LINE OF TRAIL ROAD, AND 0.1 MILE EAST OF FARMHOUSE.
NB1891'
NB1891'SOIL CONSERVATION MARK NO.2 IS ABOUT 3 MILES EAST-SOUTHEAST OF
NB1891'STATION ON TOP OF A SMALL RIDGE SOUTH OF A SMALL PINE
NB1891'THICKET. 12 FEET NORTH OF CENTER LINE OF DIRT ROAD, ON THE FARM
NB1891'OF DR. MC MICHAEL. MARK IS 1/2-INCH IRON ROD DRIVEN 3 FEET IN THE
NB1891'GROUND AND PROJECTING 1 FOOT.
NB1891'
NB1891'A 4- BY 4-INCH WOODEN POST PAINTED WHITE AND STAMPED
NB1891'U.S. TRIANGULATION WAS SET AT STATION. IT PROJECTS 2 FEET ABOVE
NB1891'THE SURFACE.
NB1891'
NB1891'TO REACH STATION FROM THE INTERSECTION OF EAST NAPLES STREET
NB1891'AND SOUTH LACKAWANNA STREET (UNITED STATES HIGHWAY 15) IN WAYLAND,
NB1891'GO SOUTH ON UNITED STATES HIGHWAY 15 FOR 6.9 MILES TO
NB1891'A GRAVEL ROAD TO EAST ABOUT 100 YARDS SOUTH OF A SMALL
NB1891'SCHOOLHOUSE ON WEST SIDE OF UNITED STATES HIGHWAY 15. TURN
NB1891'LEFT ON GRAVEL ROAD, UP HILL, FOR 1.0 MILE TO A DIRT ROAD
NB1891'OPPOSITE A BARN. GO RIGHT ON DIRT ROAD, UP HILL, FOR 0.8 MILE
NB1891'TO A DRAINAGE DITCH AND END OF ROAD. CONTINUE STRAIGHT AHEAD
NB1891'(NORTH) AND BEAR EAST ON TRAIL FOR 0.6 MILE TO TOP OF HILL
NB1891'AND STATION.
NB1891'
NB1891'HEIGHT OF LIGHT ABOVE STATION MARK 30.5 METERS.
NB1891
NB1891   STATION RECOVERY (1939)
NB1891
NB1891'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1939
NB1891'RECOVERED IN GOOD CONDITION.
NB1891
NB1891   STATION RECOVERY (1970)
NB1891
NB1891'RECOVERY NOTE BY LOCAL SURVEYOR (INDIVIDUAL OR FIRM) 1970
NB1891'STATION WAS RECOVERED IN GOOD CONDITION. R.M. NO. 1 AND R.M. NO.2
NB1891'WERE DESTROYED. A WITNESS POST WAS SET 2 FEET EAST OF THE STATION.
NB1891
NB1891   STATION RECOVERY (1992)
NB1891
NB1891'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1992
NB1891'THE STATION IS LOCATED ABOUT 9.7 KM (6.00 MI) EAST-SOUTHEAST OF
NB1891'WAYLAND, 4.0 KM (2.50 MI) NORTH OF COHOCTON, 2.4 KM (1.50 MI)
NB1891'SOUTHWEST OF ATLANTA AND ON A HIGH CULTIVATED HILL. OWNERSHIP--
STEUBEN
NB1891'COUNTY.
NB1891'TO REACH THE STATION FROM THE POST OFFICE IN THE VILLAGE OF COHOCTON,
NB1891'GO WEST AND NORTH ON STATE ROUTE 415 FOR 2.5 KM (1.55 MI) TO THE
NB1891'INTERSECTION OF DAVIS HOLLOW ROAD. TURN RIGHT AND GO NORTHEAST ON
NB1891'DAVIS HOLLOW ROAD (PAVED) FOR 3.0 KM (1.85 MI) TO A GRAVEL ROAD
NB1891'RIGHT. TURN RIGHT AND GO NORTHEASTERLY ON DRUM ROAD (SIGN IS THERE
NB1891'BUT IS HARD TO READ) FOR 0.16 KM (0.10 MI) TO A FORK IN ROAD. TAKE
NB1891'THE LEFT FORK AND GO 2.1 KM (1.30 MI) ON THE FARM ROAD TO THE STATION
NB1891'AT THE TOP OF THE HILL AND ON THE RIGHT.
NB1891'LOCATED 8.5 M (27.9 FT) WEST FROM THE CENTERLINE OF THE FARM ROAD AND
NB1891'0.5 M (1.6 FT) WEST FROM A METAL WITNESS POST. DISK IS 15 CM ABOVE
NB1891'GROUND SET IN A 25 CM SQUARE CONCRETE MONUMENT.

