

SACRAMENTO RIVER AERIAL IMAGERY, TOPOGRAPHIC AND BATHYMETRIC DATA ACQUISITION CONTROL SURVEY REPORT

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INTRODUCTION

The Yurok Tribe Fisheries Department Design and Technical Services Program (YT TSP) was tasked by the Bureau of Reclamation's (Reclamation's) Central Valley Project Improvement Act (CVPIA) Program to conduct a base-line data collection effort on the Sacramento River to support habitat and decision support modeling. High resolution aerial imagery, topography, bathymetry, and water surface elevations were provided to Reclamation and are intended to support the development of a hydrodynamic model framework for predicting habitat across a range of flows. The model will support measures needed to restore anadromous fish to optimum and sustainable levels in accordance with the restored carrying capacities of Central Valley rivers, streams, and riparian habitats. The data will also be used to support planning, design, and analysis of current and future restoration projects on the Sacramento River. The approximate project area is shown in Figure 1.



Figure 1: Survey Area

The topo-bathymetric survey area along the Sacramento River spanned from the Clear Creek confluence at approximate river mile 290 to Wilkins Slough at approximately river mile 117 (174 miles). The imagery survey area was larger, starting from the Clear Creek confluence extending down to Freeport at approximate river mile 45 (246 miles).

To ensure agreement between the different data collection methodologies and to establish a common set of survey control to be used throughout the project, a Global Navigation Satellite System (GNSS) control survey was completed prior to the commencement of the project. Additional control was also developed during the project to expand the network as well as establish temporary points for specific uses. This report describes the equipment used for the survey, data acquisition and processing methodologies in addition to summarizing the results and deliverables.

SPECIFICATIONS

The specifications for the final product are to be 0.19m Vertical Root Mean Square Error (RMSE_z) equivalent to National Map Accuracy Standard (NMAS) 2-ft contour, following American Society for Photogrammetry and Remote Sensing (ASPRS) Positional Accuracy Standards for Digital Geospatial Data, 2014). Target accuracy of ground control surveys is $\leq 0.06\text{m RMSE}_z$ which is equivalent to 3 times higher accuracy than the final product following United States Geological Survey (USGS) Base Lidar Specifications (2022 revision A).

Geodetic Parameters

The datum for all data acquisition and deliverables was the North American Datum of 1983, 2011 realization (NAD83(2011)) at Epoch 2010.0 with coordinates projected to Universal Transverse Mercator (UTM) Zone 10 North. The vertical datum is the North American Vertical Datum of 1988 (NAVD88) orthometric heights using the GEOID18 geoid model. Project units are meters.

Survey Control

To provide a documented, consistent and repeatable basis for control, the entire project will be referenced to the National Geodetic Survey (NGS) Continually Operating Reference Stations (CORS). Published coordinates of the stations used are shown in Table 1.

Table 1: NGS CORS Stations

CORS STATION (PID)	NAD83(2011) EPOCH 2010.0			UTM Zone 10N Meters		
	LATITUDE (N)	LONGITUDE (W)	ELLIPSOID HEIGHT	NORTHING	EASTING	NAVD88 HEIGHT
ORVB (DN7510)	39°33'16.64473"	121°30'00.99491"	340.547	4379400.676	628846.582	367.852
P206 (DK6396)	38°46'40.12822"	122°34'32.80308"	284.121	4292206.205	536848.754	314.102
P268 (DK4683)	38°28'24.68095"	121°38'47.02765"	-23.406	4259223.301	618077.044	7.876
P270 (DM7545)	39°14'37.55843"	122°03'18.71374"	-11.871	4344253.434	581531.323	17.664
P336 (DK6402)	39°31'41.07484"	122°25'49.68758"	287.219	4375535.284	548948.181	316.441
P339 (DN5651)	40°02'02.78495"	122°40'05.64413"	980.044	4431595.479	528305.338	1008.409
P341 (DK6405)	40°39'02.34899"	122°36'24.78562"	407.329	4500051.630	533235.569	434.252
P344 (DN5654)	39°55'44.82987"	122°01'40.64406"	50.264	4420342.459	583059.763	78.202
P345 (DN7393)	40°16'16.43043"	122°16'14.84882"	134.561	4458116.911	561998.336	163.063
P349 (DM7548)	40°43'51.89383"	122°19'09.60900"	275.887	4509128.047	557477.134	302.680
SACR (DH8725)	38°39'17.97133"	121°21'15.19309"	7.485	4279776.703	643204.811	37.939

California Surveying and Drafting Supply, Inc.'s Real Time Network (CSDS RTN) will be used for accurate positioning in real time on the survey vessels and for the ground crews.

Unfortunately, the reference frame of the CSDS RTN is not equivalent to the NGS CORS stations. To account for crustal plate motion, rather than use velocity models, CSDS readjusts the coordinates of the network's reference stations periodically. This results in a reference frame that is effectively NAD83(2011) but not at Epoch 2010.0, the desired epoch for the project. Data were collected during this control survey to determine the shifts to apply to RTN data to adjust the positions to the correct project system. Both CSDS and CORS stations are graphically shown in Figure 1.

NGS passive control marks were surveyed to serve as a verification of not only the computed CSDS RTN shifts, but also to verify the published coordinates so the points could be used in the project. Table 2 presents the published coordinates of the control marks surveyed.

Datasheets for CORS stations and control points follow this report in **Appendix A: NGS Published Datasheets**.

Table 2: NGS Control Points

PID	NAD83(2011) EPOCH 2010.0			UTM Zone 10N Meters		
	LATITUDE (N)	LONGITUDE (W)	ELLIPSOID HEIGHT	NORTHING	EASTING	NAVD88 HEIGHT
DH6394	40°31'55.82466"	122°20'55.01556"	112.172	4487029.801	555168.137	139.903
DH6520	39°14'50.41794"	122°01'52.59887"	-11.581	4344671.669	583591.358	17.871
DH6521	39°02'30.73531"	121°50'12.69929"	-10.987	4322066.687	600660.309	18.523
DH6625	39°54'23.62238"	122°06'51.25974"	37.56	4417762.037	575711.803	65.813
DL9132	40°25'01.37502"	122°11'46.07207"	87.985	4474357.402	568199.097	115.763
DL9142	40°15'47.33675"	122°13'16.55372"	68.848	4457255.701	566217.064	97.173
DL9190	39°37'47.54988"	121°59'53.81554"	8.946	4387157.623	585967.032	37.046
KS2014	39°08'35.79107"	121°54'06.27164"	-16.714	4333250.44	594909.177	12.635
KT0518	39°27'25.84659"	122°01'03.38482"	-1.321	4367972.782	584517.801	27.329
KT1807	39°44'39.73505"	122°01'14.04520"	19.938	4399844.112	583915.686	47.93
LU2291	40°09'35.65572"	122°13'26.31403"	66.825	4445793.927	566086.738	95.355

DATA COLLECTION

Field data for the initial control survey prior to the project start were collected from March 31 to April 3, 2023. Additional temporary points were surveyed into the network as the project progressed from April 29, 2023 to May 2, 2024. The following sections outline the equipment and acquisition methodology for this project. Acquisition logs and field notes follow this report in **Appendix B: Field Notes**.

At each published control point shown in Table 2, the following data were collected:

- 3-minute CSDS RTN observation
- 3-second CSDS RTN observation after reinitialization (for check)
- A minimum of 2 hours of static GNSS observables (1-second rate)
- Photos and field notes

In addition to the data collected in the field, NGS and CSDS reference station data were downloaded in RINEX 2.11 format for post-processing. During initial project planning and preparations for acquisition, data from two randomly selected days (March 1 and 4, 2023) were used for the network coordinate computations, while data from each day of field acquisition were also downloaded for static baseline processing for the NGS control point observations.

Data were archived nightly and verified for consistency and completeness prior to demobilizing from the site.

Equipment

Tripod and range pole level vials were calibrated prior to the commencement of data collection. A detailed equipment list including the serial numbers and firmware versions (where applicable) is presented in Table 3.

Table 3: Equipment List

ITEM	MANUFACTURER	MODEL	S/N	FIRMWARE
GNSS Receiver	Trimble	R10	5909470034	5.44
GNSS Receiver	Trimble	R10	5615459326	5.44
GNSS Receiver	Trimble	R10	5614459077	5.44
Data Collector	Trimble	TSC3	RS2PC57124	2017.24
Data Collector	Trimble	TSC5	JAJ214910382	22.00.280
Fixed Height Tripod	SECO	5119-00-FLY	N/A	N/A
Fixed Height Tripod	SECO	5119-10-FLY	N/A	N/A
Range Pole	Trimble	43169-10	N/A	N/A
Range Pole	Trimble	43169-10	N/A	N/A

Additional Temporary Control

Additional temporary control points were established during the project for surveys in areas where no suitable points for base stations were available. These points include:

- LD1K: One additional CSDS station to encompass the southern extent of the imagery Area of Interest (AOI) which was larger than the lidar AOI.
- RBL1: Temporary base station established by YT TSP at the Red Bluff airport to densify the coverage of the CSDS network for post-processing the airborne lidar.
- CC1: Temporary base station established by YT TSP on Clear Creek to post-process the water surface elevation float.

DATA PROCESSING

Field data were processed immediately following demobilization from the site. The following sections outline the various methods used to evaluate the data. Post-processing was completed in Trimble Business Center (TBC) version 5.81 software. The primary goal of the project was to

recompute the reference station coordinates of the CSDS network, with a secondary goal of verifying the published coordinates of NGS control points in the survey area.

CSDS Reference Station Static GNSS

The raw GNSS observables from the CSDS reference stations were post-processed in a static network to recompute positions relative to the CORS reference frame (NAD83(2011) Epoch 2010.0). 24 hours of data from March 1 and 4, 2023 were used in the analysis. Only GPS and GLONASS constellations were used, with an elevation mask of 13 degrees. Precise ephemeris files were downloaded from the International GNSS Service (IGS) (rapid version) and used in sequential baseline processing.

A subset of the surrounding CORS stations was selected based on geometry and proximity to the survey area with baseline lengths greater than 150km disabled in the solution to maintain accuracy. Loop closures were computed and all met the desired accuracy, with the a $\Delta 3D$ standard error of 0.012m (Δ Horizontal of 0.007m and Δ Vertical of 0.010m).

An unconstrained network adjustment was completed to validate the internal consistency of the network. Comparisons between unconstrained and published CORS station coordinates were all within 0.016m horizontally and mostly within 0.024m vertically. Two stations in the very north end of the project had higher vertical deviations of 0.044m and 0.034m (P349 and P341 respectively).

A constrained adjustment was then performed holding CORS stations P344 and SACR fixed. The CORS station at SACR is the same station as the CSDS network reference station SACR, so this station was held to the NGS published values. P344 was used as it is located in the middle of the project area and had low residuals compared with control coordinates. Stations P349 and P341 (and all other CORS) were retained in the adjustment but not held. Figure 2 shows the network design with enabled baselines and reference stations.

The overall results of the network adjustment were excellent, with uncertainties and differences from the published control presented in Table 4. Note that the average difference computed is within 1mm of the difference between the NGS and the CSDS published coordinates for SACR. This, in addition to the small standard deviations, suggests that there is a relatively consistent horizontal and vertical shift between the NGS and CSDS published coordinates.

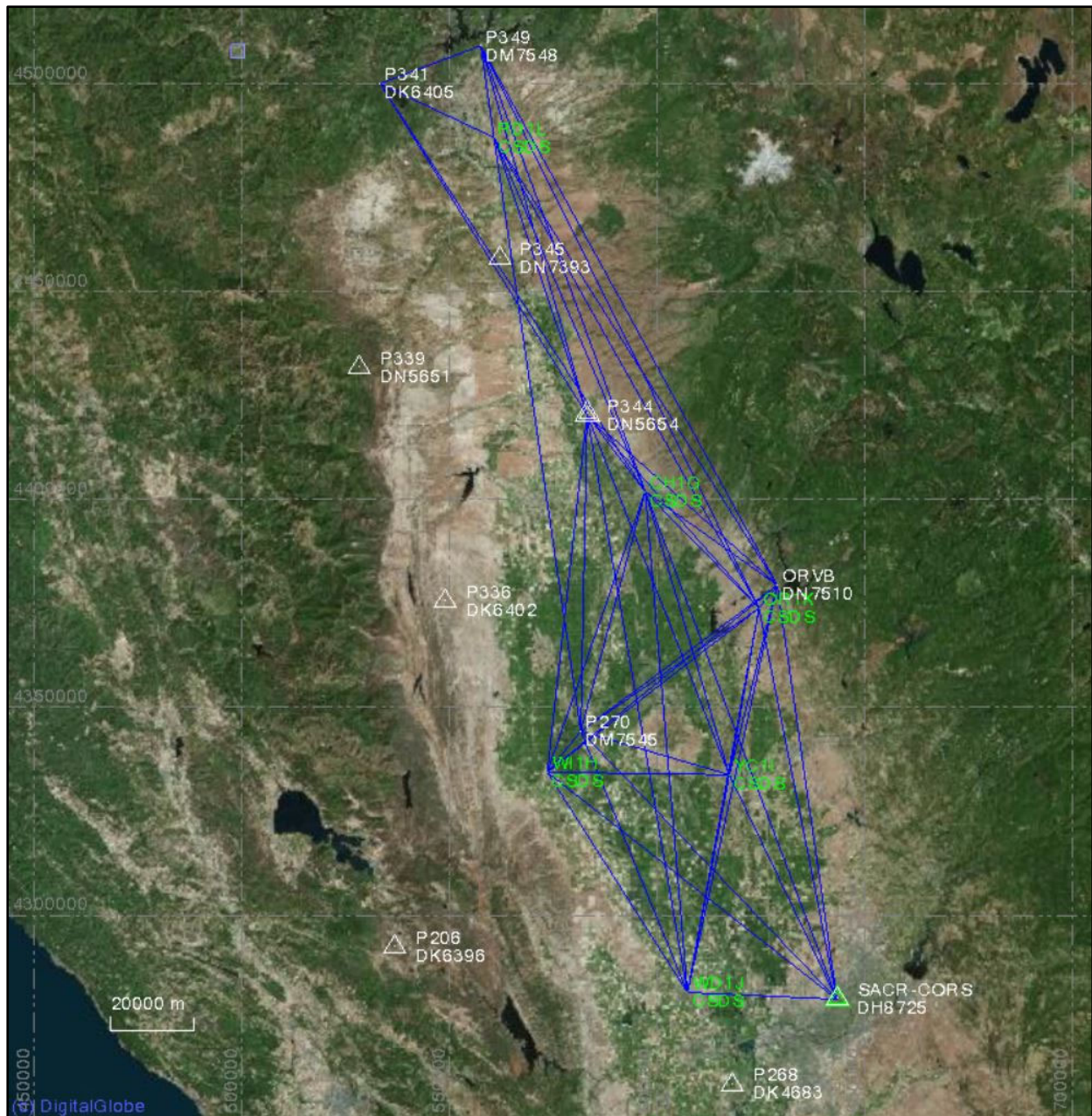


Figure 2: CSDS-CORS Reference Network Design

The highest deviation was at point WD1J which is in the southwest corner of the project area, very close to SACR. Although the magnitude and direction of the horizontal shift agreed with other points, the vertical component was in the opposite direction. This station was determined to be an outlier and not needed in the adjustment, so was removed from further computations. When removed, the average shift becomes N: -0.089m, E: 0.117m, H: 0.017m with a standard deviation of N: 0.002m, E: 0.013m, H: 0.008m.

Table 4: Constrained Network Adjustment Results

CSDS STATION	UNCERTAINTY (Meters)			DIFFERENCE FROM PUBLISHED (Meters)		
	NORTHING	EASTING	HEIGHT	NORTHING	EASTING	HEIGHT
CH1G	0.001	0.002	0.004	-0.091	0.114	0.018
OR1K	0.001	0.002	0.004	-0.090	0.110	0.021
RD1L	0.002	0.002	0.004	-0.090	0.099	0.031
SACR	Held Fixed			-0.087	0.119	0.013
WD1J	0.002	0.002	0.005	-0.084	0.133	-0.016
WI1H	0.001	0.001	0.004	-0.090	0.138	0.009
YC1I	0.001	0.001	0.005	-0.085	0.119	0.010
AVERAGE:				-0.088	0.119	0.012
STANDARD DEVIATION:				0.003	0.013	0.015

Processing reports which contain detailed results from each step are provided in **Appendix C: CSDS Reference Station Processing Reports** following this report.

CSDS Reference Station Adjustment

The adjusted coordinates of the CSDS stations were compared to the published values to determine a shift between the RTN reference frame and NAD83(2011) Epoch 2010.0. Several methods of determining the transformation were computed to evaluate the results.

The first method was a 7 parameter Helmert transformation allowing translations, rotations and a scale factor. The results are presented in Table 5. The computed rotations were very near zero and the scale factor was very close to unity, suggesting again that a simple X, Y and Z shift will accurately transform the data. The resulting horizontal residual was 0.014m and vertical was 0.012m. These values were taken to be the lowest possible residuals as this transformation should provide the best results at the expense of being the most complicated to apply.

Table 5: 7-Parameter Shift

TRANSLATIONS			ROTATIONS			SCALE FACTOR
NORTHING (Y)	EASTING (X)	NAVD88 HEIGHT (Z)	Y	X	Z	
-0.089m	0.116m	0.018m	0°00'00.07"	359°59'59.95"	359°59'59.96"	0.99999995

If the scale factor is held to unity, the horizontal residual was 0.016m and vertical was 0.012m. If the rotations are then removed (held at zero) resulting horizontal residual was 0.022m and vertical was less at 0.007m. Note that over these changes, the horizontal and vertical translations remained the same suggesting that the rotations are trivial.

To verify the computed transformation, a site calibration was developed in TBC. For the initial run, the horizontal scale factor was allowed to float and the vertical calibration was configured to have a shift and an inclined plane. The resulting maximum horizontal residual was 0.018m and maximum vertical residual was 0.005m. These results imply that the tilted plane method improves the vertical fit to the data. The horizontal results are equivalent since the Site Calibration uses a 2D Helmert transformation. The parameters are shown in Table 6.

Table 6: TBC Site Calibration with Tilted Plane

TRANSLATIONS			HORIZONTAL ROTATION	TILTED PLANE		SCALE FACTOR
NORTH (Y)	EAST (X)	NAVD88 HEIGHT		SLOPE E	SLOPE N	
-0.089m	0.116m	0.021m	359°59'59.97"	0.109ppm	0.129ppm	0.99999998
Horizontal Rotation Origin			Northing (Y):	4368458.481m	Easting (X):	602688.406m
Vertical Plane Origin			Northing (Y):	4401895.185m	Easting (X):	597057.673m

If the horizontal rotation is held to zero and the vertical calibration is restricted to only a shift, the translations become the same as those from the 7-parameter shift shown in Table 5, and the maximum residuals become 0.018m horizontally and 0.012m vertically.

Table 7: TBC Site Calibration without Tilted Plane

TRANSLATIONS			HORIZONTAL ROTATION	TILTED PLANE		SCALE FACTOR
NORTH (Y)	EAST (X)	NAVD88 HEIGHT		SLOPE E	SLOPE N	
-0.089m	0.116m	0.018m	359°59'59.97"	N/A	N/A	1.00000000
Horizontal Rotation Origin			Northing (Y):	4368458.481m	Easting (X):	602688.406m

These millimetric changes in the residuals were considered to be within the uncertainty of the transformation. Although the tilted plane seems to best fit the data, implementing it in software other than TBC is not trivial. A simpler translation of only the X, Y and Z values was more desirable for this project given the number of different platforms collecting data.

TBC will not compute a Site Calibration without a horizontal rotation since it is a 2D Helmert transformation with a vertical shift (5-parameter). Note that the rotation around the Z axis (horizontal rotation) was quite small (-0.000006°) which equates to less than 5mm at the extents of the project from the origin. As shown earlier, the horizontal rotation was negligible as the translation values do not change when it is removed.

NGS Control Point CSDS RTN

No post-processing of the RTN positions was necessary other than verifying antenna heights and that precisions fell within required uncertainties. Comparisons of the 3-minute and 3-second results after reinitialization are presented in **Quality Control Section 5.1 CSDS RTN Reinitialization Check**. Coordinates obtained were adjusted and compared to published values, with results and processing discussed in **Results and Deliverables, Section 6.3 NGS Control Point Comparison**.

NGS Control Point Static GNSS

At each NGS control point, a minimum of two hours of static GNSS observables were collected. These data were used to verify not only the positions of the published control points, but also the adjusted coordinates of the CSDS base stations. Using the adjusted CSDS base stations, the baselines were processed with a 13-degree elevation mask and precise ephemeris files in TBC. The results comparing the coordinates with the published NGS values are shown in Table 8.

Processing reports which contain detailed results from each step are provided in **Appendix D: NGS Control Processing Reports** following this report.

The data were also submitted to the NGS's Online Positioning User Service (OPUS), further discussed in Quality Control, **Section 5.2 NGS Published Control Points**.

The results showed very good agreement with the published values at all points except the elevations of DH6520 and DH6521 (highlighted in red). It is possible that these marks may have shifted from their published values, but further occupations would be necessary to validate the results. It is suggested that these points are not used in the project until additional data is collected and processed to verify the published coordinates.

Table 8: NGS Control Processed using Adjusted CSDS Stations

CONTROL POINT	ADJUSTED CSDS (UTM Zone 10N Meters)			DIFFERENCE FROM PUBLISHED (Meters)		
	NORTHING	EASTING	NAVD88 HEIGHT	NORTHING	EASTING	HEIGHT
DH6394	4487029.783	555168.155	139.902	-0.018	0.018	-0.001
DH6520	4344671.689	583591.365	17.773	0.020	0.007	-0.098
DH6521	4322066.679	600660.303	18.468	-0.008	-0.006	-0.055
DH6625	4417762.020	575711.784	65.805	-0.017	-0.019	-0.008
DL9132	4474357.383	568199.109	115.751	-0.019	0.012	-0.012
DL9142	4457255.707	566217.058	97.171	0.006	-0.006	-0.002
DL9190	4387157.605	585967.049	37.025	-0.018	0.017	-0.021
DL9193	4312289.138	608034.864	8.593	0.017	-0.020	-0.015
KS2014	4333250.407	594909.163	12.609	-0.033	-0.014	-0.026
KT0518	4367972.781	584517.816	27.310	-0.001	0.015	-0.019
KT1807	4399844.097	583915.698	47.891	-0.015	0.012	-0.039
LU2291	4445793.926	566086.724	95.353	-0.001	-0.014	-0.002
AVERAGE:				-0.007	0.000	-0.025
STANDARD DEVIATION:				0.016	0.015	0.028

Additional Temporary Control

Data for each additional temporary control point established were processed to integrate the results into the existing control network. The following sections describe the purpose and processing methods to determine final coordinates for all additional control.

Station LD1K

Data from the additional CSDS station LD1K were used to process the trajectory from the dedicated airborne imagery flights. These trajectories were post processed in Applanix POSPac MMS software using SmartBase methodologies. Applanix SmartBase uses a network of reference stations to estimate atmospheric, orbital and clock errors which are then used to correct for errors at the rover location at each epoch. This post-processing method is applying the Virtual Reference Station (VRS) concept to extend the maximum baseline lengths for integer ambiguity resolution.

In the initial processing steps, a constrained network adjustment is performed to verify and establish reference station coordinates. Data from LD1K were included in the adjustment, but the coordinates were not constrained. The POSPac adjustment using all other CSDS and CORS stations was used to establish the final coordinates for LD1K over two days. The results from each day (two 24-hour sessions) were averaged to determine the final coordinates.

Station RBL1

The airborne lidar sensor uses a different inertial navigation system than the imagery sensor, which requires single-base post-processing in Novatel Inertial Explorer software. To maintain high accuracy, distances between the aircraft and the reference base station were limited to a maximum of 50km. To densify the CSDS network coverage, TSP established a temporary GNSS base station at the Red Bluff airport called RBL1.

To determine the coordinates of RBL1, over 8 hours of data were used in a constrained adjustment with the CSDS stations. The derived coordinates were then verified with daily checks. The complete adjustment report is provided in **Appendix G: Additional Control Reports**.

Station CC1

Clear Creek extends out of the CSDS network coverage to the northwest, and to post-process the water surface elevation float, an additional base station control point was required. To simplify the establishment of CC1, OPUS was used to determine the final coordinates, with checks to published NGS and project control to verify accuracy. Two sessions were averaged, each over 7 hours of data. OPUS reports are provided in **Appendix G: Additional Control Reports**.

QUALITY CONTROL

Quality control was carried out through every phase of the project. Several checks, documented in this section, were used to ensure data integrity and quality was maintained and to validate the processed results.

CSDS RTN Reinitialization Check

Two observations were made on each NGS control point using the CSDS RTN: first a 3-minute control point observation, then the receiver was initialized, and a 3-second topo observation was measured. This was done to verify the RTN solution was stable. Results of the comparison between the long and short measurements are presented in Table 9.

Results were within expected uncertainties although the vertical difference at point DH6520 of 0.044m was somewhat larger than expected. There was an issue with the second measurement on DH6394 and it was not recorded so not included in the table.

Table 9: Reinitialization Check Results

CONTROL POINT	3-SECOND MEASURED (UTM Zone 10N Meters)			DIFFERENCE FROM 3-MINUTE (Meters)		
	NORTHING	EASTING	NAVD88 HEIGHT	NORTHING	EASTING	HEIGHT
DH6520	4344671.772	583591.227	17.792	0.012	-0.006	0.044
DH6521	4322066.788	600660.192	18.341	0.018	0.005	-0.007
DH6625	4417762.108	575711.686	65.719	-0.017	0.002	-0.004
DL9132	4474357.479	568198.995	115.729	0.006	0.000	0.007
DL9142	4457255.798	566216.962	97.147	-0.006	0.008	-0.016
DL9190	4387157.708	585966.925	36.956	0.000	0.008	-0.028
DL9193	4312289.221	608034.765	8.555	0.000	0.009	-0.011
KS2014	4333250.494	594909.051	12.541	-0.002	0.002	-0.009
KT0518	4367972.861	584517.702	27.231	0.005	0.006	-0.021
KT1807	4399844.204	583915.580	47.884	0.002	0.001	0.016
LU2291	4445794.010	566086.624	95.336	-0.007	0.003	0.002
AVERAGE:				-0.001	-0.003	0.026
STANDARD DEVIATION:				0.011	0.010	0.036

NGS Published Control Points

To evaluate the published coordinates of the NGS control points, static GNSS observables were submitted to OPUS for post-processing. The OPUS results are presented at following this report in **Appendix F: NGS Control OPUS Reports** and a summary is presented in Table 10.

Some differences (highlighted in red) were larger than expected. Since only 2 hours of data were used in the OPUS solution (the minimum accepted), these marks should be reoccupied for a longer period prior to any further conclusions being drawn. Both DH6520 and DH6521 exhibit slightly larger deviations from the published values when evaluating the static baselines post-processed in TBC (Table 8); however, KT0518 does not.

Table 10: OPUS NGS Control Point Position Check Results

CONTROL POINT	OPUS MEASURED (UTM Zone 10N Meters)			DIFFERENCE FROM PUBLISHED (Meters)		
	NORTHING	EASTING	NAVD88 HEIGHT	NORTHING	EASTING	HEIGHT
DH6394	4487029.758	555168.151	139.913	-0.043	0.014	0.010
DH6520	4344671.691	583591.326	17.743	0.022	-0.032	-0.128
DH6521	4322066.657	600660.296	18.454	-0.030	-0.013	-0.069
DH6625	4417762.009	575711.778	65.783	-0.028	-0.025	-0.030
DL9132	4474357.371	568199.113	115.753	-0.031	0.016	-0.010
DL9142	4457255.719	566217.009	97.116	0.018	-0.055	-0.057
DL9190	4387157.579	585967.031	37.044	-0.044	-0.001	-0.002
DL9193	4312289.114	608034.868	8.584	-0.007	-0.016	-0.024
KS2014	4333250.391	594909.161	12.605	-0.049	-0.016	-0.030
KT0518	4367972.779	584517.743	27.168	-0.003	-0.058	-0.161
KT1807	4399844.070	583915.690	47.924	-0.042	0.004	-0.006
LU2291	4445793.885	566086.618	95.367	-0.042	-0.120	0.012
AVERAGE:				-0.023	-0.025	-0.041
STANDARD DEVIATION:				0.025	0.038	0.054

CSDS Coordinates

To evaluate the computed adjusted coordinates of the CSDS reference stations, static GNSS observables were submitted to OPUS for post-processing. The OPUS results are presented at following this report in **Appendix E: CSDS Station OPUS Reports** and a summary is presented in Table 11.

The results show a very good agreement between the network adjusted coordinates and the OPUS results validating the computations.

Table 11: OPUS CSDS Station Position Check Results

CSDS STATION	OPUS MEASURED (UTM Zone 10N Meters)			DIFFERENCE FROM ADJUSTED (Meters)		
	NORTHING	EASTING	NAVD88 HEIGHT	NORTHING	EASTING	HEIGHT
CH1G	4401895.173	597057.669	62.315	-0.011	-0.005	0.004
OR1K	4373844.248	624441.362	68.450	-0.015	0.002	-0.017
RD1L	4487051.667	560656.068	160.494	0.004	-0.004	-0.017
SACR	4279776.684	643204.815	37.934	-0.019	0.004	-0.005
WD1J	4281430.004	607210.870	31.251	-0.015	0.001	-0.016
WI1H	4334394.225	573472.341	31.737	-0.014	-0.008	0.005
YC1I	4333788.290	617298.864	25.779	-0.011	-0.004	-0.023
AVERAGE:				-0.012	-0.002	-0.010
STANDARD DEVIATION:				0.007	0.004	0.011

CSDS RTN Shift

Since the coordinates of the CSDS stations are updated periodically to account for the tectonic movement in the area, the computed shift was compared to the NGS observed velocities at the CORS stations. In conversations with the operators of the CSDS network, it was suggested that the last reference station coordinate update was completed in January of 2022. Three CORS stations that have over 10 years of data and span the project area were selected to compute an average velocity (Table 12).

Table 12: NGS Published Velocities at CORS

CORS	NGS MEASURED (Meters/Year)		
	NORTHWARD	EASTWARD	UPWARD
P349	0.0069	-0.0054	-0.0004
P344	0.0077	-0.0080	-0.0024
SACR	0.0076	-0.0074	-0.0028
AVERAGE:	0.0074	-0.0069	-0.0019
STANDARD DEVIATION:	0.0004	0.0014	0.0013

Using this average velocity, the approximate displacement from the epoch of the CORS station coordinates (2010.0) to the last CSDS update (2022.0) was computed. The displacement was compared to the computed shift (no rotation, from Table 7) with results shown in Table 13. Only a very small difference in excess of the expected uncertainty was noted in the easting.

Table 13: Computed Displacement from NGS Velocities

	NORTHING	EASTING	HEIGHT
Computed Displacement using NGS Velocity	-0.089m	0.083m	0.022m
Computed Shift from Site Calibration	-0.089m	0.116m	0.018m
DIFFERENCE	0.000m	-0.033m	0.004m

To verify the computed shift is internally consistent with the adjusted CSDS base station coordinates, the X, Y and Z translations were applied to the published CSDS station values and compared to the computed (network adjusted) CSDS station coordinates. The shift applied was N: -0.089m, E: 0.116m, H: 0.018m (no rotation, from Table 7) with the results presented in Table 14.

Table 14: CSDS Reference Station Coordinate Check

CSDS STATION	SHIFTED (UTM Zone 10N Meters)			DIFFERENCE FROM ADJUSTED (Meters)		
	NORTHING	EASTING	NAVD88 HEIGHT	NORTHING	EASTING	HEIGHT
CH1G	4401895.186	597057.676	62.311	0.002	0.002	0.000
OR1K	4373844.264	624441.366	68.464	0.001	0.006	-0.003
RD1L	4487051.664	560656.089	160.498	0.001	0.017	-0.013
SACR	4279776.701	643204.808	37.944	-0.002	-0.003	0.005
WD1J	4281430.014	607210.852	31.301	-0.005	-0.017	0.034
WI1H	4334394.240	573472.327	31.741	0.001	-0.022	0.009
YC1I	4333788.297	617298.865	25.810	-0.004	-0.003	0.008
AVERAGE:				-0.001	-0.003	0.006
STANDARD DEVIATION:				0.003	0.013	0.015

The differences show that the computed shift agrees with the simple shift of the CSDS reference station coordinates further validating the results.

RESULTS AND DELIVERABLES

The data collected allowed the accurate determination of transformation parameters between the CSDS RTN and the project datum of NAD83(2011) Epoch 2010.0 realized by the CORS network. Additionally, the coordinates of 12 published control points were accurately surveyed and coordinates used for independent validation of the transformation parameters.

Adjusted CSDS Reference Station Coordinates

Table 15 presents the adjusted coordinates for the CSDS stations that will be used on the project for any data that are post-processed. It is anticipated that these coordinates will be used for airborne lidar and vessel-based sonar post-processing. Note that they cannot be applied to positions obtained in real-time from the CSDS RTN.

Table 15: Adjusted CSDS Reference Station Coordinates

CSDS STATION	NAD83(2011) EPOCH 2010.0			UTM Zone 10N Meters		
	LATITUDE (N)	LONGITUDE (W)	ELLIPSOID HEIGHT	NORTHING	EASTING	NAVD88 HEIGHT
CH1G	39°45'41.22852"	121°52'00.85224"	34.806	4401895.184	597057.674	62.312
OR1K	39°30'18.80484"	121°33'09.27217"	40.774	4373844.263	624441.360	68.467
RD1L	40°31'55.15327"	122°17'01.75358"	132.825	4487051.663	560656.072	160.510
SACR	38°39'17.97133"	121°21'15.19309"	7.485	4279776.703	643204.811	37.939
WD1J	38°40'29.91548"	121°46'03.07622"	0.526	4281430.019	607210.869	31.267
WI1H	39°09'20.35612"	122°08'58.73575"	1.794	4334394.239	573472.349	31.733
YC1I	39°08'43.41041"	121°38'33.44751"	-3.439	4333788.301	617298.868	25.802
LD1K	38°08'13.57392"	121°15'14.58320"	-6.804	4222467.089	653009.516	24.401

CSDS RTN Observation Shift

To adjust coordinates obtained in real time from the CSDS RTN, Table 16 presents the final shifts. Note that the vertical shift must be applied to the NAVD88 orthometric height after reducing the ellipsoid height with the geoid model. No rotations are to be applied.

