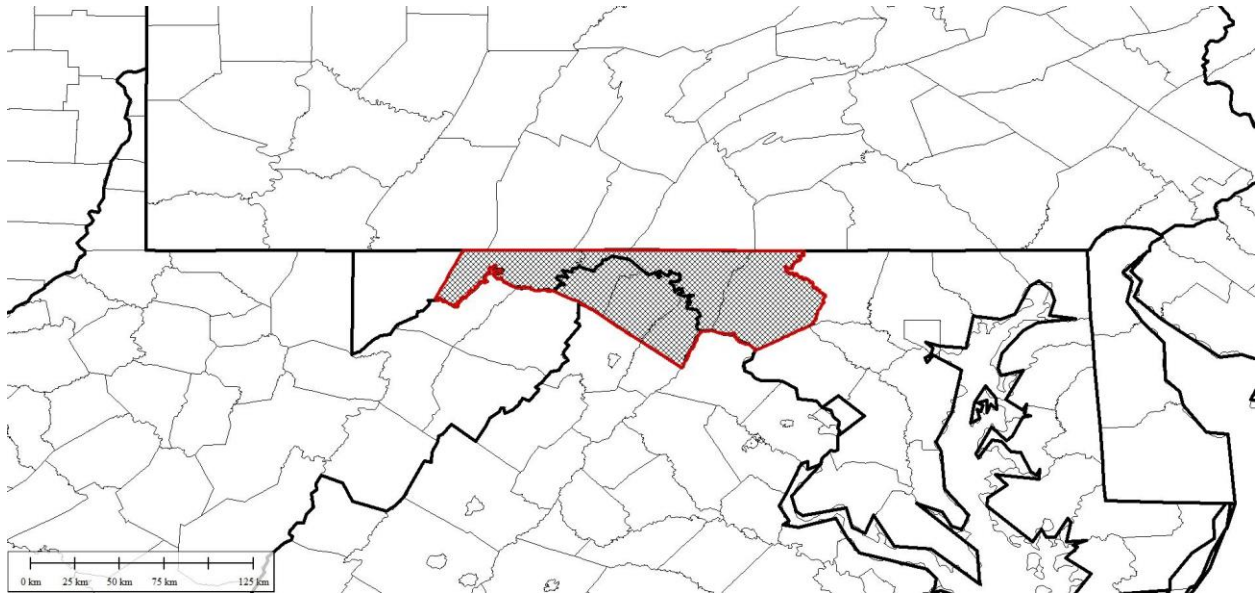


REPORT OF LIDAR SURVEY
United States Geological Survey
Ground Control Report
WESTERN MARYLAND



Performed by:

TerraSurv

For:

Fugro Geospatial
Terrasurv Project #21045

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REPORT OF SURVEY USGS LIDAR WESTERN MARYLAND

INTRODUCTION

Terrasurv, Inc of Pittsburgh, PA was tasked by Fugro Geospatial with performing a control survey in support of LiDAR data collection covering an area in western Maryland including a portion of northeastern West Virginia of approximately 2,345 mi². The project consisted of two parts: 40 ground control (calibration) points (GCP) and 140 quality control (QC: NVA/VVA-NF/VVA-F), for a total of 180 new stations. The map in figure 1 shows the location of the Ground Control (GCP) and figure 2 shows the location of the QC points. The control symbology for figures 1 and 2 are listed in table 1. Also shown in figure 1 are the Continuously Operating Reference Stations (CORS).

Table 1 - Map Symbology and Control Quantity

Type	Symbol	VA Quantity
Ground Control (GCP)	Green Dot	40
Non-Vegetated (NVA)	Red Dot	79
Vegetated (VVA-NF)	Red X	1
Woods (VVA-F)	Yellow X	60
CORS	Red +/White Square	9
Existing NSRS	Yellow X	1

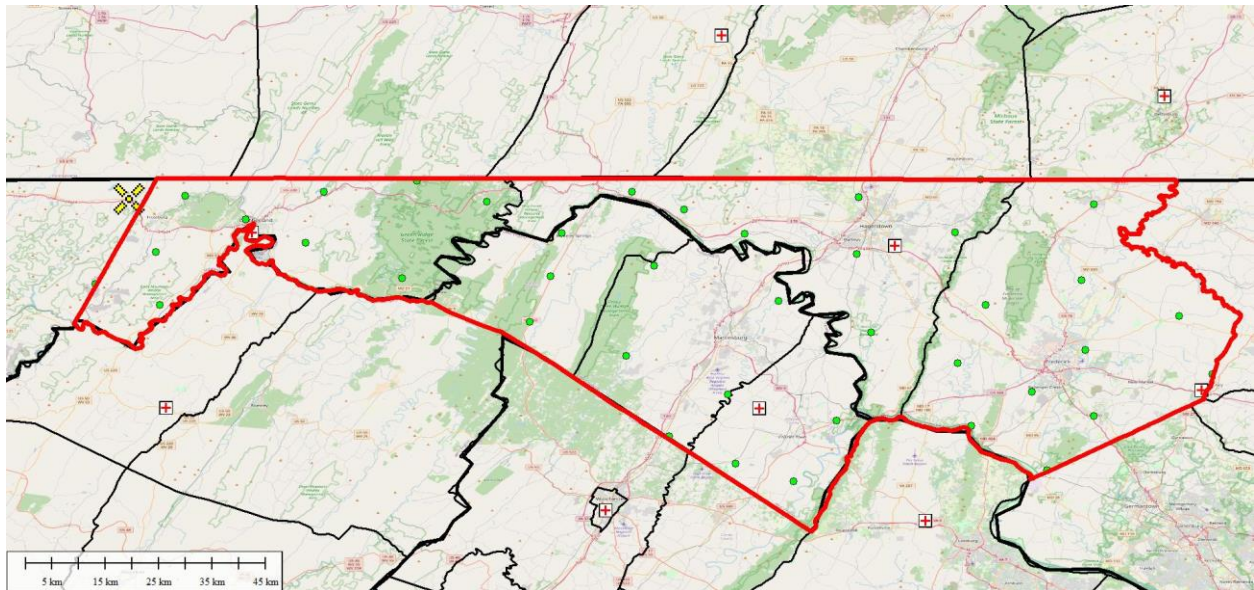


Figure 1 – GCP stations and CORS

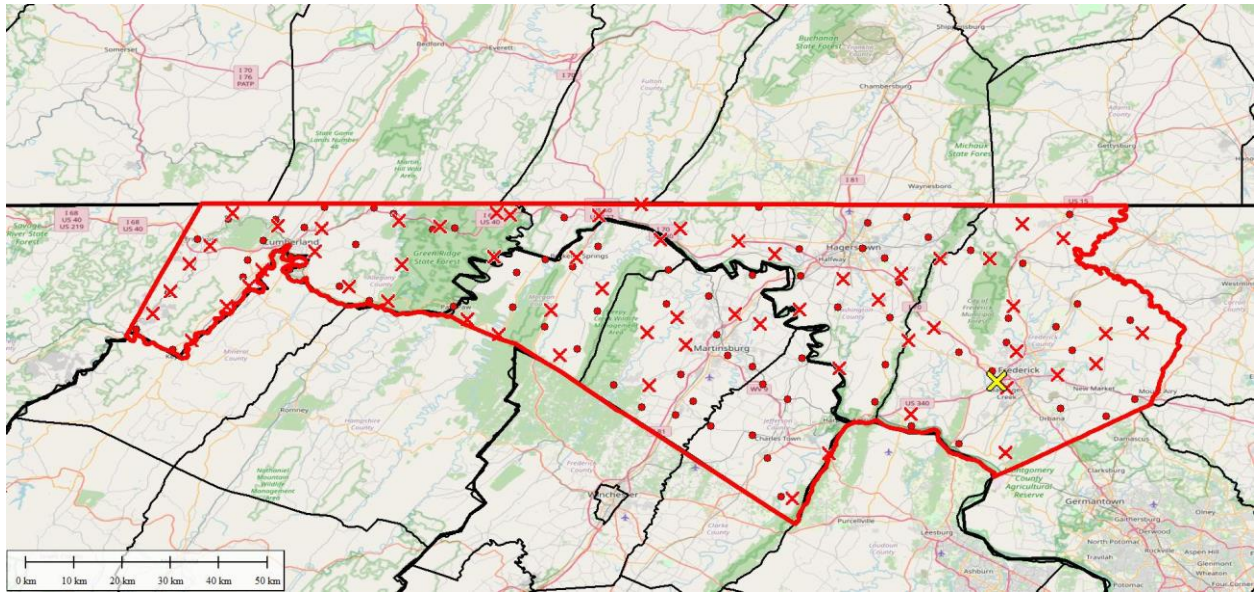


Figure 2 – Checkpoints (NVA, VVA-NF, and VVA-F)

The project consisted of two blocks, which are shown in figure 3 along with flight lines and cross ties.

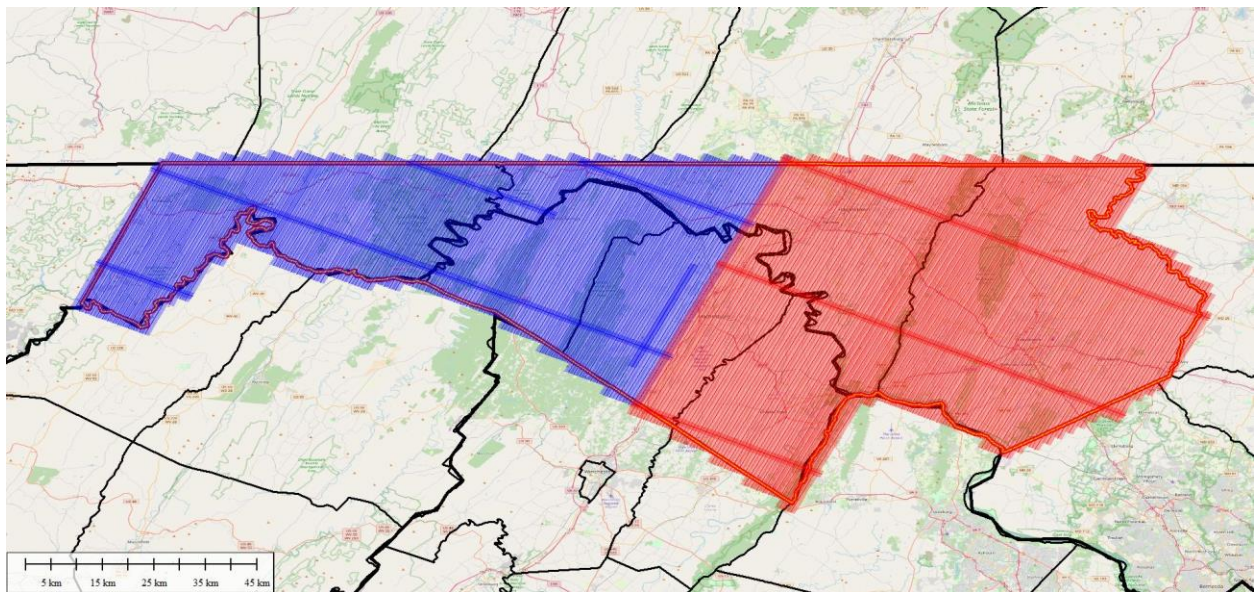


Figure 3 – Blocks and Flight Lines

CONTROL

The National Spatial Reference System (NSRS) was used to provide control for the network. The [KeyNetGPS](#) real time network (RTN) was utilized, with a total of 9 CORS from the system being used. In addition, one existing NSRS station was used as a check, located just off the western edge of the project. This station is summarized in table 2.

Table 2 - Existing NSRS Station

Station Name	NGS PID	Horizontal Accuracy	Ellip Hgt Accuracy	Ortho Hgt Accuracy
HONI	JW1579	0.66 cm	1.35 cm	2-I

The horizontal datum was the NAD83 (2011), epoch 2010.00. The vertical datum was the North American Vertical Datum of 1988 (NAVD88), realized with the GEOID18 geoid model from the National Geodetic Survey (NGS).

STATIONS

Table 3 lists the stations established in this survey, including the calibration points (GCP), the quality control points (NVA, VVA-NF, and VVA-F), the temporary base stations established to enable survey of VVA points in wooded areas, and the KeyNetGPS CORS.

Table 3 - Station List

Station Name	GPSID	USGS Quadrangle	Description
GCP01	21045AA	BARTON	gravel shoulder on north side of Michael Road just west of Russell Road opposite driveway north
GCP02	21045AB	LONACONING	paved shoulder on NW side of SR 36
GCP03	21045AC	LONACONING	gravel surface in drive/road turnout on west side of US 220 at Crossland Road
GCP04	21045AD	FROSTBURG	gravel parking lot on south side of Foundry Row NW
GCP05	21045AE	CUMBERLAND	center of paved cemetery road parallel to Fayette Street
GCP06	21045AF	PATTERSON CREEK	pavement in SB lane of Brice Hollow Road under HV power line crossing
GCP07	21045AG	EVITTS CREEK	pavement in center of golf cart path T intersection adjacent to #18 tee on west side of Pleasant Valley Road
GCP08	21045AH	OLDTOWN	bare ground in middle of gated woods road on north side of Dailey Road just west of T intersection
GCP09	21045AI	ARTEMAS	pavement in NB lane of Elbinsville Road
GCP10	21045AJ	BELLEGGROVE	pavement in NE quadrant of intersection of Orleans Road and Turkey Farm Road in center of entrance to solid waste station
GCP11	21045AK	RIDGE	asphalt centerline of Marigold Lane and on the east side of US522
GCP12	21045AL	GREAT CACAPON	gravel centerline of Mawani Village Lane and on the east side of US522
GCP13	21045AM	HANCOCK	asphalt centerline of Bennett Lane and on the east side of Cacapon Road
GCP14	21045AN	GLENGARY	asphalt centerline of Family Lane and on the north side of Back Creek Valley Road
GCP15	21045AO	HANCOCK	west shoulder of MD615 and at a garage
GCP16	21045AP	BIG POOL	asphalt southeast quadrant of the intersection of The Woods Road and Mountain Lake Road
GCP17	21045AQ	INWOOD	southside of an asphalt drive apron to an apartment complex on the east side of Fegan Road
GCP18	21045AR	CHERRY RUN	north side of Main Drive of Camp Harding Park and centerline of a parking lot drive on the north
GCP19	21045AS	MIDDLEWAY	gravel centerline of Staircase Drive and on the east side of Winding Waters Drive
GCP20	21045AT	BERRYVILLE	asphalt centerline of Thomson Lane and on the west side of Leetown Road

Station Name	GPSID	USGS Quadrangle	Description
GCP21	21045AU	CLEAR SPRING	asphalt centerline of Charles Mill Road and on the south side of Big Pool Road
GCP22	21045AV	HEDGESVILLE	gravel drive to the northwest of Scrabble Road
GCP23	21045AW	ROUND HILL	gravel centerline of Broadview Court and on the northwest side of Kabletown Road
GCP24	21045AX	CHARLES TOWN	asphalt centerline of a drive for mailboxes to Carriage Drive and on the north side of Shipley School Road
GCP25	21045AY	HAGERSTOWN	asphalt east side of Constitution Circle and in front of #17947
GCP26	21045AZ	WILLIAMSPORT	east side of a drive to 17816 Rensch Road and on the north side of Rensch Road
GCP27	21045BA	KEEDYSVILLE	asphalt centerline of the drive to Newcomer House and on the north side of Shepherdstown Pike
GCP28	21045BB	SMITHSBURG	asphalt center of Orange Blossom Court cul-de-sac
GCP29	21045BC	MIDDLETOWN	asphalt centerline of Bennies Hill Road and on the southeast side of Burkittsville Road
GCP30	21045BD	POINT OF ROCKS	south side of Lander Road at a drive to the south
GCP31	21045BE	SMITHSBURG	asphalt centerline of Harbaugh Church Road and on the east side of Midvale Road
GCP32	21045BF	MYERSVILLE	asphalt centerline of Vista Court and on the south side of Harmony Road
GCP33	21045BG	BUCKEYSTOWN	centerline of a drive to Zimmerman Farm on the south side of Ballenger Creek Pike
GCP34	21045BH	POOLESVILLE	asphalt center of Dr Belt Road and on the north side of MD28
GCP35	21045BI	WOODSBORO	asphalt south side of Shryock Mill Road and opposite a gravel lot in front of a silo and barn
GCP36	21045BJ	WALKERSVILLE	center of Riverside Research Park Synergy Drive and on the north side of Gas House Pike
GCP37	21045BK	URBANA	asphalt northwest quadrant of the intersection of Bennett Creek Avenue and MD80
GCP38	21045BL	EMMITSBURG	centerline of Dubois Terrace and on the north side of John Walsh Way
GCP39	21045BM	LIBERTYTOWN	asphalt centerline of a drive apron to Whispering Winds Farm on the north side of New Windsor Road
GCP40	21045BN	LIBERTYTOWN	asphalt centerline of Candice Drive and on the east side of Buffalo Road
NVA01	21045BO	WESTERNPORT	pavement in SB lane of Poplar Street just south of Morrison Street
NVA02	21045BP	KEYSER	pavement in church parking lot on north side of SR 135
NVA03	21045BQ	CRESAPTOWN	pavement on turn radius from Clear View Drive SE-bound to Greenleaf Drive SW-bound
NVA04	21045BR	FROSTBURG	SW bound travel lane of Chestnut Street just NE of Linden Street opposite steps to house on NW side of street
NVA05	21045BS	CUMBERLAND	gravel parking area on north side of Kreighbaum Road just east of SR 35
NVA06	21045BT	CRESAPTOWN	short grass on SW side of E Mary Street just NW of Candoc Lane between sidewalk and street
NVA07	21045BU	FLINTSTONE	paved shoulder on west side of Perrin Lane on north side of Flintstone Creek Road
NVA08	21045BV	CRESAPTOWN	gravel surface on turn radius from Mexico Farms Road WB to Gibson Lane NB
NVA09	21045BW	EVITTS CREEK	gravel parking lot on south side of Hazen Road
NVA10	21045BX	EVITTS CREEK	paved parking lot on west side of University of Maryland Extension office