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 NB1891
 NB1891                          STATION RECOVERY (1996)
 NB1891
 NB1891'RECOVERY NOTE BY NY DEPT OF TRANSP 1996 (KDS)
 NB1891'RECOVERED AS DESCRIBED.
 NB1891
 NB1891                          STATION RECOVERY (1999)
 NB1891
 NB1891'RECOVERY NOTE BY FISHER ASSOCIATES 1999 (KR)
 NB1891'THERE IS NO SIGN FOR DRUM ROAD.  PROPERTY IS POSTED.  CALL DAVID AND
 NB1891'MARTHA SIMOLO TO CHECK ON ROAD CONDITIONS.  FOUR-WHEEL DRIVE
NECESSARY
 NB1891'IF CONDITIONS NOT DRY.  PACKS OF COYOTE IN AREA.
 NB1891
 NB1891                          STATION RECOVERY (2009)
 NB1891
 NB1891'RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2009 (DMS)
 NB1891'ON PRIVATE PROPERTY, NO MUNICIPAL ROAD ACCESS
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1        National Geodetic Survey,   Retrieval Date = JUNE  5, 2014
 NB1027
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 NB1027  DESIGNATION -  VANGELDER RESET
 NB1027  PID         -  NB1027
 NB1027  STATE/COUNTY-  NY/YATES
 NB1027  COUNTRY     -  US
 NB1027  USGS QUAD   -  KEUKA PARK (1942)
 NB1027
 NB1027                          *CURRENT SURVEY CONTROL
 NB1027
_____________________________________________________________________
 NB1027* NAD 83(2011) POSITION- 42 32 50.20134(N) 077 02 54.66751(W)   NO
CHECK
 NB1027* NAD 83(2011) ELLIP HT-   454.010 (meters)        (06/27/12)   NO
CHECK
 NB1027* NAD 83(2011) EPOCH   -  2010.00
 NB1027* NAVD 88 ORTHO HEIGHT -   487.541  (meters)    1599.54  (feet)
ADJUSTED
 NB1027
_____________________________________________________________________
 NB1027  NAD 83(2011) X  -  1,054,835.221 (meters)                    COMP
 NB1027  NAD 83(2011) Y  - -4,586,710.366 (meters)                    COMP
 NB1027  NAD 83(2011) Z  -  4,290,892.315 (meters)                    COMP
 NB1027  LAPLACE CORR    -          0.88  (seconds)
DEFLEC12A
 NB1027  GEOID HEIGHT    -        -33.47  (meters)
GEOID12A
 NB1027  DYNAMIC HEIGHT  -        487.378 (meters)     1599.01  (feet) COMP
 NB1027  MODELED GRAVITY -    980,271.5   (mgal)                      NAVD
88
 NB1027
 NB1027  VERT ORDER      -  SECOND    CLASS 0
 NB1027
 NB1027  FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)
 NB1027  Type                                           Horiz  Ellip  Dist(km)
 NB1027  ----------------------------------------------------------------------
 NB1027  NETWORK                                         1.53   0.82
 NB1027  ----------------------------------------------------------------------
 NB1027  MEDIAN LOCAL ACCURACY AND DIST (003 points)   1.54   0.80     31.89
 NB1027  ----------------------------------------------------------------------
 NB1027  NOTE: Click here for information on individual local accuracy
 NB1027  values and other accuracy information.
 NB1027
 NB1027
 NB1027.The horizontal coordinates were established by GPS observations
 NB1027.and adjusted by the National Geodetic Survey in June 2012.
 NB1027
 NB1027.NAD 83(2011) refers to NAD 83 coordinates where the reference
 NB1027.frame has been affixed to the stable North American tectonic plate.
See
 NB1027.NA2011 for more information.
 NB1027
 NB1027.The horizontal coordinates are valid at the epoch date displayed
above
 NB1027.which is a decimal equivalence of Year/Month/Day.
 NB1027
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 NB1027.No horizontal observational check was made to the station.
 NB1027.
 NB1027.The orthometric height was determined by differential leveling and
 NB1027.adjusted by the NATIONAL GEODETIC SURVEY
 NB1027.in June 1991.
 NB1027
 NB1027.The X, Y, and Z were computed from the position and the ellipsoidal
ht.
 NB1027
 NB1027.The Laplace correction was computed from DEFLEC12A derived
deflections.
 NB1027
 NB1027.The ellipsoidal height was determined by GPS observations
 NB1027.and is referenced to NAD 83.
 NB1027
 NB1027.The dynamic height is computed by dividing the NAVD 88
 NB1027.geopotential number by the normal gravity value computed on the
 NB1027.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 NB1027.degrees latitude (g = 980.6199 gals.).
 NB1027
 NB1027.The modeled gravity was interpolated from observed gravity values.
 NB1027
 NB1027. The following values were computed from the NAD 83(2011) position.
 NB1027
 NB1027;                    North         East     Units Scale Factor
Converg.
 NB1027;SPC NY C     -   282,985.939   211,793.389   MT  0.99995545   -0 18
52.4
 NB1027;SPC NY C     -   928,429.70    694,858.81   sFT  0.99995545   -0 18
52.4
 NB1027;UTM  18      - 4,712,576.430   331,804.871   MT  0.99994807   -1 23
07.9
 NB1027
 NB1027!             -  Elev Factor  x  Scale Factor =   Combined Factor
 NB1027!SPC NY C     -   0.99992880  x   0.99995545  =   0.99988426
 NB1027!UTM  18      -   0.99992880  x   0.99994807  =   0.99987688
 NB1027
 NB1027:                Primary Azimuth Mark                    Grid Az
 NB1027:SPC NY C     -  KEUKA COLLEGE TANK                      336 24 50.7
 NB1027:UTM  18      -  KEUKA COLLEGE TANK                      337 29 06.2
 NB1027
 NB1027|-----------------------------------------------------------------
|
 NB1027| PID    Reference Object                      Distance      Geod. Az
|
 NB1027|                                                            dddmmss.s
|
 NB1027| DA2240 VANGELDER RM 3                        17.171 METERS 08918
|
 NB1027| NB1025 VANGELDER RM 1                       120.640 METERS 14727
|
 NB1027| DA2241 VANGELDER RM 4                        17.413 METERS 18036
|
 NB1027| NB1026 VANGELDER RM 2                        76.197 METERS 19606
|
 NB1027| DA2239 VANGELDER AZ MK                                     2220524.1
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 NB1027| NB1887 KEUKA COLLEGE TANK                  APPROX. 8.4 KM 3360558.3
|
 NB1027|-------------------------------------------------------------------
|
 NB1027
 NB1027                          SUPERSEDED SURVEY CONTROL
 NB1027
 NB1027  NAD 83(2007)-  42 32 50.20161(N)    077 02 54.66837(W) AD(2002.00) 0
 NB1027  ELLIP H (02/10/07)  454.033  (m)                       GP(2002.00)
 NB1027  ELLIP H (02/26/03)  454.049  (m)                       GP(       ) 4
1
 NB1027  ELLIP H (09/18/00)  454.073  (m)                       GP(       ) 1
1
 NB1027  NAD 83(1996)-  42 32 50.19903(N)    077 02 54.66788(W) AD(       ) 1
 NB1027  NAD 83(1986)-  42 32 50.20727(N)    077 02 54.66426(W) AD(       ) 1
 NB1027  NAD 27      -  42 32 49.95400(N)    077 02 55.77800(W) AD(       ) 1
 NB1027  NAVD 88 (09/18/00)  487.54   (m)         1599.5    (f) LEVELING    3
 NB1027  NGVD 29 (??/??/92)  487.698  (m)         1600.06   (f) ADJ UNCH    2
0
 NB1027
 NB1027.Superseded values are not recommended for survey control.
 NB1027
 NB1027.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 NB1027.See file dsdata.txt to determine how the superseded data were
derived.
 NB1027
 NB1027_U.S. NATIONAL GRID SPATIAL ADDRESS: 18TUN3180412576(NAD 83)
 NB1027
 NB1027_MARKER: DS = TRIANGULATION STATION DISK
 NB1027_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 NB1027_SP_SET: SET IN TOP OF CONCRETE MONUMENT
 NB1027_STAMPING: VANGELDER 1939
 NB1027_MARK LOGO: CGS
 NB1027_MAGNETIC: N = NO MAGNETIC MATERIAL
 NB1027_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
 NB1027+STABILITY: SURFACE MOTION
 NB1027_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 NB1027+SATELLITE: SATELLITE OBSERVATIONS - October 15, 2008
 NB1027
 NB1027  HISTORY     - Date     Condition        Report By
 NB1027  HISTORY     - 1939     MONUMENTED       CGS
 NB1027  HISTORY     - 1942     SEE DESCRIPTION  CGS
 NB1027  HISTORY     - 1964     SEE DESCRIPTION  CGS
 NB1027  HISTORY     - 1964     GOOD             CGS
 NB1027  HISTORY     - 1972     SEE DESCRIPTION  LOCENG
 NB1027  HISTORY     - 1990     GOOD             USPSQD
 NB1027  HISTORY     - 19991026 GOOD             NGS
 NB1027  HISTORY     - 20010723 GOOD             USPSQD
 NB1027  HISTORY     - 20051102 GOOD             CLOHAR
 NB1027  HISTORY     - 20081015 GOOD             NYSDOT
 NB1027
 NB1027                          STATION DESCRIPTION
 NB1027
 NB1027'DESCRIBED BY COAST AND GEODETIC SURVEY 1939 (PLB)
 NB1027'STATION IS LOCATED ON THE CULTIVATED RIDGE (ELEVATION 1600 FEET)
 NB1027'BY AIR LINE ABOUT 8 MILES SOUTH OF PENN YAN AND 4-1/4 MILES
 NB1027'WEST-NORTHWEST OF DUNDEE, ON PROPERTY OF MR. GEORGE VANGELDER, OF
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NB1027'PENN YAN. IT IS 30 FEET NORTH OF THE CENTER LINE OF ROAD AND 14
NB1027'FEET WEST OF SOUTHWEST CORNER OF BARN. THE MARK PROJECTS 6
NB1027'INCHES ABOVE THE SURFACE.
NB1027'
NB1027'SURFACE, UNDERGROUND, REFERENCE AND AZIMUTH MARKS ARE STANDARD
NB1027'BRONZE DISKS SET IN CONCRETE AS DESCRIBED IN NOTES 1A, 7A, AND 11A.
NB1027'
NB1027'REFERENCE MARK NO. 1 IS 1 FOOT WEST OF NORTH-SOUTH FENCE LINE
NB1027'IN THE SOUTHEAST CORNER OF THE FIELD.
NB1027'
NB1027'REFERENCE MARK NO. 2 IS ON THE WEST EDGE OF A FIELD ON THE
NB1027'SOUTH SIDE OF THE ROAD.
NB1027'
NB1027'THE AZIMUTH MARK IS 26.0 FEET EAST OF THE CENTER LINE OF THE
NB1027'ROAD AND 114 FEET NORTHEAST OF NORTHEAST CORNER OF HOUSE.
NB1027'
NB1027'TO REACH STATION FROM INTERSECTION OF MAIN AND ELM STREETS
NB1027'IN PENN YAN, GO NORTH ON MAIN STREET FOR 8.2 MILES TO Y WHERE 14A
NB1027'BEARS LEFT. CONTINUE STRAIGHT AHEAD ON NARROW ASPHALT ROAD AND GO
NB1027'0.1 MILE TO CROSS ROAD, TURN RIGHT AND GO 0.7 MILE TO STATION ON
NB1027'NORTH SIDE OF ROAD.
NB1027'
NB1027'A 4- BY 4-INCH WOODEN POST PAINTED WHITE AND STAMPED
NB1027'U.S. TRIANGULATION WAS SET AT STATION. IT PROJECTS 2 FEET ABOVE
NB1027'SURFACE.
NB1027'
NB1027'HEIGHT OF LIGHT ABOVE STATION MARK 26.5 METERS.
NB1027
NB1027   STATION RECOVERY (1942)
NB1027
NB1027'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1942 (CJB)
NB1027'STATION AND REFERENCE MARKS NO. 1 AND 2 WERE RECOVERED AND FOUND
NB1027'TO BE IN GOOD CONDITION. AZIMUTH MARK WAS NOT SEARCHED FOR BY
NB1027'LEVEL PARTY.
NB1027'
NB1027'R.M. NO. 1 IS 396.0 FEET SOUTHEASTERLY FROM STATION AND 1.0
NB1027'FOOT WEST OF RIGHT-OF-WAY FENCE. PROJECTS ABOUT 0.4 FOOT.
NB1027'
NB1027'R.M. NO. 2 IS 250.0 FEET SOUTH-SOUTHEASTERLY FROM THE STATION. THE
NB1027'MONUMENT PROJECTS ABOUT 0.5 FOOT.
NB1027'
NB1027'STATION IS REACHED FROM THE BAPTIST CHURCH IN DUNDEE BY TRAVELING
NB1027'3.9 MILES NORTHWESTERLY ALONG STATE HIGHWAY NO. 14-A TO INTERSECTION
NB1027'OF COUNTY ASPHALT ROAD LEADING WEST. THENCE, GO 0.7 MILE WESTERLY
NB1027'ALONG COUNTY ROAD TO THE TOP OF RIDGE AND THE SITE OF STATION.
NB1027
NB1027   STATION RECOVERY (1964)
NB1027
NB1027'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1964 (WFD)
NB1027'DETAILED STATEMENT AS TO THE FITNESS OF THE ORIGINAL
NB1027'DESCRIPTION. INCLUDING MARKS FOUND, STAMPINGS, CHANGES MADE,
NB1027'AND OTHER PERTINENT FACTS--
NB1027'
NB1027'SURFACE MARK HAD BEEN DESTROYED, RMS 1 AND 2 RECOVERED, AZIMUTH
NB1027'MARK COULD NOT BE FOUND. A NEW SURFACE MARK WAS SET ABOVE THE
NB1027'UNDERGROUND MARK, WHICH WAS RECOVERED, AND RMS 3 AND 4 SET AND
NB1027'ESTABLISHED.