Table 16: CSDS RTN Shifts

NORTHING	EASTING	NAVD88 HEIGHT
-0.089m	0.116m	0.018m

NGS Control Point Comparison

The computed shift was applied to the CSDS RTN observed values and compared to the NGS published coordinates (Table 17). The marks that exhibited poor agreement with the published values using the post-processed static baselines and OPUS solutions were removed from the average but shown in red for reference. They were removed since the intent was to evaluate the CSDS RTN shifts at published points with validated positions, not questionable ones.

Table 17: Shifted CSDS RTN NGS Control Points

CONTROL POINT	CSDS RTN SHIFTED (UTM Zone 10N Meters)			DIFFERENCE FROM PUBLISHED (Meters)		
	NORTHING	EASTING	NAVD88 HEIGHT	NORTHING	EASTING	HEIGHT
DH6394	4487029.789	555168.169	139.893	-0.012	0.032	-0.010
DH6520	4344671.671	583591.349	17.766	0.002	-0.009	-0.105
DH6521	4322066.681	600660.303	18.366	-0.006	-0.006	-0.157
DH6625	4417762.036	575711.800	65.741	-0.001	-0.003	-0.072
DL9132	4474357.384	568199.111	115.740	-0.018	0.014	-0.023
DL9142	4457255.715	566217.070	97.181	0.014	0.006	0.008
DL9190	4387157.619	585967.033	37.002	-0.004	0.001	-0.044
DL9193	4312289.132	608034.872	8.584	0.011	-0.012	-0.024
KS2014	4333250.407	594909.165	12.568	-0.033	-0.012	-0.067
KT0518	4367972.767	584517.812	27.270	-0.015	0.011	-0.059
KT1807	4399844.113	583915.695	47.886	0.001	0.009	-0.044
LU2291	4445793.928	566086.737	95.352	0.001	-0.001	-0.003
AVERAGE:				-0.007	0.004	-0.036
STANDARD DEVIATION:				0.014	0.015	0.025

The results show a good agreement with the published values and further validate the shifts computed.

Additional Control

Table 18 presents the final coordinates for the additional control points used on the project.

Table 18: Additional Control Point Coordinates

POINT	NAD83(2011) EPOCH 2010.0			UTM Zone 10N Meters		
	LATITUDE (N)	LONGITUDE (W)	ELLIPSOID HEIGHT	NORTHING	EASTING	NAVD88 HEIGHT
RBL1	40°09'26.11609"	122°15'04.57884"	74.560	4445479.853	563764.666	103.190
CC1	40°30'16.90793"	122°24'14.81618"	113.537	4483946.586	550488.206	141.408

RECOMMENDATIONS

To further validate the published coordinates of the questionable marks, it is recommended that static and CSDS RTN occupations be collected on the following marks prior to using them for other projects:

- DH6520
- DH6521
- DL9142
- KT0518

Reoccupation was not necessary as these marks were not independently required during this project.

SURVEYORS STATEMENT

I, Benjamin Lane Hocker, as a licensed land surveyor in the state of California (No. 9924) certify that the control surveys described in this report were compiled by the Yurok Tribe's Fisheries Department Design and Technical Services Program as part of a topographic and bathymetric survey following ASPRS Positional Accuracy Standards for Digital Geospatial Data, Edition 2 (2023). The data collection, processing and reporting of the control survey presented herein were overseen and verified by me to meet project requirements for a 10 cm RMSE_H horizontal and 10 cm RMSE_V vertical positional accuracy class.



Benjamin Lane Hocker, CA PLS 9924

October 17, 2024



REFERENCES

National Geodetic Survey (NGS) Control Database:

<https://geodesy.noaa.gov/NGSDataExplorer/>

Natural Geodetic Survey Online Positioning User Service (OPUS):

<https://geodesy.noaa.gov/OPUS/>

American Society of Photogrammetry and Remote Sensing (ASPRS) Positional Accuracy Standards 2023:

<https://publicdocuments.asprs.org/PositionalAccuracyStd-Ed2-V1>

United States Geological Survey (USGS) Base Lidar Specification 2022 Revision A:

<https://www.usgs.gov/ngp-standards-and-specifications/lidar-base-specification-table-contents>

Appendix A : NGS Published Datasheets

The NGS Data Sheet

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

PROGRAM = datasheet95, VERSION = 8.12.5.14

Starting Datasheet Retrieval...

1 National Geodetic Survey, Retrieval Date = MARCH 15, 2023

DH6394 *****

DH6394 DESIGNATION - 5 SHA 11.70

DH6394 PID - DH6394

DH6394 STATE/COUNTY- CA/SHASTA

DH6394 COUNTRY - US

DH6394 USGS QUAD - ENTERPRISE (2018)

DH6394

DH6394 *CURRENT SURVEY CONTROL

DH6394

DH6394* NAD 83(2011) POSITION- 40 31 55.82466(N) 122 20 55.01556(W) ADJUSTED

DH6394* NAD 83(2011) ELLIP HT- 112.172 (meters) (06/27/12) ADJUSTED

DH6394* NAD 83(2011) EPOCH - 2010.00

DH6394* NAVD 88 ORTHO HEIGHT - 139.9 (meters) 459. (feet) GPS OBS

DH6394

DH6394 NAVD 88 orthometric height was determined with geoid model GEOID03

DH6394 GEOID HEIGHT - -27.600 (meters) GEOID03

DH6394 GEOID HEIGHT - -27.731 (meters) GEOID18

DH6394 NAD 83(2011) X - -2,597,547.347 (meters) COMP

DH6394 NAD 83(2011) Y - -4,101,204.965 (meters) COMP

DH6394 NAD 83(2011) Z - 4,123,148.833 (meters) COMP

DH6394 LAPLACE CORR - 0.95 (seconds) DEFLEC18

DH6394

DH6394 Network accuracy estimates per FGDC Geospatial Positioning Accuracy

DH6394 Standards:

DH6394 FGDC (95% conf, cm) Standard deviation (cm) CorrNE

DH6394 Horiz Ellip SD_N SD_E SD_h (unitless)

DH6394 -----

DH6394 NETWORK 0.45 0.76 0.20 0.16 0.39 0.11514239

DH6394 -----

DH6394 Click here for local accuracies and other accuracy information.

DH6394

DH6394

DH6394.The horizontal coordinates were established by GPS observations

DH6394.and adjusted by the National Geodetic Survey in June 2012.

DH6394

DH6394.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has

DH6394.been affixed to the stable North American tectonic plate. See

DH6394.NA2011 for more information.

DH6394

DH6394.The horizontal coordinates are valid at the epoch date displayed above

DH6394.which is a decimal equivalence of Year/Month/Day.

DH6394

DH6394.The orthometric height was determined by GPS observations and a

DH6394.high-resolution geoid model.

DH6394

DH6394.Significant digits in the geoid height do not necessarily reflect accuracy.

DH6394.GEOID18 height accuracy estimate available here.

DH6394

DH6394.Click photographs - Photos may exist for this station.

DH6394

DH6394.The X, Y, and Z were computed from the position and the ellipsoidal ht.

DH6394

DH6394.The Laplace correction was computed from DEFLEC18 derived deflections.

DH6394

DH6394.The ellipsoidal height was determined by GPS observations

DH6394.and is referenced to NAD 83.

DH6394

DH6394. The following values were computed from the NAD 83(2011) position.

DH6394

DH6394; North East Units Scale Factor Converg.

DH6394;SPC CA 1 - 633,174.723 1,970,465.551 MT 0.99990854 -0 13 40.6

DH6394;SPC CA 1 - 2,077,340.74 6,464,769.06 sFT 0.99990854 -0 13 40.6

DH6394;UTM 10 - 4,487,029.801 555,168.137 MT 0.99963746 +0 25 24.0

DH6394

DH6394! - Elev Factor x Scale Factor = Combined Factor
 DH6394!SPC CA 1 - 0.99998240 x 0.99990854 = 0.99989095
 DH6394!UTM 10 - 0.99998240 x 0.99963746 = 0.99961987
 DH6394
 DH6394_U.S. NATIONAL GRID SPATIAL ADDRESS: 10TEK5516887029(NAD 83)
 DH6394
 DH6394 SUPERSEDED SURVEY CONTROL
 DH6394
 DH6394 NAD 83(2007)- 40 31 55.82423(N) 122 20 55.01400(W) AD(2007.00) 0
 DH6394 ELLIP H (02/10/07) 112.154 (m) GP(2007.00)
 DH6394 NAD 83(1998)- 40 31 55.82319(N) 122 20 55.01434(W) AD(2004.69) B
 DH6394 ELLIP H (09/28/05) 112.182 (m) GP(2004.69) 4 1
 DH6394
 DH6394.Superseded values are not recommended for survey control.
 DH6394
 DH6394.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 DH6394.See file dsdata.pdf to determine how the superseded data were derived.
 DH6394
 DH6394_MARKER: DD = SURVEY DISK
 DH6394_SETTING: 15 = METAL ROD DRIVEN INTO GROUND. SEE TEXT FOR ADDITIONAL
 DH6394+WITH SETTING: INFORMATION.
 DH6394_STAMPING: 5 SHA 11.70 2004
 DH6394_MARK LOGO: CSRC
 DH6394_PROJECTION: FLUSH
 DH6394_MAGNETIC: M = MARKER EQUIPPED WITH BAR MAGNET
 DH6394_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
 DH6394+STABILITY: SURFACE MOTION
 DH6394_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 DH6394+SATELLITE: SATELLITE OBSERVATIONS - August 18, 2004
 DH6394_ROD/PIPE-DEPTH: 1.2 meters
 DH6394
 DH6394 HISTORY - Date Condition Report By
 DH6394 HISTORY - 20040818 MONUMENTED CADT
 DH6394
 DH6394 STATION DESCRIPTION
 DH6394
 DH6394'DESCRIBED BY CALTRANS 2004 (JRL)
 DH6394'THE STATION IS LOCATED ADJACENT TO INTERSTATE HIGHWAY 5 IN SHASTA
 DH6394'COUNTY AT POSTMILE 11.70 ABOUT 6 KM SOUTHEAST OF REDDING, 10 KM
 DH6394'SOUTHWEST OF PALO CEDRO, AND 10 KM NORTHWEST OF ANDERSON. TO REACH
 DH6394'THE STATION FROM ABOVE THE CENTER OF INTERSTATED HIGHWAY 5 ON THE
 DH6394'SOUTH BONNYVIEW ROAD OVERCROSSING GO EASTERLY ON SOUTH BONNYVIEW ROAD
 DH6394'175 M TO A SIGNALIZED INTERSECTION WITH CHURN CREEK ROAD. CONTINUE
 DH6394'EAST AND SOUTH NOW ON CHURN CREEK ROAD 450 M TO COMMERCIAL WAY ON THE
 DH6394'RIGHT. TURN RIGHT AND GO WESTERLY ON COMMERCIAL WAY 485 M TO A ROAD
 DH6394'FRONTING INTERSTATE HIGHWAY 5. TURN LEFT AND GO SOUTHERLY ALONG
 DH6394'FRONTAGE ROAD 370 M TO THE STATION ON THE RIGHT. THE STATION IS A
 DH6394'SURVEY DISK ENCASED IN PVC PIPE WITH ACCESS COVER SET IN CONCRETE
 DH6394'FLUSH WITH THE GROUND 0.8 M EAST OF THE EAST RIGHT OF WAY FENCE, 0.7
 DH6394'M EST OF AN ORNAGE CARSONITE WITHNESS POST, 1.0 M SOUTH OF A WHITE
 DH6394'CARSONITE POST WITH AMBER REFLECTOR, 8.2 M WEST OF THE CENTER OF
 DH6394'FRONTAGE ROAD, 17 M EAST OF THE NORTHBOUND FOG STRIPE OF INTERSTATE
 DH6394'HIGHWAY 5, 40.5 M NORTHWEST OF THE CENTER OF THE MOST SOUTHERLY GATE
 DH6394'IN THE CHAIN LINK FENCE OF I-5 RENTALS YARD, AND 105 M NORTH OF THE
 DH6394'SOUTHERLY TERMINUS OF THE FRONTAGE ROAD.
 DH6394'
 DH6394'THIS STATION WAS OCCUPIED AS A PART OF THE CALTRANS NORTH REGION
 DH6394'HEIGHT MODERNIZATION PROJECT.

*** retrieval complete.
 Elapsed Time = 00:00:04

The NGS Data Sheet

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

PROGRAM = datasheet95, VERSION = 8.12.5.14

Starting Datasheet Retrieval...

1 National Geodetic Survey, Retrieval Date = MARCH 15, 2023

DH6520 *****

DH6520 HT_MOD - This is a Height Modernization Survey Station.

DH6520 DESIGNATION - HARBISON

DH6520 PID - DH6520

DH6520 STATE/COUNTY- CA/COLUSA

DH6520 COUNTRY - US

DH6520 USGS QUAD - COLUSA (2018)

DH6520

DH6520 *CURRENT SURVEY CONTROL

DH6520

DH6520* NAD 83(2011) POSITION- 39 14 50.41794(N) 122 01 52.59887(W) ADJUSTED

DH6520* NAD 83(2011) ELLIP HT- -11.581 (meters) (06/27/12) ADJUSTED

DH6520* NAD 83(2011) EPOCH - 2010.00

DH6520* NAVD 88 ORTHO HEIGHT - 17.84 (meters) 58.5 (feet) GPS OBS

DH6520

DH6520 NAVD 88 orthometric height was determined with geoid model GEOID09

DH6520 GEOID HEIGHT - -29.426 (meters) GEOID09

DH6520 GEOID HEIGHT - -29.452 (meters) GEOID18

DH6520 NAD 83(2011) X - -2,623,265.707 (meters) COMP

DH6520 NAD 83(2011) Y - -4,193,007.592 (meters) COMP

DH6520 NAD 83(2011) Z - 4,013,611.955 (meters) COMP

DH6520 LAPLACE CORR - 6.12 (seconds) DEFLEC18

DH6520

DH6520 Network accuracy estimates per FGDC Geospatial Positioning Accuracy

DH6520 Standards:

DH6520 FGDC (95% conf, cm) Standard deviation (cm) CorrNE

DH6520 Horiz Ellip SD_N SD_E SD_h (unitless)

DH6520 -----

DH6520 NETWORK 0.39 0.65 0.18 0.13 0.33 0.00667510

DH6520 -----

DH6520 Click here for local accuracies and other accuracy information.

DH6520

DH6520

DH6520.The horizontal coordinates were established by GPS observations

DH6520.and adjusted by the National Geodetic Survey in June 2012.

DH6520

DH6520.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has

DH6520.been affixed to the stable North American tectonic plate. See

DH6520.NA2011 for more information.

DH6520

DH6520.The horizontal coordinates are valid at the epoch date displayed above

DH6520.which is a decimal equivalence of Year/Month/Day.

DH6520

DH6520.The orthometric height was determined by GPS observations and a

DH6520.high-resolution geoid model using precise GPS observation and

DH6520.processing techniques.

DH6520

DH6520.Significant digits in the geoid height do not necessarily reflect accuracy.

DH6520.GEOID18 height accuracy estimate available here.

DH6520

DH6520.Click photographs - Photos may exist for this station.

DH6520

DH6520.The X, Y, and Z were computed from the position and the ellipsoidal ht.

DH6520

DH6520.The Laplace correction was computed from DEFLEC18 derived deflections.

DH6520

DH6520.The ellipsoidal height was determined by GPS observations

DH6520.and is referenced to NAD 83.

DH6520

DH6520. The following values were computed from the NAD 83(2011) position.

DH6520

DH6520; North East Units Scale Factor Converg.

DH6520;SPC CA 2 - 675,464.147 1,997,300.224 MT 0.99991869 -0 01 11.0

DH6520;SPC CA 2 - 2,216,085.29 6,552,809.15 sFT 0.99991869 -0 01 11.0

DH6520;UTM 10 - 4,344,671.669 583,591.358 MT 0.99968603 +0 36 46.5
 DH6520
 DH6520! - Elev Factor x Scale Factor = Combined Factor
 DH6520!SPC CA 2 - 1.00000182 x 0.99991869 = 0.99992051
 DH6520!UTM 10 - 1.00000182 x 0.99968603 = 0.99968785
 DH6520
 DH6520_U.S. NATIONAL GRID SPATIAL ADDRESS: 10SEJ8359144671(NAD 83)
 DH6520
 DH6520 SUPERSEDED SURVEY CONTROL
 DH6520
 DH6520 NAD 83(2007)- 39 14 50.41718(N) 122 01 52.59714(W) AD(2007.00) 0
 DH6520 ELLIP H (02/10/07) -11.627 (m) GP(2007.00)
 DH6520 NAD 83(1998)- 39 14 50.41643(N) 122 01 52.59696(W) AD(2004.69) B
 DH6520 ELLIP H (09/28/05) -11.593 (m) GP(2004.69) 4 1
 DH6520 NAVD 88 (09/28/05) 17.9 (m) GEOID03 model used GPS OBS
 DH6520
 DH6520.Superseded values are not recommended for survey control.
 DH6520
 DH6520.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 DH6520.See file dsdata.pdf to determine how the superseded data were derived.
 DH6520
 DH6520_MARKER: DD = SURVEY DISK
 DH6520_SETTING: 50 = ALUMINUM ALLOY ROD W/O SLEEVE (10 FT.+)
 DH6520_STAMPING: HARBISON 2004
 DH6520_MARK LOGO: CADT
 DH6520_PROJECTION: RECESSED 6 CENTIMETERS
 DH6520_MAGNETIC: M = MARKER EQUIPPED WITH BAR MAGNET
 DH6520_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
 DH6520_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 DH6520+SATELLITE: SATELLITE OBSERVATIONS - January 01, 2008
 DH6520_ROD/PIPE-DEPTH: 6.08 meters
 DH6520_SLEEVE-DEPTH : N/A meters
 DH6520

DH6520	HISTORY	- Date	Condition	Report By
DH6520	HISTORY	- 20040720	MONUMENTED	CADT
DH6520	HISTORY	- 20080101	GOOD	FRAME

 DH6520
 DH6520 STATION DESCRIPTION
 DH6520
 DH6520'DESCRIBED BY CALTRANS 2004 (PTD)
 DH6520'THE STATION IS LOCATED IN COLUSA COUNTY NEAR COLUSA, ABOUT 42 KM
 DH6520'NORTHEAST OF WILLIAMS, 17.6 KM SOUTH OF PRINCETON, AND 4.1 KM NORTH
 DH6520'OF COLUSA.
 DH6520'
 DH6520'TO REACH THE STATION FROM THE INTERSECTION OF STATE HIGHWAY 20 (A.K.A.
 DH6520'10 TH STREET) AND STATE HIGHWAY 45 IN COLUSA, PROCEED 3.65 KM
 DH6520'NORTHERLY ON STATE HIGHWAY 45 TO THE INTERSECTION WITH HARBISON ROAD.
 DH6520'CONTINUE 0.45 KM NORTHERLY ON STATE HIGHWAY 45 TO THE STATION ON THE
 DH6520'RIGHT AT HIGHWAY POST MILE 22.41.
 DH6520'
 DH6520'THE STATION IS A 3/4 IN ALUMINUM ALLOY ROD DRIVEN TO REFUSAL, WITH A
 DH6520'CADT/CSRC ALUMINUM SURVEY DISK AFFIXED, SET IN A 6 IN DIAMETER PVC
 DH6520'WELL CASING WITH AN ALUMINUM ACCESS COVER. THE STATION LIES 76.9 M
 DH6520'SOUTH OF MAILBOX NO. 223 ON THE EAST SIDE OF HIGHWAY, 70.6 M NORTH OF
 DH6520'A 'CASINO CROSS TRAFFIC AHEAD' TWO POLE SIGN, 61.0 M NORTHEAST OF A
 DH6520'HIGH VOLTAGE POWER POLE, 4.2 M EAST OF THE HIGHWAY EDGE OF PAVEMENT,
 DH6520'1.0 M SOUTH OF A METAL GUARD POST, AND ABOUT 0.2 M LOWER THAN THE
 DH6520'HIGHWAY. THIS STATION WAS OCCUPIED AS PART OF A CALTRANS NORTH REGION
 DH6520'OFFICE OF SURVEYORS GPS HEIGHT MODERNIZATION PROJECT.
 DH6520
 DH6520 STATION RECOVERY (2008)
 DH6520
 DH6520'RECOVERY NOTE BY FRAME SURVEYING AND MAPPING 2008 (JHF)
 DH6520'RECOVERED AS DESCRIBED.

*** retrieval complete.

Elapsed Time = 00:00:04

The NGS Data Sheet

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

PROGRAM = datasheet95, VERSION = 8.12.5.14

Starting Datasheet Retrieval...

1 National Geodetic Survey, Retrieval Date = MARCH 15, 2023

DH6521 *****

DH6521 HT_MOD - This is a Height Modernization Survey Station.

DH6521 DESIGNATION - WILSON BEND

DH6521 PID - DH6521

DH6521 STATE/COUNTY- CA/COLUSA

DH6521 COUNTRY - US

DH6521 USGS QUAD - TISDALE WEIR (2018)

DH6521

DH6521 *CURRENT SURVEY CONTROL

DH6521

DH6521* NAD 83(2011) POSITION- 39 02 30.73531(N) 121 50 12.69929(W) ADJUSTED

DH6521* NAD 83(2011) ELLIP HT- -10.987 (meters) (06/27/12) ADJUSTED

DH6521* NAD 83(2011) EPOCH - 2010.00

DH6521* NAVD 88 ORTHO HEIGHT - 18.50 (meters) 60.7 (feet) GPS OBS

DH6521

DH6521 NAVD 88 orthometric height was determined with geoid model GEOID09

DH6521 GEOID HEIGHT - -29.515 (meters) GEOID09

DH6521 GEOID HEIGHT - -29.510 (meters) GEOID18

DH6521 NAD 83(2011) X - -2,616,619.084 (meters) COMP

DH6521 NAD 83(2011) Y - -4,214,118.564 (meters) COMP

DH6521 NAD 83(2011) Z - 3,995,921.469 (meters) COMP

DH6521 LAPLACE CORR - 4.30 (seconds) DEFLEC18

DH6521

DH6521 Network accuracy estimates per FGDC Geospatial Positioning Accuracy

DH6521 Standards:

DH6521 FGDC (95% conf, cm) Standard deviation (cm) CorrNE

DH6521 Horiz Ellip SD_N SD_E SD_h (unitless)

DH6521 -----

DH6521 NETWORK 0.37 0.57 0.17 0.12 0.29 -0.00069156

DH6521 -----

DH6521 Click here for local accuracies and other accuracy information.

DH6521

DH6521

DH6521.The horizontal coordinates were established by GPS observations

DH6521.and adjusted by the National Geodetic Survey in June 2012.

DH6521

DH6521.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has

DH6521.been affixed to the stable North American tectonic plate. See

DH6521.NA2011 for more information.

DH6521

DH6521.The horizontal coordinates are valid at the epoch date displayed above

DH6521.which is a decimal equivalence of Year/Month/Day.

DH6521

DH6521.The orthometric height was determined by GPS observations and a

DH6521.high-resolution geoid model using precise GPS observation and

DH6521.processing techniques.

DH6521

DH6521.Significant digits in the geoid height do not necessarily reflect accuracy.

DH6521.GEOID18 height accuracy estimate available here.

DH6521

DH6521.Click photographs - Photos may exist for this station.

DH6521

DH6521.The X, Y, and Z were computed from the position and the ellipsoidal ht.

DH6521

DH6521.The Laplace correction was computed from DEFLEC18 derived deflections.

DH6521

DH6521.The ellipsoidal height was determined by GPS observations

DH6521.and is referenced to NAD 83.

DH6521

DH6521. The following values were computed from the NAD 83(2011) position.

DH6521

DH6521; North East Units Scale Factor Converg.

DH6521;SPC CA 2 - 652,667.651 2,014,122.611 MT 0.99991495 +0 06 10.3

DH6521;SPC CA 2 - 2,141,293.78 6,608,000.60 sFT 0.99991495 +0 06 10.3

DH6521;UTM 10 - 4,322,066.687 600,660.309 MT 0.99972476 +0 43 57.8
 DH6521
 DH6521! - Elev Factor x Scale Factor = Combined Factor
 DH6521!SPC CA 2 - 1.00000172 x 0.99991495 = 0.99991667
 DH6521!UTM 10 - 1.00000172 x 0.99972476 = 0.99972648
 DH6521
 DH6521_U.S. NATIONAL GRID SPATIAL ADDRESS: 10SFJ0066022066(NAD 83)
 DH6521
 DH6521 SUPERSEDED SURVEY CONTROL
 DH6521
 DH6521 NAD 83(2007)- 39 02 30.73423(N) 121 50 12.69748(W) AD(2007.00) 0
 DH6521 ELLIP H (02/10/07) -10.995 (m) GP(2007.00)
 DH6521 NAD 83(1998)- 39 02 30.73376(N) 121 50 12.69724(W) AD(2004.69) B
 DH6521 ELLIP H (09/28/05) -11.007 (m) GP(2004.69) 4 1
 DH6521 NAVD 88 (09/28/05) 18.5 (m) GEOID03 model used GPS OBS
 DH6521
 DH6521.Superseded values are not recommended for survey control.
 DH6521
 DH6521.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 DH6521.See file dsdata.pdf to determine how the superseded data were derived.
 DH6521
 DH6521_MARKER: DD = SURVEY DISK
 DH6521_SETTING: 50 = ALUMINUM ALLOY ROD W/O SLEEVE (10 FT.+)
 DH6521_STAMPING: WILSON BEND 2004
 DH6521_MARK LOGO: CADT
 DH6521_PROJECTION: RECESSED 6 CENTIMETERS
 DH6521_MAGNETIC: M = MARKER EQUIPPED WITH BAR MAGNET
 DH6521_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
 DH6521_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 DH6521+SATELLITE: SATELLITE OBSERVATIONS - November 29, 2011
 DH6521_ROD/PIPE-DEPTH: 4.80 meters
 DH6521_SLEEVE-DEPTH : N/A meters
 DH6521

DH6521	HISTORY	- Date	Condition	Report By
DH6521	HISTORY	- 20040707	MONUMENTED	CADT
DH6521	HISTORY	- 20080101	GOOD	FRAME
DH6521	HISTORY	- 20111129	GOOD	WATER

 DH6521
 DH6521 STATION DESCRIPTION
 DH6521
 DH6521'DESCRIBED BY CALTRANS 2004 (PTD)
 DH6521'THE STATION IS LOCATED IN COLUSA COUNTY NEAR WILSON BEND, ABOUT 37.8
 DH6521'KM NORTHWEST OF KNIGHTS LANDING, AND 7.6 KM SOUTHEAST OF GRIMES.
 DH6521'
 DH6521'TO REACH THE STATION FROM THE INTERSECTION OF STATE HIGHWAY 45 AND
 DH6521'MAIN STREET IN GRIMES, PROCEED 5.16 KM SOUTHERLY ON STATE HIGHWAY 45
 DH6521'TO THE INTERSECTION WITH WILSON BEND ROAD. TURN LEFT ON WILSON BEND
 DH6521'ROAD AND PROCEED EAST 2.41 KM TO A RIGHT CURVE IN THE PAVED ROAD.
 DH6521'CONTINUE STRAIGHT LEAVING THE PAVED ROAD AT THE BEGINNING OF THE CURVE
 DH6521'AND CONTINUE 0.2 KM TO THE TOP OF A LEVEE AND THE STATION ON THE LEFT.
 DH6521'THE STATION IS A 3/4 IN ALUMINUM ALLOY ROD DRIVEN TO REFUSAL, WITH A
 DH6521'CADT/CSRC ALUMINUM SURVEY DISK AFFIXED, SET IN A 6 IN DIAMETER PVC
 DH6521'WELL CASING WITH AN ALUMINUM ACCESS COVER. THE STATION LIES 139.6 M
 DH6521'NORTHERLY FROM THE EAST POST OF THE SOUTHERLY LEVEE GATE, 47 M
 DH6521'SOUTHEASTERLY FROM A NORTHERLY GATE POST, 40 M NORTHERLY FROM A POWER
 DH6521'POLE WITH GUY WIRE, 2.7 M EASTERLY OF THE CENTERLINE OF THE LEVEE
 DH6521'ROAD, 1.0 M WESTERLY OF A METAL GUARD POST, AND ABOUT 0.2 M LOWER
 DH6521'THAN THE TOP OF THE LEVEE. THIS STATION WAS OCCUPIED AS PART OF A
 DH6521'CALTRANS NORTH REGION OFFICE OF SURVEYORS GPS HEIGHT MODERNIZATION
 DH6521'PROJECT.
 DH6521
 DH6521 STATION RECOVERY (2008)
 DH6521
 DH6521'RECOVERY NOTE BY FRAME SURVEYING AND MAPPING 2008 (JHF)
 DH6521'RECOVERED AS DESCRIBED.
 DH6521
 DH6521 STATION RECOVERY (2011)
 DH6521
 DH6521'RECOVERY NOTE BY WATERSHED SCIENCES 2011 (DW)

DH6521'RECOVERED IN GOOD CONDITION.

*** retrieval complete.
Elapsed Time = 00:00:04

The NGS Data Sheet

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

PROGRAM = datasheet95, VERSION = 8.12.5.14

Starting Datasheet Retrieval...

1 National Geodetic Survey, Retrieval Date = MARCH 15, 2023

DH6625 *****

DH6625 HT_MOD - This is a Height Modernization Survey Station.

DH6625 DESIGNATION - MICHIGAN

DH6625 PID - DH6625

DH6625 STATE/COUNTY- CA/TEHAMA

DH6625 COUNTRY - US

DH6625 USGS QUAD - VINA (2018)

DH6625

DH6625 *CURRENT SURVEY CONTROL

DH6625

DH6625* NAD 83(2011) POSITION- 39 54 23.62238(N) 122 06 51.25974(W) ADJUSTED

DH6625* NAD 83(2011) ELLIP HT- 37.560 (meters) (06/27/12) ADJUSTED

DH6625* NAD 83(2011) EPOCH - 2010.00

DH6625* NAVD 88 ORTHO HEIGHT - 65.84 (meters) 216.0 (feet) GPS OBS

DH6625

DH6625 NAVD 88 orthometric height was determined with geoid model GEOID09

DH6625 GEOID HEIGHT - -28.305 (meters) GEOID09

DH6625 GEOID HEIGHT - -28.253 (meters) GEOID18

DH6625 NAD 83(2011) X - -2,604,564.870 (meters) COMP

DH6625 NAD 83(2011) Y - -4,149,740.913 (meters) COMP

DH6625 NAD 83(2011) Z - 4,070,056.680 (meters) COMP

DH6625 LAPLACE CORR - 6.89 (seconds) DEFLEC18

DH6625

DH6625 Network accuracy estimates per FGDC Geospatial Positioning Accuracy

DH6625 Standards:

DH6625 FGDC (95% conf, cm) Standard deviation (cm) CorrNE

DH6625 Horiz Ellip SD_N SD_E SD_h (unitless)

DH6625 -----

DH6625 NETWORK 0.26 0.49 0.12 0.09 0.25 -0.06755516

DH6625 -----

DH6625 Click here for local accuracies and other accuracy information.

DH6625

DH6625

DH6625.The horizontal coordinates were established by GPS observations

DH6625.and adjusted by the National Geodetic Survey in June 2012.

DH6625

DH6625.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has

DH6625.been affixed to the stable North American tectonic plate. See

DH6625.NA2011 for more information.

DH6625

DH6625.The horizontal coordinates are valid at the epoch date displayed above

DH6625.which is a decimal equivalence of Year/Month/Day.

DH6625

DH6625.The orthometric height was determined by GPS observations and a

DH6625.high-resolution geoid model using precise GPS observation and

DH6625.processing techniques.

DH6625

DH6625.Significant digits in the geoid height do not necessarily reflect accuracy.

DH6625.GEOID18 height accuracy estimate available here.

DH6625

DH6625.Click photographs - Photos may exist for this station.

DH6625

DH6625.The X, Y, and Z were computed from the position and the ellipsoidal ht.

DH6625

DH6625.The Laplace correction was computed from DEFLEC18 derived deflections.

DH6625

DH6625.The ellipsoidal height was determined by GPS observations

DH6625.and is referenced to NAD 83.

DH6625

DH6625. The following values were computed from the NAD 83(2011) position.

DH6625

DH6625; North East Units Scale Factor Converg.