Station Name	GPSID	USGS Quadrangle	Description
NVA11	21045BY	CUMBERLAND	pavement in church parking lot in west quadrant of intersection of National Highway and 1st Street
NVA12	21045BZ	FLINTSTONE	pavement on north side of SR 144 between off ramp from I68 EB and on ramp to I68 EB
NVA13	21045CA	ARTEMAS	pavement on east shoulder of US 40 Scenic just north of I68 WB offramp
NVA14	21045CB	OLDTOWN	pavement in church parking lot on north side of SR 51
NVA15	21045CC	ARTEMAS	pavement in boat trailer parking lot
NVA16	21045CD	PAW PAW	pavement in EB lane of River Street just east of Lee Street
NVA17	21045CE	BELLEGRIVE	asphalt centerline of Western Pike and on the south side of National Pike
NVA18	21045CF	GREAT CACAPON	gravel parking lot on west side of church on south side of WV 9
NVA19	21045CG	GREAT CACAPON	pavement in NB travel lane of Connors Run Road
NVA20	21045CH	RIDGE	center of Don's Lane cul-de-sac
NVA21	21045CI	BIG POOL	dirt centerline of Prince Drive and on the northwest side of Presidential Drive
NVA22	21045CJ	GLENGARY	asphalt centerline of Soper Lane and on the west side of Winchester Grade Road
NVA23	21045CK	GLENGARY	gravel centerline of Girl Scout Lane and on the south side of Apple Harvest Drive
NVA24	21045CL	HEDGESVILLE	asphalt centerline of Tuscany Trail and on the north side of Avalon Trail
NVA25	21045CM	INWOOD	asphalt center of Hansberry Court cul-de-sac
NVA26	21045CN	HANCOCK	asphalt centerline of Woodbrier Road and on the south side of Ridge View Drive
NVA27	21045CO	STOTLERS CROSSROADS	dirt shoulder at a track road to the north thru an orchard and on the north side of Highland Ridge Road
NVA28	21045CP	CLEAR SPRING	asphalt centerline of McIntosh Circle and on the west side of Stayman Drive
NVA29	21045CQ	HEDGESVILLE	center of Berkshire Drive cul-de-sac
NVA30	21045CR	STOTLERS CROSSROADS	asphalt southern end of parking lot for Food Lion and Advance Auto
NVA31	21045CS	GREAT CACAPON	pavement in EB lane of Orleans Road just east of Woodmont Road
NVA32	21045CT	ARTEMAS	pavement in EB lane of Old Williams Road at driveway east (Pic Lic Drive)
NVA33	21045CU	PATTERSON CREEK	bare ground on north side of MD 51
NVA34	21045CV	EVITTS CREEK	pavement in SW bound lane of Williams Road
NVA35	21045CW	CRESAPTOWN	pavement in NB lane of Briarwood Drive
NVA36	21045CX	LONACONING	asphalt pavement in church parking lot on east side of SR 36
NVA37	21045CY	FROSTBURG	bare ground in parking area for park on west side of Foundry Row NW and Lower Bank Street
NVA38	21045CZ	TABLERS STATION	asphalt center of Celcius Drive cul-de-sac
NVA39	21045DA	MARTINSBURG	asphalt centerline of Fredonia Circle cul-de-sac
NVA40	21045DB	MARTINSBURG	asphalt centerline of Sentry Lane and on the west side of Weavers Way
NVA41	21045DC	MASON-DIXON	asphalt center of Hosta Drive cul-de-sac
NVA42	21045DD	WILLIAMSPORT	centerline of a turn around to the west of Artizan Street and on the west side
NVA43	21045DE	SHEPHERDSTOWN	asphalt center of Mole Court cul-de-sac
NVA44	21045DF	MARTINSBURG	asphalt centerline of Dwight Court cul-de-sac
NVA45	21045DG	MARTINSBURG	center of gravel lot on the northeast side of Charlestown Road and north from the Citgo
NVA46	21045DH	MIDDLEWAY	asphalt centerline intersection of Cherry Hill Farm Drive and Byrd Drive
NVA47	21045DI	CHARLES TOWN	gravel centerline intersection of 4th Street and Elk Street

Station Name	GPSID	USGS Quadrangle	Description
NVA48	21045DJ	MIDDLEWAY	asphalt center of Cypress Point Court cul-de-sac
NVA49	21045DK	MIDDLEWAY	asphalt center of Dwight Court cul-de-sac
NVA50	21045DL	ROUND HILL	asphalt center of Eagle Landing Road
NVA51	21045DM	INWOOD	center of Thornhill Lane cul-de-sac
NVA52	21045DN	INWOOD	asphalt center of Decatur Drive cul-de-sac
NVA53	21045DO	BIG POOL	asphalt center of Medallion Drive cul-de-sac
NVA54	21045DP	POINT OF ROCKS	asphalt center of Wintergreen Lane
NVA55	21045DQ	FUNKSTOWN	asphalt center of Grove Lane cul-de-sac
NVA56	21045DR	KEEDYSVILLE	asphalt center of South Mount Court cul-de-sac
NVA57	21045DS	HARPERS FERRY	asphalt centerline of a turn-around apron on the south side of 858
NVA58	21045DT	FUNKSTOWN	asphalt center of Pendleton Court cul-de-sac
NVA59	21045DU	HAGERSTOWN	asphalt center of Marsh Circle cul-de-sac
NVA60	21045DV	HAGERSTOWN	asphalt center of Morningside Avenue cul-de-sac
NVA61	21045DW	FUNKSTOWN	asphalt center of Shalom Lane cul-de-sac
NVA62	21045DX	SMITHSBURG	asphalt center of Kelso Drive cul-de-sac
NVA63	21045DY	SMITHSBURG	asphalt center of Drew Circle cul-de-sac
NVA64	21045DZ	EMMITSBURG	southeast corner of the parking lot for Jubilee Foods and on the northwest quadrant of the intersection of E Main Street Extended and Silo Hill Road
NVA65	21045EA	FUNKSTOWN	asphalt center of Childacrest Drive cul-de-sac
NVA66	21045EB	MIDDLETOWN	asphalt center of Groff Court cul-de-sac
NVA67	21045EC	FREDERICK	asphalt center of Skip with Court cul-de-sac
NVA68	21045ED	FREDERICK	asphalt center of Rolling house Drive cul-de-sac
NVA69	21045EE	URBANA	asphalt center of Tottenham Court cul-de-sac
NVA70	21045EF	URBANA	asphalt center of Browning Court cul-de-sac
NVA71	21045EG	DAMASCUS	asphalt center of Four Seasons Court cul-de-sac
NVA72	21045EH	UNION BRIDGE	asphalt north end of an asphalt shoulder along Coppermine Road and at the entrance to the Frederick County DOT yard
NVA73	21045EI	WALKERSVILLE	asphalt center of Mt Pleasant Court cul-de-sac
NVA74	21045EJ	CATOCTIN FURNACE	asphalt center of Furnace Court cul-de-sac
NVA75	21045EK	CATOCTIN FURNACE	asphalt center of Crest Circle cul-de-sac
NVA76	21045EL	SMITHSBURG	gravel centerline of a road to the north of Foxville Road
NVA77	21045EM	WOODSBORO	asphalt center of Autumn Sky Terrace cul-de-sac
NVA78	21045EN	WALKERSVILLE	asphalt center of Zodiac Court cul-de-sac
NVA79	21045EO	POINT OF ROCKS	asphalt center of the Fletchers Way cul-de-sac
VVA01	21045EP	LONACONING	woods on south side of Rawlings Lane and east side of Post Office
VVA02	21045EQ	BARTON	woods on west side of SR 36 just south of old road west and across from church
VVA03	21045ER	ARTEMAS	woods in old canal on north side of boat trailer parking lot
VVA04	21045ES	FROSTBURG	woods on south side of Bishop Murphy Drive near west end of street
VVA05	21045ET	STOTLERS CROSSROADS	TREES= northwest from the intersection of Cacapon Road and Sir Johns Run Road
VVA06	21045EU	CRESAPTOWN	light woods on east side of Winchester Road just north of clearing with two tanks
VVA07	21045EV	KEYSER	woods on east side of US 220 at old road SE
VVA08	21045EW	CRESAPTOWN	woods on west side of Hazmat Drive and east side of RR tracks across from fire training center

Station Name	GPSID	USGS Quadrangle	Description
VVA09	21045EX	MIDDLETOWN	TREES= east side of Lambs Knoll Road and south of Reno Monument Road
VVA10	21045EY	ROUND HILL	TREES= northeast from the intersection of Mission Road and Multnomah Lane
VVA11	21045EZ	PATTERSON CREEK	woods on east side of Cresap Mill Rd just south of abandoned house
VVA12	21045FA	LARGENT	woods on east side of Brandon Hill Road south of church property
VVA13	21045FB	PAW PAW	woods on east side of WV 9 at pull-off for Imperial Orchard
VVA14	21045FC	CHARLES TOWN	TREES= south side of the Keys Gap parking on the south side of WV115 and WV9
VVA15	21045FD	OLDTOWN	pine woods on west side of Lower Town Creek Road
VVA16	21045FE	EVITTS CREEK	lone tree in cemetery on west side of Mt Hermon Road just north of church addition
VVA17	21045FF	ARTEMAS	woods on north side of SR 144 and south of creek and I68
VVA18	21045FG	EVITTS CREEK	woods on SE side of SR 144 just south of Grabenstein Road
VVA19	21045FH	CUMBERLAND	woods on NW side of SR 36
VVA20	21045FI	CUMBERLAND	woods on west side of cemetery access road on west side of cemetery
VVA21	21045FJ	LONACONING	woods on west side of Old Legislative Road SW
VVA22	21045FK	ARTEMAS	woods on north side of US 40 Scenic on west side of drive north
VVA23	21045FL	TABLERS STATION	TREES= south side of McGill Drive dead end
VVA24	21045FM	RIDGE	TREES= south side of the intersection of Ungers Store Road and Virginia Line Road
VVA25	21045FN	BIG POOL	TREES= island in the intersection of Dry Run Road and Kurseys Ford Road
VVA26	21045FO	CHERRY RUN	TREES= north side of Householder Road and opposite a church and cemetery
VVA27	21045FP	FUNKSTOWN	TREES= north side of the parking lot for Benevola United Methodist Church on the south side of Benevola Church Road
VVA28	21045FQ	POINT OF ROCKS	TREES= south end of Lions Maryland Park on the south side of the parking lot
VVA29NF	21045FR	FREDERICK	GRASS= dog park in the center of Jefferson Commons
VVA30	21045FS	CATOCTIN FURNACE	TREES= east side of US15 and just north from a creek
VVA31	21045FT	BLUE RIDGE SUMMIT	TREES= south of a parking lot for Eylers Valley Chapel and on the south side of Eylers Valley Road
VVA32	21045FU	EMMITSBURG	TREES= north side of 4 Points Road and east from Motters Station Road
VVA33	21045FV	WALKERSVILLE	TREES= south side of South Street and on the east of a cemetery
VVA34	21045FW	LIBERTYTOWN	TREES= west side of Clemson Ville Road and top of a hill
VVA35	21045FX	WALKERSVILLE	TREES= north side of Gas House Road and west from Country Club Road
VVA36	21045FY	BUCKEYSTOWN	TREES= north of the Monocacy River Boat Ramp parking
VVA37	21045FZ	FREDERICK	TREES= north side of Corporate Drive and on the east side of a drain
VVA38	21045GA	FREDERICK	TREES= on the south side of a drive thru Frederick Community College and near a cell tower
VVA39	21045GB	WALKERSVILLE	TREES= north of Spring Ridge Parkway and along a creek
VVA40	21045GC	MIDDLETOWN	TREES= north side of Milt Summers Road and between a water treatment plant and the Eastern Gas Transmission and storage

Station Name	GPSID	USGS Quadrangle	Description
VVA41	21045GD	TABLERS STATION	TREES= northwest from the intersection of Back Creek Valley Road and Sleepy Creek Road
VVA42	21045GE	HEDGESVILLE	TREES= north side of Myers Bridge Road
VVA43	21045GF	KEEDYSVILLE	TREES= along the east side of the C&O Canal trail and south from Canal Road and a parking area
VVA44	21045GG	WILLIAMSPORT	TREES= north side of River Bend Court and a cul-de-sac
VVA45	21045GH	FUNKSTOWN	TREES= north side of College Road and on the east side of a gravel parking area for a LP Gas Storage site
VVA46	21045GI	HEDGESVILLE	TREES= west side of Weaver Lane
VVA47	21045GJ	CATOCTIN FURNACE	TREES= east side of William Houck Road and north from the intersection with Campground Road
VVA48	21045GK	CLEAR SPRING	TREES= west side of West Drive and opposite a cemetery
VVA49	21045GL	CHERRY RUN	TREES= west side of Pecktonville Road
VVA50	21045GM	CHERRY RUN	TREES= south of the intersection of MD 615 (Heavenly Acres Road) and White Oak Ridge
VVA51	21045GN	HANCOCK	TREES= west end of a baseball field in Widmyer Park
VVA52	21045GO	BELLEGROVE	woods on east side of cemetery
VVA53	21045GP	OLDTOWN	woods on west side of Lower Town Creek Road just north of SR 51
VVA54	21045GQ	FLINTSTONE	woods on west side of cemetery
VVA55	21045GR	LONACONING	woods on east side of SR 36 between old RR and creek
VVA56	21045GS	GREAT CACAPON	TREES= east side of US522 and south from Luther Michael Road
VVA57	21045GT	TABLERS STATION	TREES= west side of Elegant Drive and Lot 13
VVA58	21045GU	STOTLERS CROSSROADS	TREES= north side of Duckwall Road and east from Highland Ridge Road
VVA59	21045GV	MYERSVILLE	TREES= in the split intersection of Garfield Road and Wolfsville Road
VVA60	21045GW	FUNKSTOWN	TREES= north side of Mapletown Road and opposite a quarry
VVA61	21045GX	MASON-DIXON	TREES= south from the intersection of Clear Spring Road and Cedar Ridge Road
BASE45	21045WA	FUNKSTOWN	Base for Woods checkpoint
BASE44	21045WB	WILLIAMSPORT	Base for Woods checkpoint
BASE42	21045WC	HEDGESVILLE	Base for Woods checkpoint
BASE10	21045WD	ROUND HILL	Base for Woods checkpoint
BASE14	21045WE	CHARLES TOWN	Base for Woods checkpoint
BASE43	21045WF	KEEDYSVILLE	Base for Woods checkpoint
BASE28	21045WG	POINT OF ROCKS	Base for Woods checkpoint
BASE36	21045WH	BUCKEYSTOWN	Base for Woods checkpoint
BASE37	21045WI	FREDERICK	Base for Woods checkpoint
BASE38	21045WJ	FREDERICK	Base for Woods checkpoint
BASE39	21045WK	WALKERSVILLE	Base for Woods checkpoint
BASE35	21045WL	WALKERSVILLE	Base for Woods checkpoint
BASE34	21045WM	LIBERTYTOWN	Base for Woods checkpoint
BASE33	21045WN	WALKERSVILLE	Base for Woods checkpoint
BASE30	21045WO	CATOCTIN FURNACE	Base for Woods checkpoint
BASE40	21045WP	MIDDLETOWN	Base for Woods checkpoint
BASE51	21045WQ	HANCOCK	Base for Woods checkpoint
BASE50	21045WR	CHERRY RUN	Base for Woods checkpoint
BASE49	21045WS	CHERRY RUN	Base for Woods checkpoint
BASE48	21045WT	CLEAR SPRING	Base for Woods checkpoint
BASE61	21045WU	MASON-DIXON	Base for Woods checkpoint
BASE46	21045WV	HEDGESVILLE	Base for Woods checkpoint
BASE26	21045WW	CHERRY RUN	Base for Woods checkpoint
BASE25	21045WX	BIG POOL	Base for Woods checkpoint
BASE57	21045WY	TABLERS STATION	Base for Woods checkpoint
BASE23	21045WZ	TABLERS STATION	Base for Woods checkpoint

Station Name	GPSID	USGS Quadrangle	Description
BASE41	21045XA	TABLERS STATION	Base for Woods checkpoint
BASE24	21045XB	RIDGE	Base for Woods checkpoint
BASE56	21045XC	GREAT CACAPON	Base for Woods checkpoint
BASE58	21045XD	STOTLERS CROSSROADS	Base for Woods checkpoint
BASE05	21045XE	STOTLERS CROSSROADS	Base for Woods checkpoint
BASE27	21045XF	FUNKSTOWN	Base for Woods checkpoint
BASE09	21045XG	MIDDLETOWN	Base for Woods checkpoint
BASE60	21045XH	FUNKSTOWN	Base for Woods checkpoint
BASE59	21045XI	MYERSVILLE	Base for Woods checkpoint
BASE47	21045XJ	CATOCTIN FURNACE	Base for Woods checkpoint
BASE31	21045XK	BLUE RIDGE SUMMIT	Base for Woods checkpoint
BASE32	21045XL	EMMITSBURG	Base for Woods checkpoint
BASEF20	21045YA	CUMBERLAND	Base for Woods checkpoint
BASEF04	21045YB	FROSTBURG	Base for Woods checkpoint
BASEF21	21045YC	LONACONING	Base for Woods checkpoint
BASEF55	21045YD	LONACONING	Base for Woods checkpoint
BASEF02	21045YE	BARTON	Base for Woods checkpoint
BASEF02	21045YF	BARTON	Base for Woods checkpoint
BASEF07	21045YG	KEYSER	Base for Woods checkpoint
BASEF01	21045YH	LONACONING	Base for Woods checkpoint
BASEF06	21045YI	CRESAPTOWN	Base for Woods checkpoint
BASEF19	21045YJ	CUMBERLAND	Base for Woods checkpoint
BASEF08	21045YK	CRESAPTOWN	Base for Woods checkpoint
BASEF16	21045YL	EVITTS CREEK	Base for Woods checkpoint
BASEF11	21045YM	PATTERSON CREEK	Base for Woods checkpoint
BASEF53	21045YN	OLDTOWN	Base for Woods checkpoint
BASEF53	21045YO	OLDTOWN	Base for Woods checkpoint
BASEF13	21045YP	PAW PAW	Base for Woods checkpoint
BASEF12	21045YQ	LARGENT	Base for Woods checkpoint
BASEF03	21045YR	ARTEMAS	Base for Woods checkpoint
BASEF15	21045YS	OLDTOWN	Base for Woods checkpoint
BASEF54	21045YT	FLINTSTONE	Base for Woods checkpoint
BASEF52	21045YU	BELLEGGROVE	Base for Woods checkpoint
BASEF22	21045YV	ARTEMAS	Base for Woods checkpoint
BASEF17	21045YW	ARTEMAS	Base for Woods checkpoint
BASEF18	21045YX	EVITTS CREEK	Base for Woods checkpoint
BCC2	BCC2	WINCHESTER	KeyNetGPS CORS
DEW5	DEW5	FUNKSTOWN	KeyNetGPS CORS
HB16	HB16	DAMASCUS	KeyNetGPS CORS
HONI	JW1579	FROSTBURG	Existing NSRS station
MAS2	MAS2	PURCELLVILLE	KeyNetGPS CORS
PAAC	PAAC	GETTYSBURG	KeyNetGPS CORS
PAFM	PAFM CORS	MCCONNELLSBURG	KeyNetGPS CORS
WVBU	PRS448246846	BURLINGTON	KeyNetGPS CORS
KP19	PRS721439768	CUMBERLAND	KeyNetGPS CORS
WVKE	WVKE	MIDDLEWAY	KeyNetGPS CORS

The GCP and CP stations were not permanently marked.

METHODOLOGY

The field survey was done by using Trimble R10 and R10-2 dual frequency, multi-constellation GNSS receivers in a real time (RTK/VRS) mode. Corrections were obtained from the KeyNetGPS network with corrections delivered over the cellular network. These corrections are applied in real time and used by the rover receiver to converge to a cm level solution. Each station was occupied once for a minimum of 3 minutes (180 epochs), then re-initialized and occupied a second time immediately after the first occupation. Additional observations were made if necessary to ensure

agreement at the 0.03 m level. The solutions are stored as vectors from the nearest physical CORS. The woods checkpoints were done by establishing a temporary base (R10) nearby using the VRS network and then using a second receiver as a rover with corrections delivered over a radio link from the nearby base. Due to areas with no cellular service, three NVA points and three woods base points were located using the Trimble Centerpoint RTX, which functions somewhat similar to the VRS service but corrections from a worldwide network of reference stations are delivered over a satellite communications link in real-time. Table 4 summarizes the VRS/RTK occupations (precisions in meters).