NB1027'
NB1027'STATION MARK IS A STANDARD DISK (NOTE 1A-7A) SET IN A SQUARE
NB1027'CONCRETE MONUMENT THAT PROJECTS 8 INCHES AND IS STAMPED VANGELDER
NB1027'1939. IT IS 60 FEET EAST OF THE CENTER OF A DRIVEWAY TO A
NB1027'DWELLING, 26 FEET WEST OF TRANSMISSION POLE D.T. AND T. CO. 55 AND
NB1027'F 4 OVER 60, 29 FEET NORTH OF THE CENTER OF THE ROAD AND
NB1027'3.2 FEET NORTHEAST OF A WITNESS POST.
NB1027'
NB1027'RM 1 IS A STANDARD DISK STAMPED VANGELDER NO 1 1939, SET IN A
NB1027'SQUARE CONCRETE MONUMENT THAT PROJECTS 6 INCHES. (NOTE 11A)
NB1027'IT IS IN WILD HEDGEROW NEAR THE INTERSECTION OF 4 FIELDS, IN THE
NB1027'CORNER OF THE (SOUTHEAST) FIELD ACROSS THE ROAD FROM THE STATION
NB1027'AND ABOUT 10 FEET NORTH OF THE CENTER OF THE WIRES OF A
NB1027'HIGH-LINE.
NB1027'
NB1027'RM 2 (NOTE 11A) IS A STANDARD DISK STAMPED VANGELDER NO 2 1939,
NB1027'SET IN A SQUARE CONCRETE MONUMENT THAT PROJECTS 6 INCHES. IT IS
NB1027'IN THE WILD HEDGEROW ALONG THE WEST EDGE OF THE FIELD ACROSS
NB1027'THE ROAD FROM THE STATION AND 210 FEET SOUTH OF THE CENTER OF THE
NB1027'ROAD.
NB1027'
NB1027'RM 3 (NOTE 11A) IS A STANDARD DISK STAMPED VANGELDER NO 3 1939,
NB1027'SET IN A SQUARE CONCRETE MONUMENT THAT PROJECTS 3 INCHES. IT IS
NB1027'28 FEET NORTH OF THE CENTER OF THE ROAD AND AT THE SOUTH EDGE OF
NB1027'A GROVE OF YOUNG CONIFERS.
NB1027'
NB1027'RM 4 (NOTE 11A) IS A STANDARD DISK STAMPED VANGELDER NO 4 1939,
NB1027'SET IN A SQUARE CONCRETE MONUMENT THAT PROJECTS 4 INCHES AND
NB1027'IS 26 FEET SOUTH OF THE CENTER OF THE ROAD.
NB1027'
NB1027'AZIMUTH MARK (NOT RECOVERED) IS DESCRIBED AS A STANDARD DISK
NB1027'STAMPED VANGELDER 1939, SET IN THE TOP OF A SQUARE CONCRETE
NB1027'MONUMENT (NOTE 16A). IT IS 114 FEET NORTHEAST OF THE NORTHEAST
NB1027'CORNER OF A HOUSE AND 26 FEET EAST OF THE CENTER OF A ROAD.
NB1027'
NB1027'TO REACH THE STATION FROM THE JUNCTION OF ROUTES 54 AND 14-A
NB1027'IN PENN YAN, GO SOUTH ON 14-A FOR 7.5 MILES TO A FORK (WHERE 14-A
NB1027'TURNS LEFT), CONTINUE SOUTH FOR 0.1 MILE TO A CROSSROAD, TURN
NB1027'RIGHT AND GO WEST FOR 0.7 MILE TO THE TOP OF THE GRADE AND THE
NB1027'MARK ON THE RIGHT.
NB1027
NB1027   STATION RECOVERY (1964)
NB1027
NB1027'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1964
NB1027'3.9 MI NW FROM DUNDEE.
NB1027'3.9 MILES NORTHWEST ALONG STATE HIGHWAY 14 A FROM THE BAPTIST CHURCH
NB1027'AT DUNDEE, YATES COUNTY, THENCE 0.7 MILE WEST ALONG A COUNTY ROAD,
NB1027'ON THE GEORGE VANGELDER PROPERTY ON THE TOP OF A CULTIVATED RIDGE, 14
NB1027'FEET EAST OF THE SOUTHEAST CORNER OF A BARN, 30 FEET NORTH OF THE
NB1027'CENTERLINE OF THE COUNTY ROAD, AND 4 FEET NORTH OF THE RIGHT-OF-WAY
NB1027'FENCE AND A WHITE WOODEN WITNESS POST. A STANDARD TRIANGULATION-
NB1027'STATION DISK, STAMPED VANGELDER 1939 AND SET IN THE TOP OF A CONCRETE
NB1027'POST PROJECTING 0.4 FOOT ABOVE GROUND.
NB1027
NB1027   STATION RECOVERY (1972)
NB1027
NB1027'RECOVERY NOTE BY LOCAL ENGINEER (INDIVIDUAL OR FIRM) 1972 (JCD)