DH6625;SPC CA 1 - 563,658.123 1,990,231.183 MT 1.00002484 -0 04 28.9

DH6625;SPC CA 1 - 1,849,268.36 6,529,616.81 sFT 1.00002484 -0 04 28.9

DH6625;UTM 10 - 4,417,762.037 575,711.803 MT 0.99967057 +0 34 05.8
 DH6625
 DH6625! - Elev Factor x Scale Factor = Combined Factor
 DH6625!SPC CA 1 - 0.99999411 x 1.00002484 = 1.00001895
 DH6625!UTM 10 - 0.99999411 x 0.99967057 = 0.99966468
 DH6625
 DH6625 U.S. NATIONAL GRID SPATIAL ADDRESS: 10SEK7571117762 (NAD 83)
 DH6625
 DH6625 SUPERSEDED SURVEY CONTROL
 DH6625
 DH6625 NAD 83(2007)- 39 54 23.62219(N) 122 06 51.25847(W) AD(2007.00) 0
 DH6625 ELLIP H (02/10/07) 37.506 (m) GP(2007.00)
 DH6625 NAD 83(1998)- 39 54 23.62087(N) 122 06 51.25814(W) AD(2004.69) B
 DH6625 ELLIP H (09/28/05) 37.559 (m) GP(2004.69) 4 1
 DH6625 NAVD 88 (09/28/05) 65.8 (m) GEOID03 model used GPS OBS
 DH6625
 DH6625.Superseded values are not recommended for survey control.
 DH6625
 DH6625.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 DH6625.See file dsdata.pdf to determine how the superseded data were derived.
 DH6625
 DH6625_MARKER: DD = SURVEY DISK
 DH6625_SETTING: 50 = ALUMINUM ALLOY ROD W/O SLEEVE (10 FT.+)
 DH6625_STAMPING: MICHIGAN 2004
 DH6625_MARK LOGO: CSRC
 DH6625_PROJECTION: RECESSED 6 CENTIMETERS
 DH6625_MAGNETIC: M = MARKER EQUIPPED WITH BAR MAGNET
 DH6625_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
 DH6625_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 DH6625+SATELLITE: SATELLITE OBSERVATIONS - January 01, 2008
 DH6625_ROD/PIPE-DEPTH: 8.2 meters
 DH6625
 DH6625 HISTORY - Date Condition Report By
 DH6625 HISTORY - 20040812 MONUMENTED CADT
 DH6625 HISTORY - 20080101 GOOD FRAME
 DH6625
 DH6625 STATION DESCRIPTION
 DH6625
 DH6625'DESCRIBED BY CALTRANS 2004 (JRL)
 DH6625'THE STATION IS LOCATED ADJACENT TO SOUTH AVENUE BETWEEN CORNING AND
 DH6625'VINA ABOUT 6 KM SOUTHEAST OF CORNING, 6 KM SOUTHWEST OF VINA, AND 19
 DH6625'KM NORTH NORTHEAST OF ORLAND. TO REACH THE STATION FROM THE
 DH6625'INTERSECTION OF INTERSTATE HIGHWAY 5 AND SOUTH AVENUE IN CORNING GO
 DH6625'EAST ON SOUTH AVENUE 2.62 KM TO MARGUERITE ROAD. CONTINUE EAST ON
 DH6625'SOUTH AVENUE 3.95 KM TO HALL ROAD. CONTINUE EAST ON SOUTH AVENUE 750
 DH6625'M TO THE STATION ON THE RIGHT. THE STATION IS A SURVEY DISK ENCASED
 DH6625'IN PVC PIPE WITH ACCESS COVER SET IN CONCRETE FLUSH WITH THE GROUND
 DH6625'0.9 M WEST OF A WHITE CARSONITE POST WITH AMBER REFLECTOR, 1.0 M
 DH6625'NORTH OF AN ORANGE CARSONITE WITNESS POST, 1.1 M NORTH OF THE SOUTH
 DH6625'RIGHT OF WAY FENCE OF SOUTH AVENUE, 8.7 M SOUTHEAST OF A SIGN FOR
 DH6625'MICHIGAN AVENUE, AND 10.8 M SOUTH OF THE YELLOW STRIPE OF SOUTH
 DH6625'AVENUE. THIS STATION WAS OCCUPIED AS A PART OF
 DH6625'THE CALTRANS NORTH REGION HEIGHT MODERNIZATION PROJECT.
 DH6625
 DH6625 STATION RECOVERY (2008)
 DH6625
 DH6625'RECOVERY NOTE BY FRAME SURVEYING AND MAPPING 2008 (JHF)
 DH6625'RECOVERED AS DESCRIBED.

*** retrieval complete.
 Elapsed Time = 00:00:03

The NGS Data Sheet

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

PROGRAM = datasheet95, VERSION = 8.12.5.14

Starting Datasheet Retrieval...

1 National Geodetic Survey, Retrieval Date = MARCH 15, 2023

DL9132 *****

DL9132 HT_MOD - This is a Height Modernization Survey Station.

DL9132 DESIGNATION - ASH

DL9132 PID - DL9132

DL9132 STATE/COUNTY- CA/SHASTA

DL9132 COUNTRY - US

DL9132 USGS QUAD - BALLS FERRY (2018)

DL9132

DL9132 *CURRENT SURVEY CONTROL

DL9132

DL9132* NAD 83(2011) POSITION- 40 25 01.37502(N) 122 11 46.07207(W) ADJUSTED

DL9132* NAD 83(2011) ELLIP HT- 87.985 (meters) (06/27/12) ADJUSTED

DL9132* NAD 83(2011) EPOCH - 2010.00

DL9132* NAVD 88 ORTHO HEIGHT - 115.74 (meters) 379.7 (feet) GPS OBS

DL9132

DL9132 NAVD 88 orthometric height was determined with geoid model GEOID09

DL9132 GEOID HEIGHT - -27.796 (meters) GEOID09

DL9132 GEOID HEIGHT - -27.778 (meters) GEOID18

DL9132 NAD 83(2011) X - -2,591,035.096 (meters) COMP

DL9132 NAD 83(2011) Y - -4,115,110.118 (meters) COMP

DL9132 NAD 83(2011) Z - 4,113,408.348 (meters) COMP

DL9132 LAPLACE CORR - 9.28 (seconds) DEFLEC18

DL9132

DL9132 Network accuracy estimates per FGDC Geospatial Positioning Accuracy

DL9132 Standards:

DL9132 FGDC (95% conf, cm) Standard deviation (cm) CorrNE

DL9132 Horiz Ellip SD_N SD_E SD_h (unitless)

DL9132 -----

DL9132 NETWORK 0.73 1.02 0.32 0.27 0.52 -0.27865393

DL9132 -----

DL9132 Click here for local accuracies and other accuracy information.

DL9132

DL9132

DL9132.The horizontal coordinates were established by GPS observations

DL9132.and adjusted by the National Geodetic Survey in June 2012.

DL9132

DL9132.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has

DL9132.been affixed to the stable North American tectonic plate. See

DL9132.NA2011 for more information.

DL9132

DL9132.The horizontal coordinates are valid at the epoch date displayed above

DL9132.which is a decimal equivalence of Year/Month/Day.

DL9132

DL9132.The orthometric height was determined by GPS observations and a

DL9132.high-resolution geoid model using precise GPS observation and

DL9132.processing techniques.

DL9132

DL9132.Significant digits in the geoid height do not necessarily reflect accuracy.

DL9132.GEOID18 height accuracy estimate available here.

DL9132

DL9132.Click photographs - Photos may exist for this station.

DL9132

DL9132.The X, Y, and Z were computed from the position and the ellipsoidal ht.

DL9132

DL9132.The Laplace correction was computed from DEFLEC18 derived deflections.

DL9132

DL9132.The ellipsoidal height was determined by GPS observations

DL9132.and is referenced to NAD 83.

DL9132

DL9132. The following values were computed from the NAD 83(2011) position.

DL9132

DL9132; North East Units Scale Factor Converg.

DL9132;SPC CA 1 - 620,351.789 1,983,355.270 MT 0.99992110 -0 07 41.7

DL9132;SPC CA 1 - 2,035,270.83 6,507,058.08 sFT 0.99992110 -0 07 41.7

DL9132;UTM 10 - 4,474,357.402 568,199.097 MT 0.99965725 +0 31 16.3
DL9132
DL9132! - Elev Factor x Scale Factor = Combined Factor
DL9132!SPC CA 1 - 0.99998620 x 0.99992110 = 0.99990730
DL9132!UTM 10 - 0.99998620 x 0.99965725 = 0.99964345
DL9132
DL9132_U.S. NATIONAL GRID SPATIAL ADDRESS: 10TEK6819974357(NAD 83)
DL9132
DL9132 SUPERSEDED SURVEY CONTROL
DL9132
DL9132 NAD 83(2007)- 40 25 01.37465(N) 122 11 46.07066(W) AD(2007.00) B
DL9132 ELLIP H (06/22/10) 87.963 (m) GP(2007.00) 3 2
DL9132
DL9132.Superseded values are not recommended for survey control.
DL9132
DL9132.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DL9132.See file dsdata.pdf to determine how the superseded data were derived.
DL9132
DL9132_MARKER: DD = SURVEY DISK
DL9132_SETTING: 50 = ALUMINUM ALLOY ROD W/O SLEEVE (10 FT.+)
DL9132_STAMPING: ASH 2008
DL9132_MARK LOGO: CADWR
DL9132_PROJECTION: RECESSED 6 CENTIMETERS
DL9132_MAGNETIC: M = MARKER EQUIPPED WITH BAR MAGNET
DL9132_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
DL9132_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
DL9132+SATELLITE: SATELLITE OBSERVATIONS - November 22, 2010
DL9132_ROD/PIPE-DEPTH: 4 meters
DL9132
DL9132 HISTORY - Date Condition Report By
DL9132 HISTORY - 20080101 MONUMENTED FRAME
DL9132 HISTORY - 20101122 GOOD PG+E
DL9132
DL9132 STATION DESCRIPTION
DL9132
DL9132'DESCRIBED BY FRAME SURVEYING AND MAPPING 2008 (JHF)
DL9132'THE STATION IS LOCATED ABOUT 6 MI SOUTHEAST OF ANDERSON AND ABOUT 5 MI
DL9132'NORTHEAST OF COTTONWOOD.
DL9132'
DL9132'TO REACH THE STATION FROM THE INTERSECTION OF INTERSTATE HIGHWAY 5 AND
DL9132'4TH STREET IN COTTONWOOD GO EAST ON 4TH STREET FOR 0.9 MI TO A
DL9132'T-INTERSECTION, BALLS FERRY ROAD. TURN LEFT AND GO NORTHEAST ON BALLS
DL9132'FERRY ROAD FOR 3.6 MI WHERE BALLS FERRY ROAD TURNS TO THE LEFT,
DL9132'NORTHWEST, AND ASH CREEK ROAD BEGINS. CONTINUE NORTHEAST ON ASH CREEK
DL9132'ROAD FOR 1.15 MI JUST BEFORE CROSSING THE SACRAMENTO RIVER TO THE
DL9132'STATION ON THE LEFT.
DL9132'
DL9132'THE STATION IS A 2 1/2 IN DISK SET ON TOP OF AN ALUMINUM ROD SET
DL9132'INSIDE A PVC PIPE AND BELOW AN ALUMINUM ACCESS COVER. IT IS 19.9 FT
DL9132'SOUTH OF THE CENTERLINE OF ASH CREEK ROAD, 23.7 FT EAST OF THE
DL9132'CENTERLINE OF A PAVED DRIVEWAY, 62.7 FT SOUTHWEST OF A TRANSFORMER
DL9132'POLE AND 1.3 FT NORTH OF A WITNESS POST.
DL9132
DL9132 STATION RECOVERY (2010)
DL9132
DL9132'RECOVERY NOTE BY PACIFIC GAS AND ELECTRIC COMPANY 2010
DL9132'RECOVERED IN GOOD CONDITION.

*** retrieval complete.
Elapsed Time = 00:00:04

The NGS Data Sheet

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

PROGRAM = datasheet95, VERSION = 8.12.5.14

Starting Datasheet Retrieval...

1 National Geodetic Survey, Retrieval Date = MARCH 15, 2023

DL9142 *****

DL9142 HT_MOD - This is a Height Modernization Survey Station.

DL9142 DESIGNATION - BEND BRIDGE

DL9142 PID - DL9142

DL9142 STATE/COUNTY- CA/TEHAMA

DL9142 COUNTRY - US

DL9142 USGS QUAD - BEND (2018)

DL9142

DL9142 *CURRENT SURVEY CONTROL

DL9142

DL9142* NAD 83(2011) POSITION- 40 15 47.33675(N) 122 13 16.55372(W) ADJUSTED

DL9142* NAD 83(2011) ELLIP HT- 68.848 (meters) (06/27/12) ADJUSTED

DL9142* NAD 83(2011) EPOCH - 2010.00

DL9142* NAVD 88 ORTHO HEIGHT - 97.17 (meters) 318.8 (feet) GPS OBS

DL9142

DL9142 NAVD 88 orthometric height was determined with geoid model GEOID09

DL9142 GEOID HEIGHT - -28.358 (meters) GEOID09

DL9142 GEOID HEIGHT - -28.325 (meters) GEOID18

DL9142 NAD 83(2011) X - -2,598,730.578 (meters) COMP

DL9142 NAD 83(2011) Y - -4,123,319.485 (meters) COMP

DL9142 NAD 83(2011) Z - 4,100,370.163 (meters) COMP

DL9142 LAPLACE CORR - 8.63 (seconds) DEFLEC18

DL9142

DL9142 Network accuracy estimates per FGDC Geospatial Positioning Accuracy

DL9142 Standards:

DL9142 FGDC (95% conf, cm) Standard deviation (cm) CorrNE

DL9142 Horiz Ellip SD_N SD_E SD_h (unitless)

DL9142 -----

DL9142 NETWORK 0.45 0.69 0.21 0.14 0.35 -0.12975548

DL9142 -----

DL9142 Click here for local accuracies and other accuracy information.

DL9142

DL9142

DL9142.The horizontal coordinates were established by GPS observations

DL9142.and adjusted by the National Geodetic Survey in June 2012.

DL9142

DL9142.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has

DL9142.been affixed to the stable North American tectonic plate. See

DL9142.NA2011 for more information.

DL9142

DL9142.The horizontal coordinates are valid at the epoch date displayed above

DL9142.which is a decimal equivalence of Year/Month/Day.

DL9142

DL9142.The orthometric height was determined by GPS observations and a

DL9142.high-resolution geoid model using precise GPS observation and

DL9142.processing techniques.

DL9142

DL9142.Significant digits in the geoid height do not necessarily reflect accuracy.

DL9142.GEOID18 height accuracy estimate available here.

DL9142

DL9142.Click photographs - Photos may exist for this station.

DL9142

DL9142.The X, Y, and Z were computed from the position and the ellipsoidal ht.

DL9142

DL9142.The Laplace correction was computed from DEFLEC18 derived deflections.

DL9142

DL9142.The ellipsoidal height was determined by GPS observations

DL9142.and is referenced to NAD 83.

DL9142

DL9142. The following values were computed from the NAD 83(2011) position.

DL9142

DL9142; North East Units Scale Factor Converg.

DL9142;SPC CA 1 - 603,268.902 1,981,179.137 MT 0.99994412 -0 08 40.9

DL9142;SPC CA 1 - 1,979,224.72 6,499,918.55 sFT 0.99994412 -0 08 40.9

DL9142;UTM 10 - 4,457,255.701 566,217.064 MT 0.99965397 +0 30 11.9
DL9142
DL9142! - Elev Factor x Scale Factor = Combined Factor
DL9142!SPC CA 1 - 0.99998920 x 0.99994412 = 0.99993332
DL9142!UTM 10 - 0.99998920 x 0.99965397 = 0.99964317
DL9142
DL9142_U.S. NATIONAL GRID SPATIAL ADDRESS: 10TEK6621757255(NAD 83)
DL9142
DL9142 SUPERSEDED SURVEY CONTROL
DL9142
DL9142 NAD 83(2007)- 40 15 47.33630(N) 122 13 16.55246(W) AD(2007.00) B
DL9142 ELLIP H (06/22/10) 68.814 (m) GP(2007.00) 3 2
DL9142
DL9142.Superseded values are not recommended for survey control.
DL9142
DL9142.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DL9142.See file dsdata.pdf to determine how the superseded data were derived.
DL9142
DL9142_MARKER: DD = SURVEY DISK
DL9142_SETTING: 50 = ALUMINUM ALLOY ROD W/O SLEEVE (10 FT.+)
DL9142_STAMPING: BEND BRIDGE 2008
DL9142_MARK LOGO: CADWR
DL9142_PROJECTION: RECESSED 6 CENTIMETERS
DL9142_MAGNETIC: M = MARKER EQUIPPED WITH BAR MAGNET
DL9142_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
DL9142_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
DL9142+SATELLITE: SATELLITE OBSERVATIONS - January 01, 2008
DL9142_ROD/PIPE-DEPTH: 5 meters
DL9142
DL9142 HISTORY - Date Condition Report By
DL9142 HISTORY - 20080101 MONUMENTED FRAME
DL9142
DL9142 STATION DESCRIPTION
DL9142
DL9142'DESCRIBED BY FRAME SURVEYING AND MAPPING 2008 (JHF)
DL9142'THE STATION IS LOCATED ABOUT 9 MI SOUTH OF COTTONWOOD AND ABOUT 6 MI
DL9142'NORTH OF RED BLUFF.
DL9142'
DL9142'TO REACH THE STATION FROM THE INTERSECTION OF INTERSTATE HIGHWAY 5 AND
DL9142'JELLYS FERRY ROAD, ABOUT 4 MI NORTH OF RED BLUFF GO NORTHWESTERLY ON
DL9142'JELLYS FERRY ROAD FOR ABOUT 2.7 MI TO A SIDE ROAD RIGHT, BEND FERRY
DL9142'ROAD. TURN RIGHT AND GO SOUTHWESTERLY FOR ABOUT 0.4 MI TO A SIDE ROAD
DL9142'LEFT AT THE ENTRANCE TO BEND BRIDGE PARK. TURN LEFT, ENTERING THE
DL9142'PARK AND THEN TAKE AN IMMEDIATE LEFT, AND THE STATION ON THE LEFT.
DL9142'
DL9142'THE STATION IS A 2 1/2 IN DISK SET ON TOP OF AN ALUMINUM ROD SET
DL9142'INSIDE A PVC PIPE AND BELOW AN ALUMINUM ACCESS COVER. IT IS 58.3 FT
DL9142'NORTHEAST OF THE CENTERLINE OF BEND FERRY ROAD, 22.4 FT SOUTHWEST OF
DL9142'THE CENTERLINE OF THE EAST-WEST PARK ROAD, 87.9 FT WEST OF A STOP SIGN
DL9142'AND 1.3 FT NORTH OF A WITNESS POST.

*** retrieval complete.
Elapsed Time = 00:00:04

The NGS Data Sheet

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

PROGRAM = datasheet95, VERSION = 8.12.5.14

Starting Datasheet Retrieval...

1 National Geodetic Survey, Retrieval Date = MARCH 15, 2023

DL9190 *****

DL9190 HT_MOD - This is a Height Modernization Survey Station.

DL9190 DESIGNATION - ORDBEND

DL9190 PID - DL9190

DL9190 STATE/COUNTY- CA/GLENN

DL9190 COUNTRY - US

DL9190 USGS QUAD - ORD FERRY (2018)

DL9190

DL9190 *CURRENT SURVEY CONTROL

DL9190

DL9190* NAD 83(2011) POSITION- 39 37 47.54988(N) 121 59 53.81554(W) ADJUSTED

DL9190* NAD 83(2011) ELLIP HT- 8.946 (meters) (06/27/12) ADJUSTED

DL9190* NAD 83(2011) EPOCH - 2010.00

DL9190* NAVD 88 ORTHO HEIGHT - 37.08 (meters) 121.7 (feet) GPS OBS

DL9190

DL9190 NAVD 88 orthometric height was determined with geoid model GEOID09

DL9190 GEOID HEIGHT - -28.151 (meters) GEOID09

DL9190 GEOID HEIGHT - -28.100 (meters) GEOID18

DL9190 NAD 83(2011) X - -2,606,562.742 (meters) COMP

DL9190 NAD 83(2011) Y - -4,171,650.679 (meters) COMP

DL9190 NAD 83(2011) Z - 4,046,425.288 (meters) COMP

DL9190 LAPLACE CORR - 5.78 (seconds) DEFLEC18

DL9190

DL9190 Network accuracy estimates per FGDC Geospatial Positioning Accuracy

DL9190 Standards:

DL9190 FGDC (95% conf, cm) Standard deviation (cm) CorrNE

DL9190 Horiz Ellip SD_N SD_E SD_h (unitless)

DL9190 -----

DL9190 NETWORK 0.58 0.80 0.27 0.19 0.41 -0.10723961

DL9190 -----

DL9190 Click here for local accuracies and other accuracy information.

DL9190

DL9190

DL9190.The horizontal coordinates were established by GPS observations

DL9190.and adjusted by the National Geodetic Survey in June 2012.

DL9190

DL9190.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has

DL9190.been affixed to the stable North American tectonic plate. See

DL9190.NA2011 for more information.

DL9190

DL9190.The horizontal coordinates are valid at the epoch date displayed above

DL9190.which is a decimal equivalence of Year/Month/Day.

DL9190

DL9190.The orthometric height was determined by GPS observations and a

DL9190.high-resolution geoid model using precise GPS observation and

DL9190.processing techniques.

DL9190

DL9190.Significant digits in the geoid height do not necessarily reflect accuracy.

DL9190.GEOID18 height accuracy estimate available here.

DL9190

DL9190.Click photographs - Photos may exist for this station.

DL9190

DL9190.The X, Y, and Z were computed from the position and the ellipsoidal ht.

DL9190

DL9190.The Laplace correction was computed from DEFLEC18 derived deflections.

DL9190

DL9190.The ellipsoidal height was determined by GPS observations

DL9190.and is referenced to NAD 83.

DL9190

DL9190. The following values were computed from the NAD 83(2011) position.

DL9190

DL9190; North East Units Scale Factor Converg.

DL9190;SPC CA 2 - 717,931.645 2,000,147.482 MT 0.99995988 +0 00 03.9

DL9190;SPC CA 2 - 2,355,414.07 6,562,150.53 sFT 0.99995988 +0 00 03.9

DL9190;UTM 10 - 4,387,157.623 585,967.032 MT 0.99969099 +0 38 20.3
DL9190
DL9190! - Elev Factor x Scale Factor = Combined Factor
DL9190!SPC CA 2 - 0.99999860 x 0.99995988 = 0.99995848
DL9190!UTM 10 - 0.99999860 x 0.99969099 = 0.99968959
DL9190
DL9190_U.S. NATIONAL GRID SPATIAL ADDRESS: 10SEJ8596787157(NAD 83)
DL9190
DL9190 SUPERSEDED SURVEY CONTROL
DL9190
DL9190 NAD 83(2007)- 39 37 47.54948(N) 121 59 53.81418(W) AD(2007.00) B
DL9190 ELLIP H (06/22/10) 8.885 (m) GP(2007.00) 3 2
DL9190
DL9190.Superseded values are not recommended for survey control.
DL9190
DL9190.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DL9190.See file dsdata.pdf to determine how the superseded data were derived.
DL9190
DL9190_MARKER: DD = SURVEY DISK
DL9190_SETTING: 50 = ALUMINUM ALLOY ROD W/O SLEEVE (10 FT.+)
DL9190_STAMPING: ORDBEND 2008
DL9190_MARK LOGO: CADWR
DL9190_PROJECTION: RECESSED 6 CENTIMETERS
DL9190_MAGNETIC: M = MARKER EQUIPPED WITH BAR MAGNET
DL9190_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
DL9190_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
DL9190+SATELLITE: SATELLITE OBSERVATIONS - January 01, 2008
DL9190_ROD/PIPE-DEPTH: 5 meters
DL9190
DL9190 HISTORY - Date Condition Report By
DL9190 HISTORY - 20080101 MONUMENTED FRAME
DL9190
DL9190 STATION DESCRIPTION
DL9190
DL9190'DESCRIBED BY FRAME SURVEYING AND MAPPING 2008 (JHF)
DL9190'THE STATION IS LOCATED ABOUT 14 MI NORTHEAST OF WILLOWS, ABOUT 11 MI
DL9190'SOUTHWEST OF CHICO AND 0.50 MI EAST OF THE TOWN OF ORD BEND.
DL9190'
DL9190'TO REACH THE STATION FROM THE INTERSECTION OF STATE HIGHWAY2 32 AND 45
DL9190'IN HAMILTON, GO SOUTH ON HIGHWAY 45 FOR ABOUT 8.1 MI TO THE
DL9190'INTERSECTION OF ROAD 32 TO THE RIGHT, WEST AND OLD FERRY ROAD TO THE
DL9190'LEFT, EAST. TURN LEFT AND GO EAST ON OLD FERRY ROAD FOR ABOUT 0.5 MI
DL9190'AND THE STATION ON THE RIGHT JUST EAST OF THE ENTRANCE TO THE ORD BEND
DL9190'UNIT OF THE SACRAMENTO RIVER NWR.
DL9190'
DL9190'THE STATION IS AN ALUMINUM ROD SET INSIDE A PVC PIPE AND BELOW AN
DL9190'ALUMINUM ACCESS COVER. IT IS ABOUT 185 FT EAST OF THE INTERSECTION OF
DL9190'ORD FERRY ROAD AND THE ENTRANCE ROAD TO ORD BEND PARK TO THE NORTH,
DL9190'67.0 FT EAST OF THE CENTERLINE OF THE GRAVEL ROAD TO THE UNIT PARKING
DL9190'LOT, 27.9 FT EAST OF A FENCE CORNER, 27.4 FT SOUTH OF THE CENTERLINE
DL9190'OF THE ROAD, 2.0 FT NORTH OF A FENCE, AND 1.1 FT NORTH OF A WITNESS
DL9190'POST.

*** retrieval complete.
Elapsed Time = 00:00:03

The NGS Data Sheet

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

PROGRAM = datasheet95, VERSION = 8.12.5.14

Starting Datasheet Retrieval...

1 National Geodetic Survey, Retrieval Date = APRIL 12, 2023

DL9193 *****

DL9193 HT_MOD - This is a Height Modernization Survey Station.

DL9193 DESIGNATION - PELGER

DL9193 PID - DL9193

DL9193 STATE/COUNTY- CA/SUTTER

DL9193 COUNTRY - US

DL9193 USGS QUAD - KIRKVILLE (2018)

DL9193

DL9193 *CURRENT SURVEY CONTROL

DL9193

DL9193* NAD 83(2011) POSITION- 38 57 10.44668(N) 121 45 11.56401(W) ADJUSTED

DL9193* NAD 83(2011) ELLIP HT- -21.077 (meters) (06/27/12) ADJUSTED

DL9193* NAD 83(2011) EPOCH - 2010.00

DL9193* NAVD 88 ORTHO HEIGHT - 8.61 (meters) 28.2 (feet) GPS OBS

DL9193

DL9193 NAVD 88 orthometric height was determined with geoid model GEOID09

DL9193 GEOID HEIGHT - -29.728 (meters) GEOID09

DL9193 GEOID HEIGHT - -29.685 (meters) GEOID18

DL9193 NAD 83(2011) X - -2,613,730.712 (meters) COMP

DL9193 NAD 83(2011) Y - -4,223,212.613 (meters) COMP

DL9193 NAD 83(2011) Z - 3,988,239.033 (meters) COMP

DL9193 LAPLACE CORR - 1.09 (seconds) DEFLEC18

DL9193

DL9193 Network accuracy estimates per FGDC Geospatial Positioning Accuracy

DL9193 Standards:

DL9193 FGDC (95% conf, cm) Standard deviation (cm) CorrNE

DL9193 Horiz Ellip SD_N SD_E SD_h (unitless)

DL9193 -----

DL9193 NETWORK 0.42 0.65 0.19 0.14 0.33 -0.19494551

DL9193 -----

DL9193 Click here for local accuracies and other accuracy information.

DL9193

DL9193

DL9193.The horizontal coordinates were established by GPS observations

DL9193.and adjusted by the National Geodetic Survey in June 2012.

DL9193

DL9193.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has

DL9193.been affixed to the stable North American tectonic plate. See

DL9193.NA2011 for more information.

DL9193

DL9193.The horizontal coordinates are valid at the epoch date displayed above

DL9193.which is a decimal equivalence of Year/Month/Day.

DL9193

DL9193.The orthometric height was determined by GPS observations and a

DL9193.high-resolution geoid model using precise GPS observation and

DL9193.processing techniques.

DL9193

DL9193.Significant digits in the geoid height do not necessarily reflect accuracy.

DL9193.GEOID18 height accuracy estimate available here.

DL9193

DL9193.Click photographs - Photos may exist for this station.

DL9193

DL9193.The X, Y, and Z were computed from the position and the ellipsoidal ht.

DL9193

DL9193.The Laplace correction was computed from DEFLEC18 derived deflections.

DL9193

DL9193.The ellipsoidal height was determined by GPS observations

DL9193.and is referenced to NAD 83.

DL9193

DL9193. The following values were computed from the NAD 83(2011) position.

DL9193

DL9193; North East Units Scale Factor Converg.

DL9193;SPC CA 2 - 642,807.911 2,021,390.708 MT 0.99991731 +0 09 20.1

DL9193;SPC CA 2 - 2,108,945.62 6,631,846.01 sFT 0.99991731 +0 09 20.1

DL9193;UTM 10 - 4,312,289.121 608,034.884 MT 0.99974372 +0 47 02.1
DL9193
DL9193! - Elev Factor x Scale Factor = Combined Factor
DL9193!SPC CA 2 - 1.00000331 x 0.99991731 = 0.99992062
DL9193!UTM 10 - 1.00000331 x 0.99974372 = 0.99974703
DL9193
DL9193_U.S. NATIONAL GRID SPATIAL ADDRESS: 10SFJ0803412289(NAD 83)
DL9193
DL9193 SUPERSEDED SURVEY CONTROL
DL9193
DL9193 NAD 83(2007)- 38 57 10.44580(N) 121 45 11.56267(W) AD(2007.00) B
DL9193 ELLIP H (06/22/10) -21.094 (m) GP(2007.00) 3 2
DL9193
DL9193.Superseded values are not recommended for survey control.
DL9193
DL9193.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DL9193.See file dsdata.pdf to determine how the superseded data were derived.
DL9193
DL9193_MARKER: DD = SURVEY DISK
DL9193_SETTING: 50 = ALUMINUM ALLOY ROD W/O SLEEVE (10 FT.+))
DL9193_STAMPING: PELGER 2008
DL9193_MARK LOGO: CADWR
DL9193_PROJECTION: RECESSED 6 CENTIMETERS
DL9193_MAGNETIC: M = MARKER EQUIPPED WITH BAR MAGNET
DL9193_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
DL9193_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
DL9193+SATELLITE: SATELLITE OBSERVATIONS - January 01, 2008
DL9193_ROD/PIPE-DEPTH: 5 meters
DL9193
DL9193 HISTORY - Date Condition Report By
DL9193 HISTORY - 20080101 MONUMENTED FRAME
DL9193
DL9193 STATION DESCRIPTION
DL9193
DL9193'DESCRIBED BY FRAME SURVEYING AND MAPPING 2008 (JHF)
DL9193'THE STATION IS LOCATED ABOUT 10 MI NORTH OF KNIGHTS LANDING AND ABOUT
DL9193'6.5 MI NORTH OF ROBBINS.
DL9193'
DL9193'TO REACH THE STATION FROM THE INTERSECTION OF STATE HIGHWAY 113 AND
DL9193'RECLAMATION ROAD IN ROBBINS, GO NORTHWEST ON RECLAMATION ROAD FOR 6.2
DL9193'MI TO THE INTERSECTION OF PELGER ROAD. TURN RIGHT ON PELGER ROAD AND
DL9193'GO ABOUT 125 FT TO A CANAL AND THE STATION ON THE LEFT ON THE EAST
DL9193'SIDE OF THE CANAL.
DL9193'
DL9193'THE STATION IS A 2 1/2 IN DISK SET ON TOP OF AN ALUMINUM ROD SET
DL9193'INSIDE A PVC PIPE AND BELOW AN ALUMINUM ACCESS COVER. IT IS 25.7 FT
DL9193'NORTH OF THE CENTERLINE OF PELGER ROAD, 122 FT EAST OF THE CENTERLINE
DL9193'OF RECLAMATION ROAD, 32.8 FT EAST OF AN IRRIGATION GATE VALVE AND 1.0
DL9193'FT SOUTH OF A WITNESS POST.

*** retrieval complete.
Elapsed Time = 00:00:04

The NGS Data Sheet

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

PROGRAM = datasheet95, VERSION = 8.12.5.14

Starting Datasheet Retrieval...

1 National Geodetic Survey, Retrieval Date = MARCH 15, 2023

KS2014 *****

KS2014 HT_MOD - This is a Height Modernization Survey Station.

KS2014 FBN - This is a Federal Base Network Control Station.

KS2014 DESIGNATION - HPGN CA 03 04

KS2014 PID - KS2014

KS2014 STATE/COUNTY- CA/SUTTER

KS2014 COUNTRY - US

KS2014 USGS QUAD - MERIDIAN (2018)

KS2014

KS2014 *CURRENT SURVEY CONTROL

KS2014

KS2014* NAD 83(2011) POSITION- 39 08 35.79107(N) 121 54 06.27164(W) ADJUSTED

KS2014* NAD 83(2011) ELLIP HT- -16.714 (meters) (06/27/12) ADJUSTED

KS2014* NAD 83(2011) EPOCH - 2010.00

KS2014* NAVD 88 ORTHO HEIGHT - 12.58 (meters) 41.3 (feet) GPS OBS

KS2014

KS2014 NAVD 88 orthometric height was determined with geoid model GEOID09

KS2014 GEOID HEIGHT - -29.316 (meters) GEOID09

KS2014 GEOID HEIGHT - -29.349 (meters) GEOID18

KS2014 NAD 83(2011) X - -2,617,635.640 (meters) COMP

KS2014 NAD 83(2011) Y - -4,205,122.514 (meters) COMP

KS2014 NAD 83(2011) Z - 4,004,655.205 (meters) COMP

KS2014 LAPLACE CORR - 6.37 (seconds) DEFLEC18

KS2014

KS2014 Network accuracy estimates per FGDC Geospatial Positioning Accuracy

KS2014 Standards:

KS2014 FGDC (95% conf, cm) Standard deviation (cm) CorrNE

KS2014 Horiz Ellip SD_N SD_E SD_h (unitless)

KS2014 -----

KS2014 NETWORK 0.25 0.45 0.11 0.09 0.23 0.01265200

KS2014 -----

KS2014 Click here for local accuracies and other accuracy information.

KS2014

KS2014

KS2014.The horizontal coordinates were established by GPS observations

KS2014.and adjusted by the National Geodetic Survey in June 2012.