Table 4 – VRS/RTK Occupation Summary

GPS BASE	GPSID	UTC Start	UTC End	Horz Prec	Vert Prec	# of SV's	PDOP
KP19	21045AA	12/21/2021 16:25:15	16:27:24	0.026	0.038	9	2.0
KP19	21045AA	12/21/2021 16:29:02	16:30:08	0.017	0.026	9	1.8
KP19	21045AA	12/21/2021 16:31:27	16:34:26	0.015	0.021	7	2.2
KP19	21045AB	12/21/2021 14:40:57	14:43:56	0.009	0.012	12	1.6
KP19	21045AB	12/21/2021 14:44:14	14:45:35	0.013	0.018	7	2.3
KP19	21045AC	12/21/2021 18:35:06	18:38:05	0.006	0.010	11	1.8
KP19	21045AC	12/21/2021 18:38:38	18:41:37	0.011	0.019	11	1.8
KP19	21045AD	12/21/2021 13:30:26	13:33:25	0.004	0.009	12	1.8
KP19	21045AD	12/21/2021 13:34:07	13:37:06	0.008	0.016	11	1.9
KP19	21045AE	12/21/2021 21:35:01	21:38:00	0.004	0.008	11	2.1
KP19	21045AE	12/21/2021 21:40:02	21:43:01	0.004	0.010	12	1.9
KP19	21045AF	12/22/2021 14:55:36	14:58:35	0.007	0.008	11	1.7
KP19	21045AF	12/22/2021 14:59:17	15:02:16	0.006	0.007	10	1.8
KP19	21045AG	12/23/2021 16:44:26	16:47:25	0.005	0.006	13	1.4
KP19	21045AG	12/23/2021 16:48:29	16:51:37	0.007	0.009	13	1.4
KP19	21045AH	12/22/2021 17:19:08	17:22:07	0.009	0.013	11	1.5
KP19	21045AH	12/22/2021 17:22:34	17:25:33	0.012	0.017	7	2.0
KP19	21045AI	12/23/2021 16:07:30	16:10:50	0.023	0.045	8	2.3
KP19	21045AI	12/23/2021 16:11:30	16:14:29	0.020	0.040	9	2.2
KP19	21045AJ	12/22/2021 20:47:39	20:50:38	0.010	0.014	12	1.5
KP19	21045AJ	12/22/2021 20:50:59	20:54:02	0.008	0.012	6	2.1
BCC2	21045AK	12/22/2021 15:15:23	15:20:57	0.011	0.016	10	2.0
BCC2	21045AK	12/22/2021 15:21:26	15:23:29	0.022	0.029	11	1.9
BCC2	21045AK	12/22/2021 15:24:49	15:25:22	0.017	0.030	12	1.8
WVKE	21045AL	12/22/2021 16:42:44	16:46:07	0.013	0.020	10	1.9
WVKE	21045AL	12/22/2021 16:47:14	16:56:46	0.011	0.017	9	2.1
PAFM	21045AM	12/22/2021 19:35:18	19:39:40	0.012	0.023	9	2.2
PAFM	21045AM	12/22/2021 19:44:40	19:46:43	0.014	0.024	8	2.9
WVKE	21045AN	12/22/2021 13:36:44	13:38:43	0.009	0.017	10	2.1
WVKE	21045AN	12/22/2021 13:39:03	13:41:02	0.010	0.019	10	2.1
PAFM	21045AO	12/21/2021 15:02:58	15:04:58	0.014	0.029	13	1.7
PAFM	21045AO	12/21/2021 15:05:31	15:07:30	0.011	0.015	13	1.7
WVKE	21045AP	12/21/2021 20:39:26	20:41:25	0.012	0.017	12	1.6
WVKE	21045AP	12/21/2021 20:41:51	20:43:52	0.013	0.019	12	1.6
WVKE	21045AQ	12/15/2021 13:08:33	13:10:32	0.008	0.012	11	1.5
WVKE	21045AQ	12/15/2021 13:11:27	13:13:30	0.008	0.013	11	1.5
DEW5	21045AR	12/21/2021 15:39:28	15:41:27	0.011	0.018	10	2.0
DEW5	21045AR	12/21/2021 15:44:12	15:48:33	0.010	0.017	11	1.8
WVKE	21045AS	12/14/2021 21:50:32	21:52:32	0.005	0.009	11	2.0
WVKE	21045AS	12/14/2021 21:52:50	21:54:51	0.005	0.010	11	2.0
WVKE	21045AT	12/15/2021 13:51:27	13:53:27	0.008	0.015	9	2.3
WVKE	21045AT	12/15/2021 13:54:05	13:56:04	0.012	0.020	9	2.3
DEW5	21045AU	12/21/2021 17:18:59	17:20:58	0.015	0.018	10	1.9
DEW5	21045AU	12/21/2021 17:21:54	17:23:54	0.013	0.017	9	2.0
WVKE	21045AV	12/14/2021 19:05:44	19:07:45	0.009	0.014	10	1.7
WVKE	21045AV	12/14/2021 19:08:10	19:10:09	0.011	0.015	10	1.7
WVKE	21045AW	12/15/2021 14:33:33	14:35:33	0.009	0.013	11	1.6
WVKE	21045AW	12/15/2021 14:36:57	14:38:57	0.010	0.016	11	1.9
WVKE	21045AX	12/15/2021 16:27:02	16:29:01	0.008	0.013	12	1.5

GPS BASE	GPSID	UTC Start	UTC End	Horz Prec	Vert Prec	# of SV's	PDOP
WVKE	21045AX	12/15/2021 16:30:46	16:32:47	0.007	0.011	12	1.4
DEW5	21045AY	12/14/2021 15:36:22	15:39:21	0.018	0.026	11	1.7
DEW5	21045AY	12/14/2021 15:39:50	15:42:49	0.012	0.017	11	1.8
DEW5	21045AZ	12/14/2021 17:21:40	17:23:39	0.005	0.007	13	1.5
DEW5	21045AZ	12/14/2021 17:24:03	17:26:03	0.006	0.008	12	1.5
DEW5	21045BA	12/15/2021 17:20:59	17:22:59	0.008	0.011	11	1.5
DEW5	21045BA	12/15/2021 17:23:38	17:25:37	0.011	0.014	11	1.5
DEW5	21045BB	12/23/2021 13:08:19	13:10:19	0.008	0.013	9	2.3
DEW5	21045BB	12/23/2021 13:10:40	13:12:39	0.008	0.014	9	2.3
DEW5	21045BC	12/16/2021 20:33:27	20:35:27	0.010	0.012	12	1.5
DEW5	21045BC	12/16/2021 20:36:16	20:38:15	0.011	0.014	12	1.5
MAS2	21045BD	12/15/2021 19:41:39	19:43:39	0.010	0.017	10	1.8
MAS2	21045BD	12/15/2021 19:44:57	19:46:56	0.011	0.018	10	1.8
DEW5	21045BE	12/23/2021 13:51:47	13:53:46	0.010	0.014	11	1.6
DEW5	21045BE	12/23/2021 13:54:05	13:56:06	0.011	0.015	12	1.5
DEW5	21045BF	12/16/2021 20:56:00	20:57:59	0.009	0.012	14	1.5
DEW5	21045BF	12/16/2021 20:58:24	21:00:23	0.010	0.014	14	1.5
HB16	21045BG	12/16/2021 12:41:48	12:43:47	0.011	0.019	12	1.7
HB16	21045BG	12/16/2021 12:44:07	12:46:06	0.011	0.019	12	1.7
MAS2	21045BH	12/15/2021 20:49:06	20:51:06	0.011	0.015	10	1.7
MAS2	21045BH	12/15/2021 20:52:14	20:54:13	0.011	0.015	11	1.6
HB16	21045BI	12/16/2021 19:01:05	19:03:06	0.009	0.015	13	1.5
HB16	21045BI	12/16/2021 19:04:12	19:06:12	0.009	0.016	13	1.5
HB16	21045BJ	12/16/2021 14:40:23	14:42:23	0.010	0.016	12	1.7
HB16	21045BJ	12/16/2021 14:43:39	14:45:38	0.009	0.015	12	1.7
HB16	21045BK	12/15/2021 21:11:05	21:13:05	0.008	0.013	11	1.9
HB16	21045BK	12/15/2021 21:15:19	21:17:18	0.008	0.014	11	1.9
PAAC	21045BL	12/23/2021 16:34:38	16:36:38	0.010	0.013	12	1.5
PAAC	21045BL	12/23/2021 16:37:28	16:39:27	0.010	0.014	12	1.5
HB16	21045BM	12/16/2021 17:13:51	17:15:51	0.008	0.011	12	1.4
HB16	21045BM	12/16/2021 17:17:00	17:18:59	0.008	0.012	12	1.4
HB16	21045BN	12/16/2021 16:33:15	16:35:14	0.004	0.007	11	1.7
HB16	21045BN	12/16/2021 16:35:40	16:37:39	0.004	0.007	11	1.7
WVBU	21045BO	12/21/2021 17:30:41	17:33:40	0.009	0.014	9	2.0
WVBU	21045BO	12/21/2021 17:34:06	17:37:05	0.009	0.014	8	2.9
WVBU	21045BP	12/21/2021 17:54:16	17:57:15	0.006	0.011	10	1.8
WVBU	21045BP	12/21/2021 17:57:39	18:00:38	0.009	0.015	7	1.9
KP19	21045BQ	12/21/2021 19:51:34	19:54:33	0.006	0.008	6	2.4
KP19	21045BQ	12/21/2021 19:55:07	19:58:06	0.006	0.007	9	1.8
KP19	21045BR	12/21/2021 13:50:34	13:53:33	0.014	0.026	11	1.8
KP19	21045BR	12/21/2021 13:53:58	13:56:57	0.011	0.021	11	1.8
KP19	21045BS	12/21/2021 21:10:42	21:13:41	0.004	0.007	11	2.0
KP19	21045BS	12/21/2021 21:14:00	21:16:59	0.005	0.010	6	2.3
KP19	21045BT	12/22/2021 13:11:52	13:14:51	0.005	0.009	10	2.2
KP19	21045BT	12/22/2021 13:15:17	13:18:17	0.006	0.012	6	2.6
KP19	21045BU	12/23/2021 16:29:26	16:32:25	0.011	0.015	12	1.5
KP19	21045BU	12/23/2021 16:32:48	16:35:47	0.010	0.014	8	1.7
KP19	21045BV	12/22/2021 13:31:17	13:34:23	0.003	0.006	11	2.1
KP19	21045BV	12/22/2021 13:34:44	13:37:43	0.004	0.007	6	2.4
KP19	21045BW	12/23/2021 17:54:27	17:57:26	0.007	0.011	10	1.9
KP19	21045BW	12/23/2021 17:57:47	18:00:46	0.010	0.017	7	2.1
KP19	21045BX	12/23/2021 17:39:32	17:42:35	0.005	0.008	9	2.0
KP19	21045BX	12/23/2021 17:42:53	17:45:52	0.005	0.008	5	3.2
KP19	21045BY	12/21/2021 20:25:46	20:28:45	0.006	0.006	11	1.6
KP19	21045BY	12/21/2021 20:29:16	20:32:15	0.005	0.005	7	2.0
KP19	21045BZ	12/23/2021 13:26:51	13:29:50	0.012	0.022	10	2.2
KP19	21045BZ	12/23/2021 13:30:10	13:33:09	0.006	0.012	6	2.4
KP19	21045CA	12/23/2021 14:58:40	15:01:39	0.012	0.015	13	1.6
KP19	21045CA	12/23/2021 15:02:09	15:05:08	0.008	0.010	13	1.6
KP19	21045CB	12/22/2021 16:05:05	16:08:10	0.010	0.016	12	1.6
KP19	21045CB	12/22/2021 16:08:32	16:11:31	0.011	0.019	7	2.5
KP19	21045CC	12/22/2021 21:06:25	21:06:44	0.026	0.042	12	1.8
KP19	21045CC	12/22/2021 21:07:42	21:08:39	0.011	0.021	11	2.5
KP19	21045CC	12/22/2021 21:09:14	21:12:13	0.013	0.027	9	2.7

GPS BASE	GPSID	UTC Start	UTC End	Horz Prec	Vert Prec	# of SV's	PDOP
KP19	21045CD	12/22/2021 17:41:30	17:44:29	0.012	0.021	8	2.1
KP19	21045CD	12/22/2021 17:45:49	17:48:48	0.012	0.018	9	1.9
PAFM	21045CE	12/21/2021 14:23:30	14:25:29	0.013	0.021	11	1.9
PAFM	21045CE	12/21/2021 14:25:56	14:27:55	0.013	0.021	11	1.9
KP19	21045CF	12/22/2021 20:08:46	20:11:45	0.012	0.016	12	1.5
KP19	21045CF	12/22/2021 20:12:32	20:12:44	0.014	0.017	12	1.5
WVKE	21045CH	12/22/2021 15:59:12	16:01:11	0.015	0.022	12	1.6
WVKE	21045CH	12/22/2021 16:02:09	16:04:08	0.014	0.024	11	1.8
WVKE	21045CH	12/22/2021 16:04:39	16:06:38	0.010	0.015	12	1.6
WVKE	21045CI	12/21/2021 19:44:33	19:46:32	0.016	0.024	9	1.9
WVKE	21045CI	12/21/2021 19:47:31	19:49:31	0.013	0.018	9	1.9
WVKE	21045CJ	12/22/2021 14:26:20	14:28:19	0.016	0.022	10	1.7
WVKE	21045CJ	12/22/2021 14:29:12	14:34:00	0.014	0.019	12	1.4
WVKE	21045CK	12/22/2021 13:22:01	13:24:00	0.009	0.018	11	2.0
WVKE	21045CK	12/22/2021 13:24:40	13:26:41	0.010	0.018	11	2.0
WVKE	21045CL	12/21/2021 19:26:05	19:28:04	0.010	0.015	10	1.8
WVKE	21045CL	12/21/2021 19:28:48	19:30:47	0.032	0.033	11	1.7
WVKE	21045CM	12/14/2021 22:04:38	22:06:38	0.006	0.013	11	2.0
WVKE	21045CM	12/14/2021 22:09:04	22:11:03	0.006	0.012	12	1.9
PAFM	21045CN	12/22/2021 19:00:01	19:02:00	0.011	0.020	11	1.7
PAFM	21045CN	12/22/2021 19:02:37	19:04:36	0.012	0.022	11	1.7
WVKE	21045CO	12/22/2021 17:16:29	17:21:18	0.021	0.050	11	1.5
WVKE	21045CO	12/22/2021 17:22:20	17:24:19	0.011	0.019	11	1.4
WVKE	21045CO	12/22/2021 17:25:19	17:30:19	0.014	0.027	11	1.4
DEW5	21045CP	12/21/2021 16:57:05	16:59:04	0.013	0.016	12	1.5
DEW5	21045CP	12/21/2021 17:00:04	17:02:05	0.010	0.012	12	1.5
DEW5	21045CP	12/21/2021 17:02:43	17:04:42	0.010	0.013	11	1.9
DEW5	21045CQ	12/21/2021 18:35:06	18:37:05	0.008	0.013	11	1.8
DEW5	21045CQ	12/21/2021 18:37:57	18:39:56	0.010	0.016	11	1.8
WVKE	21045CR	12/22/2021 18:28:47	18:32:58	0.008	0.013	11	1.6
WVKE	21045CR	12/22/2021 18:33:24	18:35:23	0.013	0.023	7	2.8
KP19	21045CS	12/22/2021 19:48:57	19:51:56	0.009	0.013	10	1.7
KP19	21045CS	12/22/2021 19:52:22	19:55:21	0.010	0.014	10	1.7
KP19	21045CT	12/23/2021 15:42:46	15:45:06	0.018	0.034	9	2.6
KP19	21045CT	12/23/2021 15:46:10	15:49:09	0.008	0.016	9	2.6
KP19	21045CT	12/23/2021 15:50:48	15:53:47	0.013	0.023	9	2.6
KP19	21045CV	12/22/2021 14:32:22	14:35:21	0.007	0.008	11	1.6
KP19	21045CV	12/22/2021 14:35:47	14:36:25	0.007	0.008	13	1.4
KP19	21045CV	12/22/2021 14:44:38	14:47:37	0.005	0.013	12	1.5
KP19	21045CW	12/21/2021 20:08:51	20:11:50	0.008	0.009	10	1.7
KP19	21045CW	12/21/2021 20:12:17	20:15:16	0.007	0.007	9	1.8
KP19	21045CX	12/21/2021 15:57:52	16:00:51	0.008	0.014	8	1.9
KP19	21045CX	12/21/2021 16:01:54	16:04:53	0.013	0.021	7	2.6
KP19	21045CY	12/21/2021 13:22:22	13:25:25	0.009	0.017	12	1.9
KP19	21045CY	12/21/2021 13:25:46	13:28:47	0.008	0.015	6	2.5
WVKE	21045CZ	12/22/2021 12:11:46	12:13:45	0.009	0.013	13	1.5
WVKE	21045CZ	12/22/2021 12:14:11	12:16:10	0.011	0.021	12	1.6
WVKE	21045CZ	12/22/2021 12:16:36	12:18:36	0.013	0.029	12	1.6
WVKE	21045DA	12/14/2021 19:55:29	19:57:28	0.009	0.013	10	1.8
WVKE	21045DA	12/14/2021 19:57:58	19:59:58	0.009	0.012	11	1.6
WVKE	21045DB	12/21/2021 22:06:43	22:08:44	0.010	0.023	9	3.2
WVKE	21045DB	12/21/2021 22:09:17	22:11:17	0.010	0.027	9	3.1
WVKE	21045DB	12/21/2021 22:12:03	22:15:06	0.009	0.021	9	3.1
DEW5	21045DC	12/21/2021 18:04:37	18:06:36	0.008	0.012	11	1.5
DEW5	21045DC	12/21/2021 18:07:58	18:09:57	0.010	0.015	12	1.5
DEW5	21045DD	12/14/2021 18:38:45	18:40:44	0.010	0.015	9	1.7
DEW5	21045DD	12/14/2021 18:44:06	18:46:05	0.007	0.010	11	1.4
WVKE	21045DE	12/15/2021 16:53:37	16:55:36	0.008	0.012	12	1.5
WVKE	21045DE	12/15/2021 16:56:03	16:58:02	0.009	0.013	12	1.5
WVKE	21045DF	12/14/2021 20:10:39	20:12:40	0.008	0.012	12	1.4
WVKE	21045DF	12/14/2021 20:13:12	20:15:11	0.008	0.012	11	1.5
WVKE	21045DG	12/14/2021 20:24:56	20:26:55	0.006	0.008	11	1.6
WVKE	21045DG	12/14/2021 20:27:27	20:29:27	0.006	0.009	12	1.4
WVKE	21045DH	12/14/2021 21:32:23	21:34:23	0.006	0.009	11	1.8