NB1027'VANGELDER 1939 GOOD.
NB1027'
NB1027'VANGELDER 1939 AZIMUTH MARK FOUND IN GOOD CONDITION. UNABLE
NB1027'TO SIGHT FROM STATION TO AZIMUTH MARK BECAUSE OF THE TREES GROWN
NB1027'UP ON SIGHT LINE.
NB1027
NB1027   STATION RECOVERY (1990)
NB1027
NB1027'RECOVERY NOTE BY US POWER SQUADRON 1990 (RHS)
NB1027'RECOVERED IN GOOD CONDITION.
NB1027
NB1027   STATION RECOVERY (1999)
NB1027
NB1027'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1999 (AJL)
NB1027'THE STATION IS LOCATED ABOUT 11.2 KM (6.95 MI) SOUTH OF PENN YAN,
10.5
NB1027'KM (6.50 MI) SOUTHEAST OF BRANCHPORT, 6.3 KM (3.90 MI) NORTHWEST OF
NB1027'DUNDEE, IN A GRASSY CLEARING. OWNERSHIP--UNKNOWN. TO REACH FROM THE
NB1027'SOUTH JUNCTION OF STATE HIGHWAYS 14A AND 54, LIBERTY AND LAKE
STREETS,
NB1027'IN PENN YAN, GO SOUTHWEST ON HIGHWAY 54 FOR 1.2 KM (0.75 MI) TO A
NB1027'PAVED ROAD ON THE LEFT. TURN LEFT AND GO SOUTH ON COUNTY ROAD 17
NB1027'(BATH ROAD) FOR 11.4 KM (7.10 MI) TO A SIDE ROAD ON THE LEFT. TURN
NB1027'LEFT AND GO EAST ON COUNTY ROAD 38 (PORTERS CORNERS ROAD) FOR 0.64 KM
NB1027'(0.40 MI) TO THE STATION ON THE LEFT. NOTE--THERE IS A RADIO TOWER
NB1027'ACROSS THE ROAD TO THE SOUTH. THE STATION IS A TRIANGULATION STATION
NB1027'DISK STAMPED VANGELDER 1939, SET IN A SQUARE CONCRETE MONUMENT WHICH
NB1027'PROJECTS 15 CM ABOVE THE GROUND LEVEL. IT IS 23.44 M (76.90 FT) EAST
NB1027'OF THE CENTER OF A GRAVEL DRIVE LEADING TO A DWELLING, 17.13 M (56.20
NB1027'FT) WEST OF REFERENCE MARK 3, 16.95 M (55.61 FT) WEST OF A STEEL
NB1027'WITNESS POST FOR RM 3, 9.60 M (31.50 FT) WEST OF THE CENTER OF A
NB1027'GRAVEL FIELD APPROACH, AND 9.36 M (30.71 FT) NORTH OF THE CENTERLINE
NB1027'OF THE ROAD.
NB1027
NB1027   STATION RECOVERY (2001)
NB1027
NB1027'RECOVERY NOTE BY US POWER SQUADRON 2001 (RH)
NB1027'RECOVERED IN GOOD CONDITION.
NB1027
NB1027   STATION RECOVERY (2005)
NB1027
NB1027'RECOVERY NOTE BY CLOUGH HARBOUR AND ASSOCIATES 2005 (CEL)
NB1027'MONUMENT IS NOW APPROXIMATELY FLUSH WITH GROUND AND IN THE FRONT YARD
NB1027'OF PRIVATE PROPERTY, OWNER UNKNOWN, BUT TO BE CONSIDERATE OCCUPANTS
OF
NB1027'HOUSE ON PROPERTY SHOULD BE NOTIFIED PRIOR TO OCCUPATION OF MONUMENT
NB1027
NB1027   STATION RECOVERY (2008)
NB1027
NB1027'RECOVERY NOTE BY NEW YORK STATE DEPT OF TRANSPORTATION 2008 (DLS)
NB1027'RECOVERED IN GOOD CONDITION.