KS2014

KS2014.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has

KS2014.been affixed to the stable North American tectonic plate. See

KS2014.NA2011 for more information.

KS2014

KS2014.The horizontal coordinates are valid at the epoch date displayed above

KS2014.which is a decimal equivalence of Year/Month/Day.

KS2014

KS2014.The orthometric height was determined by GPS observations and a

KS2014.high-resolution geoid model using precise GPS observation and

KS2014.processing techniques.

KS2014

KS2014.Significant digits in the geoid height do not necessarily reflect accuracy.

KS2014.GEOID18 height accuracy estimate available here.

KS2014

KS2014.Click photographs - Photos may exist for this station.

KS2014

KS2014.The X, Y, and Z were computed from the position and the ellipsoidal ht.

KS2014

KS2014.The Laplace correction was computed from DEFLEC18 derived deflections.

KS2014

KS2014.The ellipsoidal height was determined by GPS observations

KS2014.and is referenced to NAD 83.

KS2014

KS2014. The following values were computed from the NAD 83(2011) position.

KS2014

KS2014; North East Units Scale Factor Converg.

KS2014;SPC CA 2 - 663,916.243 2,008,493.812 MT 0.99991519 +0 03 43.0

KS2014;SPC CA 2 - 2,178,198.54 6,589,533.45 sFT 0.99991519 +0 03 43.0
 KS2014;UTM 10 - 4,333,250.440 594,909.177 MT 0.99971091 +0 41 36.0
 KS2014
 KS2014! - Elev Factor x Scale Factor = Combined Factor
 KS2014!SPC CA 2 - 1.00000262 x 0.99991519 = 0.99991781
 KS2014!UTM 10 - 1.00000262 x 0.99971091 = 0.99971353
 KS2014
 KS2014_U.S. NATIONAL GRID SPATIAL ADDRESS: 10SEJ9490933250 (NAD 83)
 KS2014
 KS2014 SUPERSEDED SURVEY CONTROL
 KS2014
 KS2014 NAD 83(2007)- 39 08 35.79003(N) 121 54 06.27002(W) AD(2007.00) 0
 KS2014 ELLIP H (02/10/07) -16.732 (m) GP(2007.00)
 KS2014 NAD 83(1998)- 39 08 35.78963(N) 121 54 06.26967(W) AD(2004.69) A
 KS2014 ELLIP H (09/13/05) -16.732 (m) GP(2004.69) 4 1
 KS2014 NAD 83(1998)- 39 08 35.78772(N) 121 54 06.26764(W) AD(1998.50) A
 KS2014 ELLIP H (04/06/00) -16.688 (m) GP(1998.50) 3 1
 KS2014 NAD 83(1986)- 39 08 35.77852(N) 121 54 06.25653(W) AD(1984.00) 1
 KS2014 NAD 83(1992)- 39 08 35.78558(N) 121 54 06.26346(W) AD(1991.35) B
 KS2014 ELLIP H (05/15/92) -16.587 (m) GP(1991.35) 4 2
 KS2014 NAVD 88 (09/28/05) 12.7 (m) GEOID03 model used GPS OBS
 KS2014 NAVD 88 (04/06/00) 12.6 (m) GEOID99 model used GPS OBS
 KS2014 NAVD 88 (09/16/94) 12.7 (m) GEOID93 model used GPS OBS
 KS2014 NAVD 88 (05/15/92) 12.8 (m) GEOID90 model used GPS OBS
 KS2014
 KS2014.Superseded values are not recommended for survey control.
 KS2014
 KS2014.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 KS2014.See file dsdata.pdf to determine how the superseded data were derived.
 KS2014
 KS2014_MARKER: DD = SURVEY DISK
 KS2014_SETTING: 50 = ALUMINUM ALLOY ROD W/O SLEEVE (10 FT.+)
 KS2014_STAMPING: HPGN-CALIF. STA.03-04 1991
 KS2014_MARK LOGO: CADT
 KS2014_PROJECTION: RECESSED 6 CENTIMETERS
 KS2014_MAGNETIC: N = NO MAGNETIC MATERIAL
 KS2014_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
 KS2014_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 KS2014+SATELLITE: SATELLITE OBSERVATIONS - January 01, 2008
 KS2014_ROD/PIPE-DEPTH: 7.00 meters
 KS2014

KS2014	HISTORY	- Date	Condition	Report By
KS2014	HISTORY	- 1991	MONUMENTED	CADT
KS2014	HISTORY	- 19910522	GOOD	NGS
KS2014	HISTORY	- 19930806	GOOD	CADT
KS2014	HISTORY	- 19940127	GOOD	NGS
KS2014	HISTORY	- 19980506	GOOD	NGS
KS2014	HISTORY	- 20030805	GOOD	CADT
KS2014	HISTORY	- 20041005	GOOD	CADT
KS2014	HISTORY	- 20050427	GOOD	CADWR
KS2014	HISTORY	- 20080101	GOOD	FRAME

 KS2014
 KS2014
 KS2014 STATION DESCRIPTION
 KS2014
 KS2014'DESCRIBED BY NATIONAL GEODETIC SURVEY 1991
 KS2014'THE STATION IS LOCATED ABOUT 1 MI (1.6 KM) EAST OF MERIDIAN ON STATE
 KS2014'HIGHWAY 20.
 KS2014'TO REACH THE STATION FROM THE POST OFFICE LOCATED AT THE INTERSECTION
 KS2014'OF STATE HIGHWAY 20 (CENTRAL STREET) AND THIRD STREET IN MERIDIAN, GO
 KS2014'EAST ON CENTRAL STREET FOR 0.7 MI (1.1 KM) TO THE STATION ON THE
 KS2014'RIGHT IN THE SOUTHEAST QUADRANT OF THE INTERSECTION.
 KS2014'THE STATION IS A 2.5 INCH ALUMINUM DISK INSIDE A 6 INCH ALUMINUM
 KS2014'ACCESS COVER. LOCATED 145 FT (44.2 M) EAST-NORTHEAST OF A PALM TREE,
 KS2014'116 FT (35.4 M) SOUTH OF THE CENTERLINE OF HIGHWAY 20, 34.6 FT
 KS2014'(10.5 M) NORTHEAST OF A TELEPHONE POLE (NUMBER 18) AND 24.5 FT
 KS2014'(7.5 M) EAST OF A HIGHWAY SIGN STOP AHEAD.
 KS2014
 KS2014
 KS2014 STATION RECOVERY (1993)
 KS2014

KS2014'RECOVERY NOTE BY CALTRANS 1993
 KS2014'RECOVERED IN GOOD CONDITION.
 KS2014
 KS2014 STATION RECOVERY (1994)
 KS2014
 KS2014'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1994 (AJL)
 KS2014'THE STATION IS LOCATED AT THE EAST EDGE OF MERIDIAN ALONG STATE
 KS2014'HIGHWAY 20. OWNERSHIP--CALIFORNIA DEPARTMENT OF TRANSPORTATION. TO
 KS2014'REACH FROM THE POST OFFICE LOCATED AT THE INTERSECTION OF CENTRAL
 KS2014'STREET AND THIRD STREET IN MERIDIAN, GO EAST ON CENTRAL STREET FOR 1.1
 KS2014'KM (0.7 MI) TO THE INTERSECTION WITH STATE HIGHWAY 20 AND THE STATION
 KS2014'ON THE RIGHT IN THE SOUTHEAST QUADRANT OF THE INTERSECTION. STATION
 KS2014'MARK IS A CADT SURVEY DISK ATOP AN ALUMINUM ALLOY ROD ENCASED IN A
 KS2014'PIPE WITH LOGO CAP SURROUNDED BY CONCRETE SET FLUSH WITH THE GROUND.
 KS2014'IT IS 35.4 M (116.1 FT) SOUTH OF, AND 0.5 M (1.6 FT) BELOW, THE CENTER
 KS2014'OF HWY 20, 17.0 M (55.8 FT) SOUTHEAST OF THE CENTER OF CENTRAL STREET,
 KS2014'44.2 M (145.0 FT) EAST-NORTHEAST OF A PALM TREE, 10.5 NORTHEAST OF A
 KS2014'UTILITY POLE (NUMBER 18), AND 7.5 M (24.6 FT) EAST OF A HIGHWAY SIGN
 KS2014'(STOP AHEAD).
 KS2014
 KS2014 STATION RECOVERY (1998)
 KS2014
 KS2014'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1998 (CSM)
 KS2014'THE STATION IS LOCATED ABOUT 20 KM (12.40 MI) WEST-NORTHWEST OF YUBA
 KS2014'CITY, 1.6 KM (1.00 MI) EAST OF MERIDIAN, IN THE SOUTHEAST ANGLE OF THE
 KS2014'JUNCTION OF STATE HIGHWAY 20 AND CENTRAL ST. OWNERSHIP--CALIFORNIA
 KS2014'DEPARTMENT OF TRANSPORTATION. TO REACH THE STATION FROM THE
 KS2014'COLUSA/SUTTER COUNTY LINE NEAR THE CENTER OF THE HIGHWAY 20 DRAW
 KS2014'BRIDGE OVER THE SACRAMENTO RIVER ON THE WEST EDGE OF MERIDIAN, GO EAST
 KS2014'FOR 1.36 KM (0.85 MI) ON HIGHWAY 20 TO THE JUNCTION OF CENTRAL ST. AND
 KS2014'THE STATION ON THE RIGHT NEAR THE NORTH EDGE OF A FIELD. THE STATION
 KS2014'IS THE TOP CENTER OF A 2.5-INCH ALUMINUM SURVEY DISK CEMENTED TO THE
 KS2014'TOP OF AN ALUMINUM ALLOY ROD RECESSED 10 CM BELOW GROUND, ENCASED IN A
 KS2014'5-INCH PVC PIPE WITH CADT LOGO CAP SURROUNDED BY CONCRETE FLUSH WITH
 KS2014'GROUND. LOCATED 41.1 M (134.8 FT) EAST-NORTHEAST OF THE NORTHEAST
 KS2014'CORNER OF A CHAIN-LINK YARD FENCE, 36.8 M (120.7 FT) SOUTH OF THE
 KS2014'CENTER OF HIGHWAY, 15.9 M (52.2 FT) EAST-SOUTHEAST OF THE CENTER OF
 KS2014'STREET, 7.4 M (24.3 FT) EAST OF A 5-INCH HIGHWAY SIGNPOST WITH ARROW
 KS2014'AND ABOUT 0.4 M (1.3 FT) BELOW THE STREET LEVEL.
 KS2014
 KS2014 STATION RECOVERY (2003)
 KS2014
 KS2014'RECOVERY NOTE BY CALTRANS 2003 (RLM)
 KS2014'THE STATION WAS RECOVERED AS DESCRIBED. THIS STATION WAS OCCUPIED AS
 KS2014'PART OF A CALTRANS NORTH REGION OFFICE OF SURVEYORS GPS HEIGHT
 KS2014'MODERNIZATION PROJECT.
 KS2014
 KS2014 STATION RECOVERY (2004)
 KS2014
 KS2014'RECOVERY NOTE BY CALTRANS 2004 (RLM)
 KS2014'THE STATION WAS RECOVERED AS DESCRIBED. THIS STATION WAS OCCUPIED AS
 KS2014'PART OF A CALTRANS NORTH REGION OFFICE OF SURVEYORS GPS HEIGHT
 KS2014'MODERNIZATION PROJECT.
 KS2014
 KS2014 STATION RECOVERY (2005)
 KS2014
 KS2014'RECOVERY NOTE BY CA DEPT OF WATER RES 2005 (DW)
 KS2014'RECOVERED IN GOOD CONDITION.
 KS2014
 KS2014 STATION RECOVERY (2008)
 KS2014
 KS2014'RECOVERY NOTE BY FRAME SURVEYING AND MAPPING 2008 (JHF)
 KS2014'RECOVERED AS DESCRIBED.

The NGS Data Sheet

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

PROGRAM = datasheet95, VERSION = 8.12.5.14

Starting Datasheet Retrieval...

1 National Geodetic Survey, Retrieval Date = MARCH 15, 2023

KT0518 *****

KT0518 HT_MOD - This is a Height Modernization Survey Station.

KT0518 DESIGNATION - Y 852

KT0518 PID - KT0518

KT0518 STATE/COUNTY- CA/GLENN

KT0518 COUNTRY - US

KT0518 USGS QUAD - PRINCETON (2018)

KT0518

KT0518 *CURRENT SURVEY CONTROL

KT0518

KT0518* NAD 83(2011) POSITION- 39 27 25.84659(N) 122 01 03.38482(W) ADJUSTED

KT0518* NAD 83(2011) ELLIP HT- -1.321 (meters) (06/27/12) ADJUSTED

KT0518* NAD 83(2011) EPOCH - 2010.00

KT0518* NAVD 88 ORTHO HEIGHT - 27.39 (meters) 89.9 (feet) GPS OBS

KT0518

KT0518 NAVD 88 orthometric height was determined with geoid model GEOID03

KT0518 GEOID HEIGHT - -28.623 (meters) GEOID03

KT0518 GEOID HEIGHT - -28.650 (meters) GEOID18

KT0518 NAD 83(2011) X - -2,614,437.418 (meters) COMP

KT0518 NAD 83(2011) Y - -4,181,114.873 (meters) COMP

KT0518 NAD 83(2011) Z - 4,031,633.156 (meters) COMP

KT0518 LAPLACE CORR - 5.37 (seconds) DEFLEC18

KT0518

KT0518 Network accuracy estimates per FGDC Geospatial Positioning Accuracy

KT0518 Standards:

KT0518 FGDC (95% conf, cm) Standard deviation (cm) CorrNE

KT0518 Horiz Ellip SD_N SD_E SD_h (unitless)

KT0518 -----

KT0518 NETWORK 0.82 1.10 0.38 0.27 0.56 -0.16176513

KT0518 -----

KT0518 Click here for local accuracies and other accuracy information.

KT0518

KT0518

KT0518.The horizontal coordinates were established by GPS observations

KT0518.and adjusted by the National Geodetic Survey in June 2012.

KT0518

KT0518.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has

KT0518.been affixed to the stable North American tectonic plate. See

KT0518.NA2011 for more information.

KT0518

KT0518.The horizontal coordinates are valid at the epoch date displayed above

KT0518.which is a decimal equivalence of Year/Month/Day.

KT0518

KT0518.The orthometric height was determined by GPS observations and a

KT0518.high-resolution geoid model using precise GPS observation and

KT0518.processing techniques.

KT0518

KT0518.Significant digits in the geoid height do not necessarily reflect accuracy.

KT0518.GEOID18 height accuracy estimate available here.

KT0518

KT0518.Click photographs - Photos may exist for this station.

KT0518

KT0518.The X, Y, and Z were computed from the position and the ellipsoidal ht.

KT0518

KT0518.The Laplace correction was computed from DEFLEC18 derived deflections.

KT0518

KT0518.The ellipsoidal height was determined by GPS observations

KT0518.and is referenced to NAD 83.

KT0518

KT0518. The following values were computed from the NAD 83(2011) position.

KT0518

KT0518; North East Units Scale Factor Converg.

KT0518;SPC CA 2 - 698,759.153 1,998,484.739 MT 0.99993576 -0 00 40.0

KT0518;SPC CA 2 - 2,292,512.32 6,556,695.35 sFT 0.99993576 -0 00 40.0

KT0518;UTM 10 - 4,367,972.782 584,517.801 MT 0.99968795 +0 37 27.7
KT0518
KT0518! - Elev Factor x Scale Factor = Combined Factor
KT0518!SPC CA 2 - 1.00000021 x 0.99993576 = 0.99993597
KT0518!UTM 10 - 1.00000021 x 0.99968795 = 0.99968816
KT0518
KT0518_U.S. NATIONAL GRID SPATIAL ADDRESS: 10SEJ8451767972 (NAD 83)
KT0518
KT0518 SUPERSEDED SURVEY CONTROL
KT0518
KT0518 NAD 83(2007)- 39 27 25.84590(N) 122 01 03.38339(W) AD(2007.00) 0
KT0518 ELLIP H (02/10/07) -1.390 (m) GP(2007.00)
KT0518 NAD 83(1998)- 39 27 25.84476(N) 122 01 03.38263(W) AD(2004.30) B
KT0518 ELLIP H (05/10/05) -1.431 (m) GP(2004.30) 4 1
KT0518 NGVD 29 (??/??/92) 26.641 (m) 87.40 (f) ADJ UNCH 1 2
KT0518
KT0518.Superseded values are not recommended for survey control.
KT0518
KT0518.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
KT0518.See file dsdata.pdf to determine how the superseded data were derived.
KT0518
KT0518_MARKER: DB = BENCH MARK DISK
KT0518_SETTING: 36 = SET IN A MASSIVE STRUCTURE
KT0518_SP_SET: CONCRETE HEADWALL
KT0518_STAMPING: Y 852 1949
KT0518_MARK LOGO: CGS
KT0518_MAGNETIC: N = NO MAGNETIC MATERIAL
KT0518_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
KT0518_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
KT0518+SATELLITE: SATELLITE OBSERVATIONS - January 01, 2008
KT0518
KT0518 HISTORY - Date Condition Report By
KT0518 HISTORY - 1949 MONUMENTED CGS
KT0518 HISTORY - 20031010 GOOD FRAME
KT0518 HISTORY - 20080101 GOOD FRAME
KT0518
KT0518 STATION DESCRIPTION
KT0518
KT0518'DESCRIBED BY COAST AND GEODETIC SURVEY 1949
KT0518'1.8 MI W FROM BUTTE CITY.
KT0518'1.8 MILES WEST ALONG STATE HIGHWAY 45 FROM THE POST OFFICE AT
KT0518'BUTTE CITY, AT THE INTERSECTION OF THE HIGHWAY, A PAVED ROAD
KT0518'LEADING SOUTH, AND A GRAVEL ROAD LEADING WEST, ABOUT 50 YARDS
KT0518'WEST OF AND ACROSS THE HIGHWAY FROM THE FOUR CORNERS SERVICE
KT0518'STORE AND GASOLINE STATION, AT A DOUBLE HEAD GATE ON THE WEST
KT0518'BANK OF AN IRRIGATION CANAL, IN THE TOP OF THE NORTH END OF THE
KT0518'SOUTH HEAD WALL, 39 FEET SOUTH OF THE SOUTHWEST CORNER OF THE
KT0518'CONCRETE BRIDGE OVER THE CANAL.
KT0518
KT0518 STATION RECOVERY (2003)
KT0518
KT0518'RECOVERY NOTE BY FRAME SURVEYING AND MAPPING 2003 (JHF)
KT0518'THE STATION IS ABOUT 2 MI WEST-SOUTHWEST OF BUTTE CITY AND ABOUT 4 MI
KT0518'NORTH OF PRINCETON (COLUSA COUNTY), AT THE INTERSECTION OF STATE
KT0518'HIGHWAYS 45 AND 162 AND ROAD 61.
KT0518'
KT0518'TO REACH THE STATION FROM THE INTERSECTION OF STATE HIGHWAYS 45 AND
KT0518'162 AND ROAD 61, GO WEST ON ROAD 61 FOR 95 FT TO A GRAVEL SIDE ROAD
KT0518'LEFT ON THE WEST SIDE OF AN IRRIGATION CANAL. TURN LEFT AND GO SOUTH
KT0518'FOR ABOUT 55 FT TO THE STATION ON THE LEFT.THE STATION IS SET IN THE
KT0518'TOP OF A CONCRETE HEADWALL WITH A DOUBLE HEADGATE ON THE WEST SIDE OF
KT0518'A CANAL. IT IS 95 FT WEWST OF THE CENTERLINE OF HIGHWAY 45, 54 FT
KT0518'SOUTH OF THE CENTERLINE OF ROAD 61, 22 FT WEST OF THE CENTERLINE OF
KT0518'THE CANAL,AND 9 FT EAST OF THE CENTERLINE OF A GRAVEL ROAD.
KT0518
KT0518 STATION RECOVERY (2008)
KT0518
KT0518'RECOVERY NOTE BY FRAME SURVEYING AND MAPPING 2008 (JHF)
KT0518'RECOVERED AS DESCRIBED.

*** retrieval complete.
Elapsed Time = 00:00:04

The NGS Data Sheet

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

PROGRAM = datasheet95, VERSION = 8.12.5.14

Starting Datasheet Retrieval...

1 National Geodetic Survey, Retrieval Date = MARCH 15, 2023

KT1807 *****

KT1807 HT_MOD - This is a Height Modernization Survey Station.

KT1807 DESIGNATION - HAMILTON

KT1807 PID - KT1807

KT1807 STATE/COUNTY- CA/GLENN

KT1807 COUNTRY - US

KT1807 USGS QUAD - HAMILTON CITY (2018)

KT1807

KT1807 *CURRENT SURVEY CONTROL

KT1807

KT1807* NAD 83(2011) POSITION- 39 44 39.73505(N) 122 01 14.04520(W) ADJUSTED

KT1807* NAD 83(2011) ELLIP HT- 19.938 (meters) (06/27/12) ADJUSTED

KT1807* NAD 83(2011) EPOCH - 2010.00

KT1807* NAVD 88 ORTHO HEIGHT - 47.97 (meters) 157.4 (feet) GPS OBS

KT1807

KT1807 NAVD 88 orthometric height was determined with geoid model GEOID09

KT1807 GEOID HEIGHT - -28.049 (meters) GEOID09

KT1807 GEOID HEIGHT - -27.993 (meters) GEOID18

KT1807 NAD 83(2011) X - -2,603,885.276 (meters) COMP

KT1807 NAD 83(2011) Y - -4,163,760.732 (meters) COMP

KT1807 NAD 83(2011) Z - 4,056,215.007 (meters) COMP

KT1807 LAPLACE CORR - 6.73 (seconds) DEFLEC18

KT1807

KT1807 Network accuracy estimates per FGDC Geospatial Positioning Accuracy

KT1807 Standards:

KT1807 FGDC (95% conf, cm) Standard deviation (cm) CorrNE

KT1807 Horiz Ellip SD_N SD_E SD_h (unitless)

KT1807 -----

KT1807 NETWORK 0.34 0.67 0.16 0.11 0.34 -0.00665625

KT1807 -----

KT1807 Click here for local accuracies and other accuracy information.

KT1807

KT1807

KT1807.The horizontal coordinates were established by GPS observations

KT1807.and adjusted by the National Geodetic Survey in June 2012.

KT1807

KT1807.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has

KT1807.been affixed to the stable North American tectonic plate. See

KT1807.NA2011 for more information.

KT1807

KT1807.The horizontal coordinates are valid at the epoch date displayed above

KT1807.which is a decimal equivalence of Year/Month/Day.

KT1807

KT1807.The orthometric height was determined by GPS observations and a

KT1807.high-resolution geoid model using precise GPS observation and

KT1807.processing techniques.

KT1807

KT1807.Significant digits in the geoid height do not necessarily reflect accuracy.

KT1807.GEOID18 height accuracy estimate available here.

KT1807

KT1807.Click photographs - Photos may exist for this station.

KT1807

KT1807.The X, Y, and Z were computed from the position and the ellipsoidal ht.

KT1807

KT1807.The Laplace correction was computed from DEFLEC18 derived deflections.

KT1807

KT1807.The ellipsoidal height was determined by GPS observations

KT1807.and is referenced to NAD 83.

KT1807

KT1807. The following values were computed from the NAD 83(2011) position.

KT1807

KT1807; North East Units Scale Factor Converg.

KT1807;SPC CA 2 - 730,643.783 1,998,237.111 MT 0.99998090 -0 00 46.7

KT1807;SPC CA 2 - 2,397,120.48 6,555,882.92 sFT 0.99998090 -0 00 46.7

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KT1807;UTM 10 - 4,399,844.112 583,915.686 MT 0.99968669 +0 37 34.5
KT1807
KT1807! - Elev Factor x Scale Factor = Combined Factor
KT1807!SPC CA 2 - 0.99999687 x 0.99998090 = 0.99997777
KT1807!UTM 10 - 0.99999687 x 0.99968669 = 0.99968356
KT1807
KT1807: Primary Azimuth Mark Grid Az
KT1807:SPC CA 2 - HAMILTON AZ MK 273 13 16.1
KT1807:UTM 10 - HAMILTON AZ MK 272 34 54.9
KT1807
KT1807_U.S. NATIONAL GRID SPATIAL ADDRESS: 10SEJ8391599844(NAD 83)
KT1807
KT1807|-----|
KT1807| PID Reference Object Distance Geod. Az |
KT1807| | | | dddmmss.s |
KT1807| DB5147 HAMILTON RM 1 33.021 METERS 05357 |
KT1807| KS1909 KHSL RADIO MAST APPROX.18.1 KM 0874434.8 |
KT1807| KT1805 HAMILTON CITY MUNICIPAL TANK APPROX. 1.1 KM 1234012.1 |
KT1807| KT1808 HAMILTON CITY HOLLY SUGAR STK APPROX. 1.3 KM 1270553.4 |
KT1807| DB5146 HAMILTON AZ MK 2731229.4 |
KT1807| DB5148 HAMILTON RM 2 25.655 METERS 33555 |
KT1807|-----|
KT1807
KT1807 SUPERSEDED SURVEY CONTROL
KT1807
KT1807 NAD 83(2007)- 39 44 39.73466(N) 122 01 14.04402(W) AD(2007.00) 0
KT1807 ELLIP H (02/10/07) 19.886 (m) GP(2007.00)
KT1807 NAD 83(1998)- 39 44 39.73359(N) 122 01 14.04357(W) AD(2004.69) B
KT1807 ELLIP H (09/28/05) 19.966 (m) GP(2004.69) 4 1
KT1807 NAD 83(1998)- 39 44 39.73296(N) 122 01 14.04332(W) AD(2004.30) B
KT1807 ELLIP H (05/10/05) 19.832 (m) GP(2004.30) 4 1
KT1807 NAD 83(1992)- 39 44 39.72932(N) 122 01 14.03733(W) AD(1991.35) 1
KT1807 ELLIP H (06/02/98) 19.987 (m) GP(1991.35) 4 2
KT1807 NAD 83(1992)- 39 44 39.72961(N) 122 01 14.03644(W) AD(1991.35) 2
KT1807 NAD 83(1986)- 39 44 39.72041(N) 122 01 14.03128(W) AD(1984.00) 2
KT1807 NAD 27 - 39 44 40.14500(N) 122 01 10.10200(W) AD( ) 2
KT1807 NAVD 88 (05/10/05) 47.96 (m) GEOID03 model used GPS OBS
KT1807 NAVD 88 (07/10/98) 47.9 (m) UNKNOWN model used GPS OBS
KT1807 NGVD 29 47.27 (m) 155.1 (f) LEVELING 3
KT1807
KT1807.Superseded values are not recommended for survey control.
KT1807
KT1807.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
KT1807.See file dsdata.pdf to determine how the superseded data were derived.
KT1807
KT1807_MARKER: DS = TRIANGULATION STATION DISK
KT1807_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
KT1807_STAMPING: HAMILTON 1939
KT1807_MARK LOGO: CGS
KT1807_PROJECTION: RECESSED 15 CENTIMETERS
KT1807_MAGNETIC: N = NO MAGNETIC MATERIAL
KT1807_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
KT1807+STABILITY: SURFACE MOTION
KT1807_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
KT1807+SATELLITE: SATELLITE OBSERVATIONS - April 24, 2019
KT1807
KT1807 HISTORY - Date Condition Report By
KT1807 HISTORY - 1939 MONUMENTED CGS
KT1807 HISTORY - 1962 SEE DESCRIPTION CASLC
KT1807 HISTORY - 19950412 GOOD CADT
KT1807 HISTORY - 20031010 GOOD FRAME
KT1807 HISTORY - 20041005 GOOD CADT
KT1807 HISTORY - 20080101 GOOD FRAME
KT1807 HISTORY - 20100511 GOOD USACE
KT1807 HISTORY - 20190424 GOOD CADT
KT1807
KT1807 STATION DESCRIPTION
KT1807
KT1807'DESCRIBED BY COAST AND GEODETIC SURVEY 1939 (FGJ)

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KT1807'ON THE WEST SIDE OF THE CENTRAL IRRIGATION CANAL AT THE NORTHWEST
KT1807'CORNER OF HAMILTON CITY JUST SOUTH OF THE ROAD LEADING WEST
KT1807'TO ORLAND. TO REACH FROM DEPOT IN HAMILTON CITY, GO NORTH 0.3
KT1807'MILE, TURN LEFT (WEST) AND GO 0.45 MILE ON STATE HIGHWAY 32
KT1807'TO STATION. THE STATION IS 45 FEET SOUTH OF CENTER LINE OF
KT1807'STATE HIGHWAY 32, 126-1/2 FEET WEST-SOUTHWEST OF THE WEST END
KT1807'OF SOUTH SIDE OF WOODEN BRIDGE OVER IRRIGATION CANAL. THE
KT1807'AZIMUTH MARK IS 0.5 MILE WEST OF STATION ON THE NORTH SIDE OF
KT1807'STATE HIGHWAY 32, A DISTANCE OF 39 FEET.

KT1807'

KT1807'SURFACE, UNDERGROUND, REFERENCE AND AZIMUTH MARKS ARE STANDARD
KT1807'BRONZE DISKS SET AS DESCRIBED IN NOTES 1A, 7A, 11A AND 11A,
KT1807'RESPECITELY.

KT1807'

KT1807'A 4- BY 4-INCH WHITE POST WAS PLACED AT STATION MARK.

KT1807'

KT1807'A 77-FOOT TOWER REQUIRED.

KT1807

KT1807 STATION RECOVERY (1962)

KT1807

KT1807'RECOVERY NOTE BY CALIFORNIA STATE LANDS COMMISSION 1962

KT1807'THE STATION WAS RECOVERED IN GOOD CONDITION. R.M. 1 AND R.M. 2

KT1807'ARE LOST. THE WOODEN BRIDGE HAS BEEN REPLACED BY A STEEL AND

KT1807'CONCRETE BRIDGE.

KT1807'

KT1807'THE STATION IS LOCATED 86.0 FEET SSW OF POWER POLE, 127.7

KT1807'FEET WSW OF SOUTHWEST CORNER OF BRIDGE, 65.0 FEET N OF A FENCE

KT1807'CORNER, 53.5 FEET ESE OF AN ANGLE POINT IN SOUTHERLY HIGHWAY

KT1807'RIGHT-OF-WAY FENCE, 44.9 FEET S OF CENTER LINE OF CALIF. ROUTE

KT1807'32 AND 1.9 FEET N OF A 4 X 4-INCH WITNESS POST. THE MARK IS A

KT1807'STANDARD USC AND GS BRASS CAP SET IN CONCRETE POST WITH A

KT1807'10-INCH SQUARE TOP FLUSH WITH THE GROUND.

KT1807'

KT1807'R.M. 3 IS 118.0 FEET SE OF POWER POLE, 140.4 FEET NE OF FENCE

KT1807'CORNER, 15.8 FEET S OF CENTER LINE OF CALIF. ROUTE 32, 0.6 FEET

KT1807'E OF WEST EDGE OF BRIDGE, 2.6 FEET S OF NORTH EDGE OF SIDEWALK.

KT1807'THE MARK IS A STANDARD CSLC BRASS CAP STAMPED HAMILTON R.M. 3

KT1807'1962 SET FLUSH WITH SIDEWALK.

KT1807'

KT1807'R.M. 4 IS 78.3 FEET W OF POWER POLE, 77.0 FEET N OF ANGLE POINT

KT1807'IN HIGHWAY RIGHT-OF-WAY FENCE, 39.2 FEET N OF CENTER LINE OF

KT1807'CALIF. ROUTE 32, 2.3 FEET E OF POWER POLE MARK R.M. THE MARK

KT1807'IS A STANDARD CSLC BRASS FAP STAMPED HAMILTON R.M. 4 1962

KT1807'SET IN CONCRETE POST WITH A 9-INCH DIAMETER TOP AND 0.2 FEET

KT1807'ABOVE THE GROUND.

KT1807

KT1807 STATION RECOVERY (1995)

KT1807

KT1807'RECOVERY NOTE BY CALTRANS 1995 (JCB)

KT1807'STATION WAS RECOVERED WITH A COMPLETE NEW DESCRIPTION AS FOLLOWS. THE

KT1807'STATION IS LOCATED ABOUT 10 MILES (16.1 KM) EAST OF ORLAND AND 12

KT1807'MILES (19.3 KM) WEST OF CHICO AT THE WEST EDGE OF HAMILTON CITY. TO

KT1807'REACH THE STATION FROM THE INTERSECTION OF HIGHWAY 45 AND HIGHWAY 32

KT1807'IN HAMILTON CITY, GO WEST ON HIGHWAY 32 0.05 MILES (0.08 KM) TO THE

KT1807'STATION ON THE LEFT ON THE SOUTH SIDE OF THE HIGHWAY. THE STATION IS

KT1807'A 3.5 INCH BRASS DISK IN TOP OF A CONCRETE MONUMENT, 0.5 FT (0.2 M)

KT1807'BELOW GROUND, 4.3 FT (1.3 M) NORTH OF THE NLY POST OF THE WELCOME TO

KT1807'HAMILTON CITY SIGN, 44.0 FT (13.4 M) SOUTH OF THE CENTERLINE YELLOW

KT1807'STRIKE, 61.7 FT (18.8 M) WEST OF THE WEST END OF THE SLY BRIDGE RAIL,

KT1807'78.0 FT (23.8 M) SOUTHWEST OF THE WEST END OF THE NLY BRIDGE RAIL,

KT1807'30.9 FT (9.4 M) NORTHWEST OF THE CENTER OF THREE 6 X 4 HIGH STEEL

KT1807'BARRIER POSTS, 17.0 FT (5.2 M) EAST OF CENTER OF A 3.5 X 5 US SPRINT

KT1807'VAULT. THIS STATION WAS OCCUPIED AS PART OF A CALIFORNIA HPGN

KT1807'DENSIFICATION SURVEY.