GPS BASE	GPSID	UTC Start	UTC End	Horz Prec	Vert Prec	# of SV's	PDOP
WVKE	21045DH	12/14/2021 21:35:08	21:37:08	0.006	0.010	11	1.8
WVKE	21045DI	12/14/2021 20:40:51	20:42:55	0.006	0.009	12	1.5
WVKE	21045DI	12/14/2021 20:43:15	20:45:14	0.006	0.009	12	1.5
WVKE	21045DJ	12/14/2021 21:06:10	21:08:09	0.005	0.009	12	1.7
WVKE	21045DJ	12/14/2021 21:08:47	21:10:46	0.005	0.009	12	1.7
WVKE	21045DK	12/15/2021 14:11:53	14:13:52	0.008	0.012	10	1.8
WVKE	21045DK	12/15/2021 14:14:52	14:16:51	0.008	0.013	10	1.8
MAS2	21045DL	12/15/2021 15:30:33	15:32:32	0.009	0.012	13	1.6
MAS2	21045DL	12/15/2021 15:33:13	15:35:12	0.011	0.016	12	1.8
WVKE	21045DM	12/22/2021 13:02:48	13:04:47	0.009	0.017	10	2.1
WVKE	21045DM	12/22/2021 13:05:23	13:07:22	0.009	0.017	10	2.1
WVKE	21045DN	12/15/2021 13:24:39	13:26:38	0.007	0.012	11	1.8
WVKE	21045DN	12/15/2021 13:27:01	13:29:01	0.008	0.013	11	1.8
WVKE	21045DO	12/21/2021 20:55:04	20:57:06	0.011	0.017	10	2.3
WVKE	21045DO	12/21/2021 20:57:47	20:59:46	0.012	0.018	10	2.3
MAS2	21045DP	12/15/2021 19:23:05	19:25:05	0.009	0.015	11	1.6
MAS2	21045DP	12/15/2021 19:25:58	19:27:59	0.009	0.015	11	1.6
DEW5	21045DQ	12/22/2021 21:03:28	21:05:29	0.008	0.014	11	1.9
DEW5	21045DQ	12/22/2021 21:06:37	21:08:36	0.008	0.013	11	1.9
DEW5	21045DR	12/15/2021 18:19:17	18:21:16	0.010	0.014	11	1.6
DEW5	21045DR	12/15/2021 18:22:31	18:24:32	0.010	0.016	11	1.6
WVKE	21045DS	12/15/2021 18:35:49	18:37:49	0.012	0.018	11	1.6
WVKE	21045DS	12/15/2021 18:38:33	18:40:32	0.010	0.015	11	1.5
DEW5	21045DT	12/14/2021 17:43:39	17:45:38	0.008	0.012	10	1.7
DEW5	21045DT	12/14/2021 17:46:44	17:48:43	0.008	0.013	10	1.7
DEW5	21045DU	12/14/2021 16:03:49	16:06:48	0.007	0.011	12	1.8
DEW5	21045DU	12/14/2021 16:07:26	16:10:25	0.007	0.011	12	1.7
DEW5	21045DV	12/14/2021 16:24:28	16:27:27	0.005	0.008	11	2.1
DEW5	21045DV	12/14/2021 16:28:21	16:31:22	0.005	0.008	11	2.1
DEW5	21045DW	12/23/2021 12:25:23	12:27:22	0.004	0.006	11	1.7
DEW5	21045DW	12/23/2021 12:28:02	12:30:04	0.004	0.006	11	1.5
DEW5	21045DX	12/23/2021 13:37:43	13:39:43	0.009	0.014	10	1.8
DEW5	21045DX	12/23/2021 13:40:15	13:42:15	0.009	0.014	10	1.8
DEW5	21045DY	12/23/2021 13:22:33	13:24:32	0.010	0.018	9	2.3
DEW5	21045DY	12/23/2021 13:24:57	13:26:57	0.009	0.015	9	2.3
PAAC	21045DZ	12/23/2021 17:12:43	17:14:43	0.011	0.017	11	1.6
PAAC	21045DZ	12/23/2021 17:16:04	17:18:04	0.010	0.015	11	1.6
DEW5	21045EA	12/22/2021 21:59:16	22:01:15	0.006	0.015	11	2.1
DEW5	21045EA	12/22/2021 22:02:19	22:04:18	0.008	0.020	11	2.0
DEW5	21045EB	12/16/2021 20:14:07	20:16:06	0.010	0.014	11	1.8
DEW5	21045EB	12/16/2021 20:17:03	20:19:03	0.011	0.015	12	1.6
HB16	21045EC	12/16/2021 13:43:43	13:45:42	0.010	0.017	11	2.1
HB16	21045EC	12/16/2021 13:48:42	13:50:41	0.009	0.017	11	2.0
HB16	21045ED	12/16/2021 13:13:00	13:14:59	0.009	0.019	11	2.0
HB16	21045ED	12/16/2021 13:24:05	13:26:04	0.010	0.019	11	2.0
HB16	21045EE	12/15/2021 21:26:56	21:28:55	0.008	0.013	11	1.6
HB16	21045EE	12/15/2021 21:31:26	21:33:25	0.009	0.016	10	1.9
HB16	21045EF	12/15/2021 21:48:38	21:50:37	0.006	0.012	11	1.9
HB16	21045EF	12/15/2021 21:51:29	21:53:28	0.007	0.014	11	2.0
HB16	21045EG	12/15/2021 22:09:57	22:11:56	0.004	0.009	11	2.1
HB16	21045EG	12/15/2021 22:12:35	22:14:34	0.004	0.009	11	2.1
HB16	21045EH	12/16/2021 17:25:26	17:27:25	0.008	0.011	12	1.4
HB16	21045EH	12/16/2021 17:35:56	17:37:55	0.009	0.015	11	1.7
HB16	21045EI	12/16/2021 15:34:36	15:36:35	0.008	0.012	13	1.6
HB16	21045EI	12/16/2021 15:37:24	15:39:24	0.008	0.012	13	1.6
DEW5	21045EJ	12/23/2021 15:44:15	15:46:15	0.009	0.014	14	1.4
DEW5	21045EJ	12/23/2021 15:47:02	15:49:01	0.009	0.014	14	1.3
DEW5	21045EK	12/16/2021 19:45:39	19:47:38	0.010	0.016	12	1.6
DEW5	21045EK	12/16/2021 19:48:24	19:50:25	0.010	0.017	12	1.6
DEW5	21045EL	12/23/2021 14:38:13	14:40:14	0.010	0.017	13	1.5
DEW5	21045EL	12/23/2021 14:40:46	14:42:46	0.010	0.017	12	1.6
HB16	21045EM	12/16/2021 18:30:01	18:32:00	0.010	0.017	14	1.3
HB16	21045EM	12/16/2021 18:33:08	18:35:07	0.009	0.016	14	1.3
HB16	21045EN	12/16/2021 18:44:18	18:46:19	0.008	0.014	14	1.3

GPS BASE	GPSID	UTC Start	UTC End	Horz Prec	Vert Prec	# of SV's	PDOP
HB16	21045EN	12/16/2021 18:46:56	18:48:56	0.011	0.017	13	1.4
MAS2	21045EO	12/15/2021 19:55:14	19:57:13	0.010	0.015	10	2.0
MAS2	21045EO	12/15/2021 19:58:32	20:00:31	0.013	0.020	10	2.0
21045YH	21045EP	12/21/2021 18:59:22	19:02:21	0.005	0.010	13	2.0
21045YH	21045EP	12/21/2021 19:02:48	19:05:47	0.006	0.013	12	2.4
21045YF	21045EQ	12/21/2021 17:11:59	17:14:58	0.005	0.008	12	1.8
21045YF	21045EQ	12/21/2021 17:15:23	17:18:23	0.005	0.008	10	1.9
21045YR	21045ER	12/22/2021 21:23:01	21:25:59	0.048	0.031	13	1.8
21045YR	21045ER	12/22/2021 21:27:15	21:31:24	0.009	0.016	13	1.9
21045YB	21045ES	12/21/2021 14:20:25	14:23:24	0.006	0.011	11	2.8
21045YB	21045ES	12/21/2021 14:27:30	14:30:29	0.005	0.008	12	2.4
21045XE	21045ET	12/22/2021 19:24:55	19:26:54	0.010	0.013	15	2.0
21045XE	21045ET	12/22/2021 19:27:27	19:29:26	0.011	0.014	15	1.8
21045YI	21045EU	12/21/2021 19:38:43	19:39:36	0.025	0.064	11	3.0
21045YI	21045EU	12/21/2021 19:40:20	19:43:19	0.006	0.011	9	3.0
21045YG	21045EV	12/21/2021 18:21:37	18:24:36	0.005	0.007	10	2.4
21045YG	21045EV	12/21/2021 18:26:13	18:29:12	0.007	0.010	12	1.9
21045YK	21045EW	12/22/2021 12:43:27	12:46:26	0.006	0.013	12	2.5
21045YK	21045EW	12/22/2021 12:47:06	12:50:05	0.006	0.011	14	1.8
21045YK	21045EW	12/22/2021 12:50:41	12:53:40	0.007	0.012	13	2.0
21045XG	21045EX	12/22/2021 21:32:47	21:34:47	0.010	0.019	18	1.7
21045XG	21045EX	12/22/2021 21:35:41	21:37:38	0.016	0.027	15	1.9
21045WD	21045EY	12/15/2021 15:12:55	15:14:55	0.009	0.011	18	1.5
21045WD	21045EY	12/15/2021 15:19:45	15:21:46	0.031	0.038	22	1.4
21045YM	21045EZ	12/22/2021 15:45:48	15:48:47	0.016	0.037	11	2.5
21045YM	21045EZ	12/22/2021 15:50:21	15:51:43	0.010	0.017	12	2.4
21045YM	21045EZ	12/22/2021 15:53:51	15:54:56	0.007	0.012	15	1.9
21045YQ	21045FA	12/22/2021 19:07:10	19:07:42	0.016	0.062	13	1.7
21045YQ	21045FA	12/22/2021 19:08:45	19:09:25	0.007	0.011	13	1.8
21045YQ	21045FA	12/22/2021 19:09:54	19:12:58	0.011	0.016	12	2.1
21045YP	21045FB	12/22/2021 18:30:03	18:33:02	0.003	0.005	13	1.8
21045YP	21045FB	12/22/2021 18:33:48	18:36:47	0.005	0.009	14	1.7
21045WE	21045FC	12/15/2021 16:06:42	16:08:41	0.010	0.012	21	1.3
21045WE	21045FC	12/15/2021 16:09:16	16:11:15	0.007	0.010	22	1.2
21045YS	21045FD	12/23/2021 12:31:58	12:34:57	0.004	0.007	16	1.4
21045YS	21045FD	12/23/2021 12:36:59	12:39:58	0.003	0.006	15	1.5
21045YL	21045FE	12/22/2021 14:06:20	14:07:02	0.018	0.066	13	2.2
21045YL	21045FE	12/22/2021 14:08:08	14:11:14	0.007	0.014	12	2.4
21045YL	21045FE	12/22/2021 14:12:07	14:12:26	0.007	0.015	13	1.9
21045YL	21045FE	12/22/2021 14:13:34	14:16:33	0.038	0.066	11	2.7
21045YW	21045FF	12/23/2021 15:28:34	15:31:33	0.004	0.006	18	1.3
21045YW	21045FF	12/23/2021 15:31:59	15:34:58	0.004	0.006	18	1.3
21045YX	21045FG	12/23/2021 17:24:23	17:27:22	0.004	0.007	12	2.1
21045YX	21045FG	12/23/2021 17:28:49	17:31:48	0.005	0.007	12	1.9
21045YJ	21045FH	12/21/2021 20:55:21	20:58:36	0.007	0.010	15	1.9
21045YJ	21045FH	12/21/2021 20:59:30	21:02:38	0.007	0.010	14	2.2
21045YJ	21045FH	12/21/2021 21:03:13	21:06:12	0.007	0.011	13	2.1
21045YA	21045FI	12/21/2021 13:03:11	13:03:43	0.049	0.047	11	1.9
21045YA	21045FI	12/21/2021 13:04:40	13:07:39	0.005	0.009	14	1.8
21045YA	21045FI	12/21/2021 13:08:16	13:11:15	0.004	0.006	13	2.4
21045YC	21045FJ	12/21/2021 15:03:39	15:07:14	0.005	0.008	12	2.6
21045YC	21045FJ	12/21/2021 15:07:53	15:11:08	0.004	0.008	14	2.0
21045YV	21045FK	12/23/2021 14:41:18	14:44:17	0.007	0.010	12	2.2
21045YV	21045FK	12/23/2021 14:45:22	14:48:22	0.007	0.009	14	1.9
21045WZ	21045FL	12/22/2021 12:44:46	12:48:58	0.007	0.011	17	1.5
21045WZ	21045FL	12/22/2021 12:49:22	12:51:22	0.007	0.010	17	1.6
21045XB	21045FM	12/22/2021 14:56:04	14:58:03	0.007	0.011	22	1.1
21045XB	21045FM	12/22/2021 14:58:30	15:00:30	0.006	0.009	22	1.1
21045WX	21045FN	12/21/2021 21:20:41	21:22:40	0.005	0.010	22	1.3
21045WX	21045FN	12/21/2021 21:23:17	21:25:18	0.006	0.013	20	1.6
21045WW	21045FO	12/21/2021 20:17:58	20:19:57	0.008	0.010	17	1.4
21045WW	21045FO	12/21/2021 20:20:59	20:22:58	0.008	0.009	19	1.3
21045XF	21045FP	12/22/2021 20:45:35	20:47:34	0.008	0.013	16	1.5
21045XF	21045FP	12/22/2021 20:48:15	20:50:14	0.008	0.015	15	1.7

GPS BASE	GPSID	UTC Start	UTC End	Horz Prec	Vert Prec	# of SV's	PDOP
21045WG	21045FQ	12/15/2021 19:06:20	19:08:24	0.009	0.012	13	1.9
21045WG	21045FQ	12/15/2021 19:09:00	19:11:13	0.007	0.011	15	1.5
HB16	21045FR	12/16/2021 12:58:04	13:00:03	0.009	0.018	12	1.6
HB16	21045FR	12/16/2021 13:01:11	13:03:10	0.010	0.020	12	1.6
21045WO	21045FS	12/16/2021 19:29:08	19:33:15	0.011	0.020	16	2.2
21045WO	21045FS	12/16/2021 19:34:28	19:36:27	0.012	0.024	16	2.2
21045XK	21045FT	12/23/2021 16:17:17	16:19:16	0.007	0.013	13	2.0
21045XK	21045FT	12/23/2021 16:19:49	16:21:50	0.008	0.013	16	1.7
21045XL	21045FU	12/23/2021 16:56:35	16:58:34	0.006	0.009	18	1.3
21045XL	21045FU	12/23/2021 16:59:00	17:01:01	0.007	0.011	17	1.5
21045WN	21045FV	12/16/2021 18:08:39	18:10:38	0.007	0.011	17	1.7
21045WN	21045FV	12/16/2021 18:12:03	18:14:10	0.009	0.014	17	1.7
21045WM	21045FW	12/16/2021 17:01:07	17:03:06	0.004	0.006	18	1.3
21045WM	21045FW	12/16/2021 17:03:54	17:05:53	0.005	0.008	19	1.2
21045WL	21045FX	12/16/2021 16:06:17	16:08:16	0.008	0.017	20	1.3
21045WL	21045FX	12/16/2021 16:08:47	16:10:46	0.007	0.011	19	1.4
21045WH	21045FY	12/15/2021 20:35:40	20:37:41	0.008	0.015	18	1.4
21045WH	21045FY	12/15/2021 20:39:13	20:41:12	0.007	0.012	17	1.5
21045WI	21045FZ	12/16/2021 12:28:27	12:30:26	0.007	0.011	23	1.3
21045WI	21045FZ	12/16/2021 12:30:56	12:32:59	0.009	0.012	22	1.3
21045WJ	21045GA	12/16/2021 14:11:11	14:14:55	0.010	0.016	19	1.3
21045WJ	21045GA	12/16/2021 14:16:07	14:18:20	0.013	0.016	20	1.3
21045WK	21045GB	12/16/2021 15:10:25	15:12:24	0.008	0.011	22	1.2
21045WK	21045GB	12/16/2021 15:12:57	15:14:56	0.008	0.011	22	1.2
21045WP	21045GC	12/16/2021 21:22:59	21:24:58	0.007	0.013	21	1.4
21045WP	21045GC	12/16/2021 21:25:27	21:27:28	0.006	0.011	24	1.4
21045XA	21045GD	12/22/2021 13:58:26	14:00:25	0.007	0.013	19	1.4
21045XA	21045GD	12/22/2021 14:00:50	14:02:49	0.006	0.013	21	1.3
21045WC	21045GE	12/14/2021 19:32:06	19:34:05	0.011	0.015	20	1.2
21045WC	21045GE	12/14/2021 19:35:16	19:37:15	0.008	0.012	19	1.3
21045WF	21045GF	12/15/2021 17:51:32	17:53:31	0.006	0.008	16	1.6
21045WF	21045GF	12/15/2021 17:54:13	17:56:12	0.009	0.011	16	1.6
21045WB	21045GG	12/14/2021 18:16:08	18:18:11	0.008	0.015	17	1.5
21045WB	21045GG	12/14/2021 18:18:44	18:20:48	0.008	0.014	17	1.6
21045WA	21045GH	12/14/2021 17:08:00	17:09:59	0.007	0.013	17	1.5
21045WA	21045GH	12/14/2021 17:10:25	17:12:24	0.007	0.012	18	1.3
21045WV	21045GI	12/21/2021 19:04:03	19:06:02	0.005	0.009	21	1.2
21045WV	21045GI	12/21/2021 19:06:21	19:08:21	0.006	0.009	19	1.3
21045XJ	21045GJ	12/23/2021 15:15:40	15:17:39	0.009	0.013	18	1.7
21045XJ	21045GJ	12/23/2021 15:19:57	15:21:56	0.008	0.012	19	1.6
21045WT	21045GK	12/21/2021 16:35:56	16:37:57	0.008	0.014	18	1.4
21045WT	21045GK	12/21/2021 16:38:40	16:43:06	0.007	0.012	17	1.5
21045WS	21045GL	12/21/2021 16:03:11	16:05:10	0.004	0.007	20	1.4
21045WS	21045GL	12/21/2021 16:05:29	16:07:28	0.003	0.006	11	1.9
21045WR	21045GM	12/21/2021 15:20:58	15:22:57	0.006	0.011	22	1.3
21045WR	21045GM	12/21/2021 15:23:15	15:25:14	0.005	0.010	18	1.3
21045WQ	21045GN	12/21/2021 14:46:59	14:48:58	0.006	0.011	19	1.6
21045WQ	21045GN	12/21/2021 14:49:23	14:51:22	0.006	0.012	20	1.6
21045YU	21045GO	12/23/2021 14:07:39	14:10:38	0.003	0.005	16	1.7
21045YU	21045GO	12/23/2021 14:11:41	14:14:40	0.002	0.004	18	1.5
21045YO	21045GP	12/22/2021 16:37:04	16:40:39	0.011	0.017	12	2.6
21045YO	21045GP	12/22/2021 16:41:23	16:42:20	0.013	0.020	15	1.7
21045YO	21045GP	12/22/2021 16:43:00	16:45:59	0.008	0.011	15	1.6
21045YT	21045GQ	12/23/2021 13:10:45	13:13:44	0.004	0.009	12	2.1
21045YT	21045GQ	12/23/2021 13:14:07	13:17:06	0.004	0.009	11	2.1
21045YD	21045GR	12/21/2021 15:40:11	15:43:10	0.009	0.018	9	2.4
21045YD	21045GR	12/21/2021 15:46:22	15:53:16	0.004	0.008	13	2.1
21045XC	21045GS	12/22/2021 16:31:22	16:33:21	0.008	0.011	18	1.4
21045XC	21045GS	12/22/2021 16:33:54	16:35:53	0.006	0.009	17	1.4
21045WY	21045GT	12/21/2021 21:48:43	21:50:42	0.009	0.016	22	1.3
21045WY	21045GT	12/21/2021 21:51:06	21:53:05	0.008	0.017	22	1.5
21045XD	21045GU	12/22/2021 18:03:45	18:05:44	0.008	0.009	20	1.1
21045XD	21045GU	12/22/2021 18:06:14	18:08:13	0.006	0.008	17	1.5
21045XI	21045GV	12/23/2021 14:21:53	14:23:54	0.007	0.009	22	1.2