1 National Geodetic Survey, Retrieval Date = JUNE 5, 2014
NB2147
****
NB2147 CBN - This is a Cooperative Base Network Control Station.
NB2147 DESIGNATION - TT 40 R
NB2147 PID - NB2147
NB2147 STATE/COUNTY- NY/SCHUYLER
NB2147 COUNTRY - US
NB2147 USGS QUAD - BURDETT (1976)
NB2147
NB2147 *CURRENT SURVEY CONTROL
NB2147

NB2147* NAD 83(2011) POSITION- 42 25 58.52091(N) 076 51 46.55757(W) ADJUSTED
NB2147* NAD 83(2011) ELLIP HT- 192.564 (meters) (06/27/12) ADJUSTED
NB2147* NAD 83(2011) EPOCH - 2010.00
NB2147* NAVD 88 ORTHO HEIGHT - 225.727 (meters) 740.57 (feet) ADJUSTED
NB2147

NB2147 NAD 83(2011) X - 1,071,592.861 (meters) COMP
NB2147 NAD 83(2011) Y - -4,591,438.100 (meters) COMP
NB2147 NAD 83(2011) Z - 4,281,348.164 (meters) COMP
NB2147 LAPLACE CORR - 3.34 (seconds) DEFLEC12A
NB2147 GEOID HEIGHT - -33.19 (meters) GEOID12A
NB2147 DYNAMIC HEIGHT - 225.656 (meters) 740.34 (feet) COMP
NB2147 MODELED GRAVITY - 980,301.7 (mgal) NAVD 88
NB2147
NB2147 VERT ORDER - SECOND CLASS II
NB2147
NB2147 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)

NB2147 Type	Horiz	Ellip	Dist(km)
NB2147 NETWORK	1.02	2.61	
NB2147 MEDIAN LOCAL ACCURACY AND DIST (009 points)	1.15	2.98	34.78

NB2147 NOTE: Click here for information on individual local accuracy
NB2147 values and other accuracy information.
NB2147
NB2147
NB2147.The horizontal coordinates were established by GPS observations
NB2147.and adjusted by the National Geodetic Survey in June 2012.
NB2147
NB2147.NAD 83(2011) refers to NAD 83 coordinates where the reference
NB2147.frame has been affixed to the stable North American tectonic plate. See
NB2147.NA2011 for more information.
NB2147
NB2147.The horizontal coordinates are valid at the epoch date displayed above
NB2147.which is a decimal equivalence of Year/Month/Day.

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 NB2147
 NB2147.The orthometric height was determined by differential leveling and
 NB2147.adjusted by the NATIONAL GEODETIC SURVEY
 NB2147.in April 2005.
 NB2147
 NB2147.No vertical observational check was made to the station.
 NB2147
 NB2147.The X, Y, and Z were computed from the position and the ellipsoidal
ht.
 NB2147
 NB2147.The Laplace correction was computed from DEFLEC12A derived
deflections.
 NB2147
 NB2147.The ellipsoidal height was determined by GPS observations
 NB2147.and is referenced to NAD 83.
 NB2147
 NB2147.The dynamic height is computed by dividing the NAVD 88
 NB2147.geopotential number by the normal gravity value computed on the
 NB2147.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 NB2147.degrees latitude (g = 980.6199 gals.).
 NB2147
 NB2147.The modeled gravity was interpolated from observed gravity values.
 NB2147
 NB2147. The following values were computed from the NAD 83(2011) position.
 NB2147
 NB2147;                    North         East     Units Scale Factor
Converg.
 NB2147;SPC NY C     -   270,216.778   226,994.092   MT  0.99994401   -0 11
19.2
 NB2147;SPC NY C     -   886,536.21    744,729.78   sFT  0.99994401   -0 11
19.2
 NB2147;UTM  18      - 4,699,526.108   346,764.059   MT  0.99988891   -1 15
26.0
 NB2147
 NB2147!             -  Elev Factor  x  Scale Factor =   Combined Factor
 NB2147!SPC NY C     -   0.99996980  x   0.99994401  =   0.99991381
 NB2147!UTM  18      -   0.99996980  x   0.99988891  =   0.99985871
 NB2147
 NB2147                          SUPERSEDED SURVEY CONTROL
 NB2147
 NB2147  NAD 83(2007)-  42 25 58.52116(N)    076 51 46.55825(W) AD(2002.00) 0
 NB2147  ELLIP H (02/10/07)  192.579  (m)                      GP(2002.00)
 NB2147  ELLIP H (12/03/02)  192.575  (m)                      GP(       ) 3
1
 NB2147  NAD 83(1996)-  42 25 58.52107(N)    076 51 46.55869(W) AD(       ) B
 NB2147  ELLIP H (07/24/97)  192.625  (m)                      GP(       ) 1
1
 NB2147  NAD 83(1986)-  42 25 58.52646(N)    076 51 46.55787(W) AD(       ) B
 NB2147  NAD 83(1992)-  42 25 58.52065(N)    076 51 46.55794(W) AD(       ) B
 NB2147  ELLIP H (04/16/93)  192.564  (m)                      GP(       ) 4
1
 NB2147  NAVD 88 (04/16/93)  225.7    (m)  UNKNOWN model used   GPS OBS
 NB2147
 NB2147.Superseded values are not recommended for survey control.
 NB2147
 NB2147.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
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NB2147.See file dsdata.txt to determine how the superseded data were derived.
NB2147
NB2147_U.S. NATIONAL GRID SPATIAL ADDRESS: 18TUM4676499526(NAD 83)
NB2147
NB2147_MARKER: DB = BENCH MARK DISK
NB2147_SETTING: 66 = SET IN ROCK OUTCROP
NB2147_SP_SET: IN DRILL HOLE IN ROCK OUTCROP
NB2147_STAMPING: TT 40 R 1942
NB2147_MARK LOGO: USGS
NB2147_MAGNETIC: N = NO MAGNETIC MATERIAL
NB2147_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
NB2147+STABILITY: POSITION/ELEVATION WELL
NB2147_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
NB2147+SATELLITE: SATELLITE OBSERVATIONS - May 14, 2010
NB2147

NB2147	HISTORY	- Date	Condition	Report By
NB2147	HISTORY	- 1942	MONUMENTED	USGS
NB2147	HISTORY	- 19920723	GOOD	NGS
NB2147	HISTORY	- 19960709	GOOD	NYDT
NB2147	HISTORY	- 19990322	GOOD	USPSQD
NB2147	HISTORY	- 20040511	GOOD	TVGA
NB2147	HISTORY	- 20100514	GOOD	JCLS