KT1807

KT1807 STATION RECOVERY (2003)

KT1807

KT1807'RECOVERY NOTE BY FRAME SURVEYING AND MAPPING 2003 (JHF)

KT1807'THE STATION WAS RECOVERED AS DESCRIBED.

KT1807
KT1807 STATION RECOVERY (2004)
KT1807
KT1807'RECOVERY NOTE BY CALTRANS 2004 (RLM)
KT1807'THE STATION WAS RECOVERED AS DESCRIBED. THIS STATION WAS OCCUPIED AS
KT1807'PART OF A CALTRANS NORTH REGION OFFICE OF SURVEYORS GPS HEIGHT
KT1807'MODERNIZATION PROJECT.
KT1807
KT1807 STATION RECOVERY (2008)
KT1807
KT1807'RECOVERY NOTE BY FRAME SURVEYING AND MAPPING 2008 (JHF)
KT1807'RECOVERED AS DESCRIBED.
KT1807
KT1807 STATION RECOVERY (2010)
KT1807
KT1807'RECOVERY NOTE BY US ARMY CORPS OF ENGINEERS 2010
KT1807'DESCRIPTION IS ADEQUATE
KT1807
KT1807 STATION RECOVERY (2019)
KT1807
KT1807'RECOVERY NOTE BY CALTRANS 2019 (RLM)
KT1807'DESCRIPTION IS ADEQUATE.

*** retrieval complete.
Elapsed Time = 00:00:04

The NGS Data Sheet

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

PROGRAM = datasheet95, VERSION = 8.12.5.14

Starting Datasheet Retrieval...

1 National Geodetic Survey, Retrieval Date = MARCH 15, 2023

LU2291 *****

LU2291 HT_MOD - This is a Height Modernization Survey Station.

LU2291 DESIGNATION - HPGN CA 02 22

LU2291 PID - LU2291

LU2291 STATE/COUNTY- CA/TEHAMA

LU2291 COUNTRY - US

LU2291 USGS QUAD - RED BLUFF EAST (2018)

LU2291

LU2291 *CURRENT SURVEY CONTROL

LU2291

LU2291* NAD 83(2011) POSITION- 40 09 35.65572(N) 122 13 26.31403(W) ADJUSTED

LU2291* NAD 83(2011) ELLIP HT- 66.825 (meters) (06/27/12) ADJUSTED

LU2291* NAD 83(2011) EPOCH - 2010.00

LU2291* NAVD 88 ORTHO HEIGHT - 95.36 (meters) 312.9 (feet) GPS OBS

LU2291

LU2291 NAVD 88 orthometric height was determined with geoid model GEOID09

LU2291 GEOID HEIGHT - -28.572 (meters) GEOID09

LU2291 GEOID HEIGHT - -28.530 (meters) GEOID18

LU2291 NAD 83(2011) X - -2,602,871.552 (meters) COMP

LU2291 NAD 83(2011) Y - -4,129,456.626 (meters) COMP

LU2291 NAD 83(2011) Z - 4,091,613.974 (meters) COMP

LU2291 LAPLACE CORR - 7.48 (seconds) DEFLEC18

LU2291

LU2291 Network accuracy estimates per FGDC Geospatial Positioning Accuracy

LU2291 Standards:

LU2291 FGDC (95% conf, cm) Standard deviation (cm) CorrNE

LU2291 Horiz Ellip SD_N SD_E SD_h (unitless)

LU2291 -----

LU2291 NETWORK 0.30 0.55 0.14 0.10 0.28 0.00976994

LU2291 -----

LU2291 Click here for local accuracies and other accuracy information.

LU2291

LU2291

LU2291.The horizontal coordinates were established by GPS observations

LU2291.and adjusted by the National Geodetic Survey in June 2012.

LU2291

LU2291.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has

LU2291.been affixed to the stable North American tectonic plate. See

LU2291.NA2011 for more information.

LU2291

LU2291.The horizontal coordinates are valid at the epoch date displayed above

LU2291.which is a decimal equivalence of Year/Month/Day.

LU2291

LU2291.The orthometric height was determined by GPS observations and a

LU2291.high-resolution geoid model using precise GPS observation and

LU2291.processing techniques.

LU2291

LU2291.Significant digits in the geoid height do not necessarily reflect accuracy.

LU2291.GEOID18 height accuracy estimate available here.

LU2291

LU2291.Click photographs - Photos may exist for this station.

LU2291

LU2291.The X, Y, and Z were computed from the position and the ellipsoidal ht.

LU2291

LU2291.The Laplace correction was computed from DEFLEC18 derived deflections.

LU2291

LU2291.The ellipsoidal height was determined by GPS observations

LU2291.and is referenced to NAD 83.

LU2291

LU2291. The following values were computed from the NAD 83(2011) position.

LU2291

LU2291; North East Units Scale Factor Converg.

LU2291;SPC CA 1 - 591,805.897 1,980,919.219 MT 0.99996357 -0 08 47.2

LU2291;SPC CA 1 - 1,941,616.51 6,499,065.80 sFT 0.99996357 -0 08 47.2

```

LU2291;UTM 10 - 4,445,793.927 566,086.738 MT 0.99965376 +0 30 01.8
LU2291
LU2291! - Elev Factor x Scale Factor = Combined Factor
LU2291!SPC CA 1 - 0.99998952 x 0.99996357 = 0.99995309
LU2291!UTM 10 - 0.99998952 x 0.99965376 = 0.99964328
LU2291
LU2291_U.S. NATIONAL GRID SPATIAL ADDRESS: 10TEK6608645793(NAD 83)
LU2291
LU2291 SUPERSEDED SURVEY CONTROL
LU2291
LU2291 NAD 83(2007)- 40 09 35.65554(N) 122 13 26.31267(W) AD(2007.00) 0
LU2291 ELLIP H (02/10/07) 66.787 (m) GP(2007.00)
LU2291 NAD 83(1998)- 40 09 35.65424(N) 122 13 26.31262(W) AD(2004.69) A
LU2291 ELLIP H (09/13/05) 66.828 (m) GP(2004.69) 4 1
LU2291 NAD 83(1986)- 40 09 35.64305(N) 122 13 26.30400(W) AD(1984.00) 1
LU2291 NAD 83(1992)- 40 09 35.65021(N) 122 13 26.30607(W) AD(1991.35) B
LU2291 ELLIP H (05/15/92) 66.967 (m) GP(1991.35) 4 2
LU2291 NAVD 88 95.37 (m) 312.9 (f) LEVELING 3
LU2291 NAVD 88 (05/28/98) 95.6 (m) UNKNOWN model used GPS OBS
LU2291 NAVD 88 (05/23/94) 95.4 (m) UNKNOWN model used GPS OBS
LU2291 NAVD 88 (05/15/92) 95.6 (m) GEOID90 model used GPS OBS
LU2291 NGVD 29 (05/23/94) 94.6 (m) GEOID93 model used GPS OBS
LU2291
LU2291.Superseded values are not recommended for survey control.
LU2291
LU2291.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
LU2291.See file dsdata.pdf to determine how the superseded data were derived.
LU2291
LU2291_MARKER: DD = SURVEY DISK
LU2291_SETTING: 50 = ALUMINUM ALLOY ROD W/O SLEEVE (10 FT.+)
LU2291_STAMPING: HPGN-CALIF. STA. 0222 1990
LU2291_MARK LOGO: CADT
LU2291_PROJECTION: RECESSED 6 CENTIMETERS
LU2291_MAGNETIC: N = NO MAGNETIC MATERIAL
LU2291_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
LU2291_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
LU2291+SATELLITE: SATELLITE OBSERVATIONS - January 01, 2008
LU2291_ROD/PIPE-DEPTH: 1.8 meters
LU2291
LU2291 HISTORY - Date Condition Report By
LU2291 HISTORY - 1990 MONUMENTED CADT
LU2291 HISTORY - 19910703 GOOD NGS
LU2291 HISTORY - 19920430 GOOD NOS
LU2291 HISTORY - 19951115 GOOD CADT
LU2291 HISTORY - 19960129 GOOD CADT
LU2291 HISTORY - 20031223 GOOD CADT
LU2291 HISTORY - 20041005 GOOD CADT
LU2291 HISTORY - 20080101 GOOD FRAME
LU2291
LU2291 STATION DESCRIPTION
LU2291
LU2291'DESCRIBED BY NATIONAL GEODETIC SURVEY 1991
LU2291'THE STATION IS LOCATED JUST OFF OF THE DIAMOND AVENUE INTERCHANGE AT
LU2291'INTERSTATE HIGHWAY 5 IN RED BLUFF.
LU2291'TO REACH THE STATION FROM THE INTERSECTION OF INTERSTATE 5 AND THE
LU2291'CENTER OF THE OVERPASS OF DIAMOND AVENUE OVER INTERSTATE 5, GO WEST
LU2291'FOR 0.1 MI (0.2 KM) TO A DIRT ACCESS ON THE RIGHT. TURN RIGHT ONTO
LU2291'THE ACCESS WAY AND THEN MAKE AN IMMEDIATE RIGHT AGAIN (EAST) ALONG
LU2291'THE FENCE LINE TO THE STATION ON THE LEFT.
LU2291'THE STATION IS A 2.5 INCH ALUMINUM DISK INSIDE A 6 INCH ALUMINUM
LU2291'ACCESS COVER, IN THE SOUTHWEST QUADRANT OF THE DIAMOND AVENUE AND
LU2291'INTERSTATE 5 INTERSECTION. LOCATED 32.6 FT (9.9 M) NORTHEAST OF CADT
LU2291'MONUMENT DIAMOND RM2 1972, 23.0 FT (7.0 M) EAST OF CADT MONUMENT
LU2291'DIAMOND RM1 1972, 22.4 FT (6.8 M) EAST OF A 6 FOOT HIGH CHAIN LINK
LU2291'FENCE, 20.4 FT (6.2 M) WEST OF THE TOP OF A BLUFF OVERLOOKING
LU2291'SOUTHBOUND INTERSTATE 5 EXIT AND 3.5 FT (1.1 M) EAST OF A METAL
LU2291'WITNESS POST PAINTED ORANGE.
LU2291'THE LOCATION OF THE STATION WILL BE IN THE APPARENT LOCATION OF
LU2291'STATION DIAMOND 1972 WHICH IS PRESUMED DESTROYED. A LEVEL TIE CAN

```

LU2291
LU2291 STATION RECOVERY (1992)
LU2291
LU2291'RECOVERY NOTE BY NATIONAL OCEAN SERVICE 1992
LU2291'RECOVERED IN GOOD CONDITION.
LU2291
LU2291 STATION RECOVERY (1995)
LU2291
LU2291'RECOVERY NOTE BY CALTRANS 1995 (JRL)
LU2291'THE STATION WAS RECOVERED WITH THE FOLLOWING REVISION. THE STATION IS
LU2291'LOCATED IN THE NORTHWEST QUADRANT OF THE INTERSECTION OF INTERSTATE 5
LU2291'AND DIAMOND AVENUE, NOT THE SOUTHWEST QUADRANT AS STATED IN THE 1991
LU2291'DESCRIPTION. THE REMAINDER OF THE DESCRIPTION IS CORRECT.
LU2291
LU2291 STATION RECOVERY (1996)
LU2291
LU2291'RECOVERY NOTE BY CALTRANS 1996 (JRL)
LU2291'RECOVERED AS DESCRIBED.
LU2291
LU2291 STATION RECOVERY (2003)
LU2291
LU2291'RECOVERY NOTE BY CALTRANS 2003 (JRL)
LU2291'THE STATION IS 1.2 M EAST OF AN ORANGE CARSONITE WITNESS POST AND 2.5
LU2291'M SOUTHEAST OF A WHITE CARSONITE POST WITH AMBER RELFECTOR.
LU2291'
LU2291'THIS STATION WAS OCCUPIED AS A PART OF THE CALTRANS NORTH REGION
LU2291'HEIGHT MODERNIZATION PROJECT.
LU2291
LU2291 STATION RECOVERY (2004)
LU2291
LU2291'RECOVERY NOTE BY CALTRANS 2004 (JRL)
LU2291'THE STATION IS 1.2 M EAST OF AN ORANGE CARSONITE WITNESS POST AND 2.5
LU2291'M SOUTHEAST OF A WHITE CARSONITE POST WITH AMBER RELFECTOR.
LU2291'
LU2291'THIS STATION WAS OCCUPIED AS A PART OF THE CALTRANS NORTH REGION
LU2291'HEIGHT MODERNIZATION PROJECT.
LU2291
LU2291 STATION RECOVERY (2008)
LU2291
LU2291'RECOVERY NOTE BY FRAME SURVEYING AND MAPPING 2008 (JHF)
LU2291'RECOVERED AS DESCRIBED.

*** retrieval complete.
Elapsed Time = 00:00:04

Appendix B : Field Notes

BASE STATION SETUP

BH

SACRAMENTO RIVER

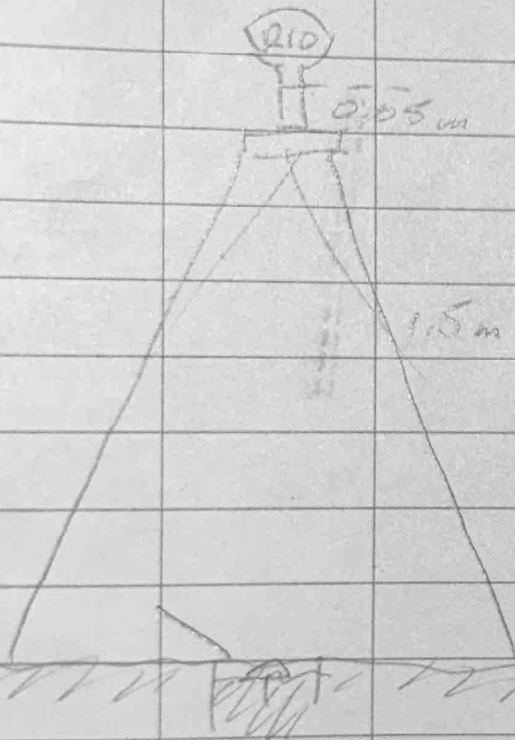
04/01/23

PT 102 TC ASH (PID DL9132)

ALCAP SET IN MON BOX ON ASH d. 10

HA TO ARP = 1,550 m TRM RID

TRIMBLE RIO#9077, QR, TSC5 DL3, SECO FIX



START 15 @ 15:15 UTC

90770910.402

MONOF 1-2 BARS CELL

END @ 17:52 UTC

JL DARLING LLC
Tacoma, WA, USA • RiteintheRain.com

DL9132

PT 103 CSOS 3-min NETWORK OBS

REINITIALIZE (SU RESET)

104 DL9132-CHK TOPO

BASE STATION SETUP

SACRAMENTO RIVER

BH

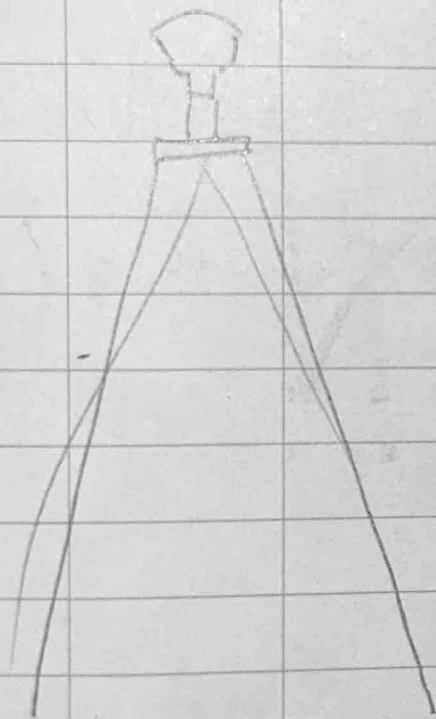
21/01/23

PT 105 TC HPGN 02.22 (LU2291)

ALCAP IN MON BOX @ DIAMOND AVE

HA TO ARP = 1.550 m TRM R10

TRMBLE R10 SN 9077, OR, TSC5 DC3, S2CO



START IS @ 20:11

9077 0911 to 02

BATTERY DIED BEFORE

2HRS - RESTART OBS

9077 9012 to 02

STAKE @ 22:

END @ 20

NO
LID

PT 106 LU2291 - CSOS 3min NETWORK OBS

REINITIALIZE (SU RESOT)

PT 107 LU2291 - CHK TORD

BASE STATION SETUP

BH

SACRAMENTO RIVER

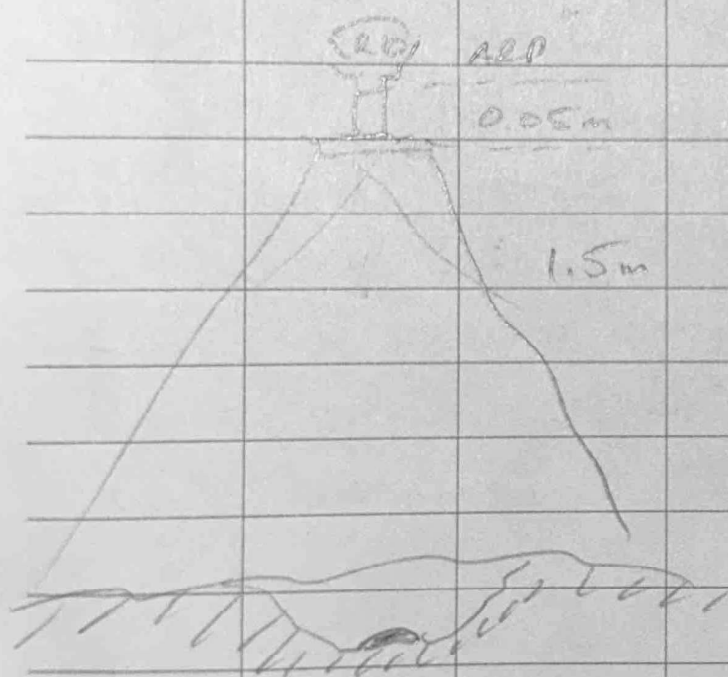
04/02/23

AT HAMILTON (KT1807)

BRASS DISK SET IN SHOULDER OF HWY 32

HA TO ARP = 1.550m TRIM210

TRIMBLE RO 80707740R, TSC5003, SIO



START IS @ 15:10 UTC

90770920.602

END @ 15:12 UTC

"KT1807-STATIC"

HAD TO DIG MARK OUT A BIT

SOFT GRAVEL

PT 108 KT1807-CSDS 3-min Control

REINIT & REMEASURE SV RESET

PT 109 KT1807-CHK TDD

BASE STATION SETUP

BH

SACRAMENTO RIVER

04/02/23

Y-852 (KT0518)

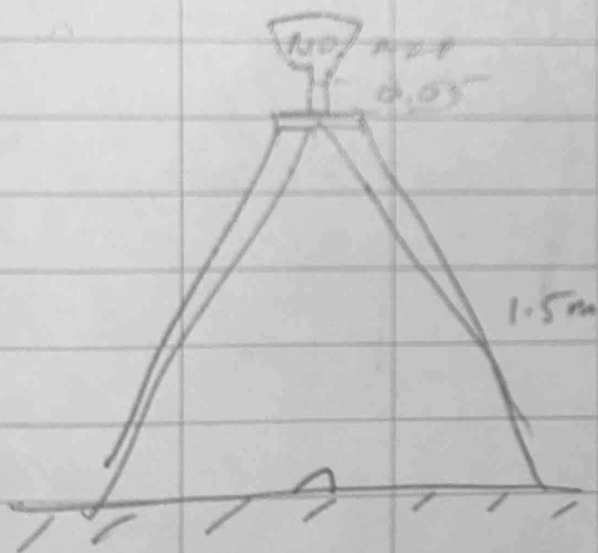
BRASS DISK SET IN CONCRETE

HEADWALL @ HWY 45 & 162 & RD 61

* TOUGH TRIPOD SETUP!

HA TO ARP = 1.550m TRML10

THING OF R1049077 YR, TSC5 X3, S600



START IS @ 18:01

90770921. to 2

END @ 20:05

PT 110 KT0518-CSDS 3 min CONTROL

REINT & REMEASURE SU RESET

PT 111 KT0518-CHK

BASE STATION SETUP BH

SACRAMENTO RIVER

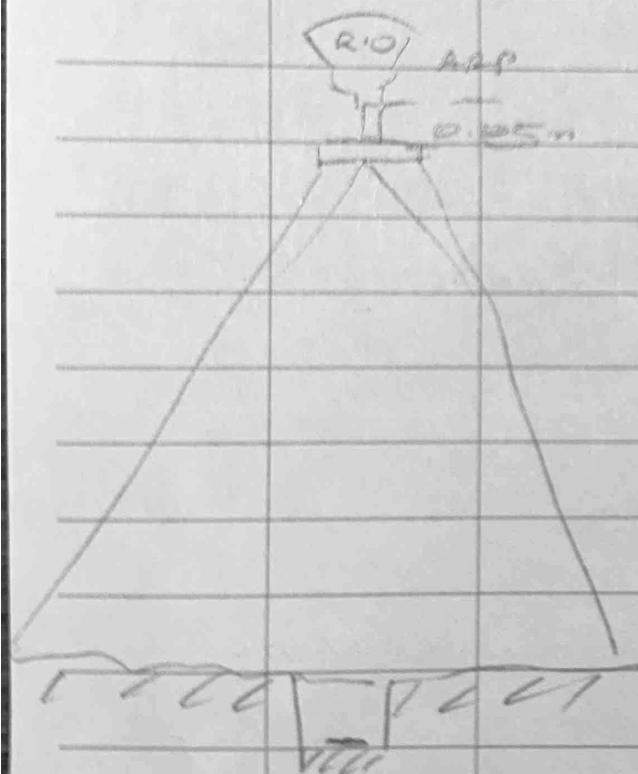
04/02/23

RC HPGN CA 03 04 (KS 2014)

AC CAP IN PVC (MISSING LID) ON
HWY 20 @ CENTRAL ST.

HA TO ARP = 1.550m TRM R10

TRIMBLE R10 #9077, QR, TSC5 DC3, 8660



START IS 021:00

9077/922 402

END @ 23:10

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PT 112

KS2014-CSDS 3 MIN CONTROL

REINIT + RESSERVE (SU RESET)

PT 113

KS2014-CHK

BASE STATION SETUP

B14

SACRAMENTO RIVER

04/02/23

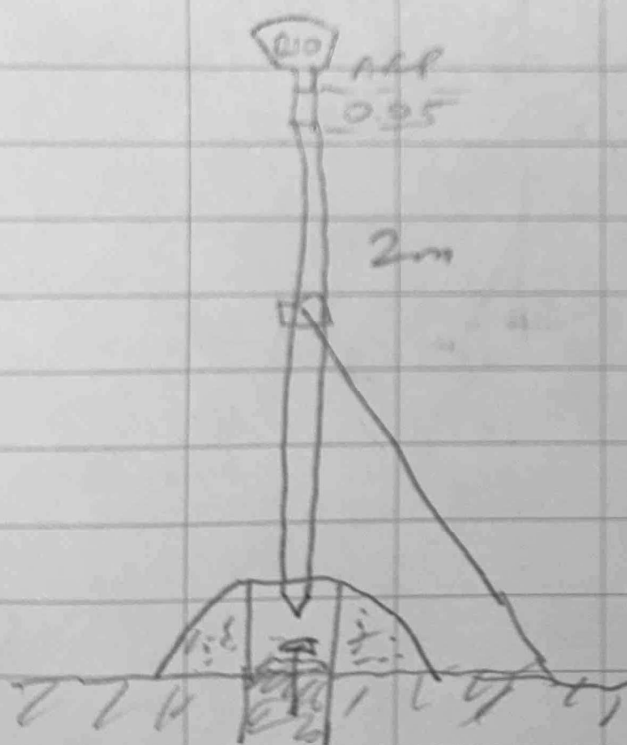
TC PAGER (DL9193)

AL CAP SET IN PVC PIPE w/ LID

ON SIDE OF RECLAMATION

~~*~~ NA TO ARP = 2.050m TRM210

TRIMBLE RX = 9326, TSC5 DC3, BIPODIAL



START IS @ 22:44

93260920. to 2

END @ 00:47

PT 114 DL9193-CDIS 3-min

REINIT + REMEASURE SW RESET

PT 115 DL9193-CHK TOPO

BASE STATION SETUP

1314

SACRAMENTO RIVER

03/31/23

PT.
100

T@ 5 SHA 11.70 (PID DH639A)

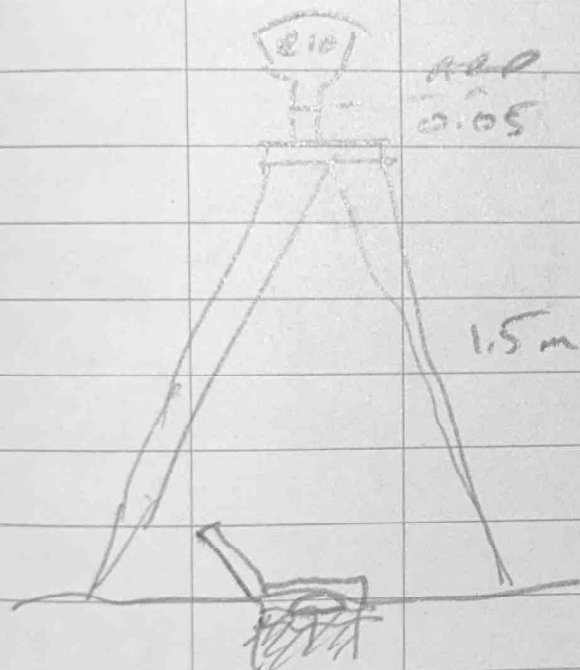
ALCAP SET IN MON BOX - REDDING

HA TO ARP = 1.550 m TRM R10

TRIMBLE R10 SN 9077 w/ae

SIO FIELD LEAS @ 1.500 m

TRIMBLE TSCS DL3



START 15@ 22:21 UTC

90770900.t02

END @ 00:30 UTC

STORED AS PT 100

RTN OBSERVATION: CSDS Port 5003

"CSDS-RTXNet-RTCM3x"

3 min CONTROL OBS, PT 101

A. Pineda Sanchez

04/01/2023

Sacramento Data Collection Task
Control Verification

JOB: Control Verification = DC4

DL9142
~~DL9142~~Coord Syst: North Am UTM Zone 10 N
(meters)

- Using: DC4, R4 (0034)
- Point: 400 [~~DL9142~~]
- Fast Static Survey Style 1 second logging
- Height: 1.5 m (BQR)
- Start Time: 11:38 am local
- End Time: 1:39 pm local

BOAT
RAMP

(BEND BRIDGE) (DL9142)

* Fair cell service 3 bars LTE

Bent Bridge Park Public Access

BOAT RAMP; CLOSE TO DL9142

- Fair access, good parking
10 ft of mud at bottom of
ramp. (* See pictures)

DL9142

- Using DC4, R4 (0034)
- Point 403
- CSDS RTN survey style
↳ observed control point 190 equals
- Height 1.5 m (BQR)

Rite in the Rain

DL9142

- Point 404 [DL9142 - CSDS]
- Height: 1.5 m (BQR)
- CSDS RTN survey style
↳ Topo Point

~~Time~~

* NOTE Points 402 & 403 should be deleted.

DH6625

* Great cell service in area.

• DC4, R4 (0034) File: 00340912

- Point 405
- Fast Static @ 2:48 p.m. local
- Height: 1.5 m (BQR)
- End Time: 4:49 p.m. local

- Point 406 [DH6625 - CSDS]

- CSDS RTN survey style

↳ observed control point 180 epochs

- Height: 1.5 m (BQR)

- Point: 407 [DH6625 - CHK]

- CSDS RTN

↳ Topo point

- Height: 1.5 m (BQR)

WOODSON BRIDGE BOAT RAMP (NEAR) - D146625²⁹

- Does not look like viable option to launch the boats

- ~~20~~ 20 ft - 30 ft of mud / sand

* See pictures

* No trucks with trailers parked ~~at ramp~~

MILL CREEK PARK BOAT RAMP (15 mins from D146625)

- Might be a viable option to launch - some mud but not an excessive amount

* See pictures

* Can access downstream and upstream reaches.

* Trucks w/ trailers parked in the parking lot (lifted w/ mud tires)

A. Pineda Sanchez
 Sacramento Control Verification
 04/02/2023

DL9190

• DL 4, R4 (0034)

■ Point 408

- Fast Static @ 8:26 am local
- Height: 1.5 m (BQR)
- End Time: 10:27 am local
- File: ~~00340912~~ 00340920

■ Point 409

- 409 [DL9190 - CSDS]
- Observed Control Point 180 epochs
- Height: 1.5 meters (BQR)
 - CSDS RTN SURVEY STYLE

■ Point 408***

Accidentally named 408
 should be named 410.

- *410* [DL9190 - CSDS - CHK]
- CSDS RTN Survey Style
- Topo Point
- Height: 1.5 m (BQR)

ORD BEND BOAT RAMP (Next to DL9190)

- Looks like a great boat launch option
- Little to no mud on ramp
- No wires/objects down river or upriver
- Fee to launch = \$5

X-section 6 (Just river from ORDBEN BOAT RAMP)

- looks clear other than a tree or two poking out of the water
- doesn't look too shallow

DH6520

• DC4, R4 (0034)

■ • Point 411

- Fast Static @ 11:32 a.m. local
- Height: 1.5 m (BOR)
- End Time: 1:33 pm local
- File: 00340921

■ • Point - 412

- 412 [DH6520 - CSDS]
- Observed Control Point - 180 crossing
- Height: 1.5 m (BOR)
- CSDS RTN Survey Style

■ • Point 413

- CSDS RTN Survey Style
- 413 [DH6520 - CSDS - CHK]
- Top point
- Height: 1.5 m (BOR)

COLUSA - Sacram. River Stake Rec Area BOAT RAMP

- Great condition; good option to launch ^{boats}
- Costs \$13 to launch ^{into the River}

Section 8 - looks deep; no debris or obstacles
 - Saw jet boats in that area
 - See pictures

DH6521

• DC 4, R4 (0034)

Point 4/14 ~~42~~

• Fast Static @ 2:36 pm local

• Height: 1.5 m (BQR)

• End Time: 4:37 pm local

• File: 00340922

Point

• ~~4/15~~ 4/15 [DH6521 - CSDS]

• CSDS - RTN Survey Style Observed Control Pt.

• Height: 1.5 m BQR

Point

• 4/16 [DH6521 - CSDS - CHK]

• CSDS-RTN \rightarrow Topo Point

• Height: 1.5 m (BQR)

A. Pineda Sanchez

04/03/2023

Sacramento Control Verification

DL9158

• DCY, RY (0034)

Point ~~418~~ 417

- Fast Static C 2:52 pm local
- Height: 1.5 m (BQR)
- End Time: 4:53 pm local
- File: 00340930

Point 418 [DL9158 - CSOS]

- CSOS - RTN - Survey Style
- observed Control Rain 180 epochs
- Height: 1.5 m (BQR)

Point 419 [DL9158 - CSOS - CHK]

- CSOS - RTN - Survey Style
- Topo Point
- Height: 1.5 m (BQR)

Appendix C : CSDS Reference Station Processing Reports

Project File Data	Coordinate System
Name: C:\Users\bhocker\OneDrive - yuroktribe.nsn.us\Documents\Active_Projects\Sacramento_River_TopoBathy\C-Process\TBC\CSDS_Network_Verification\CSDS_BaseStationNetwork.vce	Name: World wide/UTM
Size: 390 KB	Zone: 10 North
Modified: 4/18/2023 2:55:56 PM (UTC:-7)	Datum: NAD83(2011)
Time zone: Pacific Standard Time	Global reference datum: NAD83(2011)
Reference number:	Global reference epoch: 2010
Description:	Geoid: GEOID18 (Conus)
Comment 1:	Vertical datum: NAVD88
Comment 2:	Calibrated site:
Comment 3:	

--

GNSS Loop Closure Results

Summary

Legs in loop: 3
 Number of Loops: 824
 Number Passed: 824
 Number Failed: 0

	Length (Meter)	Δ3D (Meter)	ΔHoriz (Meter)	ΔVert (Meter)	PPM
Pass/Fail Criteria					1
Best		0.0001	0.0001	0.0000	0.000
Worst		0.0326	0.0212	0.0321	0.338
Average Loop	214538.9330	0.0099	0.0049	0.0077	0.052
Standard Error	59870.6434	0.0119	0.0068	0.0098	0.045

Date: 4/20/2023 11:41:44 AM	Project: C:\Users\bhocker\OneDrive - yuroktribe.nsn.us\Documents\Active_Projects\Sacramento_River_TopoBathy\C-Process\TBC\CSDS_Network_Verification\CSDS_BaseStationNetwork.vce	Trimble Business Center
-----------------------------	---	-------------------------

Project File Data		Coordinate System	
Name:	C:\Users\bhocker\OneDrive - yuroktribe.nsn.us\Documents\Active_Projects\Sacramento_River_TopoBathy\C-Process\TBC\CSDS_Network_Verification\CSDS_BaseStationNetwork.vce	Name:	World wide/UTM
Size:	390 KB	Zone:	10 North
Modified:	4/18/2023 12:05:56 PM (UTC:-7)	Datum:	NAD83(2011)
Time zone:	Pacific Standard Time	Global reference datum:	NAD83(2011)
Reference number:		Global reference epoch:	2010
Description:		Geoid:	GEOID18 (Conus)
Comment 1:		Vertical datum:	NAVD88
Comment 2:		Calibrated site:	
Comment 3:			

Network Adjustment Report

Adjustment Settings

Set-Up Errors

GNSS

Error in Height of Antenna: 0.0015 m

Centering Error: 0.0015 m

Covariance Display

Horizontal:

Propagated Linear Error [E]: U.S.

Constant Term [C]: 0.0000 m

Scale on Linear Error [S]: 1.960

Three-Dimensional

Propagated Linear Error [E]: U.S.