GPS BASE	GPSID	UTC Start	UTC End	Horz Prec	Vert Prec	# of SV's	PDOP
21045XI	21045GV	12/23/2021 14:24:20	14:26:19	0.006	0.009	23	1.1
21045XH	21045GW	12/23/2021 12:52:22	12:54:22	0.008	0.016	19	1.7
21045XH	21045GW	12/23/2021 12:54:57	12:56:57	0.009	0.017	18	1.5
21045WU	21045GX	12/21/2021 17:44:24	17:46:23	0.007	0.015	18	1.6
21045WU	21045GX	12/21/2021 17:46:46	17:48:45	0.007	0.015	18	1.6
DEW5	21045WA	12/14/2021 16:54:43	16:57:43	0.006	0.010	10	2.0
DEW5	21045WA	12/14/2021 16:58:08	17:01:07	0.007	0.012	10	2.0
DEW5	21045WB	12/14/2021 18:06:05	18:08:04	0.010	0.017	9	1.9
DEW5	21045WB	12/14/2021 18:11:27	18:13:26	0.012	0.018	9	1.9
WVKE	21045WC	12/14/2021 19:24:17	19:26:17	0.009	0.015	10	1.9
WVKE	21045WC	12/14/2021 19:26:41	19:28:40	0.010	0.017	11	1.7
WVKE	21045WD	12/15/2021 14:59:51	15:01:51	0.016	0.017	12	1.9
WVKE	21045WD	12/15/2021 15:02:35	15:04:34	0.017	0.019	10	2.6
WVKE	21045WD	12/15/2021 15:07:18	15:09:17	0.016	0.019	10	2.5
WVKE	21045WE	12/15/2021 15:55:46	15:57:47	0.008	0.012	14	1.4
WVKE	21045WE	12/15/2021 16:00:53	16:02:54	0.010	0.015	15	1.4
WVKE	21045WF	12/15/2021 17:39:13	17:41:12	0.013	0.018	10	1.8
WVKE	21045WF	12/15/2021 17:43:46	17:45:45	0.010	0.015	10	1.7
MAS2	21045WG	12/15/2021 18:52:01	18:54:00	0.009	0.015	11	1.6
MAS2	21045WG	12/15/2021 18:56:42	18:58:44	0.009	0.015	11	1.6
MAS2	21045WH	12/15/2021 20:20:06	20:22:05	0.013	0.020	10	1.8
MAS2	21045WH	12/15/2021 20:28:07	20:30:06	0.013	0.021	9	2.1
HB16	21045WI	12/16/2021 12:19:56	12:21:55	0.011	0.019	13	1.4
HB16	21045WI	12/16/2021 12:22:28	12:24:27	0.012	0.020	11	1.7
HB16	21045WJ	12/16/2021 14:02:32	14:04:31	0.010	0.019	12	1.7
HB16	21045WJ	12/16/2021 14:05:07	14:07:07	0.011	0.019	12	1.7
HB16	21045WK	12/16/2021 15:01:52	15:03:53	0.010	0.015	13	1.4
HB16	21045WK	12/16/2021 15:05:01	15:07:00	0.010	0.014	13	1.5
HB16	21045WL	12/16/2021 15:57:04	15:59:03	0.007	0.012	13	1.5
HB16	21045WL	12/16/2021 16:00:05	16:02:04	0.007	0.012	14	1.5
HB16	21045WM	12/16/2021 16:53:01	16:55:00	0.011	0.015	11	1.5
HB16	21045WM	12/16/2021 16:55:45	16:57:44	0.010	0.013	11	1.6
HB16	21045WN	12/16/2021 17:55:32	17:57:31	0.010	0.020	10	1.8
HB16	21045WN	12/16/2021 17:58:46	18:00:45	0.011	0.024	8	3.0
DEW5	21045WO	12/16/2021 19:19:11	19:21:11	0.012	0.021	10	2.3
DEW5	21045WO	12/16/2021 19:22:15	19:24:14	0.013	0.023	10	2.3
DEW5	21045WP	12/16/2021 21:13:52	21:15:52	0.010	0.014	13	1.8
DEW5	21045WP	12/16/2021 21:16:40	21:18:40	0.010	0.015	13	1.8
PAFM	21045WQ	12/21/2021 14:36:26	14:38:25	0.020	0.034	10	2.3
PAFM	21045WQ	12/21/2021 14:39:26	14:41:30	0.014	0.024	10	2.3
PAFM	21045WR	12/21/2021 15:12:32	15:14:31	0.011	0.017	12	1.8
PAFM	21045WR	12/21/2021 15:16:39	15:18:38	0.011	0.018	12	1.8
DEW5	21045WS	12/21/2021 15:55:27	15:57:26	0.011	0.016	9	2.1
DEW5	21045WS	12/21/2021 15:58:20	16:00:19	0.013	0.019	10	1.9
DEW5	21045WT	12/21/2021 16:26:33	16:28:32	0.013	0.019	9	2.0
DEW5	21045WT	12/21/2021 16:30:48	16:32:48	0.010	0.014	10	1.7
DEW5	21045WU	12/21/2021 17:34:07	17:36:06	0.014	0.023	8	2.9
DEW5	21045WU	12/21/2021 17:38:03	17:40:53	0.010	0.018	8	3.0
WVKE	21045WV	12/21/2021 18:57:04	18:59:05	0.009	0.014	11	1.8
WVKE	21045WV	12/21/2021 18:59:27	19:01:26	0.010	0.015	11	1.8
DEW5	21045WW	12/21/2021 20:03:20	20:05:35	0.016	0.018	9	1.8
DEW5	21045WW	12/21/2021 20:07:01	20:09:00	0.015	0.019	10	1.7
DEW5	21045WW	12/21/2021 20:10:27	20:12:26	0.015	0.017	9	1.7
DEW5	21045WW	12/21/2021 20:13:08	20:15:07	0.017	0.019	9	1.7
WVKE	21045WX	12/21/2021 21:09:25	21:11:25	0.010	0.018	10	2.0
WVKE	21045WX	12/21/2021 21:13:06	21:15:07	0.010	0.018	11	2.0
WVKE	21045WX	12/21/2021 21:15:46	21:17:46	0.012	0.020	10	2.1
WVKE	21045WY	12/21/2021 21:41:48	21:43:48	0.010	0.023	11	2.0
WVKE	21045WY	12/21/2021 21:44:21	21:46:20	0.010	0.023	12	1.9
WVKE	21045WZ	12/22/2021 12:33:08	12:35:07	0.010	0.017	10	2.3
WVKE	21045WZ	12/22/2021 12:36:18	12:38:17	0.012	0.021	9	3.0
WVKE	21045XA	12/22/2021 13:51:28	13:53:27	0.011	0.020	10	1.9
WVKE	21045XA	12/22/2021 13:53:59	13:55:58	0.013	0.023	10	1.9
BCC2	21045XB	12/22/2021 14:46:00	14:50:32	0.014	0.018	11	1.6

GPS BASE	GPSID	UTC Start	UTC End	Horz Prec	Vert Prec	# of SV's	PDOP
BCC2	21045XB	12/22/2021 14:50:56	14:53:27	0.011	0.014	11	1.6
WVKE	21045XC	12/22/2021 16:20:23	16:24:29	0.011	0.019	11	1.6
WVKE	21045XC	12/22/2021 16:25:47	16:27:54	0.013	0.021	11	1.7
WVKE	21045XD	12/22/2021 17:56:19	17:57:33	0.037	0.030	11	1.4
WVKE	21045XD	12/22/2021 17:58:50	18:01:04	0.012	0.018	10	1.6
WVKE	21045XE	12/22/2021 19:16:17	19:17:38	0.016	0.029	9	2.3
WVKE	21045XE	12/22/2021 19:19:52	19:21:27	0.012	0.020	9	2.2
DEW5	21045XF	12/22/2021 20:37:30	20:39:29	0.008	0.011	11	1.8
DEW5	21045XF	12/22/2021 20:39:59	20:41:59	0.008	0.011	12	1.7
DEW5	21045XG	12/22/2021 21:19:40	21:21:39	0.009	0.021	10	2.7
DEW5	21045XG	12/22/2021 21:23:36	21:25:35	0.009	0.022	10	2.7
DEW5	21045XG	12/22/2021 21:26:45	21:28:45	0.009	0.024	10	2.6
DEW5	21045XH	12/23/2021 12:44:24	12:46:23	0.008	0.013	9	2.2
DEW5	21045XH	12/23/2021 12:47:13	12:49:13	0.006	0.011	10	2.1
DEW5	21045XI	12/23/2021 14:14:11	14:16:10	0.010	0.018	11	1.9
DEW5	21045XI	12/23/2021 14:16:53	14:18:55	0.010	0.017	11	1.9
DEW5	21045XJ	12/23/2021 14:55:34	14:57:33	0.014	0.020	11	2.2
DEW5	21045XJ	12/23/2021 15:05:19	15:07:19	0.020	0.028	9	2.4
DEW5	21045XJ	12/23/2021 15:08:52	15:11:41	0.014	0.021	11	2.1
PAAC	21045XK	12/23/2021 16:06:05	16:07:56	0.013	0.028	10	1.7
PAAC	21045XK	12/23/2021 16:09:37	16:11:01	0.011	0.021	10	1.7
PAAC	21045XK	12/23/2021 16:11:50	16:13:49	0.011	0.019	10	1.7
PAAC	21045XL	12/23/2021 16:46:27	16:48:26	0.016	0.023	12	1.5
PAAC	21045XL	12/23/2021 16:48:50	16:50:49	0.014	0.019	12	1.5
KP19	21045YA	12/21/2021 12:50:46	12:53:45	0.009	0.018	9	2.2
KP19	21045YA	12/21/2021 12:54:23	12:57:22	0.009	0.018	12	1.7
KP19	21045YB	12/21/2021 14:07:50	14:10:54	0.012	0.025	9	2.8
KP19	21045YB	12/21/2021 14:11:24	14:15:00	0.014	0.027	10	2.0
KP19	21045YC	12/21/2021 14:53:48	14:56:47	0.011	0.019	14	1.6
KP19	21045YC	12/21/2021 14:57:44	15:00:43	0.011	0.020	13	1.6
KP19	21045YD	12/21/2021 15:25:41	15:28:40	0.013	0.021	11	1.9
KP19	21045YD	12/21/2021 15:29:09	15:32:08	0.012	0.019	11	1.9
WVBU	21045YE	12/21/2021 16:48:22	16:50:21	0.020	0.024	9	1.8
WVBU	21045YF	12/21/2021 16:59:56	17:01:59	0.028	0.042	11	1.6
WVBU	21045YF	12/21/2021 17:06:16	17:08:15	0.015	0.016	12	1.5
WVBU	21045YG	12/21/2021 18:09:34	18:12:33	0.010	0.018	9	2.0
WVBU	21045YG	12/21/2021 18:13:05	18:16:07	0.007	0.012	10	1.9
WVBU	21045YG	12/21/2021 18:16:36	18:19:35	0.010	0.019	8	2.7
KP19	21045YH	12/21/2021 18:49:54	18:52:53	0.006	0.010	6	2.4
KP19	21045YH	12/21/2021 18:53:39	18:56:38	0.006	0.010	7	2.1
KP19	21045YI	12/21/2021 19:21:57	19:24:59	0.019	0.033	8	2.3
KP19	21045YI	12/21/2021 19:28:28	19:31:27	0.005	0.010	7	3.6
KP19	21045YI	12/21/2021 19:32:57	19:35:56	0.010	0.017	7	3.3
KP19	21045YJ	12/21/2021 20:44:25	20:47:43	0.006	0.007	10	1.8
KP19	21045YJ	12/21/2021 20:48:29	20:51:30	0.005	0.006	12	1.7
KP19	21045YK	12/22/2021 12:35:28	12:38:31	0.005	0.008	6	3.2
KP19	21045YK	12/22/2021 12:38:54	12:41:53	0.003	0.005	7	1.9
KP19	21045YL	12/22/2021 13:50:17	13:53:22	0.010	0.027	5	5.3
KP19	21045YL	12/22/2021 13:55:17	13:58:43	0.006	0.011	10	2.2
KP19	21045YN	12/22/2021 16:20:06	16:20:21	0.026	0.040	9	2.3
KP19	21045YO	12/22/2021 16:26:59	16:30:00	0.009	0.014	6	2.3
KP19	21045YO	12/22/2021 16:30:43	16:33:42	0.006	0.009	10	1.9
KP19	21045YP	12/22/2021 18:14:49	18:17:48	0.024	0.031	10	1.6
KP19	21045YR	12/22/2021 21:16:00	21:18:59	0.013	0.023	11	2.0
KP19	21045YR	12/22/2021 21:19:34	21:20:07	0.023	0.050	12	2.0
KP19	21045YR	12/22/2021 21:20:48	21:21:17	0.018	0.047	12	2.0
KP19	21045YT	12/23/2021 13:00:24	13:03:23	0.013	0.023	9	2.2
KP19	21045YT	12/23/2021 13:04:29	13:07:28	0.010	0.018	9	2.2
KP19	21045YU	12/23/2021 13:50:25	13:53:24	0.018	0.035	11	1.6
KP19	21045YU	12/23/2021 13:54:00	13:56:59	0.016	0.022	11	1.6
KP19	21045YU	12/23/2021 13:57:31	14:00:30	0.016	0.020	12	1.5
KP19	21045YU	12/23/2021 14:01:36	14:04:35	0.017	0.022	11	1.9
KP19	21045YV	12/23/2021 14:23:54	14:26:55	0.026	0.049	12	1.8
KP19	21045YV	12/23/2021 14:27:09	14:30:19	0.020	0.025	11	2.0

GPS BASE	GPSID	UTC Start	UTC End	Horz Prec	Vert Prec	# of SV's	PDOP
KP19	21045YV	12/23/2021 14:33:51	14:37:57	0.019	0.020	11	1.9
KP19	21045YW	12/23/2021 15:13:27	15:16:32	0.020	0.030	12	1.7
KP19	21045YW	12/23/2021 15:17:06	15:20:05	0.016	0.016	13	1.6
KP19	21045YX	12/23/2021 17:11:26	17:14:25	0.016	0.020	9	2.0
KP19	21045YX	12/23/2021 17:18:51	17:21:50	0.013	0.017	8	2.4
KP19	JW1579	12/21/2021 12:13:08	12:16:07	0.006	0.009	13	1.5
KP19	JW1579	12/21/2021 12:17:09	12:20:08	0.005	0.009	6	2.4

Table 5 lists the RTX occupations.

Table 5 - RTX Occupations Summary

GPSID	UTC Start	UTC End	Horz Prec	Vert Prec	# of SV's	# of Epochs	PDOP
21045CV	12/22/2021 14:39:41	14:43:09	0.012	0.035	20	180	1.172
21045CU	12/22/2021 15:16:36	15:19:44	0.042	0.054	16	180	1.904
21045CU	12/22/2021 15:20:48	15:25:14	0.011	0.051	16	180	1.644
21045YM	12/22/2021 15:34:36	15:37:35	0.009	0.050	26	180	1.189
21045YM	12/22/2021 15:37:52	15:40:15	0.010	0.073	26	132	1.131
21045YM	12/22/2021 15:40:40	15:41:20	0.012	0.073	26	41	1.131
21045YM	12/22/2021 15:41:58	15:42:50	0.017	0.070	26	53	1.131
21045YP	12/22/2021 18:07:26	18:08:45	0.025	0.064	20	24	1.327
21045YP	12/22/2021 18:08:56	18:10:10	0.011	0.065	20	50	1.251
21045YP	12/22/2021 18:10:35	18:13:54	0.010	0.055	21	180	1.332
21045YQ	12/22/2021 18:48:54	18:53:20	0.014	0.048	21	180	1.277
21045YQ	12/22/2021 18:53:35	18:54:05	0.028	0.072	21	25	1.278
21045YQ	12/22/2021 18:54:58	18:56:55	0.049	0.044	21	60	1.282
21045YQ	12/22/2021 18:57:25	19:04:00	0.008	0.032	21	180	1.357
21045CG	12/22/2021 19:26:22	19:30:18	0.012	0.043	15	181	1.511
21045CG	12/22/2021 19:30:36	19:35:29	0.012	0.044	15	180	1.495
21045YS	12/23/2021 12:20:28	12:23:27	0.008	0.031	26	180	1.111
21045YS	12/23/2021 12:23:44	12:26:43	0.009	0.033	26	180	1.151

The RTX observations were stored as ITRF2014 positions at the current epoch (2021.96). The NGS utility HTDP was used to transform the ITRF2014 positions to NAD83 (2011) epoch 2010.0 prior to the least squares adjustment.

As mentioned, each station was occupied at least twice in succession. The Earth Centered Earth Fixed (ECEF) vector differences from the VRS observations were rotated into a local horizon system (N, E, Up) for analysis, summarized in figure 4. Stations which had observations that differed by more than 0.03 m in the vertical component were re-observed until agreement was achieved.

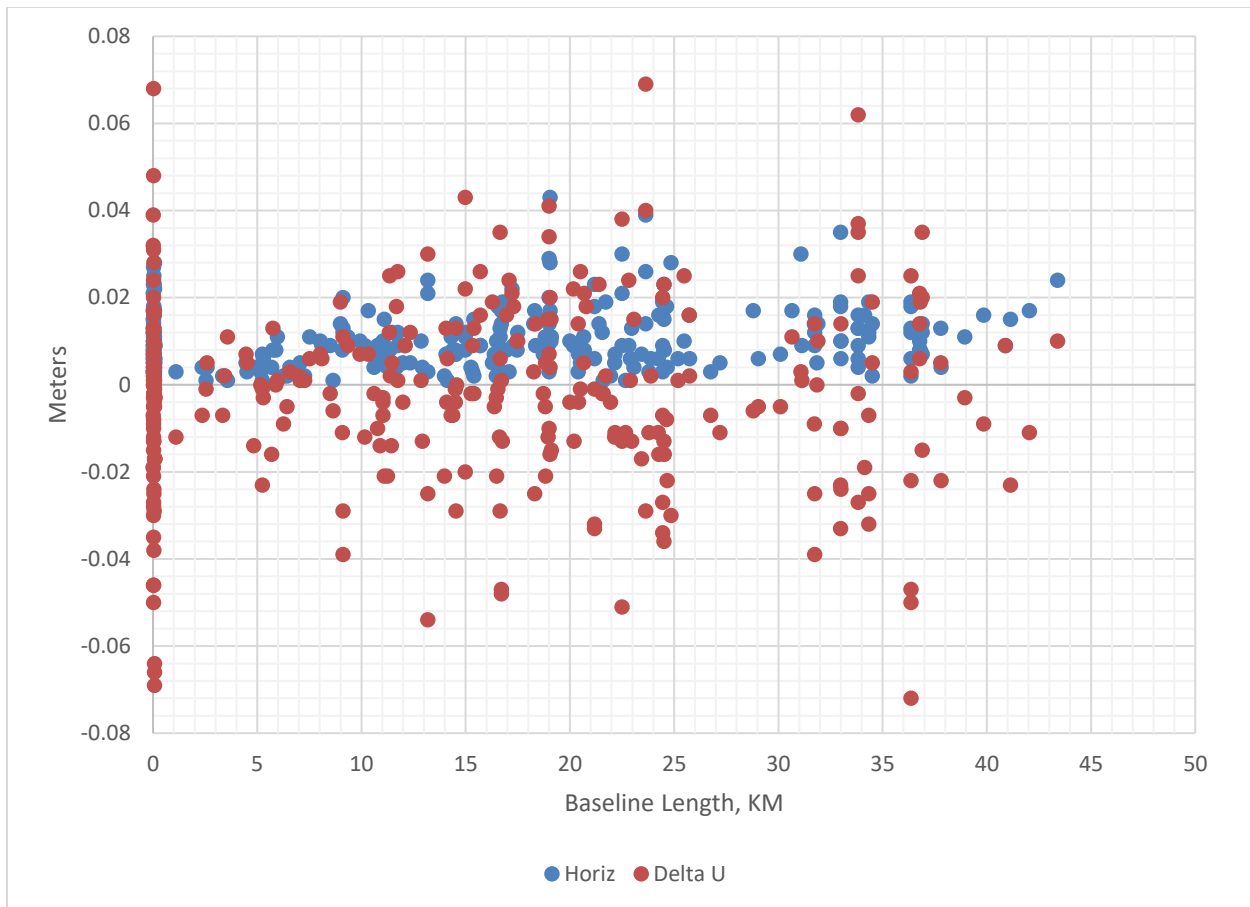


Figure 4 - Repeat Baseline Analysis

LEAST SQUARES ADJUSTMENTS

Geolab was used to adjust the VRS/RTK vectors and RTX positions. No scaling of the apriori GPS statistics was done. Station errors (centering, HI and HT) of 0.005 m were input. The GEOID18 model was used.