NB2147
NB2147 STATION DESCRIPTION
NB2147
NB2147'DESCRIBED BY NATIONAL GEODETIC SURVEY 1992
NB2147'THE STATION IS LOCATED ABOUT 7.1 KM (4.40 MI) NORTH OF WATKINS GLEN,
NB2147'1.6 KM (1.00 MI) EAST FROM SENECA LAKE AND IN THE SOUTHEAST ANGLE OF
NB2147'THE INTERSECTION OF STATE ROUTE 414 AND COUNTY ROAD 5.
NB2147'OWNERSHIP--STATE HIGHWAY RIGHT-OF-WAY.
NB2147'TO REACH THE STATION FROM THE JUNCTION OF STATE ROUTE 14 AND STATE
NB2147'ROUTE 414 IN WATKINS GLEN, GO NORTH ON STATE ROUTE 414 FOR 2.6 KM
NB2147'(1.60 MI) TO THE JUNCTION OF STATE ROUTE 79. BEAR LEFT AND CONTINUE
NB2147'NORTH ON STATE ROUTE 414 AND GO 2.7 KM (1.65 MI) TO A WATER FOLL ON
NB2147'THE RIGHT. CONTINUE AHEAD AND GO NORTH 1.6 KM (1.00 MI) ON STATE
NB2147'ROUTE 414 TO THE JUNCTION OF COUNTY ROAD 5 ON THE RIGHT AND THE
NB2147'STATION ON THE RIGHT.
NB2147'LOCATED 11.9 M (39.0 FT) EAST FROM THE CENTERLINE OF STATE ROUTE 414,
NB2147'9.5 M (31.2 FT) SOUTHWEST FROM THE CENTERLINE OF COUNTY ROAD 5, 1.9 M
NB2147'(6.2 FT) SOUTH FROM A POWER POLE.
NB2147
NB2147 STATION RECOVERY (1996)
NB2147
NB2147'RECOVERY NOTE BY NY DEPT OF TRANSP 1996 (KDS)
NB2147'THE JUNCTION OF ROUTE 414 AND COUNTY ROUTE 5 HAS BEEN COMPLETELY
NB2147'RECONSTRUCTED. NEW TIES FOLLOW. THE STATION IS A BRONZE DISK SET IN
NB2147'A BOULDER ON THE SOUTHEAST ANGLE OF ROTE 414 AND COUNTY ROUE 5. IT IS
NB2147'42 FT (12.80 M) EAST OF THE CENTERLINE ROUTE 414, 26 FT (7.92 M) SOUTH
NB2147'OF THE CENTERLINE OF COUNTY ROUTE 5 AND 16.2 FT (4.94 M) NORTH OF
NB2147'POWER POLE NYSEG 2-1.
NB2147
NB2147 STATION RECOVERY (1999)
NB2147
NB2147'RECOVERY NOTE BY US POWER SQUADRON 1999

NB2147'RECOVERED IN GOOD CONDITION.
NB2147
NB2147 STATION RECOVERY (2004)
NB2147
NB2147'RECOVERY NOTE BY TVGA ENGINEERING SURVEYING PC 2004 (GJB)
NB2147'RECOVERED AS DESCRIBED.
NB2147
NB2147 STATION RECOVERY (2010)
NB2147
NB2147'RECOVERY NOTE BY JOHN CHANCE LAND SURVEYS INC 2010
NB2147'RECOVERED IN GOOD CONDITION.