Constant Term [C]: 0.0000 m

Scale on Linear Error [S]: 1.960

Adjustment Statistics

Number of Iterations for Successful Adjustment: 2

Network Reference Factor: 0.95

Chi Square Test (95%): Passed

Precision Confidence Level: 95%

Degrees of Freedom: 261

Post Processed Vector Statistics

Reference Factor: 0.95
Redundancy Number: 261.00
A Priori Scalar: 1.00

Control Coordinate Comparisons

Values shown are control coordinates minus adjusted coordinates.

Point ID	Δ Easting (Meter)	Δ Northing (Meter)	Δ Elevation (Meter)	Δ Height (Meter)
ORVB	-0.0008	-0.0030	?	0.0139
P270	0.0014	0.0039	?	0.0163
P341	0.0032	-0.0052	?	-0.0335
P344	0.0035	0.0024	?	-0.0133
P349	0.0003	0.0064	?	-0.0438
SACR	-0.0043	0.0161	?	-0.0238

Control Point Constraints

Point ID	Type	East σ (Meter)	North σ (Meter)	Height σ (Meter)	Elevation σ (Meter)
Fixed = 0.000000(Meter)					

Adjusted Grid Coordinates

Point ID	Easting (Meter)	Easting Error (Meter)	Northing (Meter)	Northing Error (Meter)	Elevation (Meter)	Elevation Error (Meter)	Constraint
CH1G	597057.673	0.0009	4401895.180	0.0011	62.328	0.0030	
OR1K	624441.361	0.0010	4373844.257	0.0011	68.484	0.0032	
ORVB	628846.584	0.0009	4379400.670	0.0010	367.869	0.0026	
P270	581531.320	0.0010	4344253.424	0.0011	17.681	0.0027	
P341	533235.559	0.0015	4500051.635	0.0017	434.267	0.0043	
P344	583059.760	0.0009	4420342.456	0.0011	78.215	0.0027	
P349	557477.127	0.0012	4509128.054	0.0015	302.696	0.0038	
RD1L	560656.066	0.0011	4487051.667	0.0013	160.526	0.0034	
SACR	643204.815	0.0012	4279776.686	0.0014	37.963	0.0042	
WD1J	607210.870	0.0011	4281430.003	0.0014	31.284	0.0040	
WI1H	573472.345	0.0011	4334394.228	0.0012	31.750	0.0034	
YC1I	617298.869	0.0011	4333788.290	0.0013	25.819	0.0039	

Coordinates from a free adjustment should only be used for analysis of the inner accuracy of the network. They should not be distributed as final results.

Adjusted Geodetic Coordinates

Point ID	Latitude	Longitude	Height (Meter)	Height Error (Meter)	Constraint
CH1G	N39°45'41.22838"	W121°52'00.85232"	34.823	0.0030	
OR1K	N39°30'18.80463"	W121°33'09.27212"	40.791	0.0032	
ORVB	N39°33'16.64453"	W121°30'00.99485"	340.564	0.0026	
P270	N39°14'37.55810"	W122°03'18.71386"	-11.854	0.0027	
P341	N40°39'02.34915"	W122°36'24.78603"	407.345	0.0043	
P344	N39°55'44.82979"	W122°01'40.64421"	50.277	0.0027	
P349	N40°43'51.89403"	W122°19'09.60931"	275.903	0.0038	
RD1L	N40°31'55.15340"	W122°17'01.75386"	132.840	0.0034	
SACR	N38°39'17.97080"	W121°21'15.19293"	7.509	0.0042	
WD1J	N38°40'29.91496"	W121°46'03.07620"	0.543	0.0040	
W1IH	N39°09'20.35576"	W122°08'58.73590"	1.811	0.0034	
YC1I	N39°08'43.41006"	W121°38'33.44747"	-3.422	0.0039	

Coordinates from a free adjustment should only be used for analysis of the inner accuracy of the network. They should not be distributed as final results.

Adjusted ECEF Coordinates

Point ID	X (Meter)	X Error (Meter)	Y (Meter)	Y Error (Meter)	Z (Meter)	Z Error (Meter)	3D Error (Meter)	Constraint
CH1G	-2592074.648	0.0015	-4169708.958	0.0022	4057682.620	0.0020	0.0033	
OR1K	-2578658.663	0.0016	-4199334.119	0.0023	4035776.948	0.0021	0.0035	
ORVB	-2573121.220	0.0014	-4198906.746	0.0019	4040198.152	0.0018	0.0030	
P270	-2625149.095	0.0014	-4192124.485	0.0020	4013304.652	0.0018	0.0031	
P341	-2611515.296	0.0022	-4082431.761	0.0032	4133332.026	0.0030	0.0049	
P344	-2597465.613	0.0014	-4152304.131	0.0020	4071985.826	0.0019	0.0031	
P349	-2587827.366	0.0019	-4090481.141	0.0028	4140018.890	0.0026	0.0043	
RD1L	-2592923.274	0.0017	-4104164.524	0.0025	4123146.528	0.0023	0.0038	
SACR	-2595053.388	0.0020	-4259028.391	0.0030	3962484.552	0.0027	0.0046	
WD1J	-2624975.379	0.0020	-4239015.424	0.0029	3964212.402	0.0026	0.0044	
W1IH	-2635351.693	0.0018	-4193034.780	0.0025	4005732.676	0.0023	0.0038	
YC1I	-2598519.037	0.0019	-4216800.125	0.0028	4004845.819	0.0025	0.0042	

Coordinates from a free adjustment should only be used for analysis of the inner accuracy of the network. They should not be distributed as final results.

Error Ellipse Components

Point ID	Semi-major axis (Meter)	Semi-minor axis (Meter)	Azimuth
CH1G	0.0013	0.0011	173°
OR1K	0.0014	0.0012	174°
ORVB	0.0013	0.0011	174°
P270	0.0013	0.0012	178°
P341	0.0021	0.0018	161°
P344	0.0014	0.0011	168°
P349	0.0018	0.0015	165°
RD1L	0.0017	0.0014	165°
SACR	0.0018	0.0015	163°
WD1J	0.0017	0.0014	177°
WIIH	0.0015	0.0014	2°
YC1I	0.0016	0.0013	172°

Adjusted GNSS Observations

Observation ID		Observation	A-posteriori Error	Residual	Standardized Residual
ORVB --> OR1K (PV184)	Az.	219°21'46"	0.042 sec	0.249 sec	4.107
	ΔHt.	-299.7734 m	0.0042 m	0.0111 m	2.310
	Ellip Dist.	7092.2558 m	0.0014 m	-0.0038 m	-1.824
OR1K --> WIIH (PV14)	Az.	233°10'41"	0.005 sec	0.027 sec	3.709
	ΔHt.	-38.9792 m	0.0048 m	0.0033 m	0.429
	Ellip Dist.	64470.5031 m	0.0016 m	-0.0026 m	-0.979
CH1G --> OR1K (PV1)	Az.	136°24'44"	0.008 sec	-0.002 sec	-0.163
	ΔHt.	5.9681 m	0.0046 m	-0.0108 m	-1.247
	Ellip Dist.	39210.7623 m	0.0015 m	0.0085 m	3.619
OR1K --> WIIH (PV35)	Az.	233°10'41"	0.005 sec	-0.026 sec	-3.567
	ΔHt.	-38.9792 m	0.0048 m	-0.0065 m	-0.820
	Ellip Dist.	64470.5031 m	0.0016 m	-0.0014 m	-0.506
P270 --> OR1K (PV96)	Az.	56°00'34"	0.006 sec	0.030 sec	3.505

	ΔHt.	52.6451 m	0.0043 m	-0.0023 m	-0.347
	Ellip Dist.	52137.7336 m	0.0015 m	-0.0028 m	-1.118
P270 --> OR1K (PV211)	Az.	56°00'34"	0.006 sec	-0.029 sec	-3.406
	ΔHt.	52.6451 m	0.0043 m	0.0059 m	0.865
	Ellip Dist.	52137.7336 m	0.0015 m	-0.0016 m	-0.634
CH1G --> OR1K (PV22)	Az.	136°24'44"	0.008 sec	-0.002 sec	-0.156
	ΔHt.	5.9681 m	0.0046 m	0.0042 m	0.482
	Ellip Dist.	39210.7623 m	0.0015 m	-0.0076 m	-3.207
P349 --> OR1K (PV177)	Az.	154°06'06"	0.002 sec	0.000 sec	-0.033
	ΔHt.	-235.1120 m	0.0053 m	-0.0051 m	-0.528
	Ellip Dist.	150994.3629 m	0.0020 m	0.0106 m	3.135
P344 --> OR1K (PV261)	Az.	138°57'10"	0.005 sec	-0.004 sec	-0.595
	ΔHt.	-9.4866 m	0.0044 m	0.0036 m	0.523
	Ellip Dist.	62262.1827 m	0.0016 m	-0.0074 m	-2.799
P344 --> OR1K (PV146)	Az.	138°57'10"	0.005 sec	0.002 sec	0.312
	ΔHt.	-9.4866 m	0.0044 m	-0.0045 m	-0.664
	Ellip Dist.	62262.1827 m	0.0016 m	0.0072 m	2.785
OR1K --> YC1I (PV41)	Az.	191°01'40"	0.008 sec	-0.020 sec	-1.776
	ΔHt.	-44.2127 m	0.0052 m	0.0096 m	1.131
	Ellip Dist.	40696.7383 m	0.0017 m	0.0064 m	2.663
P349 --> OR1K (PV292)	Az.	154°06'06"	0.002 sec	-0.001 sec	-0.258
	ΔHt.	-235.1120 m	0.0053 m	0.0011 m	0.145
	Ellip Dist.	150994.3629 m	0.0020 m	-0.0076 m	-2.421
OR1K --> RD1L (PV2)	Az.	331°31'50"	0.002 sec	0.000 sec	-0.117
	ΔHt.	92.0496 m	0.0049 m	0.0052 m	0.532
	Ellip Dist.	129978.0436 m	0.0018 m	0.0077 m	2.411
OR1K --> WD1J (PV9)	Az.	191°28'29"	0.003 sec	0.010 sec	2.081
	ΔHt.	-40.2478 m	0.0053 m	0.0043 m	0.476
	Ellip Dist.	94028.8800 m	0.0018 m	-0.0076 m	-2.323
OR1K --> RD1L (PV23)	Az.	331°31'50"	0.002 sec	-0.001 sec	-0.335
	ΔHt.	92.0496 m	0.0049 m	-0.0018 m	-0.230
	Ellip Dist.	129978.0436 m	0.0018 m	-0.0060 m	-2.231
ORVB --> OR1K (PV69)	Az.	219°21'46"	0.042 sec	-0.137 sec	-2.197
	ΔHt.	-299.7734 m	0.0042 m	-0.0053 m	-0.964
	Ellip Dist.	7092.2558 m	0.0014 m	0.0025 m	1.159
OR1K --> YC1I (PV20)	Az.	191°01'40"	0.008 sec	0.022 sec	2.008
	ΔHt.	-44.2127 m	0.0052 m	-0.0012 m	-0.154
	Ellip Dist.	40696.7383 m	0.0017 m	-0.0033 m	-1.436
OR1K --> SACR (PV26)	Az.	169°37'54"	0.003 sec	-0.005 sec	-1.135

	ΔHt.	-33.2819 m	0.0054 m	-0.0006 m	-0.083
	Ellip Dist.	95937.8545 m	0.0019 m	0.0059 m	1.910
OR1K --> SACR (PV5)	Az.	169°37'54"	0.003 sec	0.009 sec	1.848
	ΔHt.	-33.2819 m	0.0054 m	0.0052 m	0.660
	Ellip Dist.	95937.8545 m	0.0019 m	-0.0054 m	-1.813
P270 --> CH1G (PV212)	Az.	15°40'36"	0.005 sec	0.005 sec	0.628
	ΔHt.	46.6769 m	0.0042 m	-0.0112 m	-1.669
	Ellip Dist.	59714.2373 m	0.0016 m	0.0013 m	0.484
P341 --> RD1L (PV131)	Az.	115°37'16"	0.013 sec	0.009 sec	0.638
	ΔHt.	-274.5042 m	0.0052 m	0.0052 m	0.983
	Ellip Dist.	30357.3556 m	0.0019 m	0.0030 m	1.532
ORVB --> YC1I (PV64)	Az.	195°09'30"	0.006 sec	-0.002 sec	-0.248
	ΔHt.	-343.9861 m	0.0048 m	-0.0099 m	-1.488
	Ellip Dist.	47061.4912 m	0.0016 m	0.0016 m	0.719
CH1G --> YC1I (PV21)	Az.	164°10'05"	0.004 sec	-0.006 sec	-0.964
	ΔHt.	-38.2446 m	0.0052 m	-0.0132 m	-1.484
	Ellip Dist.	71069.4156 m	0.0018 m	0.0000 m	-0.002
ORVB --> YC1I (PV179)	Az.	195°09'30"	0.006 sec	-0.001 sec	-0.069
	ΔHt.	-343.9861 m	0.0048 m	0.0118 m	1.468
	Ellip Dist.	47061.4912 m	0.0016 m	0.0014 m	0.577
P344 --> CH1G (PV262)	Az.	143°25'53"	0.012 sec	-0.005 sec	-0.271
	ΔHt.	-15.4547 m	0.0042 m	-0.0097 m	-1.419
	Ellip Dist.	23163.8813 m	0.0015 m	0.0006 m	0.262
P341 --> CH1G (PV248)	Az.	147°13'12"	0.003 sec	-0.002 sec	-0.561
	ΔHt.	-372.5219 m	0.0054 m	-0.0114 m	-1.396
	Ellip Dist.	117121.2023 m	0.0020 m	-0.0005 m	-0.156
P349 --> RD1L (PV176)	Az.	172°14'57"	0.015 sec	-0.002 sec	-0.111
	ΔHt.	-143.0624 m	0.0049 m	-0.0001 m	-0.017
	Ellip Dist.	22312.0576 m	0.0019 m	0.0027 m	1.334
CH1G --> RD1L (PV24)	Az.	337°35'05"	0.003 sec	-0.004 sec	-0.882
	ΔHt.	98.0177 m	0.0047 m	0.0108 m	1.330
	Ellip Dist.	92640.3363 m	0.0018 m	0.0003 m	0.089
P341 --> P349 (PV280)	Az.	69°43'47"	0.016 sec	0.004 sec	0.254
	ΔHt.	-131.4418 m	0.0053 m	-0.0069 m	-1.219
	Ellip Dist.	25894.7206 m	0.0018 m	-0.0013 m	-0.661
P344 --> YC1I (PV256)	Az.	159°02'07"	0.003 sec	0.003 sec	0.595
	ΔHt.	-53.6993 m	0.0050 m	0.0092 m	1.167
	Ellip Dist.	93105.9150 m	0.0017 m	-0.0036 m	-1.217

P341 --> P349 (PV165)	Az.	69°43'47"	0.016 sec	0.005 sec	0.349
	ΔHt.	-131.4418 m	0.0053 m	0.0060 m	1.188
	Ellip Dist.	25894.7206 m	0.0018 m	0.0015 m	0.800
OR1K --> WD1J (PV30)	Az.	191°28'29"	0.003 sec	-0.006 sec	-1.181
	ΔHt.	-40.2478 m	0.0053 m	-0.0019 m	-0.220
	Ellip Dist.	94028.8800 m	0.0018 m	0.0018 m	0.583
P270 --> P344 (PV252)	Az.	1°45'10"	0.004 sec	0.003 sec	0.498
	ΔHt.	62.1316 m	0.0039 m	-0.0066 m	-1.177
	Ellip Dist.	76128.4858 m	0.0016 m	-0.0005 m	-0.194
WI1H --> YC1I (PV16)	Az.	91°19'45"	0.008 sec	0.006 sec	0.495
	ΔHt.	-5.2335 m	0.0053 m	-0.0099 m	-1.153
	Ellip Dist.	43843.2516 m	0.0015 m	0.0022 m	1.013
P349 --> RD1L (PV291)	Az.	172°14'57"	0.015 sec	0.003 sec	0.175
	ΔHt.	-143.0624 m	0.0049 m	0.0023 m	0.395
	Ellip Dist.	22312.0576 m	0.0019 m	-0.0024 m	-1.136
CH1G --> RD1L (PV3)	Az.	337°35'05"	0.003 sec	0.005 sec	0.969
	ΔHt.	98.0177 m	0.0047 m	-0.0078 m	-1.134
	Ellip Dist.	92640.3363 m	0.0018 m	0.0015 m	0.553
P341 --> CH1G (PV133)	Az.	147°13'12"	0.003 sec	0.002 sec	0.633
	ΔHt.	-372.5219 m	0.0054 m	0.0069 m	1.126
	Ellip Dist.	117121.2023 m	0.0020 m	-0.0016 m	-0.623
ORVB --> WI1H (PV180)	Az.	231°50'55"	0.004 sec	-0.007 sec	-1.061
	ΔHt.	-338.7526 m	0.0044 m	-0.0015 m	-0.222
	Ellip Dist.	71376.7867 m	0.0015 m	-0.0010 m	-0.407
CH1G --> WD1J (PV31)	Az.	175°53'55"	0.002 sec	0.004 sec	1.050
	ΔHt.	-34.2796 m	0.0053 m	0.0064 m	0.706
	Ellip Dist.	120925.1172 m	0.0019 m	0.0012 m	0.372
P349 --> CH1G (PV178)	Az.	160°10'45"	0.003 sec	0.004 sec	1.042
	ΔHt.	-241.0802 m	0.0050 m	0.0041 m	0.620
	Ellip Dist.	114341.6058 m	0.0019 m	-0.0001 m	-0.056
P341 --> RD1L (PV246)	Az.	115°37'16"	0.013 sec	-0.004 sec	-0.286
	ΔHt.	-274.5042 m	0.0052 m	-0.0057 m	-0.950
	Ellip Dist.	30357.3556 m	0.0019 m	-0.0020 m	-1.011
P344 --> YC1I (PV141)	Az.	159°02'07"	0.003 sec	-0.003 sec	-0.644
	ΔHt.	-53.6993 m	0.0050 m	-0.0067 m	-0.987
	Ellip Dist.	93105.9150 m	0.0017 m	-0.0022 m	-0.824
ORVB --> P270 (PV90)	Az.	234°20'47"	0.005 sec	0.001 sec	0.183
	ΔHt.	-352.4184 m	0.0038 m	-0.0042 m	-0.946
	Ellip Dist.	58956.5992 m	0.0014 m	-0.0005 m	-0.246

SACR --> WIIH (PV33)	Az.	309°06'09"	0.004 sec	-0.005 sec	-0.939
	ΔHt.	-5.6973 m	0.0054 m	0.0007 m	0.085
	Ellip Dist.	88598.1100 m	0.0018 m	-0.0013 m	-0.466
ORVB --> CH1G (PV185)	Az.	306°14'28"	0.008 sec	0.005 sec	0.426
	ΔHt.	-305.7415 m	0.0042 m	0.0004 m	0.070
	Ellip Dist.	38952.1730 m	0.0014 m	-0.0020 m	-0.927
CH1G --> YC1I (PV42)	Az.	164°10'05"	0.004 sec	0.006 sec	0.926
	ΔHt.	-38.2446 m	0.0052 m	0.0080 m	0.864
	Ellip Dist.	71069.4156 m	0.0018 m	-0.0008 m	-0.248
ORVB --> P349 (PV171)	Az.	332°08'51"	0.002 sec	0.001 sec	0.277
	ΔHt.	-64.6613 m	0.0048 m	-0.0019 m	-0.257
	Ellip Dist.	148106.1213 m	0.0019 m	0.0026 m	0.923
CH1G --> WD1J (PV10)	Az.	175°53'55"	0.002 sec	-0.003 sec	-0.919
	ΔHt.	-34.2796 m	0.0053 m	-0.0077 m	-0.845
	Ellip Dist.	120925.1172 m	0.0019 m	0.0012 m	0.367
P270 --> YC1I (PV91)	Az.	106°54'21"	0.009 sec	0.002 sec	0.159
	ΔHt.	8.4323 m	0.0048 m	-0.0033 m	-0.508
	Ellip Dist.	37277.4231 m	0.0015 m	0.0019 m	0.916
ORVB --> P349 (PV286)	Az.	332°08'51"	0.002 sec	-0.001 sec	-0.422
	ΔHt.	-64.6613 m	0.0048 m	0.0052 m	0.910
	Ellip Dist.	148106.1213 m	0.0019 m	-0.0013 m	-0.545
P349 --> CH1G (PV293)	Az.	160°10'45"	0.003 sec	-0.004 sec	-0.900
	ΔHt.	-241.0802 m	0.0050 m	-0.0032 m	-0.388
	Ellip Dist.	114341.6058 m	0.0019 m	-0.0007 m	-0.217
P270 --> RD1L (PV210)	Az.	352°17'18"	0.002 sec	0.000 sec	0.151
	ΔHt.	144.6947 m	0.0044 m	-0.0052 m	-0.887
	Ellip Dist.	144364.7216 m	0.0018 m	0.0009 m	0.358
P270 --> SACR (PV209)	Az.	136°51'58"	0.004 sec	-0.004 sec	-0.866
	ΔHt.	19.3631 m	0.0050 m	-0.0030 m	-0.423
	Ellip Dist.	89245.1794 m	0.0018 m	-0.0008 m	-0.291
P270 --> YC1I (PV206)	Az.	106°54'21"	0.009 sec	-0.001 sec	-0.110
	ΔHt.	8.4323 m	0.0048 m	0.0065 m	0.857
	Ellip Dist.	37277.4231 m	0.0015 m	-0.0007 m	-0.329
P344 --> CH1G (PV147)	Az.	143°25'53"	0.012 sec	0.012 sec	0.615
	ΔHt.	-15.4547 m	0.0042 m	0.0043 m	0.704
	Ellip Dist.	23163.8813 m	0.0015 m	0.0018 m	0.828
ORVB --> P270 (PV205)	Az.	234°20'47"	0.005 sec	-0.006 sec	-0.817
	ΔHt.	-352.4184 m	0.0038 m	0.0000 m	0.000
	Ellip Dist.	58956.5992 m	0.0014 m	-0.0008 m	-0.365

P270 --> CH1G (PV97)	Az.	15°40'36"	0.005 sec	-0.002 sec	-0.301
	ΔHt.	46.6769 m	0.0042 m	0.0052 m	0.807
	Ellip Dist.	59714.2373 m	0.0016 m	-0.0003 m	-0.123
P341 --> P344 (PV134)	Az.	148°14'41"	0.004 sec	0.000 sec	0.074
	ΔHt.	-357.0672 m	0.0051 m	-0.0005 m	-0.099
	Ellip Dist.	94033.4819 m	0.0020 m	-0.0018 m	-0.788
ORVB --> P344 (PV255)	Az.	312°45'40"	0.005 sec	0.001 sec	0.106
	ΔHt.	-290.2868 m	0.0039 m	0.0045 m	0.780
	Ellip Dist.	61437.9600 m	0.0015 m	-0.0003 m	-0.134
SACR --> YC1I (PV39)	Az.	335°24'33"	0.006 sec	-0.005 sec	-0.606
	ΔHt.	-10.9308 m	0.0058 m	0.0077 m	0.767
	Ellip Dist.	59914.4244 m	0.0019 m	0.0023 m	0.684
WI1H --> YC1I (PV37)	Az.	91°19'45"	0.008 sec	-0.005 sec	-0.404
	ΔHt.	-5.2335 m	0.0053 m	0.0068 m	0.763
	Ellip Dist.	43843.2516 m	0.0015 m	-0.0007 m	-0.326
P344 --> WD1J (PV258)	Az.	170°45'08"	0.002 sec	0.002 sec	0.747
	ΔHt.	-49.7343 m	0.0051 m	0.0065 m	0.716
	Ellip Dist.	141036.8743 m	0.0019 m	0.0014 m	0.423
ORVB --> P344 (PV140)	Az.	312°45'40"	0.005 sec	-0.001 sec	-0.187
	ΔHt.	-290.2868 m	0.0039 m	-0.0037 m	-0.743
	Ellip Dist.	61437.9600 m	0.0015 m	-0.0003 m	-0.148
SACR --> YC1I (PV18)	Az.	335°24'33"	0.006 sec	0.004 sec	0.535
	ΔHt.	-10.9308 m	0.0058 m	-0.0062 m	-0.735
	Ellip Dist.	59914.4244 m	0.0019 m	0.0017 m	0.575
ORVB --> CH1G (PV70)	Az.	306°14'28"	0.008 sec	-0.008 sec	-0.672
	ΔHt.	-305.7415 m	0.0042 m	-0.0010 m	-0.174
	Ellip Dist.	38952.1730 m	0.0014 m	0.0015 m	0.732
ORVB --> SACR (PV67)	Az.	172°44'40"	0.003 sec	0.003 sec	0.687
	ΔHt.	-333.0553 m	0.0050 m	-0.0031 m	-0.481
	Ellip Dist.	100670.6610 m	0.0018 m	0.0018 m	0.672
WD1J --> YC1I (PV17)	Az.	11°40'48"	0.006 sec	0.000 sec	-0.011
	ΔHt.	-3.9650 m	0.0057 m	-0.0057 m	-0.683
	Ellip Dist.	53334.3236 m	0.0019 m	0.0005 m	0.179
P344 --> RD1L (PV145)	Az.	342°03'48"	0.004 sec	0.003 sec	0.497
	ΔHt.	82.5630 m	0.0044 m	-0.0042 m	-0.682
	Ellip Dist.	70394.4105 m	0.0017 m	0.0004 m	0.166
ORVB --> WD1J (PV181)	Az.	193°24'00"	0.003 sec	0.002 sec	0.403
	ΔHt.	-340.0211 m	0.0050 m	0.0025 m	0.334
	Ellip Dist.	100354.1096 m	0.0018 m	-0.0019 m	-0.664

ORVB --> WI1H (PV65)	Az.	231°50'55"	0.004 sec	0.003 sec	0.470
	ΔHt.	-338.7526 m	0.0044 m	-0.0040 m	-0.651
	Ellip Dist.	71376.7867 m	0.0015 m	-0.0006 m	-0.266
SACR --> WD1J (PV28)	Az.	273°39'30"	0.011 sec	-0.006 sec	-0.437
	ΔHt.	-6.9658 m	0.0058 m	0.0054 m	0.600
	Ellip Dist.	36039.3064 m	0.0016 m	0.0014 m	0.648
ORVB --> WD1J (PV66)	Az.	193°24'00"	0.003 sec	-0.001 sec	-0.185
	ΔHt.	-340.0211 m	0.0050 m	-0.0049 m	-0.637
	Ellip Dist.	100354.1096 m	0.0018 m	-0.0011 m	-0.371
SACR --> WD1J (PV7)	Az.	273°39'30"	0.011 sec	-0.002 sec	-0.175
	ΔHt.	-6.9658 m	0.0058 m	-0.0012 m	-0.152
	Ellip Dist.	36039.3064 m	0.0016 m	-0.0014 m	-0.623
P344 --> WD1J (PV143)	Az.	170°45'08"	0.002 sec	-0.002 sec	-0.614
	ΔHt.	-49.7343 m	0.0051 m	-0.0049 m	-0.557
	Ellip Dist.	141036.8743 m	0.0019 m	0.0002 m	0.051
ORVB --> RD1L (PV183)	Az.	328°36'41"	0.002 sec	-0.001 sec	-0.203
	ΔHt.	-207.7238 m	0.0044 m	0.0036 m	0.599
	Ellip Dist.	127467.3854 m	0.0017 m	0.0004 m	0.174
WD1J --> YC1I (PV38)	Az.	11°40'48"	0.006 sec	0.003 sec	0.399
	ΔHt.	-3.9650 m	0.0057 m	0.0055 m	0.592
	Ellip Dist.	53334.3236 m	0.0019 m	-0.0002 m	-0.062
CH1G --> WI1H (PV36)	Az.	199°58'49"	0.004 sec	0.002 sec	0.354
	ΔHt.	-33.0111 m	0.0048 m	0.0048 m	0.588
	Ellip Dist.	71524.9375 m	0.0017 m	0.0008 m	0.290
ORVB --> SACR (PV182)	Az.	172°44'40"	0.003 sec	-0.002 sec	-0.358
	ΔHt.	-333.0553 m	0.0050 m	0.0045 m	0.583
	Ellip Dist.	100670.6610 m	0.0018 m	0.0007 m	0.244
P270 --> WD1J (PV208)	Az.	158°21'40"	0.005 sec	0.002 sec	0.258
	ΔHt.	12.3973 m	0.0049 m	0.0005 m	0.063
	Ellip Dist.	67888.8141 m	0.0018 m	0.0016 m	0.571
WD1J --> WI1H (PV11)	Az.	328°16'35"	0.005 sec	-0.003 sec	-0.438
	ΔHt.	1.2685 m	0.0054 m	0.0048 m	0.562
	Ellip Dist.	62816.0106 m	0.0018 m	0.0015 m	0.524
P344 --> P349 (PV164)	Az.	344°33'17"	0.003 sec	0.002 sec	0.536
	ΔHt.	225.6254 m	0.0047 m	-0.0001 m	-0.015
	Ellip Dist.	92429.0913 m	0.0019 m	0.0003 m	0.139
P344 --> WI1H (PV257)	Az.	186°59'03"	0.004 sec	0.000 sec	0.009
	ΔHt.	-48.4658 m	0.0046 m	0.0038 m	0.532
	Ellip Dist.	86509.3783 m	0.0017 m	-0.0005 m	-0.178

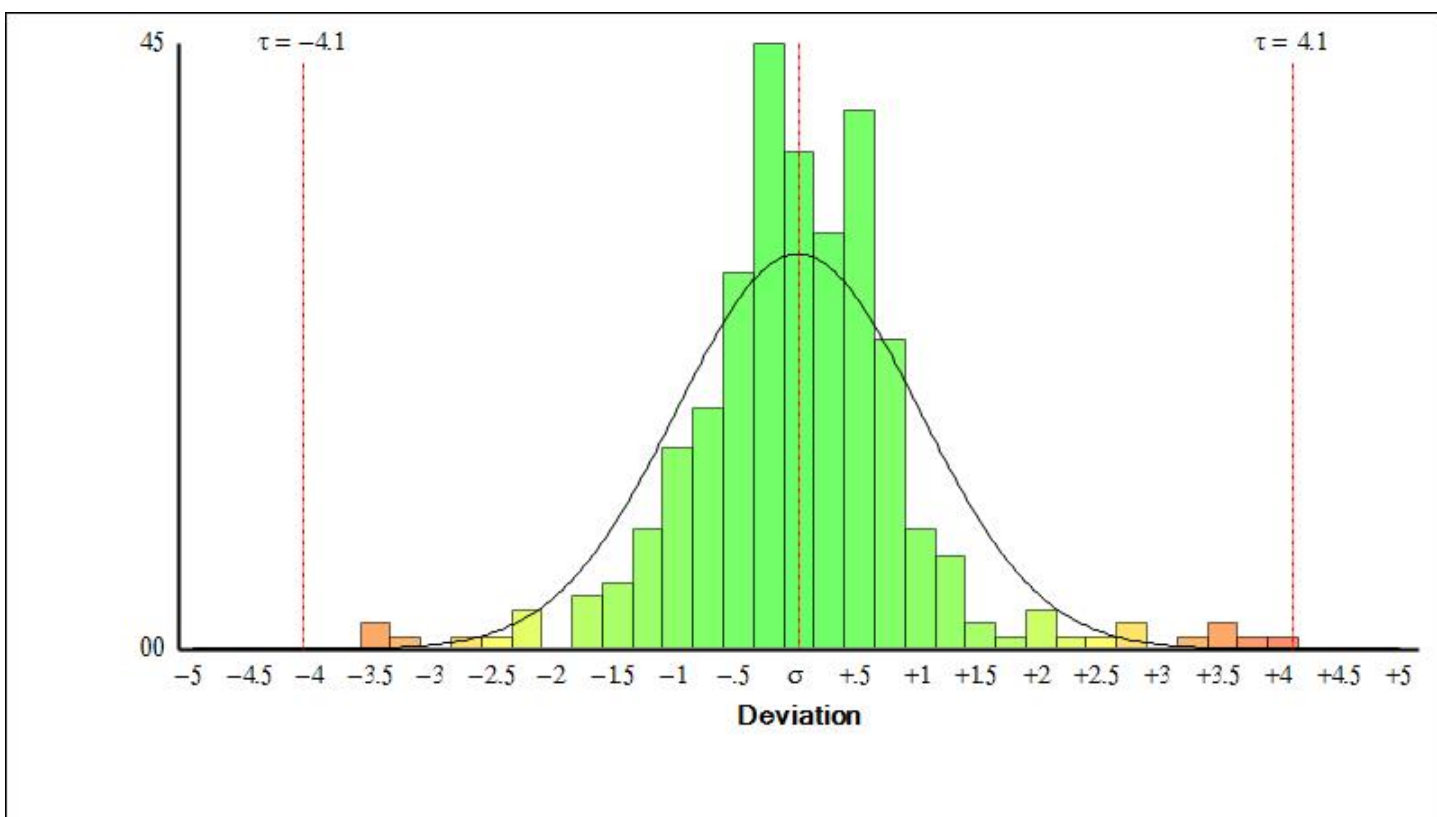
CH1G --> SACR (PV6)	Az.	160°00'51"	0.002 sec	-0.001 sec	-0.314
	ΔHt.	-27.3138 m	0.0054 m	-0.0046 m	-0.509
	Ellip Dist.	130575.6114 m	0.0019 m	0.0011 m	0.338
P270 --> SACR (PV94)	Az.	136°51'58"	0.004 sec	0.001 sec	0.111
	ΔHt.	19.3631 m	0.0050 m	0.0030 m	0.501
	Ellip Dist.	89245.1794 m	0.0018 m	-0.0010 m	-0.404
P270 --> RD1L (PV95)	Az.	352°17'18"	0.002 sec	0.001 sec	0.365
	ΔHt.	144.6947 m	0.0044 m	0.0024 m	0.499
	Ellip Dist.	144364.7216 m	0.0018 m	-0.0008 m	-0.354
P270 --> P344 (PV137)	Az.	1°45'10"	0.004 sec	-0.002 sec	-0.311
	ΔHt.	62.1316 m	0.0039 m	0.0017 m	0.351
	Ellip Dist.	76128.4858 m	0.0016 m	0.0012 m	0.496
P270 --> WD1J (PV93)	Az.	158°21'40"	0.005 sec	-0.003 sec	-0.493
	ΔHt.	12.3973 m	0.0049 m	0.0006 m	0.089
	Ellip Dist.	67888.8141 m	0.0018 m	-0.0001 m	-0.021
ORVB --> RD1L (PV68)	Az.	328°36'41"	0.002 sec	0.000 sec	0.042
	ΔHt.	-207.7238 m	0.0044 m	-0.0033 m	-0.475
	Ellip Dist.	127467.3854 m	0.0017 m	-0.0001 m	-0.026
P344 --> RD1L (PV260)	Az.	342°03'48"	0.004 sec	-0.003 sec	-0.441
	ΔHt.	82.5630 m	0.0044 m	0.0005 m	0.069
	Ellip Dist.	70394.4105 m	0.0017 m	0.0013 m	0.459
CH1G --> SACR (PV27)	Az.	160°00'51"	0.002 sec	0.001 sec	0.405
	ΔHt.	-27.3138 m	0.0054 m	0.0014 m	0.149
	Ellip Dist.	130575.6114 m	0.0019 m	0.0015 m	0.456
P344 --> P349 (PV279)	Az.	344°33'17"	0.003 sec	-0.002 sec	-0.435
	ΔHt.	225.6254 m	0.0047 m	-0.0031 m	-0.408
	Ellip Dist.	92429.0913 m	0.0019 m	-0.0002 m	-0.084
WD1J --> W11H (PV32)	Az.	328°16'35"	0.005 sec	0.001 sec	0.094
	ΔHt.	1.2685 m	0.0054 m	0.0007 m	0.075
	Ellip Dist.	62816.0106 m	0.0018 m	0.0012 m	0.408
P270 --> W11H (PV92)	Az.	219°51'36"	0.025 sec	0.009 sec	0.265
	ΔHt.	13.6658 m	0.0043 m	-0.0017 m	-0.378
	Ellip Dist.	12737.9977 m	0.0016 m	0.0005 m	0.253
P344 --> W11H (PV142)	Az.	186°59'03"	0.004 sec	-0.001 sec	-0.181
	ΔHt.	-48.4658 m	0.0046 m	-0.0012 m	-0.181
	Ellip Dist.	86509.3783 m	0.0017 m	0.0010 m	0.358
P341 --> P344 (PV249)	Az.	148°14'41"	0.004 sec	-0.001 sec	-0.250
	ΔHt.	-357.0672 m	0.0051 m	-0.0014 m	-0.205