The adjustment constrained the VRS CORS positions (as computed and broadcast by the network) in all three dimensions (NAD83 (2011) epoch 2010.0 latitude, longitude, and ellipsoidal height). The estimated variance factor was 1.31. Figure 5 is a plot of the horizontal and vertical residuals versus baseline length.

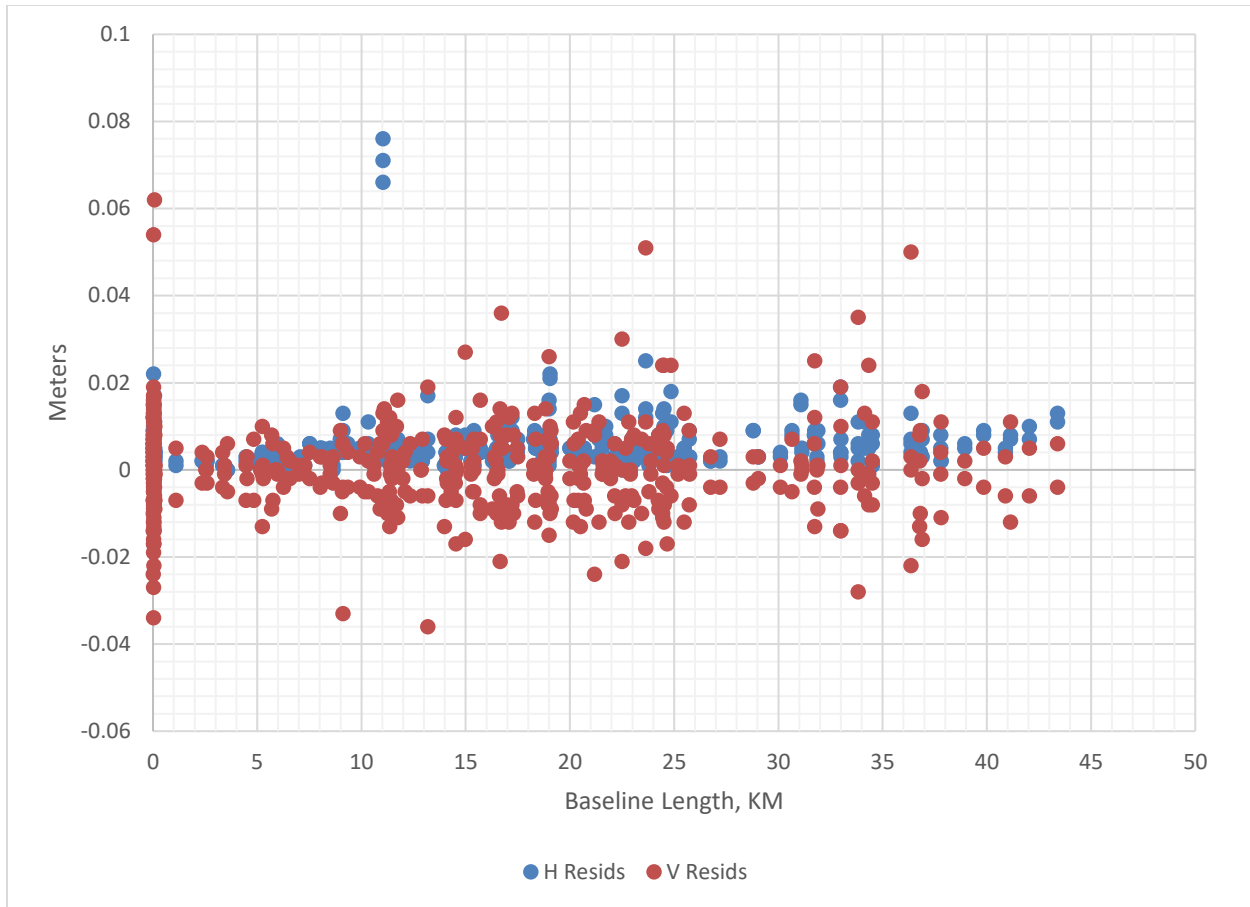


Figure 5 - H & V Residuals

The misclosures at existing NSRS station **HONI** (PID JW1579) are listed in table 6.

Table 6 - NSRS Misclosures

Station Name	Δ North	Δ East	Δ Ellip Hgt	Δ NAVD88
HONI	+0.009 m	-0.010 m	+0.010 m	-0.008 m

This adjustment provided the adjusted positions (NAD83 (2011) epoch 2010.0) and GPS derived orthometric heights (NAVD88) for the stations in the network. The adjusted latitude/longitudes were transformed to UTM Zones 17 and 18 grid coordinates. Table 7 lists the station confidence regions at the 95% level, in meters.

Table 7 - Station Confidence Regions @ 95% meters

Station Name	Semi-Major Axis	Azimuth	Semi-Minor Axis	Vertical
21045AA	0.026	145	0.020	0.034
21045AB	0.023	11	0.018	0.025
21045AC	0.019	27	0.018	0.024
21045AD	0.017	173	0.016	0.021
21045AE	0.015	130	0.015	0.019
21045AF	0.018	23	0.016	0.017
21045AG	0.017	144	0.016	0.016
21045AH	0.021	41	0.020	0.026
21045AI	0.040	131	0.025	0.068
21045AJ	0.020	156	0.018	0.023
21045AK	0.023	35	0.018	0.030

21045AL	0.023	163	0.020	0.031
21045AM	0.025	138	0.021	0.039
21045AN	0.020	157	0.018	0.030
21045AO	0.023	18	0.021	0.032
21045AP	0.024	160	0.021	0.030
21045AQ	0.019	15	0.018	0.023
21045AR	0.021	13	0.019	0.030
21045AS	0.016	155	0.015	0.019
21045AT	0.021	168	0.019	0.029
21045AU	0.027	34	0.021	0.030
21045AV	0.020	161	0.019	0.026
21045AW	0.022	5	0.017	0.025
21045AX	0.019	20	0.017	0.022
21045AY	0.028	33	0.021	0.034
21045AZ	0.016	6	0.016	0.016
21045BA	0.021	124	0.018	0.022
21045BB	0.019	165	0.017	0.024
21045BC	0.022	171	0.018	0.023
21045BD	0.021	45	0.020	0.030
21045BE	0.023	175	0.018	0.026
21045BF	0.020	175	0.018	0.024
21045BG	0.022	16	0.018	0.032
21045BH	0.023	167	0.019	0.026
21045BI	0.020	16	0.018	0.027
21045BJ	0.021	3	0.018	0.027
21045BK	0.019	148	0.017	0.024
21045BL	0.021	139	0.019	0.024
21045BM	0.018	107	0.018	0.022
21045BN	0.015	172	0.015	0.016
21045BO	0.020	60	0.018	0.025
21045BP	0.019	60	0.017	0.023
21045BQ	0.017	165	0.015	0.017
21045BR	0.025	177	0.020	0.038
21045BS	0.016	134	0.015	0.017
21045BT	0.016	178	0.016	0.019
21045BU	0.022	150	0.019	0.025
21045BV	0.015	168	0.015	0.015
21045BW	0.019	49	0.018	0.024
21045BX	0.016	72	0.015	0.017
21045BY	0.017	163	0.015	0.014
21045BZ	0.020	173	0.017	0.027
21045CA	0.021	23	0.017	0.022
21045CB	0.021	10	0.019	0.029
21045CC	0.022	135	0.018	0.036
21045CD	0.023	58	0.020	0.033
21045CE	0.026	179	0.020	0.036
21045CF	0.025	171	0.020	0.028
21045CG	0.020	137	0.013	0.069
21045CH	0.020	2	0.017	0.027
21045CI	0.027	159	0.021	0.034
21045CJ	0.029	15	0.021	0.034
21045CK	0.020	150	0.019	0.031
21045CL	0.028	179	0.021	0.032
21045CM	0.017	153	0.016	0.023
21045CN	0.024	154	0.019	0.035
21045CO	0.020	30	0.019	0.035
21045CP	0.017	169	0.017	0.020
21045CQ	0.019	26	0.018	0.025
21045CR	0.021	30	0.019	0.029
21045CS	0.021	166	0.017	0.024
21045CT	0.019	135	0.017	0.029
21045CU	0.025	6	0.013	0.074
21045CV	0.013	4	0.010	0.015
21045CW	0.019	168	0.016	0.017
21045CX	0.021	12	0.019	0.029
21045CY	0.019	171	0.018	0.028

21045CZ	0.018	32	0.015	0.026
21045DA	0.020	156	0.017	0.023
21045DB	0.017	154	0.015	0.032
21045DC	0.020	36	0.018	0.024
21045DD	0.019	103	0.018	0.022
21045DE	0.019	145	0.018	0.023
21045DF	0.018	167	0.017	0.022
21045DG	0.016	177	0.016	0.018
21045DH	0.016	176	0.016	0.019
21045DI	0.016	12	0.016	0.018
21045DJ	0.016	61	0.016	0.018
21045DK	0.019	177	0.017	0.023
21045DL	0.021	18	0.017	0.024
21045DM	0.020	160	0.018	0.029
21045DN	0.018	5	0.018	0.023
21045DO	0.022	141	0.020	0.031
21045DP	0.019	170	0.018	0.026
21045DQ	0.018	151	0.017	0.024
21045DR	0.020	54	0.019	0.026
21045DS	0.022	33	0.019	0.028
21045DT	0.018	61	0.018	0.023
21045DU	0.018	17	0.016	0.020
21045DV	0.016	9	0.015	0.017
21045DW	0.015	15	0.015	0.015
21045DX	0.020	173	0.017	0.025
21045DY	0.021	168	0.018	0.028
21045DZ	0.022	102	0.019	0.028
21045EA	0.018	143	0.016	0.029
21045EB	0.022	168	0.018	0.026
21045EC	0.021	169	0.018	0.029
21045ED	0.021	178	0.018	0.032
21045EE	0.019	157	0.018	0.026
21045EF	0.017	133	0.016	0.024
21045EG	0.015	20	0.015	0.018
21045EH	0.019	88	0.018	0.023
21045EI	0.019	30	0.017	0.022
21045EJ	0.020	15	0.018	0.025
21045EK	0.021	159	0.018	0.029
21045EL	0.022	14	0.017	0.029
21045EM	0.020	13	0.019	0.029
21045EN	0.020	16	0.018	0.027
21045EO	0.024	154	0.018	0.029
21045EP	0.023	155	0.022	0.029
21045EQ	0.031	94	0.031	0.038
21045ER	0.031	72	0.030	0.052
21045ES	0.031	2	0.024	0.047
21045ET	0.034	151	0.028	0.046
21045EU	0.025	142	0.023	0.035
21045EV	0.023	74	0.022	0.028
21045EW	0.021	1	0.020	0.024
21045EX	0.029	146	0.024	0.047
21045EY	0.038	16	0.024	0.037
21045EZ	0.022	21	0.018	0.075
21045FA	0.022	163	0.020	0.059
21045FB	0.021	17	0.019	0.079
21045FC	0.029	18	0.024	0.031
21045FD	0.020	36	0.019	0.053
21045FE	0.023	15	0.020	0.035
21045FF	0.037	27	0.026	0.036
21045FG	0.031	118	0.026	0.035
21045FH	0.022	143	0.020	0.022
21045FI	0.025	177	0.024	0.035
21045FJ	0.027	12	0.025	0.037
21045FK	0.036	14	0.025	0.038
21045FL	0.028	17	0.025	0.038
21045FM	0.030	19	0.025	0.033

21045FN	0.024	156	0.023	0.033
21045FO	0.029	170	0.022	0.029
21045FP	0.026	127	0.024	0.032
21045FQ	0.027	30	0.025	0.034
21045FR	0.021	4	0.018	0.032
21045FS	0.032	84	0.029	0.052
21045FT	0.026	38	0.024	0.038
21045FU	0.032	147	0.029	0.040
21045FV	0.028	86	0.026	0.042
21045FW	0.027	136	0.024	0.029
21045FX	0.025	16	0.024	0.033
21045FY	0.031	160	0.026	0.042
21045FZ	0.030	165	0.026	0.039
21045GA	0.033	156	0.026	0.042
21045GB	0.028	10	0.025	0.033
21045GC	0.026	22	0.025	0.034
21045GD	0.029	170	0.026	0.042
21045GE	0.028	176	0.026	0.037
21045GF	0.030	110	0.025	0.034
21045GG	0.029	93	0.026	0.039
21045GH	0.025	39	0.023	0.030
21045GI	0.026	8	0.024	0.031
21045GJ	0.030	14	0.025	0.038
21045GK	0.028	155	0.026	0.036
21045GL	0.028	33	0.024	0.034
21045GM	0.028	18	0.025	0.036
21045GN	0.036	18	0.026	0.050
21045GO	0.027	7	0.021	0.030
21045GP	0.025	180	0.023	0.030
21045GQ	0.027	2	0.025	0.038
21045GR	0.030	20	0.026	0.039
21045GS	0.029	145	0.027	0.038
21045GT	0.027	176	0.026	0.048
21045GU	0.035	32	0.028	0.038
21045GV	0.029	9	0.023	0.035
21045GW	0.026	5	0.025	0.036
21045GX	0.027	86	0.027	0.043
21045WA	0.017	13	0.016	0.020
21045WB	0.021	95	0.020	0.030
21045WC	0.020	169	0.018	0.028
21045WD	0.027	11	0.016	0.025
21045WE	0.021	26	0.017	0.024
21045WF	0.023	99	0.019	0.028
21045WG	0.020	34	0.018	0.026
21045WH	0.026	160	0.020	0.034
21045WI	0.023	160	0.020	0.033
21045WJ	0.023	168	0.018	0.032
21045WK	0.022	19	0.018	0.025
21045WL	0.018	37	0.016	0.022
21045WM	0.022	135	0.018	0.025
21045WN	0.021	98	0.019	0.036
21045WO	0.023	65	0.021	0.037
21045WP	0.020	15	0.019	0.026
21045WQ	0.031	22	0.021	0.045
21045WR	0.022	19	0.019	0.030
21045WS	0.024	35	0.019	0.030
21045WT	0.023	150	0.020	0.028
21045WU	0.022	65	0.021	0.034
21045WV	0.020	4	0.018	0.026
21045WW	0.022	174	0.014	0.022
21045WX	0.018	131	0.016	0.026
21045WY	0.021	131	0.018	0.038
21045WZ	0.022	31	0.019	0.032
21045XA	0.024	167	0.020	0.035
21045XB	0.025	22	0.020	0.027
21045XC	0.023	151	0.021	0.033

21045XD	0.031	33	0.021	0.034
21045XE	0.025	154	0.022	0.039
21045XF	0.018	55	0.017	0.021
21045XG	0.017	138	0.014	0.030
21045XH	0.017	172	0.017	0.021
21045XI	0.022	8	0.017	0.030
21045XJ	0.024	26	0.017	0.030
21045XK	0.019	155	0.017	0.030
21045XL	0.027	149	0.023	0.035
21045YA	0.019	178	0.018	0.031
21045YB	0.027	4	0.018	0.043
21045YC	0.021	7	0.019	0.033
21045YD	0.024	25	0.021	0.033
21045YE	0.054	119	0.032	0.055
21045YF	0.027	85	0.026	0.033
21045YG	0.016	58	0.015	0.022
21045YH	0.017	3	0.016	0.019
21045YI	0.017	157	0.015	0.022
21045YJ	0.016	148	0.015	0.015
21045YK	0.015	17	0.015	0.015
21045YL	0.018	12	0.016	0.027
21045YM	0.012	21	0.010	0.071
21045YN	0.063	116	0.047	0.091
21045YO	0.018	176	0.017	0.021
21045YP	0.014	17	0.012	0.078
21045YQ	0.014	173	0.013	0.054
21045YR	0.024	143	0.019	0.043
21045YS	0.013	37	0.011	0.051
21045YT	0.023	4	0.020	0.034
21045YU	0.022	8	0.015	0.027
21045YV	0.031	14	0.019	0.033
21045YW	0.033	27	0.021	0.033
21045YX	0.027	118	0.022	0.031
JW1579	0.016	34	0.016	0.018

SUMMARY

A LiDAR ground control network was established in western Maryland and northeastern West Virginia. The estimated accuracy of the control network is ± 0.03 m with respect to the NAD83 (2011) epoch 2010.0 reference frame and the NAVD88 vertical datum (using GEOID18).