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1        National Geodetic Survey,   Retrieval Date = JUNE  5, 2014
 NB1620
***********************************************************************
 NB1620  FBN         -  This is a Federal Base Network Control Station.
 NB1620  DESIGNATION -  G 463
 NB1620  PID         -  NB1620
 NB1620  STATE/COUNTY-  NY/CHEMUNG
 NB1620  COUNTRY     -  US
 NB1620  USGS QUAD   -  VAN ETTEN (1969)
 NB1620
 NB1620                         *CURRENT SURVEY CONTROL
 NB1620
_____________________________________________________________________________
 NB1620* NAD 83(2011) POSITION- 42 12 18.13024(N) 076 34 24.73638(W)
ADJUSTED
 NB1620* NAD 83(2011) ELLIP HT-   274.505 (meters)        (06/27/12)
ADJUSTED
 NB1620* NAD 83(2011) EPOCH   -  2010.00
 NB1620* NAVD 88 ORTHO HEIGHT -   307.600  (meters)    1009.18  (feet)
ADJUSTED
 NB1620
_____________________________________________________________________________
 NB1620  NAD 83(2011) X  -  1,098,741.381 (meters)                    COMP
 NB1620  NAD 83(2011) Y  - -4,602,603.291 (meters)                    COMP
 NB1620  NAD 83(2011) Z  -  4,262,685.656 (meters)                    COMP
 NB1620  LAPLACE CORR    -         -1.10  (seconds)
DEFLEC12A
 NB1620  GEOID HEIGHT    -        -33.08  (meters)
GEOID12A
 NB1620  DYNAMIC HEIGHT  -        307.485 (meters)     1008.81  (feet) COMP
 NB1620  MODELED GRAVITY -    980,242.0   (mgal)                      NAVD
88
 NB1620
 NB1620  VERT ORDER      -  FIRST     CLASS II
 NB1620
 NB1620  FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)
 NB1620  Type                                           Horiz  Ellip  Dist(km)
 NB1620  ----------------------------------------------------------------------
 NB1620  NETWORK                                         0.69   1.65
 NB1620  ----------------------------------------------------------------------
 NB1620  MEDIAN LOCAL ACCURACY AND DIST (081 points)   0.82   1.94    110.20
 NB1620  ----------------------------------------------------------------------
 NB1620  NOTE: Click here for information on individual local accuracy
 NB1620  values and other accuracy information.
 NB1620
 NB1620
 NB1620.The horizontal coordinates were established by GPS observations
 NB1620.and adjusted by the National Geodetic Survey in June 2012.
 NB1620
 NB1620.NAD 83(2011) refers to NAD 83 coordinates where the reference
 NB1620.frame has been affixed to the stable North American tectonic plate.
See
 NB1620.NA2011 for more information.
 NB1620
 NB1620.The horizontal coordinates are valid at the epoch date displayed
above
 NB1620.which is a decimal equivalence of Year/Month/Day.
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 NB1620
 NB1620.The orthometric height was determined by differential leveling and
 NB1620.adjusted by the NATIONAL GEODETIC SURVEY
 NB1620.in June 1991.
 NB1620
 NB1620.The X, Y, and Z were computed from the position and the ellipsoidal
ht.
 NB1620
 NB1620.The Laplace correction was computed from DEFLEC12A derived
deflections.
 NB1620
 NB1620.The ellipsoidal height was determined by GPS observations
 NB1620.and is referenced to NAD 83.
 NB1620
 NB1620.The dynamic height is computed by dividing the NAVD 88
 NB1620.geopotential number by the normal gravity value computed on the
 NB1620.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 NB1620.degrees latitude (g = 980.6199 gals.).
 NB1620
 NB1620.The modeled gravity was interpolated from observed gravity values.
 NB1620
 NB1620. The following values were computed from the NAD 83(2011) position.
 NB1620
 NB1620;                    North         East     Units Scale Factor
Converg.
 NB1620;SPC NY C     -   244,867.040   250,808.899   MT  0.99993751   +0 00
23.7
 NB1620;SPC NY C     -   803,367.95    822,862.20   sFT  0.99993751   +0 00
23.7
 NB1620;UTM  18      - 4,673,740.013   370,100.894   MT  0.99980762   -1 03
26.0
 NB1620
 NB1620!             -  Elev Factor  x  Scale Factor =   Combined Factor
 NB1620!SPC NY C     -   0.99995695  x   0.99993751  =   0.99989446
 NB1620!UTM  18      -   0.99995695  x   0.99980762  =   0.99976458
 NB1620
 NB1620                          SUPERSEDED SURVEY CONTROL
 NB1620
 NB1620  NAD 83(2007)-  42 12 18.13052(N)    076 34 24.73725(W) AD(2002.00) 0
 NB1620  ELLIP H (02/10/07)  274.526  (m)                      GP(2002.00)
 NB1620  ELLIP H (09/18/02)  274.508  (m)                      GP(       ) 4
2
 NB1620  NAD 83(1996)-  42 12 18.13037(N)    076 34 24.73754(W) AD(       ) B
 NB1620  ELLIP H (07/22/97)  274.579  (m)                      GP(       ) 1
1
 NB1620  NAVD 88 (07/22/97)  307.60   (m)         1009.2    (f) LEVELING    3
 NB1620
 NB1620.Superseded values are not recommended for survey control.
 NB1620
 NB1620.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 NB1620.See file dsdata.txt to determine how the superseded data were
derived.
 NB1620
 NB1620_U.S. NATIONAL GRID SPATIAL ADDRESS: 18TUM7010073740(NAD 83)
 NB1620
 NB1620_MARKER: I = METAL ROD
 NB1620_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)
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NB1620_SP_SET: STAINLESS STEEL ROD
NB1620_STAMPING: G 463 1982
NB1620_MARK LOGO: NGS
NB1620_PROJECTION: FLUSH
NB1620_MAGNETIC: O = OTHER; SEE DESCRIPTION
NB1620_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
NB1620+STABILITY: POSITION/ELEVATION WELL
NB1620_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
NB1620+SATELLITE: SATELLITE OBSERVATIONS - May 07, 2014
NB1620_ROD/PIPE-DEPTH: 7.20 meters
NB1620
NB1620 HISTORY   - Date   Condition   Report By
NB1620 HISTORY   - 1982   MONUMENTED   NGS
NB1620 HISTORY   - 1988   GOOD   USPSQD
NB1620 HISTORY   - 1989   GOOD   USPSQD
NB1620 HISTORY   - 19940926 GOOD   USPSQD
NB1620 HISTORY   - 19951103 GOOD   NYDT
NB1620 HISTORY   - 19991202 GOOD   NGS
NB1620 HISTORY   - 20000615 GOOD   NGS
NB1620 HISTORY   - 20000621 GOOD   NGS
NB1620 HISTORY   - 20010812 GOOD   NGS
NB1620 HISTORY   - 20030515 GOOD   WOOLPT
NB1620 HISTORY   - 20140507 GOOD   INDIV
NB1620
NB1620   STATION DESCRIPTION
NB1620
NB1620'DESCRIBED BY NATIONAL GEODETIC SURVEY 1982
NB1620'2.15 KM (1.35 MI) WEST FROM VAN ETTEN.
NB1620'2.15 KM (1.35 MI) WEST ALONG STATE HIGHWAY 224 FROM THE
NB1620'JUNCTION OF STATE HIGHWAY 34 IN VAN ETTEN TO THE MARK ON
NB1620'THE RIGHT, AT THE JUNCTION OF BLAKE HILL ROAD,
NB1620'11.55 METERS (37.9 FT) NORTHEAST OF THE CENTERLINE OF THE
NB1620'HIGHWAY, 22.10 METERS (72.5 FT) NORTHWEST OF MILE MARKER
NB1620'224 6201 1012, 11.05 METERS (36.3 FT) SOUTHEAST OF THE
NB1620'CENTER OF BLAKE HILL ROAD, 0.83 METERS (2.7 FT) OF UTILITY
NB1620'POLE NUMBER 6529,21A,A9,2 WITH A TRANSFORMER AND 3 GUY WIRES.
NB1620'THE MARK IS 0.65 METERS NW FROM A WITNESS POST.
NB1620'THE MARK IS 0.60 M ABOVE HIGHWAY.
NB1620
NB1620   STATION RECOVERY (1988)
NB1620
NB1620'RECOVERY NOTE BY US POWER SQUADRON 1988 (RHS)
NB1620'RECOVERED IN GOOD CONDITION.
NB1620
NB1620   STATION RECOVERY (1989)
NB1620
NB1620'RECOVERY NOTE BY US POWER SQUADRON 1989 (RHS)
NB1620'RECOVERED IN GOOD CONDITION.
NB1620
NB1620   STATION RECOVERY (1994)
NB1620
NB1620'RECOVERY NOTE BY US POWER SQUADRON 1994
NB1620'RECOVERED IN GOOD CONDITION.
NB1620
NB1620   STATION RECOVERY (1995)
NB1620
NB1620'RECOVERY NOTE BY NY DEPT OF TRANSP 1995 (KDS)

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 NB1620'RECOVERED AS DESCRIBED.
 NB1620
 NB1620                          STATION RECOVERY (1999)
 NB1620
 NB1620'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1999 (RGH)
 NB1620'RECOVERED AS DESCRIBED.  BY R.G.  HAYES
 NB1620
 NB1620                          STATION RECOVERY (2000)
 NB1620
 NB1620'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2000 (AJL)
 NB1620'RECOVERED AS DESCRIBED.
 NB1620
 NB1620                          STATION RECOVERY (2000)
 NB1620
 NB1620'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2000 (RAH)
 NB1620'RECOVERED AS DESCRIBED.
 NB1620
 NB1620                          STATION RECOVERY (2001)
 NB1620
 NB1620'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2001 (CSM)
 NB1620'RECOVERED WITH FOLOWING NOTES.
 NB1620'
 NB1620'1.25 MILES WEST ALONG STATE ROUTE 224 FROM THE JUNCTION OF SR 34 IN
 NB1620'VAN ETTEN TO THE
 NB1620'MARK ON THE RIGHT AT THE JUNCTION OF BLAKE HILL RD.
 NB1620'
 NB1620'9.1 FT ENE OF MILE POST 224 6201 1012, 2.7 FT SE OF POLE 6529 WITH
GUY
 NB1620'WIRE AND NO
 NB1620'TRANSFORMER. A PUNCH MARK ON TOP OF A DATUM CAP CRIMPED TO A
STAINLESS
 NB1620'STEEL ROD.
 NB1620'
 NB1620
 NB1620                          STATION RECOVERY (2003)
 NB1620
 NB1620'RECOVERY NOTE BY WOOLPERT CONSULTANTS 2003 (RMC)
 NB1620'RECOVERED IN GOOD CONDITION.
 NB1620
 NB1620                          STATION RECOVERY (2014)
 NB1620
 NB1620'RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2014 (ABJ)
 NB1620'RECOVERED IN GOOD CONDITION.