	Ellip Dist.	94033.4819 m	0.0020 m	0.0002 m	0.093
P270 --> WI1H (PV207)	Az.	219°51'36"	0.025 sec	-0.008 sec	-0.248
	ΔHt.	13.6658 m	0.0043 m	0.0009 m	0.178
	Ellip Dist.	12737.9977 m	0.0016 m	-0.0003 m	-0.120
CH1G --> WI1H (PV15)	Az.	199°58'49"	0.004 sec	0.000 sec	-0.051
	ΔHt.	-33.0111 m	0.0048 m	-0.0015 m	-0.204
	Ellip Dist.	71524.9375 m	0.0017 m	0.0003 m	0.091
SACR --> WI1H (PV12)	Az.	309°06'09"	0.004 sec	0.001 sec	0.138
	ΔHt.	-5.6973 m	0.0054 m	-0.0002 m	-0.031
	Ellip Dist.	88598.1100 m	0.0018 m	-0.0003 m	-0.133

Histogram of Standardized Residuals

Critical Tau Value: 4.1

Observations Failing the Tau Test: 1



Covariance Terms

From Point	To Point		Components	A-posteriori Error	Horiz. Precision (Ratio)	3D Precision (Ratio)
CH1G	OR1K	Az.	136°24'44"	0.008 sec	1 : 26030393	1 : 25979958
		ΔHt.	5.9681 m	0.0046 m		
		ΔElev.	6.1561 m	0.0046 m		
		Ellip Dist.	39210.7623 m	0.0015 m		
CH1G	ORVB	Az.	126°00'26"	0.008 sec	1 : 27652588	1 : 27555838
		ΔHt.	305.7415 m	0.0042 m		
		ΔElev.	305.5411 m	0.0042 m		
		Ellip Dist.	38952.1730 m	0.0014 m		
CH1G	P270	Az.	195°47'47"	0.005 sec	1 : 38069872	1 : 38115597
		ΔHt.	-46.6769 m	0.0042 m		
		ΔElev.	-44.6470 m	0.0042 m		
		Ellip Dist.	59714.2373 m	0.0016 m		
CH1G	P341	Az.	327°41'52"	0.003 sec	1 : 57131746	1 : 57139017
		ΔHt.	372.5219 m	0.0054 m		
		ΔElev.	371.9390 m	0.0054 m		
		Ellip Dist.	117121.2023 m	0.0021 m		
CH1G	P344	Az.	323°32'04"	0.012 sec	1 : 15335811	1 : 15313792
		ΔHt.	15.4547 m	0.0042 m		
		ΔElev.	15.8874 m	0.0042 m		
		Ellip Dist.	23163.8813 m	0.0015 m		
CH1G	P349	Az.	340°28'18"	0.003 sec	1 : 60870298	1 : 60883353
		ΔHt.	241.0802 m	0.0050 m		
		ΔElev.	240.3679 m	0.0050 m		
		Ellip Dist.	114341.6058 m	0.0019 m		
CH1G	RD1L	Az.	337°35'05"	0.003 sec	1 : 52658762	1 : 52643473
		ΔHt.	98.0177 m	0.0047 m		
		ΔElev.	98.1982 m	0.0047 m		
		Ellip Dist.	92640.3363 m	0.0018 m		
CH1G	SACR	Az.	160°00'51"	0.002 sec	1 : 69239668	1 : 69199238
		ΔHt.	-27.3138 m	0.0054 m		
		ΔElev.	-24.3649 m	0.0054 m		
		Ellip Dist.	130575.6114 m	0.0019 m		
CH1G	WD1J	Az.	175°53'55"	0.002 sec	1 : 65276587	1 : 65277254
		ΔHt.	-34.2796 m	0.0053 m		
		ΔElev.	-31.0440 m	0.0053 m		
		Ellip Dist.	120925.1172 m	0.0019 m		
CH1G	WI1H	Az.	199°58'49"	0.004 sec	1 : 42757541	1 : 42808731
		ΔHt.	-33.0111 m	0.0048 m		
		ΔElev.	-30.5783 m	0.0048 m		
		Ellip Dist.	71524.9375 m	0.0017 m		

CH1G	YCII	Az.	164°10'05"	0.004 sec	1 : 40671914	1 : 40652400
		ΔHt.	-38.2446 m	0.0052 m		
		ΔElev.	-36.5092 m	0.0052 m		
		Ellip Dist.	71069.4156 m	0.0017 m		
OR1K	ORVB	Az.	39°19'46"	0.042 sec	1 : 4895995	1 : 4917149
		ΔHt.	299.7734 m	0.0042 m		
		ΔElev.	299.3850 m	0.0042 m		
		Ellip Dist.	7092.2558 m	0.0014 m		
OR1K	P270	Az.	236°19'42"	0.006 sec	1 : 35705790	1 : 35772598
		ΔHt.	-52.6451 m	0.0043 m		
		ΔElev.	-50.8031 m	0.0043 m		
		Ellip Dist.	52137.7336 m	0.0015 m		
OR1K	P344	Az.	319°15'24"	0.005 sec	1 : 40042367	1 : 39965775
		ΔHt.	9.4866 m	0.0044 m		
		ΔElev.	9.7313 m	0.0044 m		
		Ellip Dist.	62262.1827 m	0.0016 m		
OR1K	P349	Az.	334°35'44"	0.002 sec	1 : 77473995	1 : 77437391
		ΔHt.	235.1120 m	0.0053 m		
		ΔElev.	234.2118 m	0.0053 m		
		Ellip Dist.	150994.3629 m	0.0019 m		
OR1K	RD1L	Az.	331°31'50"	0.002 sec	1 : 71941533	1 : 71876373
		ΔHt.	92.0496 m	0.0049 m		
		ΔElev.	92.0422 m	0.0049 m		
		Ellip Dist.	129978.0436 m	0.0018 m		
OR1K	SACR	Az.	169°37'54"	0.003 sec	1 : 51372259	1 : 51378677
		ΔHt.	-33.2819 m	0.0054 m		
		ΔElev.	-30.5210 m	0.0054 m		
		Ellip Dist.	95937.8545 m	0.0019 m		
OR1K	WD1J	Az.	191°28'29"	0.003 sec	1 : 51512876	1 : 51580087
		ΔHt.	-40.2478 m	0.0053 m		
		ΔElev.	-37.2001 m	0.0053 m		
		Ellip Dist.	94028.8800 m	0.0018 m		
OR1K	WI1H	Az.	233°10'41"	0.005 sec	1 : 40951376	1 : 41029656
		ΔHt.	-38.9792 m	0.0048 m		
		ΔElev.	-36.7344 m	0.0048 m		
		Ellip Dist.	64470.5031 m	0.0016 m		
OR1K	YCII	Az.	191°01'40"	0.008 sec	1 : 24134904	1 : 24168563
		ΔHt.	-44.2128 m	0.0052 m		
		ΔElev.	-42.6652 m	0.0052 m		
		Ellip Dist.	40696.7383 m	0.0017 m		
ORVB	P270	Az.	234°20'47"	0.005 sec	1 : 41633911	1 : 41725915
		ΔHt.	-352.4184 m	0.0038 m		

		ΔElev.	-350.1881 m	0.0038 m		
		Ellip Dist.	58956.5992 m	0.0014 m		
ORVB	P344	Az.	312°45'40"	0.005 sec	1 : 41775821	1 : 41652405
		ΔHt.	-290.2868 m	0.0039 m		
		ΔElev.	-289.6537 m	0.0039 m		
		Ellip Dist.	61437.9600 m	0.0015 m		
ORVB	P349	Az.	332°08'51"	0.002 sec	1 : 79166864	1 : 79082876
		ΔHt.	-64.6613 m	0.0048 m		
		ΔElev.	-65.1732 m	0.0048 m		
		Ellip Dist.	148106.1213 m	0.0019 m		
P270	P344	Az.	1°45'10"	0.004 sec	1 : 48001568	1 : 48027110
		ΔHt.	62.1316 m	0.0039 m		
		ΔElev.	60.5344 m	0.0039 m		
		Ellip Dist.	76128.4858 m	0.0016 m		
P341	P344	Az.	148°14'41"	0.004 sec	1 : 46687586	1 : 46719946
		ΔHt.	-357.0672 m	0.0051 m		
		ΔElev.	-356.0517 m	0.0051 m		
		Ellip Dist.	94033.4819 m	0.0020 m		
P341	P349	Az.	69°43'47"	0.016 sec	1 : 14290187	1 : 14288680
		ΔHt.	-131.4418 m	0.0053 m		
		ΔElev.	-131.5711 m	0.0053 m		
		Ellip Dist.	25894.7206 m	0.0018 m		
P344	P349	Az.	344°33'17"	0.003 sec	1 : 49767733	1 : 49797129
		ΔHt.	225.6254 m	0.0047 m		
		ΔElev.	224.4805 m	0.0047 m		
		Ellip Dist.	92429.0913 m	0.0019 m		
RD1L	ORVB	Az.	148°06'26"	0.002 sec	1 : 73795937	1 : 73717382
		ΔHt.	207.7238 m	0.0044 m		
		ΔElev.	207.3429 m	0.0044 m		
		Ellip Dist.	127467.3854 m	0.0017 m		
RD1L	P270	Az.	172°08'30"	0.002 sec	1 : 80349473	1 : 80376340
		ΔHt.	-144.6947 m	0.0044 m		
		ΔElev.	-142.8453 m	0.0044 m		
		Ellip Dist.	144364.7216 m	0.0018 m		
RD1L	P341	Az.	295°49'53"	0.013 sec	1 : 16083464	1 : 16089970
		ΔHt.	274.5042 m	0.0052 m		
		ΔElev.	273.7408 m	0.0052 m		
		Ellip Dist.	30357.3556 m	0.0019 m		
RD1L	P344	Az.	161°53'53"	0.004 sec	1 : 40297667	1 : 40303127
		ΔHt.	-82.5630 m	0.0044 m		
		ΔElev.	-82.3109 m	0.0044 m		

		Ellip Dist.	70394.4105 m	0.0017 m		
RD1L	P349	Az.	352°16'20"	0.015 sec	1 : 11970258	1 : 11990955
		ΔHt.	143.0624 m	0.0049 m		
		ΔElev.	142.1696 m	0.0049 m		
		Ellip Dist.	22312.0576 m	0.0019 m		
SACR	ORVB	Az.	352°50'12"	0.003 sec	1 : 55544055	1 : 55616489
		ΔHt.	333.0553 m	0.0050 m		
		ΔElev.	329.9060 m	0.0050 m		
		Ellip Dist.	100670.6610 m	0.0018 m		
SACR	P270	Az.	317°18'24"	0.004 sec	1 : 50849929	1 : 50737313
		ΔHt.	-19.3631 m	0.0050 m		
		ΔElev.	-20.2821 m	0.0050 m		
		Ellip Dist.	89245.1794 m	0.0018 m		
SACR	WD1J	Az.	273°39'30"	0.011 sec	1 : 22406995	1 : 22365651
		ΔHt.	-6.9658 m	0.0058 m		
		ΔElev.	-6.6791 m	0.0058 m		
		Ellip Dist.	36039.3064 m	0.0016 m		
SACR	WI1H	Az.	309°06'09"	0.004 sec	1 : 49675618	1 : 49554261
		ΔHt.	-5.6973 m	0.0054 m		
		ΔElev.	-6.2134 m	0.0054 m		
		Ellip Dist.	88598.1100 m	0.0018 m		
SACR	YCI1	Az.	335°24'33"	0.006 sec	1 : 30989902	1 : 30952990
		ΔHt.	-10.9308 m	0.0058 m		
		ΔElev.	-12.1442 m	0.0058 m		
		Ellip Dist.	59914.4244 m	0.0019 m		
WD1J	ORVB	Az.	13°13'53"	0.003 sec	1 : 56875249	1 : 56985584
		ΔHt.	340.0211 m	0.0050 m		
		ΔElev.	336.5851 m	0.0050 m		
		Ellip Dist.	100354.1096 m	0.0018 m		
WD1J	P270	Az.	338°32'31"	0.005 sec	1 : 38625530	1 : 38574681
		ΔHt.	-12.3973 m	0.0049 m		
		ΔElev.	-13.6030 m	0.0049 m		
		Ellip Dist.	67888.8141 m	0.0018 m		
WD1J	P344	Az.	350°55'02"	0.002 sec	1 : 75544856	1 : 75530737
		ΔHt.	49.7343 m	0.0051 m		
		ΔElev.	46.9314 m	0.0051 m		
		Ellip Dist.	141036.8743 m	0.0019 m		
WD1J	WI1H	Az.	328°16'35"	0.005 sec	1 : 34949015	1 : 34886724
		ΔHt.	1.2685 m	0.0054 m		
		ΔElev.	0.4657 m	0.0054 m		
		Ellip Dist.	62816.0106 m	0.0018 m		
WD1J	YCI1	Az.	11°40'48"	0.006 sec	1 : 28173733	1 : 28205490

		ΔHt.	-3.9650 m	0.0057 m		
		ΔElev.	-5.4651 m	0.0057 m		
		Ellip Dist.	53334.3236 m	0.0019 m		
WI1H	ORVB	Az.	51°26'12"	0.004 sec	1 : 46406294	1 : 46479242
		ΔHt.	338.7526 m	0.0044 m		
		ΔElev.	336.1194 m	0.0044 m		
		Ellip Dist.	71376.7867 m	0.0015 m		
WI1H	P270	Az.	39°48'01"	0.025 sec	1 : 8173760	1 : 8179172
		ΔHt.	-13.6658 m	0.0043 m		
		ΔElev.	-14.0687 m	0.0043 m		
		Ellip Dist.	12737.9977 m	0.0016 m		
WI1H	P344	Az.	6°54'24"	0.004 sec	1 : 50885988	1 : 50913303
		ΔHt.	48.4658 m	0.0046 m		
		ΔElev.	46.4657 m	0.0046 m		
		Ellip Dist.	86509.3783 m	0.0017 m		
WI1H	YC1I	Az.	91°19'45"	0.008 sec	1 : 28551404	1 : 28545572
		ΔHt.	-5.2335 m	0.0053 m		
		ΔElev.	-5.9309 m	0.0053 m		
		Ellip Dist.	43843.2516 m	0.0015 m		
YC1I	ORVB	Az.	15°04'05"	0.006 sec	1 : 28884413	1 : 28968686
		ΔHt.	343.9861 m	0.0048 m		
		ΔElev.	342.0503 m	0.0048 m		
		Ellip Dist.	47061.4912 m	0.0016 m		
YC1I	P270	Az.	287°10'00"	0.009 sec	1 : 25021176	1 : 24982912
		ΔHt.	-8.4323 m	0.0048 m		
		ΔElev.	-8.1379 m	0.0048 m		
		Ellip Dist.	37277.4231 m	0.0015 m		
YC1I	P344	Az.	339°16'50"	0.003 sec	1 : 53411109	1 : 53375191
		ΔHt.	53.6993 m	0.0050 m		
		ΔElev.	52.3965 m	0.0050 m		
		Ellip Dist.	93105.9150 m	0.0017 m		

Date: 4/18/2023 2:11:24 PM	Project: C:\Users\bhocker\OneDrive - yuroktribe.nsn.us\Documents\Active_Projects\Sacramento_River_TopoBathy\C- Process\TBC\CSDS_Network_Verification\CSDS_BaseStationNetwork.vce	Trimble Business Center
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Project File Data		Coordinate System	
Name:	C:\Users\bhocker\OneDrive - yuroktribe.nsn.us\Documents\Active_Projects\Sacramento_River_TopoBathy\C-Process\TBC\CSDS_Network_Verification\CSDS_BaseStationNetwork.vce	Name:	World wide/UTM
Size:	390 KB	Zone:	10 North
Modified:	4/18/2023 12:05:56 PM (UTC:-7)	Datum:	NAD83(2011)
Time zone:	Pacific Standard Time	Global reference datum:	NAD83(2011)
Reference number:		Global reference epoch:	2010
Description:		Geoid:	GEOID18 (Conus)
Comment 1:		Vertical datum:	NAVD88
Comment 2:		Calibrated site:	
Comment 3:			

Network Adjustment Report

Adjustment Settings

Set-Up Errors

GNSS

Error in Height of Antenna: 0.0015 m

Centering Error: 0.0015 m

Covariance Display

Horizontal:

Propagated Linear Error [E]: U.S.

Constant Term [C]: 0.0000 m

Scale on Linear Error [S]: 1.960

Three-Dimensional

Propagated Linear Error [E]: U.S.

Constant Term [C]: 0.0000 m

Scale on Linear Error [S]: 1.960

Adjustment Statistics

Number of Iterations for Successful Adjustment: 2

Network Reference Factor: 0.97

Chi Square Test (95%): Passed

Precision Confidence Level: 95%

Degrees of Freedom: 262

Post Processed Vector Statistics

Reference Factor: 0.97
Redundancy Number: 262.00
A Priori Scalar: 1.00

Control Coordinate Comparisons

Values shown are control coordinates minus adjusted coordinates.

Point ID	Δ Easting (Meter)	Δ Northing (Meter)	Δ Elevation (Meter)	Δ Height (Meter)
ORVB	0.0007	-0.0091	?	0.0306
P270	-0.0013	-0.0062	?	0.0332
P341	-0.0062	-0.0002	?	-0.0183
P349	-0.0068	0.0126	?	-0.0282

Control Point Constraints

Point ID	Type	East σ (Meter)	North σ (Meter)	Height σ (Meter)	Elevation σ (Meter)
P344	Local	Fixed	Fixed	Fixed	
SACR	Local	Fixed	Fixed	Fixed	
Fixed = 0.000000(Meter)					

Adjusted Grid Coordinates

Point ID	Easting (Meter)	Easting Error (Meter)	Northing (Meter)	Northing Error (Meter)	Elevation (Meter)	Elevation Error (Meter)	Constraint
CH1G	597057.674	0.0013	4401895.184	0.0015	62.312	0.0040	
OR1K	624441.360	0.0013	4373844.263	0.0015	68.467	0.0041	
ORVB	628846.582	0.0013	4379400.676	0.0014	367.852	0.0036	
P270	581531.323	0.0013	4344253.434	0.0015	17.664	0.0036	
P341	533235.569	0.0023	4500051.630	0.0026	434.252	0.0051	
P344	583059.763	?	4420342.459	?	78.202	?	LLh
P349	557477.134	0.0021	4509128.047	0.0025	302.680	0.0047	
RD1L	560656.072	0.0019	4487051.663	0.0022	160.510	0.0043	
SACR	643204.811	?	4279776.703	?	37.939	?	LLh
WD1J	607210.869	0.0016	4281430.019	0.0019	31.267	0.0048	
W1IH	573472.349	0.0014	4334394.239	0.0016	31.733	0.0042	
YC1I	617298.868	0.0014	4333788.301	0.0016	25.802	0.0047	

Adjusted Geodetic Coordinates

Point ID	Latitude	Longitude	Height (Meter)	Height Error (Meter)	Constraint
CH1G	N39°45'41.22852"	W121°52'00.85224"	34.806	0.0040	
OR1K	N39°30'18.80484"	W121°33'09.27217"	40.774	0.0041	
ORVB	N39°33'16.64473"	W121°30'00.99491"	340.547	0.0036	
P270	N39°14'37.55843"	W122°03'18.71374"	-11.871	0.0036	
P341	N40°39'02.34899"	W122°36'24.78562"	407.329	0.0051	
P344	N39°55'44.82987"	W122°01'40.64406"	50.264	?	LLh
P349	N40°43'51.89383"	W122°19'09.60900"	275.887	0.0047	
RD1L	N40°31'55.15327"	W122°17'01.75358"	132.825	0.0043	
SACR	N38°39'17.97133"	W121°21'15.19309"	7.485	?	LLh
WD1J	N38°40'29.91548"	W121°46'03.07622"	0.526	0.0048	
WI1H	N39°09'20.35612"	W122°08'58.73575"	1.794	0.0042	
YC1I	N39°08'43.41041"	W121°38'33.44751"	-3.439	0.0047	

Adjusted ECEF Coordinates

Point ID	X (Meter)	X Error (Meter)	Y (Meter)	Y Error (Meter)	Z (Meter)	Z Error (Meter)	3D Error (Meter)	Constraint
CH1G	-2592074.638	0.0020	-4169708.946	0.0029	4057682.613	0.0027	0.0044	
OR1K	-2578658.655	0.0020	-4199334.104	0.0030	4035776.942	0.0027	0.0045	
ORVB	-2573121.213	0.0019	-4198906.731	0.0026	4040198.146	0.0024	0.0040	
P270	-2625149.082	0.0019	-4192124.470	0.0026	4013304.649	0.0024	0.0041	
P341	-2611515.284	0.0029	-4082431.759	0.0039	4133332.013	0.0037	0.0062	
P344	-2597465.603	?	-4152304.123	?	4071985.820	?	?	LLh
P349	-2587827.356	0.0027	-4090481.139	0.0036	4140018.875	0.0035	0.0057	
RD1L	-2592923.264	0.0025	-4104164.520	0.0033	4123146.514	0.0032	0.0052	
SACR	-2595053.377	?	-4259028.365	?	3962484.550	?	?	LLh
WD1J	-2624975.367	0.0025	-4239015.403	0.0036	3964212.404	0.0033	0.0055	
WI1H	-2635351.679	0.0022	-4193034.764	0.0031	4005732.673	0.0029	0.0048	
YC1I	-2598519.027	0.0023	-4216800.107	0.0034	4004845.817	0.0031	0.0052	

Error Ellipse Components

Point ID	Semi-major axis (Meter)	Semi-minor axis (Meter)	Azimuth
CH1G	0.0019	0.0016	171°
OR1K	0.0018	0.0016	170°
ORVB	0.0017	0.0016	169°
P270	0.0018	0.0016	173°
P341	0.0033	0.0028	160°
P349	0.0031	0.0026	168°
RD1L	0.0028	0.0023	167°
WD1J	0.0024	0.0020	177°
WIIH	0.0020	0.0018	177°
YC1I	0.0021	0.0017	168°

Adjusted GNSS Observations

Transformation Parameters

Azimuth Rotation: -0.002 sec (95%) 0.002 sec

Scale Factor: 0.99999990 (95%) 0.00000001

Observation ID		Observation	A-posteriori Error	Residual	Standardized Residual
ORVB --> OR1K (PV184)	Az.	219°21'46"	0.043 sec	0.249 sec	4.011
	ΔHt.	-299.7735 m	0.0043 m	0.0110 m	2.233
	Ellip Dist.	7092.2558 m	0.0015 m	-0.0038 m	-1.783
OR1K --> WIIH (PV14)	Az.	233°10'41"	0.005 sec	0.027 sec	3.626
	ΔHt.	-38.9795 m	0.0049 m	0.0030 m	0.389
	Ellip Dist.	64470.5032 m	0.0016 m	-0.0026 m	-0.963
CH1G --> OR1K (PV1)	Az.	136°24'44"	0.008 sec	-0.002 sec	-0.162
	ΔHt.	5.9678 m	0.0048 m	-0.0111 m	-1.256
	Ellip Dist.	39210.7624 m	0.0015 m	0.0085 m	3.528
OR1K --> WIIH (PV35)	Az.	233°10'41"	0.005 sec	-0.026 sec	-3.478
	ΔHt.	-38.9795 m	0.0049 m	-0.0068 m	-0.829
	Ellip Dist.	64470.5032 m	0.0016 m	-0.0014 m	-0.501
P270 --> OR1K (PV96)	Az.	56°00'34"	0.006 sec	0.030 sec	3.423
	ΔHt.	52.6451 m	0.0044 m	-0.0023 m	-0.337
	Ellip Dist.	52137.7337 m	0.0015 m	-0.0028 m	-1.098
P270 --> OR1K (PV211)	Az.	56°00'34"	0.006 sec	-0.029 sec	-3.324
	ΔHt.	52.6451 m	0.0044 m	0.0059 m	0.846
	Ellip Dist.	52137.7337 m	0.0015 m	-0.0016 m	-0.625
CH1G --> OR1K (PV22)	Az.	136°24'44"	0.008 sec	-0.002 sec	-0.155

	ΔHt.	5.9678 m	0.0048 m	0.0039 m	0.433
	Ellip Dist.	39210.7624 m	0.0015 m	-0.0076 m	-3.137
P349 --> OR1K (PV177)	Az.	154°06'06"	0.002 sec	0.000 sec	-0.038
	ΔHt.	-235.1131 m	0.0054 m	-0.0064 m	-0.640
	Ellip Dist.	150994.3633 m	0.0020 m	0.0106 m	3.049
P344 --> OR1K (PV261)	Az.	138°57'10"	0.005 sec	-0.005 sec	-0.610
	ΔHt.	-9.4900 m	0.0041 m	0.0002 m	0.037
	Ellip Dist.	62262.1827 m	0.0016 m	-0.0075 m	-2.766
P344 --> OR1K (PV146)	Az.	138°57'10"	0.005 sec	0.002 sec	0.274
	ΔHt.	-9.4900 m	0.0041 m	-0.0079 m	-1.131
	Ellip Dist.	62262.1827 m	0.0016 m	0.0071 m	2.684
OR1K --> YC1L (PV41)	Az.	191°01'40"	0.008 sec	-0.020 sec	-1.735
	ΔHt.	-44.2129 m	0.0053 m	0.0095 m	1.086
	Ellip Dist.	40696.7383 m	0.0017 m	0.0064 m	2.595
P349 --> OR1K (PV292)	Az.	154°06'06"	0.002 sec	-0.001 sec	-0.257
	ΔHt.	-235.1131 m	0.0054 m	-0.0002 m	0.000
	Ellip Dist.	150994.3633 m	0.0020 m	-0.0077 m	-2.376
OR1K --> RD1L (PV2)	Az.	331°31'50"	0.003 sec	0.000 sec	-0.118
	ΔHt.	92.0507 m	0.0050 m	0.0062 m	0.621
	Ellip Dist.	129978.0439 m	0.0018 m	0.0077 m	2.337
OR1K --> WD1J (PV9)	Az.	191°28'29"	0.003 sec	0.010 sec	2.037
	ΔHt.	-40.2483 m	0.0054 m	0.0039 m	0.421
	Ellip Dist.	94028.8802 m	0.0019 m	-0.0076 m	-2.278
OR1K --> RD1L (PV23)	Az.	331°31'50"	0.003 sec	-0.001 sec	-0.332
	ΔHt.	92.0507 m	0.0050 m	-0.0008 m	-0.089
	Ellip Dist.	129978.0439 m	0.0018 m	-0.0061 m	-2.198
ORVB --> OR1K (PV69)	Az.	219°21'46"	0.043 sec	-0.137 sec	-2.144
	ΔHt.	-299.7735 m	0.0043 m	-0.0055 m	-0.961
	Ellip Dist.	7092.2558 m	0.0015 m	0.0025 m	1.130
OR1K --> YC1L (PV20)	Az.	191°01'40"	0.008 sec	0.022 sec	1.960
	ΔHt.	-44.2129 m	0.0053 m	-0.0013 m	-0.170
	Ellip Dist.	40696.7383 m	0.0017 m	-0.0033 m	-1.407
OR1K --> SACR (PV5)	Az.	169°37'54"	0.003 sec	0.009 sec	1.802
	ΔHt.	-33.2889 m	0.0041 m	-0.0016 m	-0.180
	Ellip Dist.	95937.8545 m	0.0019 m	-0.0056 m	-1.845
P344 --> CH1G (PV262)	Az.	143°25'53"	0.012 sec	-0.006 sec	-0.287
	ΔHt.	-15.4578 m	0.0040 m	-0.0128 m	-1.817
	Ellip Dist.	23163.8813 m	0.0015 m	0.0005 m	0.212

OR1K --> SACR (PV26)	Az.	169°37'54"	0.003 sec	-0.005 sec	-1.111
	ΔHt.	-33.2889 m	0.0041 m	-0.0075 m	-0.837
	Ellip Dist.	95937.8545 m	0.0019 m	0.0057 m	1.792
P270 --> CH1G (PV212)	Az.	15°40'36"	0.005 sec	0.005 sec	0.614
	ΔHt.	46.6774 m	0.0043 m	-0.0109 m	-1.578
	Ellip Dist.	59714.2374 m	0.0016 m	0.0013 m	0.463
P341 --> CH1G (PV248)	Az.	147°13'12"	0.003 sec	-0.002 sec	-0.555
	ΔHt.	-372.5230 m	0.0055 m	-0.0127 m	-1.515
	Ellip Dist.	117121.2026 m	0.0021 m	-0.0005 m	-0.164
CH1G --> YC1I (PV21)	Az.	164°10'05"	0.004 sec	-0.006 sec	-0.944
	ΔHt.	-38.2452 m	0.0053 m	-0.0137 m	-1.503
	Ellip Dist.	71069.4157 m	0.0018 m	0.0000 m	-0.010
ORVB --> YC1I (PV64)	Az.	195°09'30"	0.007 sec	-0.002 sec	-0.241
	ΔHt.	-343.9864 m	0.0049 m	-0.0102 m	-1.492
	Ellip Dist.	47061.4913 m	0.0017 m	0.0016 m	0.695
P341 --> RD1L (PV131)	Az.	115°37'16"	0.013 sec	0.009 sec	0.613
	ΔHt.	-274.5048 m	0.0053 m	0.0046 m	0.841
	Ellip Dist.	30357.3556 m	0.0019 m	0.0030 m	1.490
P344 --> YC1I (PV141)	Az.	159°02'07"	0.003 sec	-0.003 sec	-0.641
	ΔHt.	-53.7030 m	0.0047 m	-0.0103 m	-1.471
	Ellip Dist.	93105.9151 m	0.0018 m	-0.0023 m	-0.840
ORVB --> SACR (PV67)	Az.	172°44'40"	0.003 sec	0.003 sec	0.674
	ΔHt.	-333.0623 m	0.0036 m	-0.0100 m	-1.459
	Ellip Dist.	100670.6610 m	0.0018 m	0.0015 m	0.569
ORVB --> YC1I (PV179)	Az.	195°09'30"	0.007 sec	-0.001 sec	-0.067
	ΔHt.	-343.9864 m	0.0049 m	0.0115 m	1.401
	Ellip Dist.	47061.4913 m	0.0017 m	0.0013 m	0.557
SACR --> YC1I (PV39)	Az.	335°24'33"	0.006 sec	-0.005 sec	-0.615
	ΔHt.	-10.9240 m	0.0047 m	0.0144 m	1.378
	Ellip Dist.	59914.4243 m	0.0020 m	0.0020 m	0.586
CH1G --> RD1L (PV24)	Az.	337°35'05"	0.003 sec	-0.004 sec	-0.863
	ΔHt.	98.0184 m	0.0048 m	0.0114 m	1.376
	Ellip Dist.	92640.3366 m	0.0018 m	0.0002 m	0.076
ORVB --> P344 (PV255)	Az.	312°45'40"	0.005 sec	0.000 sec	0.068
	ΔHt.	-290.2834 m	0.0036 m	0.0079 m	1.306
	Ellip Dist.	61437.9600 m	0.0015 m	-0.0004 m	-0.177
P270 --> SACR (PV209)	Az.	136°51'58"	0.004 sec	-0.005 sec	-0.897
	ΔHt.	19.3562 m	0.0036 m	-0.0099 m	-1.302
	Ellip Dist.	89245.1794 m	0.0018 m	-0.0010 m	-0.354