Adjusted Coordinates

Horizontal Datum: NAD83 (2011) epoch 2010.0

Vertical Datum: NAVD88=Ellipsoidal Height-GEOID18

Units: meters

Table 8 - NAD83 (2011) Coordinates

Station Name	GPSID	Latitude	Longitude	Ellipsoidal Height	NAVD 1988
GCP01	21045AA	39°32'42.01379" N	79°01'54.61176" W	492.663	524.595
GCP02	21045AB	39°35'54.98128" N	78°55'49.44149" W	544.344	576.501
GCP03	21045AC	39°30'35.05805" N	78°55'27.17941" W	285.102	317.465
GCP04	21045AD	39°41'37.55051" N	78°52'50.12993" W	344.031	376.254
GCP05	21045AE	39°39'13.73931" N	78°46'44.08716" W	192.424	225.086
GCP06	21045AF	39°36'53.19609" N	78°40'40.79323" W	269.556	302.480
GCP07	21045AG	39°41'57.45502" N	78°38'51.53479" W	335.011	367.868
GCP08	21045AH	39°33'17.25053" N	78°30'56.64233" W	277.837	311.204
GCP09	21045AI	39°43'05.61384" N	78°29'29.08057" W	358.275	391.491
GCP10	21045AJ	39°41'00.10351" N	78°22'23.19529" W	292.915	326.501
GCP11	21045AK	39°28'55.57135" N	78°18'04.76545" W	222.573	256.328
GCP12	21045AL	39°33'31.34207" N	78°15'56.97812" W	226.914	260.772
GCP13	21045AM	39°37'52.27699" N	78°14'51.78232" W	243.781	277.692
GCP14	21045AN	39°25'27.03694" N	78°08'21.61600" W	139.507	173.507
GCP15	21045AO	39°41'59.15895" N	78°07'46.84597" W	172.812	206.911
GCP16	21045AP	39°34'35.33888" N	78°05'32.62550" W	201.334	235.465
GCP17	21045AQ	39°17'23.53675" N	78°04'01.00086" W	143.471	177.390
GCP18	21045AR	39°40'11.63571" N	78°02'30.05252" W	88.885	123.097
GCP19	21045AS	39°21'36.22918" N	77°58'05.89639" W	121.854	155.862
GCP20	21045AT	39°14'37.65277" N	77°57'18.53753" W	158.296	192.076
GCP21	21045AU	39°37'45.88151" N	77°56'22.52566" W	98.264	132.556
GCP22	21045AV	39°31'01.51821" N	77°52'57.65846" W	85.471	119.671
GCP23	21045AW	39°12'50.21815" N	77°51'28.08668" W	92.087	125.600
GCP24	21045AX	39°18'58.09614" N	77°47'08.02290" W	90.070	123.655
GCP25	21045AY	39°41'27.55881" N	77°44'51.75487" W	151.013	185.279
GCP26	21045AZ	39°35'44.56777" N	77°45'04.82335" W	125.287	159.419
GCP27	21045BA	39°27'51.98658" N	77°43'37.29718" W	74.620	108.404
GCP28	21045BB	39°37'55.85570" N	77°35'09.28472" W	214.539	248.206
GCP29	21045BC	39°24'45.07009" N	77°34'52.90879" W	125.404	158.537
GCP30	21045BD	39°18'28.02685" N	77°33'30.00264" W	47.457	80.291
GCP31	21045BE	39°43'15.07894" N	77°32'34.76104" W	175.177	209.004
GCP32	21045BF	39°30'35.80447" N	77°32'02.72598" W	208.503	241.616
GCP33	21045BG	39°21'52.55682" N	77°27'21.29329" W	67.557	100.264
GCP34	21045BH	39°13'56.63799" N	77°25'53.61494" W	86.676	119.026
GCP35	21045BI	39°33'05.25370" N	77°22'22.59373" W	65.096	98.076
GCP36	21045BJ	39°26'04.24706" N	77°21'59.47295" W	60.434	93.115
GCP37	21045BK	39°19'26.30607" N	77°21'08.93910" W	105.979	138.317
GCP38	21045BL	39°40'43.40941" N	77°21'09.19924" W	140.715	173.970
GCP39	21045BM	39°29'29.21665" N	77°12'29.36396" W	133.090	165.497
GCP40	21045BN	39°23'40.31844" N	77°09'10.50969" W	164.469	196.462
NVA01	21045BO	39°29'24.73951" N	79°02'54.46641" W	322.044	354.047
NVA02	21045BP	39°27'07.85349" N	78°58'54.87025" W	224.172	256.428
NVA03	21045BQ	39°35'11.22916" N	78°51'03.64329" W	222.766	255.285
NVA04	21045BR	39°39'24.64345" N	78°56'07.35082" W	602.786	634.840
NVA05	21045BS	39°41'37.03640" N	78°47'23.62927" W	186.502	219.058
NVA06	21045BT	39°37'25.37816" N	78°45'45.78934" W	153.578	186.334
NVA07	21045BU	39°42'53.00120" N	78°36'29.72901" W	330.599	363.518
NVA08	21045BV	39°36'05.36663" N	78°45'49.89978" W	152.668	185.450
NVA09	21045BW	39°42'58.27631" N	78°41'59.40240" W	212.104	244.852
NVA10	21045BX	39°40'43.83705" N	78°44'14.84309" W	197.260	229.991
NVA11	21045BY	39°39'18.02033" N	78°48'46.23032" W	215.005	247.548
NVA12	21045BZ	39°42'16.29796" N	78°34'17.29686" W	226.057	259.105
NVA13	21045CA	39°40'36.98876" N	78°27'29.40553" W	199.649	233.034
NVA14	21045CB	39°32'35.93468" N	78°36'57.94504" W	151.275	184.454
NVA15	21045CC	39°37'33.76689" N	78°23'07.50353" W	105.531	139.168
NVA16	21045CD	39°31'55.86892" N	78°27'37.34332" W	132.762	166.267

Station Name	GPSID	Latitude	Longitude	Ellipsoidal Height	NAVD 1988
NVA17	21045CE	39°41'49.69801" N	78°15'19.90141" W	158.299	192.162
NVA18	21045CF	39°37'11.00632" N	78°17'27.08238" W	109.334	143.176
NVA19	21045CG	39°31'52.45893" N	78°21'01.45829" W	138.347	172.049
NVA20	21045CH	39°29'42.63694" N	78°17'31.59583" W	228.174	261.957
NVA21	21045CI	39°36'00.52123" N	78°03'45.37687" W	122.934	157.124
NVA22	21045CJ	39°27'13.47740" N	78°13'50.06171" W	281.204	315.071
NVA23	21045CK	39°23'14.71992" N	78°09'50.40788" W	146.229	180.178
NVA24	21045CL	39°33'07.27849" N	77°59'13.04519" W	126.909	161.140
NVA25	21045CM	39°21'27.82874" N	78°00'58.02092" W	140.076	174.091
NVA26	21045CN	39°38'36.88073" N	78°11'32.11277" W	188.100	222.106
NVA27	21045CO	39°31'26.71598" N	78°11'38.70238" W	251.324	285.266
NVA28	21045CP	39°42'55.81096" N	77°53'37.73529" W	179.299	213.590
NVA29	21045CQ	39°35'26.55838" N	77°54'20.41686" W	112.618	146.903
NVA30	21045CR	39°36'21.90654" N	78°14'23.25872" W	168.770	202.689
NVA31	21045CS	39°35'41.96391" N	78°20'37.44352" W	254.622	288.337
NVA32	21045CT	39°40'30.02789" N	78°29'59.57070" W	290.352	323.626
NVA33	21045CU	39°34'12.74969" N	78°40'19.95231" W	196.734	229.749
NVA34	21045CV	39°38'48.05272" N	78°38'32.95288" W	347.229	380.171
NVA35	21045CW	39°37'04.61706" N	78°50'32.05521" W	283.771	316.258
NVA36	21045CX	39°33'21.97000" N	78°59'22.26910" W	404.961	437.005
NVA37	21045CY	39°41'40.14818" N	78°52'44.86008" W	338.482	370.710
NVA38	21045CZ	39°24'25.83513" N	78°02'19.38125" W	165.329	199.393
NVA39	21045DA	39°26'31.43478" N	77°57'06.43169" W	120.592	154.716
NVA40	21045DB	39°28'50.49603" N	77°58'22.58556" W	112.454	146.625
NVA41	21045DC	39°38'21.52826" N	77°49'09.58414" W	111.464	145.754
NVA42	21045DD	39°35'20.97653" N	77°49'01.22131" W	97.653	131.885
NVA43	21045DE	39°26'12.78512" N	77°48'50.29964" W	96.530	130.481
NVA44	21045DF	39°25'14.68603" N	77°54'22.61617" W	116.253	150.317
NVA45	21045DG	39°23'19.33717" N	77°53'11.47390" W	134.726	168.704
NVA46	21045DH	39°18'41.39305" N	77°59'02.41969" W	125.682	159.622
NVA47	21045DI	39°21'38.13183" N	77°50'25.44412" W	123.739	157.569
NVA48	21045DJ	39°17'38.00327" N	77°54'23.01060" W	137.084	170.896
NVA49	21045DK	39°15'08.27003" N	77°52'40.36057" W	127.488	161.150
NVA50	21045DL	39°10'49.36910" N	77°51'10.97373" W	103.042	136.437
NVA51	21045DM	39°20'48.07920" N	78°06'41.88094" W	197.686	231.644
NVA52	21045DN	39°19'54.73801" N	78°02'53.51921" W	131.730	165.710
NVA53	21045DO	39°32'13.54913" N	78°03'57.49535" W	186.817	220.968
NVA54	21045DP	39°18'41.27936" N	77°36'39.07219" W	90.357	123.360
NVA55	21045DQ	39°30'42.34310" N	77°39'03.63455" W	141.532	175.149
NVA56	21045DR	39°25'31.83557" N	77°39'36.90190" W	173.776	207.200
NVA57	21045DS	39°21'20.29840" N	77°40'42.99740" W	119.839	153.158
NVA58	21045DT	39°31'52.41636" N	77°44'50.75182" W	112.381	146.381
NVA59	21045DU	39°41'12.47642" N	77°41'33.27488" W	148.892	183.064
NVA60	21045DV	39°38'25.71475" N	77°42'08.32085" W	121.002	155.112
NVA61	21045DW	39°37'16.56971" N	77°39'40.55071" W	154.230	188.176
NVA62	21045DX	39°41'52.68972" N	77°37'11.58316" W	150.049	184.065
NVA63	21045DY	39°39'37.16840" N	77°34'49.43992" W	194.262	228.018
NVA64	21045DZ	39°42'11.10006" N	77°19'02.90796" W	90.015	123.344
NVA65	21045EA	39°34'35.85244" N	77°38'01.60365" W	139.169	172.886
NVA66	21045EB	39°26'54.58772" N	77°31'21.65758" W	182.827	215.815
NVA67	21045EC	39°27'55.64207" N	77°26'07.62501" W	96.276	129.133
NVA68	21045ED	39°24'48.44433" N	77°27'40.38503" W	100.694	133.490
NVA69	21045EE	39°20'39.26013" N	77°20'07.26476" W	103.165	135.504
NVA70	21045EF	39°19'47.85802" N	77°15'01.39416" W	158.794	190.834
NVA71	21045EG	39°21'41.50731" N	77°11'50.30498" W	190.519	222.508
NVA72	21045EH	39°30'25.24449" N	77°12'20.00434" W	151.129	183.580
NVA73	21045EI	39°27'04.85740" N	77°18'47.61616" W	111.513	144.089
NVA74	21045EJ	39°36'43.49368" N	77°24'18.90512" W	115.293	148.420
NVA75	21045EK	39°30'38.85614" N	77°25'53.93331" W	105.607	138.543
NVA76	21045EL	39°38'12.51284" N	77°30'04.98460" W	427.957	461.250
NVA77	21045EM	39°32'12.99517" N	77°18'14.21512" W	86.970	119.795
NVA78	21045EN	39°29'40.73747" N	77°20'35.42948" W	64.137	96.933
NVA79	21045EO	39°16'43.63197" N	77°31'22.10497" W	51.571	84.265
VVA01	21045EP	39°32'02.81191" N	78°52'57.34464" W	192.487	224.975

Station Name	GPSID	Latitude	Longitude	Ellipsoidal Height	NAVD 1988
VVA02	21045EQ	39°31'11.76958" N	79°01'07.84140" W	343.311	375.340
VVA03	21045ER	39°37'33.88076" N	78°23'08.63534" W	104.581	138.217
VVA04	21045ES	39°38'44.56464" N	78°54'45.17363" W	578.827	610.983
VVA05	21045ET	39°37'26.97372" N	78°14'02.93769" W	209.063	242.996
VVA06	21045EU	39°34'16.26395" N	78°50'24.75635" W	207.161	239.748
VVA07	21045EV	39°28'12.99781" N	78°56'46.72396" W	212.665	245.008
VVA08	21045EW	39°36'06.76048" N	78°48'56.21664" W	164.006	196.628
VVA09	21045EX	39°28'13.17954" N	77°37'02.62922" W	291.027	324.392
VVA10	21045EY	39°10'42.89307" N	77°49'55.34150" W	204.441	237.749
VVA11	21045EZ	39°34'10.23717" N	78°39'19.15605" W	183.847	216.898
VVA12	21045FA	39°28'53.72990" N	78°22'39.21514" W	171.090	204.724
VVA13	21045FB	39°30'34.23335" N	78°26'07.11128" W	240.594	274.117
VVA14	21045FC	39°15'42.36361" N	77°45'54.60231" W	232.618	265.961
VVA15	21045FD	39°36'38.00106" N	78°33'28.25530" W	206.659	239.885
VVA16	21045FE	39°38'06.99661" N	78°43'06.67752" W	237.830	270.658
VVA17	21045FF	39°40'51.77785" N	78°29'09.53877" W	216.867	250.172
VVA18	21045FG	39°40'40.29725" N	78°42'20.12719" W	179.621	212.424
VVA19	21045FH	39°40'56.21519" N	78°47'12.52131" W	172.319	204.905
VVA20	21045FI	39°42'24.15512" N	78°52'18.46163" W	435.811	468.049
VVA21	21045FJ	39°36'45.81012" N	78°57'03.91703" W	532.651	564.724
VVA22	21045FK	39°42'25.21455" N	78°22'53.30330" W	274.431	307.956
VVA23	21045FL	39°23'14.93010" N	78°05'55.25978" W	191.242	225.242
VVA24	21045FM	39°26'34.33285" N	78°15'47.65849" W	223.461	257.274
VVA25	21045FN	39°30'45.40180" N	78°02'45.62192" W	114.399	148.558
VVA26	21045FO	39°39'24.75316" N	78°04'37.74256" W	161.491	195.676
VVA27	21045FP	39°32'44.76240" N	77°40'23.70268" W	112.010	145.811
VVA28	21045FQ	39°20'02.12771" N	77°36'45.78583" W	84.316	117.373
VVA29NF	21045FR	39°23'41.86831" N	77°27'10.68397" W	93.983	126.735
VVA30	21045FS	39°32'03.10741" N	77°25'23.52587" W	87.012	119.988
VVA31	21045FT	39°41'09.57890" N	77°24'22.95440" W	255.572	288.853
VVA32	21045FU	39°39'33.44190" N	77°19'46.07641" W	100.108	133.310
VVA33	21045FV	39°28'57.98416" N	77°15'05.30472" W	135.336	167.831
VVA34	21045FW	39°29'02.83011" N	77°11'03.68235" W	135.497	167.821
VVA35	21045FX	39°25'36.37371" N	77°16'09.27121" W	108.891	141.268
VVA36	21045FY	39°15'45.49651" N	77°26'13.24171" W	34.426	66.874
VVA37	21045FZ	39°22'57.24393" N	77°26'07.11911" W	55.513	88.216
VVA38	21045GA	39°26'59.53382" N	77°25'01.41591" W	73.367	106.174
VVA39	21045GB	39°24'26.15721" N	77°20'27.85736" W	72.765	105.296
VVA40	21045GC	39°29'36.76777" N	77°34'13.40918" W	138.508	171.749
VVA41	21045GD	39°29'07.31366" N	78°06'04.81988" W	137.734	171.814
VVA42	21045GE	39°30'03.81539" N	77°53'33.66081" W	82.538	116.722
VVA43	21045GF	39°25'06.09234" N	77°44'45.74270" W	55.752	89.478
VVA44	21045GG	39°31'39.14837" N	77°49'08.81401" W	90.045	124.188
VVA45	21045GH	39°35'02.11483" N	77°44'19.55540" W	116.857	150.942
VVA46	21045GI	39°31'10.61219" N	77°56'20.99204" W	106.848	141.068
VVA47	21045GJ	39°37'16.58678" N	77°27'58.73428" W	289.351	322.512
VVA48	21045GK	39°39'16.13700" N	77°55'57.00691" W	139.424	173.710
VVA49	21045GL	39°40'36.65137" N	78°02'24.84640" W	90.372	124.579
VVA50	21045GM	39°43'19.83016" N	78°06'47.64993" W	198.534	232.629
VVA51	21045GN	39°42'07.17398" N	78°11'28.17239" W	90.729	124.730
VVA52	21045GO	39°42'10.53715" N	78°21'19.99793" W	220.966	254.577
VVA53	21045GP	39°32'35.98305" N	78°34'58.72911" W	147.743	180.990
VVA54	21045GQ	39°41'32.04801" N	78°33'43.04081" W	224.709	257.803
VVA55	21045GR	39°33'40.74048" N	78°59'09.04216" W	412.471	444.517
VVA56	21045GS	39°31'35.46878" N	78°16'49.24266" W	195.527	229.347
VVA57	21045GT	39°27'44.65849" N	78°01'50.34166" W	158.576	192.700
VVA58	21045GU	39°34'00.60929" N	78°11'06.46733" W	236.325	270.312
VVA59	21045GV	39°37'20.80862" N	77°33'30.58596" W	426.445	459.924
VVA60	21045GW	39°35'38.46339" N	77°37'51.19576" W	124.006	157.761
VVA61	21045GX	39°37'50.93500" N	77°51'54.62025" W	108.150	142.456
BASE45BASE	21045WA	39°35'01.71426" N	77°44'20.91761" W	119.008	153.093
BASE44BASE	21045WB	39°31'39.04228" N	77°49'08.05095" W	93.014	127.157
BASE42BASE	21045WC	39°30'03.31427" N	77°53'33.87757" W	84.986	119.170
BASE10BASE	21045WD	39°10'42.12579" N	77°49'56.67366" W	208.734	242.043