 *** retrieval complete.
 Elapsed Time = 00:00:14
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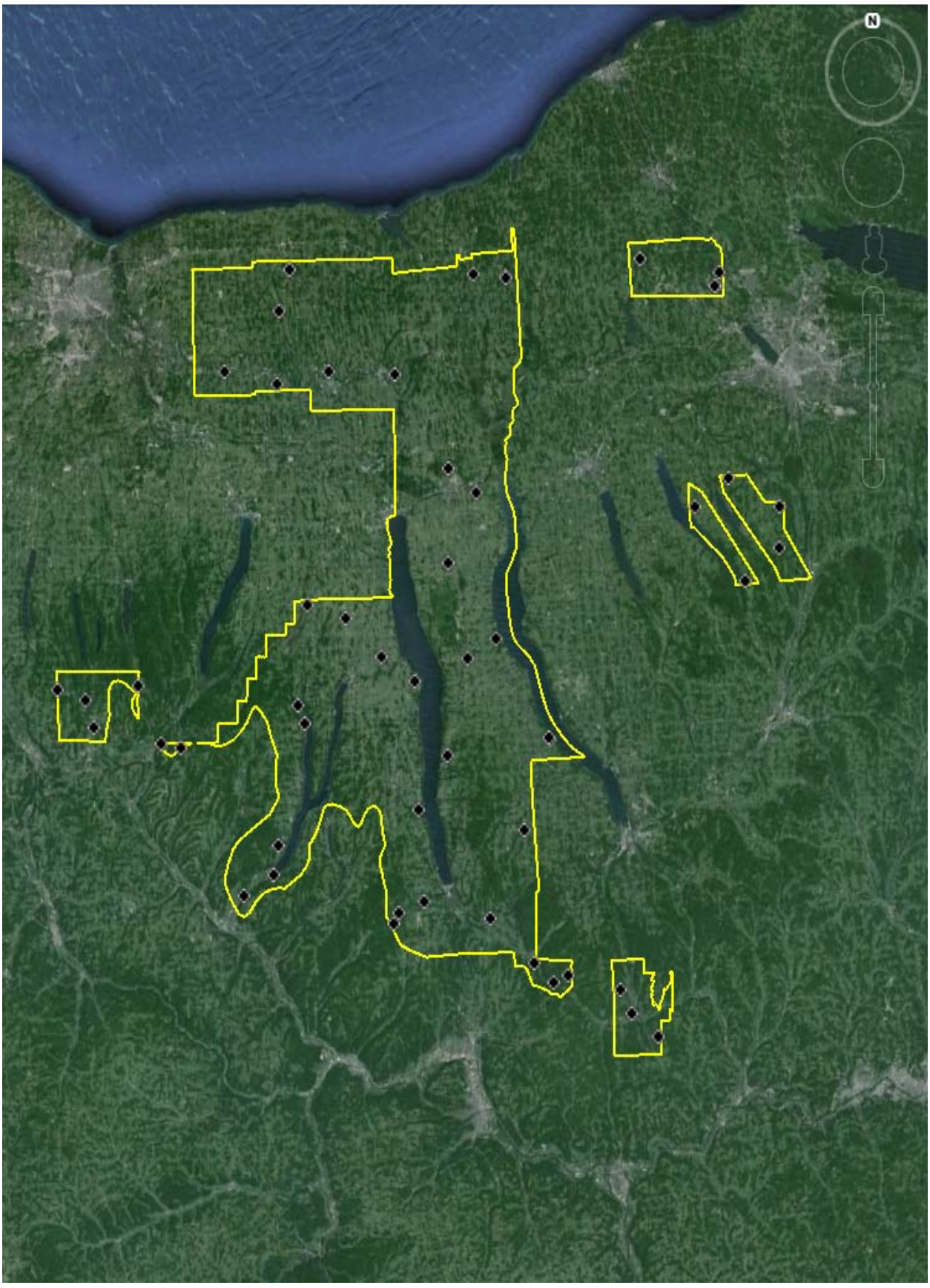
Appendix B

Fundamental Vertical Accuracy Point List

Point ID	LAT	LONG	Easting	Northing	Elevation	Ellipsoid	Feature Code
Z1a	42°38'50.427066255"	-77°39'15.007525016"	282423.45	4725069.273	587.438	553.741	BARE EARTH OPEN TERRAIN
Z6a	43°12'23.460137914"	-76°27'20.361549112"	381749.198	4784777.065	134.84	100.562	BARE EARTH OPEN TERRAIN
Z15a	43°11'13.506270330"	-76°43'54.245881826"	359276.747	4783046.284	144.633	109.985	BARE EARTH OPEN TERRAIN
Z16a	43°11'59.981965631"	-77°10'31.045882837"	323269.058	4785321.436	152.708	117.468	BARE EARTH OPEN TERRAIN
Z18a	43°03'32.187404007"	-76°57'41.688700649"	340265.575	4769227.37	125.516	90.771	BARE EARTH OPEN TERRAIN
Z28a	42°33'17.622552402"	-76°51'50.260921227"	346977.193	4713072.262	270.855	237.437	BARE EARTH OPEN TERRAIN
Z31a	42°20'05.625388065"	-76°58'35.468397521"	337167.436	4688852.308	427.647	394.724	BARE EARTH OPEN TERRAIN
Z34a	42°15'45.262178300"	-76°37'37.717677893"	365797.474	4680211.814	357.033	324.04	BARE EARTH OPEN TERRAIN
Z35a	42°14'31.628308309"	-76°31'18.501600355"	374445.092	4677780.061	438.172	405.125	BARE EARTH OPEN TERRAIN
Z36a	42°34'31.236118169"	-77°26'33.785413811"	299527.196	4716551.299	444.189	410.706	BARE EARTH OPEN TERRAIN
Z38a	42°22'26.329142935"	-77°16'41.222599762"	312435.869	4693813.998	339.589	306.542	BARE EARTH OPEN TERRAIN
Z39a	42°45'21.335675504"	-77°08'39.311972034"	324531.984	4735940.993	284.344	250.235	BARE EARTH OPEN TERRAIN
Z41a	42°10'43.274623547"	-76°26'49.578402687"	380488.796	4670629.472	433.351	400.24	BARE EARTH OPEN TERRAIN
97	43°03'56.787137552"	-77°18'34.496034972"	311947.162	4770707.763	148.043	112.904	BARE EARTH OPEN TERRAIN
135	42°49'09.764750104"	-76°11'02.249017751"	403214.808	4741437.198	415.591	382.694	BARE EARTH OPEN TERRAIN
T14	42°36'00.164217728"	-77°09'05.791270089"	323489.198	4718645.973	219.783	186.135	BARE EARTH OPEN TERRAIN
T18	42°48'31.406507750"	-76°51'27.234965779"	348122.033	4741247.64	204.337	170.204	BARE EARTH OPEN TERRAIN
216	42°34'24.129246812"	-76°39'21.386839924"	364095.298	4714768.808	209.467	176.116	BARE EARTH OPEN TERRAIN
123	43°10'06.724086874"	-76°18'11.751142250"	394063.276	4780354.894	135.633	101.65	BARE EARTH OPEN TERRAIN
Z3a	42°35'50.404819057"	-77°34'47.696776799"	288341.276	4719327.563	464.388	430.868	BARE EARTH OPEN TERRAIN

Appendix C


N