Station Name	GPSID	Latitude	Longitude	Ellipsoidal Height	NAVD 1988
BASE14BASE	21045WE	39°15'43.74072" N	77°45'54.00475" W	231.519	264.862
BASE43BASE	21045WF	39°25'07.53381" N	77°44'44.34955" W	59.000	92.726
BASE28BASE	21045WG	39°20'04.00158" N	77°36'48.15532" W	86.944	120.005
BASE36BASE	21045WH	39°15'44.65181" N	77°26'12.17781" W	37.254	69.700
BASE37BASE	21045WI	39°22'56.66077" N	77°26'07.71845" W	59.573	92.275
BASE38BASE	21045WJ	39°27'01.48742" N	77°25'02.04159" W	76.599	109.407
BASE39BASE	21045WK	39°24'24.33297" N	77°20'28.60429" W	78.675	111.205
BASE35BASE	21045WL	39°25'34.06715" N	77°16'08.23839" W	112.076	144.450
BASE34BASE	21045WM	39°29'02.72832" N	77°11'02.67421" W	134.334	166.658
BASE33BASE	21045WN	39°28'57.81089" N	77°15'06.62131" W	136.338	168.834
BASE30BASE	21045WO	39°32'03.29100" N	77°25'24.60013" W	88.283	121.260
BASE40BASE	21045WP	39°29'36.06659" N	77°34'11.67833" W	142.176	175.415
BASE51BASE	21045WQ	39°42'07.32808" N	78°11'26.77612" W	90.920	124.922
BASE50BASE	21045WR	39°43'20.59273" N	78°06'47.67080" W	202.103	236.198
BASE49BASE	21045WS	39°40'37.26305" N	78°02'24.21753" W	90.600	124.807
BASE48BASE	21045WT	39°39'16.37513" N	77°55'56.09973" W	140.239	174.525
BASE61BASE	21045WU	39°37'52.65097" N	77°51'54.55649" W	108.634	142.940
BASE46BASE	21045WV	39°31'10.99637" N	77°56'20.06186" W	105.840	140.060
BASE26BASE	21045WW	39°39'24.03677" N	78°04'38.41293" W	163.253	197.438
BASE25BASE	21045WX	39°30'44.92894" N	78°02'45.14748" W	116.449	150.608
BASE57BASE	21045WY	39°27'44.19686" N	78°01'49.29673" W	159.830	193.955
BASE23BASE	21045WZ	39°23'16.69221" N	78°05'54.17904" W	193.581	227.581
BASE41BASE	21045XA	39°29'06.50928" N	78°06'04.49915" W	137.336	171.414
BASE24BASE	21045XB	39°26'35.35399" N	78°15'47.75230" W	222.072	255.886
BASE56BASE	21045XC	39°31'34.40604" N	78°16'48.65074" W	194.783	228.604
BASE58BASE	21045XD	39°34'00.15824" N	78°11'06.99082" W	236.762	270.749
BASE05BASE	21045XE	39°37'26.64979" N	78°14'01.68844" W	211.749	245.683
BASE27BASE	21045XF	39°32'44.51357" N	77°40'24.96418" W	111.562	145.364
BASE09BASE	21045XG	39°28'14.10486" N	77°37'03.30988" W	289.605	322.972
BASE60BASE	21045XH	39°35'38.00216" N	77°37'50.53925" W	127.576	161.329
BASE59BASE	21045XI	39°37'20.38531" N	77°33'28.64185" W	423.961	457.437
BASE47BASE	21045XJ	39°37'15.74245" N	77°27'59.61031" W	292.047	325.208
BASE31BASE	21045XK	39°41'09.94479" N	77°24'24.38750" W	254.007	287.289
BASE32BASE	21045XL	39°39'32.78389" N	77°19'45.97562" W	99.997	133.198
BASEF20	21045YA	39°42'22.90120" N	78°52'15.44037" W	437.933	470.176
BASEF04	21045YB	39°38'44.91067" N	78°54'43.93576" W	580.973	613.132
BASEF21	21045YC	39°36'46.60890" N	78°57'02.50061" W	536.701	568.775
BASEF55	21045YD	39°33'41.91903" N	78°59'09.45746" W	414.795	446.840
BASEF02	21045YE	39°31'25.15606" N	79°01'06.77622" W	336.287	368.310
BASEF02	21045YF	39°31'12.40135" N	79°01'07.32295" W	342.506	374.534
BASEF07	21045YG	39°28'13.90968" N	78°56'46.80937" W	210.768	243.110
BASEF01	21045YH	39°32'04.21091" N	78°52'58.15898" W	195.326	227.812
BASEF06	21045YI	39°34'15.62374" N	78°50'25.57987" W	204.738	237.324
BASEF19	21045YJ	39°40'55.81124" N	78°47'12.00365" W	176.263	208.849
BASEF08	21045YK	39°36'06.67054" N	78°48'55.16634" W	165.936	198.558
BASEF16	21045YL	39°38'05.67915" N	78°43'04.34220" W	238.610	271.440
BASEF11	21045YM	39°34'11.70441" N	78°39'20.06309" W	183.739	216.790
BASEF53	21045YN	39°32'35.51856" N	78°34'58.63876" W	150.696	183.943
BASEF53	21045YO	39°32'35.64326" N	78°34'58.37032" W	150.957	184.204
BASEF13	21045YP	39°30'34.61037" N	78°26'07.58220" W	239.714	273.236
BASEF12	21045YQ	39°28'54.76083" N	78°22'39.56471" W	173.478	207.111
BASEF03	21045YR	39°37'33.40006" N	78°23'07.39699" W	107.319	140.956
BASEF15	21045YS	39°36'38.42227" N	78°33'27.49507" W	206.594	239.820
BASEF54	21045YT	39°41'32.44390" N	78°33'39.77455" W	226.525	259.622
BASEF52	21045YU	39°42'11.34111" N	78°21'21.44888" W	228.652	262.261
BASEF22	21045YV	39°42'24.31869" N	78°22'53.04867" W	275.388	308.914
BASEF17	21045YW	39°40'51.86940" N	78°29'13.91630" W	221.280	254.582
BASEF18	21045YX	39°40'41.41865" N	78°42'20.09218" W	183.201	216.003
BCC2	BCC2	39°09'57.34381" N	78°10'26.17634" W	189.872	223.608
DEW5	DEW5	39°36'37.12650" N	77°41'16.40535" W	141.531	175.537
HB16	HB16	39°22'05.05150" N	77°10'16.71768" W	195.307	227.263
HONI	JW1579	39°41'17.31651" N	78°58'30.65205" W	760.490	792.352
MAS2	MAS2	39°08'53.40321" N	77°38'10.05026" W	127.452	160.118
PAAC	PAAC	39°51'39.56637" N	77°13'59.94962" W	132.721	166.452

Station Name	GPSID	Latitude	Longitude	Ellipsoidal Height	NAVD 1988
PAFM	PAFM CORS	39°57'44.91208" N	77°58'43.61768" W	286.767	320.710
WVBU	PRS448246846	39°20'16.82171" N	78°54'48.58710" W	200.059	232.547
KP19	PRS721439768	39°37'55.39868" N	78°46'10.65353" W	176.410	209.136
WVKE	WVKE	39°20'12.87311" N	77°54'55.17695" W	139.158	173.072

Table 9 - NAD83(2011) UTM Zone 17 and UTM Zone 18

Station Name	GPSID	UTM17 North	UTM17 East	UTM18 North	UTM18 East
GCP01	21045AA	4379108.846	669117.935	4385027.871	153515.709
GCP02	21045AB	4385254.087	677697.760	4390593.012	162495.972
GCP03	21045AC	4375402.430	678456.432	4380702.694	162596.108
GCP04	21045AD	4395916.122	681725.349	4400972.347	167231.583
GCP05	21045AE	4391692.996	690554.206	4396164.124	175766.067
GCP06	21045AF	4387578.746	699324.983	4391469.520	184249.178
GCP07	21045AG	4397027.968	701684.572	4400746.630	187237.075
GCP08	21045AH	4381293.076	713439.716	4384251.416	197921.962
GCP09	21045AI	4399492.837	715022.672	4402314.700	200718.518
GCP10	21045AJ	4395913.343	725277.543	4398055.359	210715.717
GCP11	21045AK	4373755.327	732105.627	4375482.882	216052.276
GCP12	21045AL	4382350.778	734900.607	4383875.610	219414.776
GCP13	21045AM	4390444.243	736210.183	4391865.879	221262.039
GCP14	21045AN	4367755.303	746243.940	4368553.832	229763.373
GCP15	21045AO	4398374.466	746098.511	4399119.021	231660.373
GCP16	21045AP	4384791.825	749739.104	4385321.884	234385.960
GCP17	21045AQ	4353046.780	752960.953	4353430.073	235489.622
GCP18	21045AR	4395304.204	753754.034	4395543.470	239094.190
GCP19	21045AS	4361119.421	761208.193	4360937.859	244254.484
GCP20	21045AT	4348250.535	762776.722	4347993.826	244966.088
GCP21	21045AU	4391103.520	762665.885	4390756.839	247705.405
GCP22	21045AV	4378802.303	767983.620	4378129.545	252190.367
GCP23	21045AW	4345224.993	771294.688	4344411.273	253264.168
GCP24	21045AX	4356788.051	777129.903	4355560.049	259851.511
GCP25	21045AY	4398518.979	778889.743	4397070.527	264385.687
GCP26	21045AZ	4387930.525	778961.431	4386503.814	263750.085
GCP27	21045BA	4373433.014	781580.041	4371868.192	265396.284
GCP28	21045BB	4392506.437	793015.720	4390129.960	278073.336
GCP29	21045BC	4368134.592	794333.300	4365735.576	277764.211
GCP30	21045BD	4356582.737	796760.007	4354053.590	279417.708
GCP31	21045BE	4402492.174	796320.766	4399867.817	282036.635
GCP32	21045BF	4379106.250	797987.964	4376434.539	282138.769
GCP33	21045BG	4363231.748	805345.761	4360114.828	288420.953
GCP34	21045BH	4348637.716	808024.342	4345384.294	290124.760
GCP35	21045BI	4384261.706	811660.462	4380664.817	296116.113
GCP36	21045BJ	4371300.223	812736.827	4367669.379	296326.808
GCP37	21045BK	4359076.728	814441.690	4355368.268	297215.246
GCP38	21045BL	4398462.309	812838.403	4394745.319	298238.043
GCP39	21045BM	4378183.627	826104.822	4373643.206	310112.521
GCP40	21045BN	4367624.961	831316.392	4362770.982	314606.097
NVA01	21045BO	4372995.458	667821.059	4379007.657	151812.416
NVA02	21045BP	4368901.201	673639.352	4374530.195	157351.394
NVA03	21045BQ	4384065.134	684546.978	4388948.017	169257.130
NVA04	21045BR	4391708.648	677121.949	4397078.199	162352.384
NVA05	21045BS	4396088.030	689502.912	4400623.406	175010.285
NVA06	21045BT	4388386.399	692026.930	4392763.686	177015.670
NVA07	21045BU	4398830.053	705016.472	4402322.872	190684.408
NVA08	21045BV	4385916.963	691990.340	4390300.155	176814.128
NVA09	21045BW	4398787.201	697161.750	4402805.981	182838.850
NVA10	21045BX	4394559.870	694041.191	4398793.691	179439.898
NVA11	21045BY	4391753.491	687639.872	4396419.447	172859.775
NVA12	21045BZ	4397783.151	708200.785	4401064.492	193793.545
NVA13	21045CA	4394990.346	718002.378	4397620.594	203391.815

Station Name	GPSID	UTM17 North	UTM17 East	UTM18 North	UTM18 East
NVA14	21045CB	4379785.726	704849.764	4383319.539	189245.272
NVA15	21045CC	4389520.143	724407.315	4391731.984	209419.728
NVA16	21045CD	4378916.654	718267.579	4381557.013	202583.152
NVA17	21045CE	4397744.696	735315.728	4399211.796	220857.353
NVA18	21045CF	4389059.006	732545.738	4390728.093	217512.175
NVA19	21045CG	4379084.155	727723.117	4381093.782	212033.012
NVA20	21045CH	4375230.367	732854.543	4376905.245	216898.016
NVA21	21045CI	4387501.758	752212.460	4387860.966	237034.838
NVA22	21045CJ	4370792.080	738288.428	4372113.741	222025.893
NVA23	21045CK	4363608.234	744248.809	4364547.874	227496.641
NVA24	21045CL	4382374.791	758888.036	4382299.978	243353.727
NVA25	21045CM	4360723.091	757096.544	4360815.412	240125.629
NVA26	21045CN	4391967.084	740927.949	4393070.503	226072.134
NVA27	21045CO	4378697.860	741185.112	4379810.896	225443.326
NVA28	21045CP	4400795.919	766264.241	4400186.197	251943.168
NVA29	21045CQ	4386907.052	765725.667	4386365.855	250478.006
NVA30	21045CR	4387678.525	736975.950	4389054.460	221841.598
NVA31	21045CS	4386177.762	728087.410	4388149.974	212869.866
NVA32	21045CT	4394675.136	714430.422	4397544.826	199804.911
NVA33	21045CU	4382644.525	699950.151	4386500.926	184543.894
NVA34	21045CV	4391199.612	702280.657	4394887.358	187442.371
NVA35	21045CW	4387579.238	685216.596	4392412.781	170160.652
NVA36	21045CX	4380421.188	672726.878	4386097.825	157208.197
NVA37	21045CY	4395999.184	681848.981	4401047.025	167360.616
NVA38	21045CZ	4366147.858	754968.777	4366369.714	238362.886
NVA39	21045DA	4370270.318	762323.939	4369993.978	245975.839
NVA40	21045DB	4374497.037	760359.023	4374341.902	244296.606
NVA41	21045DC	4392561.760	772950.565	4391524.847	258063.155
NVA42	21045DD	4387001.061	773347.379	4385951.166	258087.856
NVA43	21045DE	4370105.625	774206.673	4369039.424	257819.788
NVA44	21045DF	4368037.164	766321.940	4367500.091	249816.185
NVA45	21045DG	4364538.809	768146.269	4363888.631	251403.787
NVA46	21045DH	4355682.925	760035.219	4355591.334	242723.337
NVA47	21045DI	4361556.138	772228.343	4360641.897	255278.155
NVA48	21045DJ	4353954.539	766795.161	4353418.569	249353.373
NVA49	21045DK	4349421.950	769414.129	4348722.924	251665.898
NVA50	21045DL	4341512.775	771834.677	4340672.056	253557.288
NVA51	21045DM	4359229.685	748904.475	4359869.100	231851.907
NVA52	21045DN	4357761.715	754425.583	4358037.765	237263.885
NVA53	21045DO	4380493.394	752151.883	4380871.757	236506.944
NVA54	21045DP	4356820.163	792215.101	4354591.717	274900.622
NVA55	21045DQ	4378927.008	787925.890	4376925.758	272091.577
NVA56	21045DR	4369322.055	787486.433	4367374.946	271014.245
NVA57	21045DS	4361506.846	786191.340	4359665.852	269203.392
NVA58	21045DT	4380783.651	779556.275	4379335.140	263866.967
NVA59	21045DU	4398226.929	783635.657	4396461.987	269100.020
NVA60	21045DV	4393053.502	782989.774	4391344.971	268110.174
NVA61	21045DW	4391051.491	786592.315	4389107.618	271569.776
NVA62	21045DX	4399699.705	789824.089	4397517.257	275370.741
NVA63	21045DY	4395648.843	793369.813	4393240.281	278636.311
NVA64	21045DZ	4401289.845	815736.868	4397370.806	301316.875
NVA65	21045EA	4386183.360	789137.944	4384082.380	273783.990
NVA66	21045EB	4372322.053	799232.579	4369586.067	282928.586
NVA67	21045EC	4374498.466	806666.383	4371262.056	290486.426

Station Name	GPSID	UTM17 North	UTM17 East	UTM18 North	UTM18 East
NVA68	21045ED	4368637.986	804675.869	4365550.404	288111.940
NVA69	21045EE	4361386.417	815827.630	4357579.288	298750.316
NVA70	21045EF	4360102.035	823217.919	4355808.591	306033.405
NVA71	21045EG	4363798.499	827647.080	4359199.970	310694.223
NVA72	21045EH	4379921.009	826255.584	4375365.196	310378.434
NVA73	21045EI	4373355.881	817248.551	4369419.089	300961.937
NVA74	21045EJ	4390880.616	808614.170	4387467.688	293519.930
NVA75	21045EK	4379544.858	806794.060	4376285.637	290949.545
NVA76	21045EL	4393299.688	800251.999	4390437.984	285342.827
NVA77	21045EM	4382891.673	817656.718	4378899.367	302003.447
NVA78	21045EN	4378058.101	814475.500	4374291.888	298509.841
NVA79	21045EO	4353480.730	799947.986	4350748.689	282391.479
VVA01	21045EP	4378191.413	681971.247	4383253.772	166292.606
VVA02	21045EQ	4376350.974	670295.623	4382194.465	154508.060
VVA03	21045ER	4389522.868	724380.225	4391736.514	209392.869
VVA04	21045ES	4390518.222	679109.156	4395756.320	164257.519
VVA05	21045ET	4389699.806	737398.841	4391043.513	222398.630
VVA06	21045EU	4382392.656	685515.411	4387213.057	170112.611
VVA07	21045EV	4370978.893	676656.574	4376404.447	160503.527
VVA08	21045EW	4385850.607	687545.331	4390530.840	172370.783
VVA09	21045EX	4374435.220	790989.248	4372241.833	274847.942
VVA10	21045EY	4341376.340	773656.795	4340415.440	255366.077
VVA11	21045EZ	4382604.759	701402.940	4386364.247	185991.843
VVA12	21045FA	4373504.787	725549.534	4375669.427	209491.615
VVA13	21045FB	4376460.628	720493.760	4378956.846	204641.750
VVA14	21045FC	4350815.096	779104.593	4349470.817	261425.457
VVA15	21045FD	4387383.826	709652.725	4390584.956	194547.792
VVA16	21045FE	4389765.091	695788.209	4393889.005	180863.729
VVA17	21045FF	4395379.108	715603.747	4398169.120	201023.325
VVA18	21045FG	4394520.158	696777.119	4398570.985	182169.189
VVA19	21045FH	4394835.906	689798.567	4399353.227	175221.730
VVA20	21045FI	4397370.947	682445.568	4402377.075	168048.276
VVA21	21045FJ	4386780.542	675885.613	4392238.720	160788.018
VVA22	21045FK	4398516.760	724483.565	4400707.130	210097.362
VVA23	21045FL	4363793.624	749875.091	4364359.023	233123.619
VVA24	21045FM	4369499.178	735514.026	4371007.973	219170.855
VVA25	21045FN	4377831.470	753957.226	4378095.284	238131.004
VVA26	21045FO	4393758.736	750758.208	4394201.572	236001.583
VVA27	21045FP	4382631.211	785873.648	4380757.074	270291.405
VVA28	21045FQ	4359307.308	791960.759	4357089.192	274811.899
VVA29NF	21045FR	4366612.777	805467.153	4363478.313	288766.478
VVA30	21045FS	4382171.986	807417.084	4378863.801	291745.740
VVA31	21045FT	4399082.842	808188.730	4395674.706	293643.361
VVA32	21045FU	4396385.346	814907.655	4392536.274	300162.464
VVA33	21045FV	4377064.231	822418.601	4372772.480	306363.101
VVA34	21045FW	4377456.411	828186.794	4372779.728	312139.667
VVA35	21045FX	4370782.953	821147.525	4366594.701	304678.247
VVA36	21045FY	4351976.208	807421.369	4348753.299	289744.508
VVA37	21045FZ	4365296.589	807042.536	4362061.221	290250.022
VVA38	21045GA	4372830.947	808317.893	4369489.451	292022.353
VVA39	21045GB	4368363.837	815050.643	4364587.824	298438.766
VVA40	21045GC	4377165.983	794935.614	4374702.721	278965.522
VVA41	21045GD	4374652.124	749296.849	4375233.129	233268.850
VVA42	21045GE	4376993.187	767185.195	4376377.845	251273.323

Station Name	GPSID	UTM17 North	UTM17 East	UTM18 North	UTM18 East
VVA43	21045GF	4368257.989	780128.779	4366802.619	263604.532
VVA44	21045GG	4380154.058	773408.332	4379116.693	257692.195
VVA45	21045GH	4386660.512	780088.953	4385161.771	264790.064
VVA46	21045GI	4378915.961	763117.685	4378567.093	247343.287
VVA47	21045GJ	4391692.947	803330.320	4388630.269	288305.310
VVA48	21045GK	4393907.503	763179.226	4393520.078	248404.849
VVA49	21045GL	4396079.696	753852.637	4396310.671	239244.414
VVA50	21045GM	4400907.359	747428.423	4401557.599	233156.938
VVA51	21045GN	4398454.582	740818.775	4399552.141	226396.900
VVA52	21045GO	4398129.430	726719.147	4400170.922	212302.912
VVA53	21045GP	4379863.174	707695.675	4383207.025	192091.877
VVA54	21045GQ	4396440.887	709053.765	4399667.327	194555.313
VVA55	21045GR	4381006.983	673029.598	4386662.734	157549.679
VVA56	21045GS	4378740.005	733761.207	4380347.767	218036.812
VVA57	21045GT	4372301.555	755461.429	4372477.255	239263.737
VVA58	21045GU	4383467.256	741806.341	4384529.247	226381.304
VVA59	21045GV	4391515.538	795410.724	4388981.873	280395.741
VVA60	21045GW	4388123.500	789313.893	4386005.687	274088.868
VVA61	21045GX	4391479.858	769048.716	4390706.096	254098.440