P349 --> RD1L (PV176)	Az.	172°14'57"	0.015 sec	-0.002 sec	-0.108
	ΔHt.	-143.0627 m	0.0050 m	-0.0004 m	-0.072
	Ellip Dist.	22312.0576 m	0.0019 m	0.0027 m	1.298
SACR --> WD1J (PV28)	Az.	273°39'30"	0.011 sec	-0.007 sec	-0.504
	ΔHt.	-6.9594 m	0.0048 m	0.0118 m	1.264
	Ellip Dist.	36039.3064 m	0.0017 m	0.0014 m	0.596
P341 --> P349 (PV280)	Az.	69°43'47"	0.017 sec	0.004 sec	0.241
	ΔHt.	-131.4421 m	0.0054 m	-0.0073 m	-1.248
	Ellip Dist.	25894.7206 m	0.0019 m	-0.0013 m	-0.643
CH1G --> SACR (PV6)	Az.	160°00'51"	0.002 sec	-0.001 sec	-0.326
	ΔHt.	-27.3210 m	0.0040 m	-0.0118 m	-1.238
	Ellip Dist.	130575.6115 m	0.0019 m	0.0008 m	0.257
P344 --> YC1I (PV256)	Az.	159°02'07"	0.003 sec	0.003 sec	0.569
	ΔHt.	-53.7030 m	0.0047 m	0.0056 m	0.691
	Ellip Dist.	93105.9151 m	0.0018 m	-0.0037 m	-1.221
OR1K --> WD1J (PV30)	Az.	191°28'29"	0.003 sec	-0.006 sec	-1.149
	ΔHt.	-40.2483 m	0.0054 m	-0.0023 m	-0.261
	Ellip Dist.	94028.8802 m	0.0019 m	0.0018 m	0.559
WI1H --> YC1I (PV16)	Az.	91°19'45"	0.008 sec	0.006 sec	0.487
	ΔHt.	-5.2334 m	0.0054 m	-0.0098 m	-1.117
	Ellip Dist.	43843.2517 m	0.0016 m	0.0022 m	0.986
P349 --> RD1L (PV291)	Az.	172°14'57"	0.015 sec	0.003 sec	0.170
	ΔHt.	-143.0627 m	0.0050 m	0.0020 m	0.336
	Ellip Dist.	22312.0576 m	0.0019 m	-0.0024 m	-1.113
P341 --> P349 (PV165)	Az.	69°43'47"	0.017 sec	0.005 sec	0.334
	ΔHt.	-131.4421 m	0.0054 m	0.0056 m	1.094
	Ellip Dist.	25894.7206 m	0.0019 m	0.0016 m	0.783
ORVB --> P349 (PV286)	Az.	332°08'51"	0.002 sec	-0.001 sec	-0.419
	ΔHt.	-64.6600 m	0.0049 m	0.0064 m	1.087
	Ellip Dist.	148106.1216 m	0.0019 m	-0.0014 m	-0.557
P344 --> RD1L (PV145)	Az.	342°03'48"	0.004 sec	0.003 sec	0.491
	ΔHt.	82.5606 m	0.0043 m	-0.0067 m	-1.049
	Ellip Dist.	70394.4107 m	0.0018 m	0.0005 m	0.209
P341 --> RD1L (PV246)	Az.	115°37'16"	0.013 sec	-0.004 sec	-0.288
	ΔHt.	-274.5048 m	0.0053 m	-0.0063 m	-1.032
	Ellip Dist.	30357.3556 m	0.0019 m	-0.0020 m	-0.993
ORVB --> WI1H (PV180)	Az.	231°50'55"	0.005 sec	-0.007 sec	-1.030
	ΔHt.	-338.7530 m	0.0045 m	-0.0018 m	-0.267
	Ellip Dist.	71376.7868 m	0.0016 m	-0.0010 m	-0.405

CH1G --> WD1J (PV31)	Az.	175°53'55"	0.003 sec	0.004 sec	1.027
	ΔHt.	-34.2804 m	0.0054 m	0.0056 m	0.606
	Ellip Dist.	120925.1174 m	0.0019 m	0.0011 m	0.349
P270 --> P344 (PV137)	Az.	1°45'10"	0.004 sec	-0.002 sec	-0.291
	ΔHt.	62.1352 m	0.0036 m	0.0052 m	1.026
	Ellip Dist.	76128.4858 m	0.0016 m	0.0010 m	0.422
CH1G --> RD1L (PV3)	Az.	337°35'05"	0.003 sec	0.005 sec	0.945
	ΔHt.	98.0184 m	0.0048 m	-0.0071 m	-1.016
	Ellip Dist.	92640.3366 m	0.0018 m	0.0015 m	0.528
P349 --> CH1G (PV178)	Az.	160°10'45"	0.003 sec	0.004 sec	1.015
	ΔHt.	-241.0810 m	0.0051 m	0.0032 m	0.465
	Ellip Dist.	114341.6060 m	0.0019 m	-0.0002 m	-0.066
SACR --> WIIH (PV33)	Az.	309°06'09"	0.004 sec	-0.005 sec	-0.974
	ΔHt.	-5.6905 m	0.0042 m	0.0073 m	0.857
	Ellip Dist.	88598.1101 m	0.0018 m	-0.0015 m	-0.548
P344 --> WD1J (PV143)	Az.	170°45'08"	0.002 sec	-0.002 sec	-0.596
	ΔHt.	-49.7382 m	0.0048 m	-0.0087 m	-0.969
	Ellip Dist.	141036.8745 m	0.0019 m	0.0001 m	0.019
ORVB --> P270 (PV90)	Az.	234°20'47"	0.005 sec	0.001 sec	0.181
	ΔHt.	-352.4186 m	0.0039 m	-0.0043 m	-0.950
	Ellip Dist.	58956.5993 m	0.0015 m	-0.0006 m	-0.247
ORVB --> CH1G (PV185)	Az.	306°14'28"	0.008 sec	0.005 sec	0.413
	ΔHt.	-305.7412 m	0.0043 m	0.0007 m	0.103
	Ellip Dist.	38952.1731 m	0.0014 m	-0.0020 m	-0.910
CH1G --> WD1J (PV10)	Az.	175°53'55"	0.003 sec	-0.003 sec	-0.895
	ΔHt.	-34.2804 m	0.0054 m	-0.0084 m	-0.906
	Ellip Dist.	120925.1174 m	0.0019 m	0.0011 m	0.345
CH1G --> YC1I (PV42)	Az.	164°10'05"	0.004 sec	0.006 sec	0.901
	ΔHt.	-38.2452 m	0.0053 m	0.0075 m	0.791
	Ellip Dist.	71069.4157 m	0.0018 m	-0.0008 m	-0.249
P341 --> CH1G (PV133)	Az.	147°13'12"	0.003 sec	0.002 sec	0.610
	ΔHt.	-372.5230 m	0.0055 m	0.0056 m	0.893
	Ellip Dist.	117121.2026 m	0.0021 m	-0.0016 m	-0.623
P270 --> YC1I (PV91)	Az.	106°54'21"	0.009 sec	0.002 sec	0.156
	ΔHt.	8.4322 m	0.0049 m	-0.0034 m	-0.517
	Ellip Dist.	37277.4232 m	0.0015 m	0.0019 m	0.891
P349 --> CH1G (PV293)	Az.	160°10'45"	0.003 sec	-0.004 sec	-0.880
	ΔHt.	-241.0810 m	0.0051 m	-0.0042 m	-0.489
	Ellip Dist.	114341.6060 m	0.0019 m	-0.0007 m	-0.222

ORVB --> P349 (PV171)	Az.	332°08'51"	0.002 sec	0.001 sec	0.265
	ΔHt.	-64.6600 m	0.0049 m	-0.0008 m	-0.103
	Ellip Dist.	148106.1216 m	0.0019 m	0.0026 m	0.880
P270 --> CH1G (PV97)	Az.	15°40'36"	0.005 sec	-0.002 sec	-0.293
	ΔHt.	46.6774 m	0.0043 m	0.0055 m	0.842
	Ellip Dist.	59714.2374 m	0.0016 m	-0.0003 m	-0.130
P270 --> YC1L (PV206)	Az.	106°54'21"	0.009 sec	-0.001 sec	-0.107
	ΔHt.	8.4322 m	0.0049 m	0.0064 m	0.818
	Ellip Dist.	37277.4232 m	0.0015 m	-0.0007 m	-0.325
SACR --> WI1H (PV12)	Az.	309°06'09"	0.004 sec	0.000 sec	0.075
	ΔHt.	-5.6905 m	0.0042 m	0.0064 m	0.807
	Ellip Dist.	88598.1101 m	0.0018 m	-0.0006 m	-0.228
ORVB --> P270 (PV205)	Az.	234°20'47"	0.005 sec	-0.006 sec	-0.796
	ΔHt.	-352.4186 m	0.0039 m	-0.0001 m	-0.022
	Ellip Dist.	58956.5993 m	0.0015 m	-0.0008 m	-0.363
P344 --> CH1G (PV147)	Az.	143°25'53"	0.012 sec	0.011 sec	0.577
	ΔHt.	-15.4578 m	0.0040 m	0.0012 m	0.191
	Ellip Dist.	23163.8813 m	0.0015 m	0.0017 m	0.763
WI1H --> YC1L (PV37)	Az.	91°19'45"	0.008 sec	-0.005 sec	-0.391
	ΔHt.	-5.2334 m	0.0054 m	0.0068 m	0.753
	Ellip Dist.	43843.2517 m	0.0016 m	-0.0007 m	-0.321
P341 --> P344 (PV134)	Az.	148°14'41"	0.004 sec	0.000 sec	0.085
	ΔHt.	-357.0652 m	0.0051 m	0.0013 m	0.278
	Ellip Dist.	94033.4822 m	0.0021 m	-0.0017 m	-0.736
P344 --> WD1J (PV258)	Az.	170°45'08"	0.002 sec	0.002 sec	0.732
	ΔHt.	-49.7382 m	0.0048 m	0.0026 m	0.277
	Ellip Dist.	141036.8745 m	0.0019 m	0.0013 m	0.383
ORVB --> RD1L (PV183)	Az.	328°36'41"	0.003 sec	-0.001 sec	-0.204
	ΔHt.	-207.7228 m	0.0045 m	0.0044 m	0.728
	Ellip Dist.	127467.3856 m	0.0018 m	0.0004 m	0.150
P344 --> WI1H (PV142)	Az.	186°59'03"	0.004 sec	-0.001 sec	-0.157
	ΔHt.	-48.4696 m	0.0042 m	-0.0049 m	-0.713
	Ellip Dist.	86509.3783 m	0.0017 m	0.0008 m	0.311
ORVB --> CH1G (PV70)	Az.	306°14'28"	0.008 sec	-0.008 sec	-0.659
	ΔHt.	-305.7412 m	0.0043 m	-0.0008 m	-0.131
	Ellip Dist.	38952.1731 m	0.0014 m	0.0015 m	0.710
P270 --> RD1L (PV210)	Az.	352°17'18"	0.002 sec	0.000 sec	0.147
	ΔHt.	144.6959 m	0.0045 m	-0.0042 m	-0.700
	Ellip Dist.	144364.7219 m	0.0018 m	0.0008 m	0.325

P270 --> RD1L (PV95)	Az.	352°17'18"	0.002 sec	0.001 sec	0.355
	ΔHt.	144.6959 m	0.0045 m	0.0034 m	0.692
	Ellip Dist.	144364.7219 m	0.0018 m	-0.0009 m	-0.373
ORVB --> WI1H (PV65)	Az.	231°50'55"	0.005 sec	0.003 sec	0.465
	ΔHt.	-338.7530 m	0.0045 m	-0.0043 m	-0.691
	Ellip Dist.	71376.7868 m	0.0016 m	-0.0007 m	-0.269
ORVB --> WD1J (PV66)	Az.	193°24'00"	0.003 sec	-0.001 sec	-0.175
	ΔHt.	-340.0217 m	0.0051 m	-0.0054 m	-0.689
	Ellip Dist.	100354.1098 m	0.0018 m	-0.0011 m	-0.374
P344 --> P349 (PV279)	Az.	344°33'17"	0.004 sec	-0.002 sec	-0.422
	ΔHt.	225.6233 m	0.0047 m	-0.0052 m	-0.677
	Ellip Dist.	92429.0916 m	0.0019 m	-0.0001 m	-0.041
ORVB --> WD1J (PV181)	Az.	193°24'00"	0.003 sec	0.002 sec	0.399
	ΔHt.	-340.0217 m	0.0051 m	0.0020 m	0.258
	Ellip Dist.	100354.1098 m	0.0018 m	-0.0019 m	-0.660
SACR --> WD1J (PV7)	Az.	273°39'30"	0.011 sec	-0.003 sec	-0.252
	ΔHt.	-6.9594 m	0.0048 m	0.0052 m	0.611
	Ellip Dist.	36039.3064 m	0.0017 m	-0.0014 m	-0.645
WD1J --> YC1I (PV17)	Az.	11°40'48"	0.006 sec	0.000 sec	-0.006
	ΔHt.	-3.9646 m	0.0058 m	-0.0055 m	-0.637
	Ellip Dist.	53334.3238 m	0.0019 m	0.0005 m	0.167
WD1J --> YC1I (PV38)	Az.	11°40'48"	0.006 sec	0.004 sec	0.394
	ΔHt.	-3.9646 m	0.0058 m	0.0057 m	0.605
	Ellip Dist.	53334.3238 m	0.0019 m	-0.0002 m	-0.068
CH1G --> SACR (PV27)	Az.	160°00'51"	0.002 sec	0.001 sec	0.376
	ΔHt.	-27.3210 m	0.0040 m	-0.0057 m	-0.586
	Ellip Dist.	130575.6115 m	0.0019 m	0.0013 m	0.375
P270 --> SACR (PV94)	Az.	136°51'58"	0.004 sec	0.000 sec	0.055
	ΔHt.	19.3562 m	0.0036 m	-0.0038 m	-0.576
	Ellip Dist.	89245.1794 m	0.0018 m	-0.0012 m	-0.471
WD1J --> WI1H (PV11)	Az.	328°16'35"	0.005 sec	-0.003 sec	-0.427
	ΔHt.	1.2688 m	0.0055 m	0.0050 m	0.570
	Ellip Dist.	62816.0108 m	0.0018 m	0.0015 m	0.504
P270 --> WD1J (PV208)	Az.	158°21'40"	0.005 sec	0.002 sec	0.254
	ΔHt.	12.3968 m	0.0050 m	0.0001 m	0.010
	Ellip Dist.	67888.8142 m	0.0018 m	0.0016 m	0.548
P270 --> P344 (PV252)	Az.	1°45'10"	0.004 sec	0.003 sec	0.499
	ΔHt.	62.1352 m	0.0036 m	-0.0032 m	-0.540

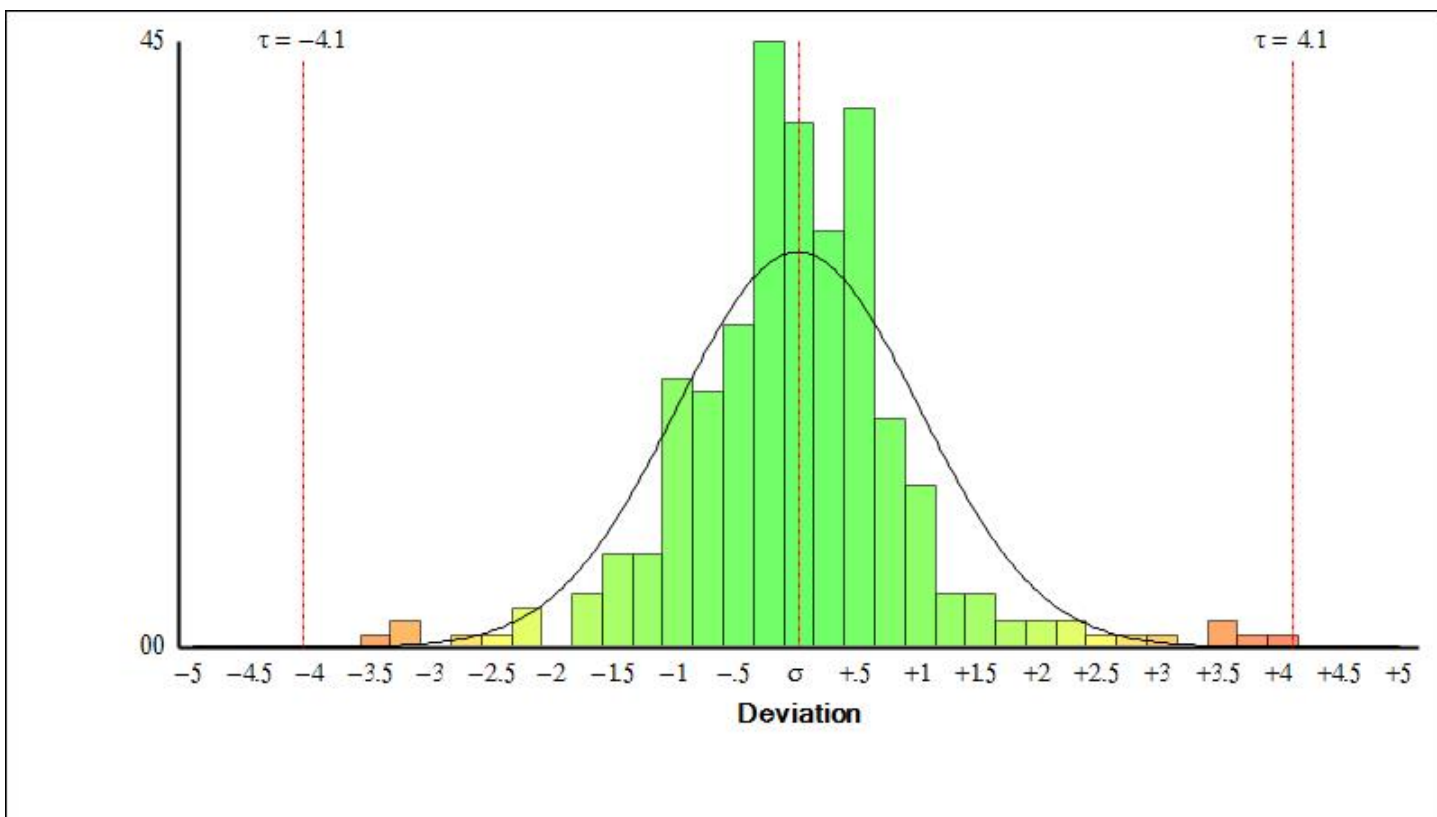
	Ellip Dist.	76128.4858 m	0.0016 m	-0.0006 m	-0.247
P344 --> P349 (PV164)	Az.	344°33'17"	0.004 sec	0.002 sec	0.527
	ΔHt.	225.6233 m	0.0047 m	-0.0022 m	-0.425
	Ellip Dist.	92429.0916 m	0.0019 m	0.0004 m	0.186
CH1G --> W11H (PV36)	Az.	199°58'49"	0.004 sec	0.002 sec	0.350
	ΔHt.	-33.0117 m	0.0049 m	0.0042 m	0.504
	Ellip Dist.	71524.9376 m	0.0017 m	0.0008 m	0.273
SACR --> YC1I (PV18)	Az.	335°24'33"	0.006 sec	0.004 sec	0.499
	ΔHt.	-10.9240 m	0.0047 m	0.0004 m	0.047
	Ellip Dist.	59914.4243 m	0.0020 m	0.0014 m	0.471
P344 --> RD1L (PV260)	Az.	342°03'48"	0.004 sec	-0.003 sec	-0.425
	ΔHt.	82.5606 m	0.0043 m	-0.0019 m	-0.259
	Ellip Dist.	70394.4107 m	0.0018 m	0.0014 m	0.491
P270 --> WD1J (PV93)	Az.	158°21'40"	0.005 sec	-0.003 sec	-0.479
	ΔHt.	12.3968 m	0.0050 m	0.0001 m	0.023
	Ellip Dist.	67888.8142 m	0.0018 m	-0.0001 m	-0.032
P270 --> W11H (PV92)	Az.	219°51'36"	0.025 sec	0.009 sec	0.263
	ΔHt.	13.6656 m	0.0044 m	-0.0019 m	-0.418
	Ellip Dist.	12737.9977 m	0.0016 m	0.0005 m	0.244
WD1J --> W11H (PV32)	Az.	328°16'35"	0.005 sec	0.001 sec	0.093
	ΔHt.	1.2688 m	0.0055 m	0.0009 m	0.093
	Ellip Dist.	62816.0108 m	0.0018 m	0.0012 m	0.391
ORVB --> SACR (PV182)	Az.	172°44'40"	0.003 sec	-0.002 sec	-0.346
	ΔHt.	-333.0623 m	0.0036 m	-0.0024 m	-0.294
	Ellip Dist.	100670.6610 m	0.0018 m	0.0005 m	0.160
ORVB --> RD1L (PV68)	Az.	328°36'41"	0.003 sec	0.000 sec	0.036
	ΔHt.	-207.7228 m	0.0045 m	-0.0024 m	-0.340
	Ellip Dist.	127467.3856 m	0.0018 m	-0.0001 m	-0.044
CH1G --> W11H (PV15)	Az.	199°58'49"	0.004 sec	0.000 sec	-0.046
	ΔHt.	-33.0117 m	0.0049 m	-0.0021 m	-0.274
	Ellip Dist.	71524.9376 m	0.0017 m	0.0002 m	0.078
P270 --> W11H (PV207)	Az.	219°51'36"	0.025 sec	-0.008 sec	-0.239
	ΔHt.	13.6656 m	0.0044 m	0.0007 m	0.133
	Ellip Dist.	12737.9977 m	0.0016 m	-0.0003 m	-0.120
P341 --> P344 (PV249)	Az.	148°14'41"	0.004 sec	-0.001 sec	-0.232
	ΔHt.	-357.0652 m	0.0051 m	0.0005 m	0.066
	Ellip Dist.	94033.4822 m	0.0021 m	0.0003 m	0.119
ORVB --> P344 (PV140)	Az.	312°45'40"	0.005 sec	-0.002 sec	-0.220
	ΔHt.	-290.2834 m	0.0036 m	-0.0003 m	-0.063

	Ellip Dist.	61437.9600 m	0.0015 m	-0.0004 m	-0.194
P344 --> W11H(PV257)	Az.	186°59'03"	0.004 sec	0.000 sec	0.029
	ΔHt.	-48.4696 m	0.0042 m	0.0001 m	0.017
	Ellip Dist.	86509.3783 m	0.0017 m	-0.0006 m	-0.211

Histogram of Standardized Residuals

Critical Tau Value: 4.1

Observations Failing the Tau Test: 0



Covariance Terms

From Point	To Point		Components	A-posteriori Error	Horiz. Precision (Ratio)	3D Precision (Ratio)
CH1G	OR1K	Az.	136°24'44"	0.008 sec	1 : 24437309	1 : 24392373
		ΔHt.	5.9678 m	0.0048 m		
		ΔElev.	6.1557 m	0.0048 m		
		Ellip Dist.	39210.7584 m	0.0016 m		
CH1G	ORVB	Az.	126°00'26"	0.008 sec	1 : 25769993	1 : 25686924

		ΔHt.	305.7412 m	0.0043 m		
		ΔElev.	305.5408 m	0.0043 m		
		Ellip Dist.	38952.1691 m	0.0015 m		
CH1G	P270	Az.	195°47'47"	0.005 sec	1 : 34248075	1 : 34282001
		ΔHt.	-46.6773 m	0.0043 m		
		ΔElev.	-44.6474 m	0.0043 m		
		Ellip Dist.	59714.2313 m	0.0017 m		
CH1G	P341	Az.	327°41'52"	0.004 sec	1 : 47734688	1 : 47736464
		ΔHt.	372.5231 m	0.0055 m		
		ΔElev.	371.9402 m	0.0055 m		
		Ellip Dist.	117121.1905 m	0.0025 m		
CH1G	P344	Az.	323°32'04"	0.012 sec	1 : 16094799	1 : 16070154
		ΔHt.	15.4578 m	0.0040 m		
		ΔElev.	15.8905 m	0.0040 m		
		Ellip Dist.	23163.8789 m	0.0014 m		
CH1G	P349	Az.	340°28'18"	0.003 sec	1 : 49218815	1 : 49218582
		ΔHt.	241.0810 m	0.0051 m		
		ΔElev.	240.3687 m	0.0051 m		
		Ellip Dist.	114341.5942 m	0.0023 m		
CH1G	RD1L	Az.	337°35'05"	0.004 sec	1 : 44251054	1 : 44235199
		ΔHt.	98.0184 m	0.0048 m		
		ΔElev.	98.1988 m	0.0048 m		
		Ellip Dist.	92640.3270 m	0.0021 m		
CH1G	SACR	Az.	160°00'51"	0.002 sec	1 : 88141175	1 : 88079708
		ΔHt.	-27.3212 m	0.0040 m		
		ΔElev.	-24.3723 m	0.0040 m		
		Ellip Dist.	130575.5981 m	0.0015 m		
CH1G	WD1J	Az.	175°53'55"	0.003 sec	1 : 51799694	1 : 51791067
		ΔHt.	-34.2806 m	0.0054 m		
		ΔElev.	-31.0450 m	0.0054 m		
		Ellip Dist.	120925.1050 m	0.0023 m		
CH1G	WI1H	Az.	199°58'49"	0.005 sec	1 : 37871016	1 : 37907389
		ΔHt.	-33.0118 m	0.0049 m		
		ΔElev.	-30.5790 m	0.0049 m		
		Ellip Dist.	71524.9302 m	0.0019 m		
CH1G	YCI1	Az.	164°10'05"	0.005 sec	1 : 36163942	1 : 36147783
		ΔHt.	-38.2452 m	0.0053 m		
		ΔElev.	-36.5097 m	0.0053 m		
		Ellip Dist.	71069.4084 m	0.0020 m		
OR1K	ORVB	Az.	39°19'46"	0.043 sec	1 : 4771655	1 : 4792155
		ΔHt.	299.7734 m	0.0043 m		
		ΔElev.	299.3851 m	0.0043 m		

		Ellip Dist.	7092.2551 m	0.0015 m		
OR1K	P270	Az.	236°19'42"	0.007 sec	1 : 32133620	1 : 32182656
		ΔHt.	-52.6451 m	0.0044 m		
		ΔElev.	-50.8031 m	0.0044 m		
		Ellip Dist.	52137.7283 m	0.0016 m		
OR1K	P344	Az.	319°15'24"	0.004 sec	1 : 43915220	1 : 43830214
		ΔHt.	9.4901 m	0.0041 m		
		ΔElev.	9.7348 m	0.0041 m		
		Ellip Dist.	62262.1763 m	0.0014 m		
OR1K	P349	Az.	334°35'44"	0.003 sec	1 : 57442150	1 : 57408964
		ΔHt.	235.1133 m	0.0054 m		
		ΔElev.	234.2131 m	0.0054 m		
		Ellip Dist.	150994.3477 m	0.0026 m		
OR1K	RD1L	Az.	331°31'50"	0.003 sec	1 : 54809881	1 : 54762640
		ΔHt.	92.0506 m	0.0050 m		
		ΔElev.	92.0432 m	0.0050 m		
		Ellip Dist.	129978.0305 m	0.0024 m		
OR1K	SACR	Az.	169°37'54"	0.003 sec	1 : 65268021	1 : 65271995
		ΔHt.	-33.2889 m	0.0041 m		
		ΔElev.	-30.5280 m	0.0041 m		
		Ellip Dist.	95937.8446 m	0.0015 m		
OR1K	WD1J	Az.	191°28'29"	0.004 sec	1 : 43528795	1 : 43564961
		ΔHt.	-40.2483 m	0.0054 m		
		ΔElev.	-37.2007 m	0.0054 m		
		Ellip Dist.	94028.8705 m	0.0022 m		
OR1K	WI1H	Az.	233°10'41"	0.006 sec	1 : 36139964	1 : 36193106
		ΔHt.	-38.9795 m	0.0049 m		
		ΔElev.	-36.7346 m	0.0049 m		
		Ellip Dist.	64470.4966 m	0.0018 m		
OR1K	YCI1	Az.	191°01'40"	0.008 sec	1 : 22693005	1 : 22722929
		ΔHt.	-44.2130 m	0.0053 m		
		ΔElev.	-42.6654 m	0.0053 m		
		Ellip Dist.	40696.7342 m	0.0018 m		
ORVB	P270	Az.	234°20'47"	0.006 sec	1 : 36455148	1 : 36515547
		ΔHt.	-352.4185 m	0.0039 m		
		ΔElev.	-350.1883 m	0.0039 m		
		Ellip Dist.	58956.5932 m	0.0016 m		
ORVB	P344	Az.	312°45'40"	0.004 sec	1 : 45667650	1 : 45543048
		ΔHt.	-290.2834 m	0.0036 m		
		ΔElev.	-289.6504 m	0.0036 m		
		Ellip Dist.	61437.9537 m	0.0013 m		

ORVB	P349	Az.	332°08'51"	0.003 sec	1 : 58059522	1 : 58007003
		ΔHt.	-64.6602 m	0.0049 m		
		ΔElev.	-65.1721 m	0.0049 m		
		Ellip Dist.	148106.1063 m	0.0026 m		
P270	P344	Az.	1°45'10"	0.004 sec	1 : 52227669	1 : 52253868
		ΔHt.	62.1352 m	0.0036 m		
		ΔElev.	60.5379 m	0.0036 m		
		Ellip Dist.	76128.4780 m	0.0015 m		
P341	P344	Az.	148°14'41"	0.005 sec	1 : 35892918	1 : 35905177
		ΔHt.	-357.0653 m	0.0051 m		
		ΔElev.	-356.0497 m	0.0051 m		
		Ellip Dist.	94033.4725 m	0.0026 m		
P341	P349	Az.	69°43'47"	0.017 sec	1 : 13717131	1 : 13715779
		ΔHt.	-131.4421 m	0.0054 m		
		ΔElev.	-131.5715 m	0.0054 m		
		Ellip Dist.	25894.7180 m	0.0019 m		
P344	P349	Az.	344°33'17"	0.005 sec	1 : 36715812	1 : 36722376
		ΔHt.	225.6232 m	0.0047 m		
		ΔElev.	224.4783 m	0.0047 m		
		Ellip Dist.	92429.0821 m	0.0025 m		
RD1L	ORVB	Az.	148°06'26"	0.003 sec	1 : 55625740	1 : 55580038
		ΔHt.	207.7229 m	0.0045 m		
		ΔElev.	207.3420 m	0.0045 m		
		Ellip Dist.	127467.3725 m	0.0023 m		
RD1L	P270	Az.	172°08'30"	0.003 sec	1 : 58618876	1 : 58625345
		ΔHt.	-144.6957 m	0.0045 m		
		ΔElev.	-142.8463 m	0.0045 m		
		Ellip Dist.	144364.7071 m	0.0025 m		
RD1L	P341	Az.	295°49'53"	0.013 sec	1 : 15498064	1 : 15504596
		ΔHt.	274.5048 m	0.0053 m		
		ΔElev.	273.7414 m	0.0053 m		
		Ellip Dist.	30357.3525 m	0.0020 m		
RD1L	P344	Az.	161°53'53"	0.006 sec	1 : 31211769	1 : 31210332
		ΔHt.	-82.5605 m	0.0043 m		
		ΔElev.	-82.3084 m	0.0043 m		
		Ellip Dist.	70394.4035 m	0.0023 m		
RD1L	P349	Az.	352°16'20"	0.015 sec	1 : 11592468	1 : 11612161
		ΔHt.	143.0627 m	0.0050 m		
		ΔElev.	142.1699 m	0.0050 m		
		Ellip Dist.	22312.0553 m	0.0019 m		
SACR	ORVB	Az.	352°50'12"	0.003 sec	1 : 71862950	1 : 71932144
		ΔHt.	333.0624 m	0.0036 m		

		ΔElev.	329.9131 m	0.0036 m		
		Ellip Dist.	100670.6506 m	0.0014 m		
SACR	P270	Az.	317°18'24"	0.003 sec	1 : 63469642	1 : 63345205
		ΔHt.	-19.3562 m	0.0036 m		
		ΔElev.	-20.2751 m	0.0036 m		
		Ellip Dist.	89245.1702 m	0.0014 m		
SACR	WD1J	Az.	273°39'30"	0.011 sec	1 : 22758150	1 : 22735195
		ΔHt.	-6.9594 m	0.0048 m		
		ΔElev.	-6.6727 m	0.0048 m		
		Ellip Dist.	36039.3027 m	0.0016 m		
SACR	WI1H	Az.	309°06'09"	0.004 sec	1 : 58272205	1 : 58157324
		ΔHt.	-5.6906 m	0.0042 m		
		ΔElev.	-6.2067 m	0.0042 m		
		Ellip Dist.	88598.1009 m	0.0015 m		
SACR	YC1I	Az.	335°24'33"	0.005 sec	1 : 36710990	1 : 36662831
		ΔHt.	-10.9240 m	0.0047 m		
		ΔElev.	-12.1374 m	0.0047 m		
		Ellip Dist.	59914.4181 m	0.0016 m		
WD1J	ORVB	Az.	13°13'53"	0.004 sec	1 : 46739514	1 : 46792916
		ΔHt.	340.0218 m	0.0051 m		
		ΔElev.	336.5858 m	0.0051 m		
		Ellip Dist.	100354.0994 m	0.0021 m		
WD1J	P270	Az.	338°32'31"	0.005 sec	1 : 34680748	1 : 34638051
		ΔHt.	-12.3968 m	0.0050 m		
		ΔElev.	-13.6025 m	0.0050 m		
		Ellip Dist.	67888.8072 m	0.0020 m		
WD1J	P344	Az.	350°55'02"	0.002 sec	1 : 72970807	1 : 72940353
		ΔHt.	49.7384 m	0.0048 m		
		ΔElev.	46.9354 m	0.0048 m		
		Ellip Dist.	141036.8600 m	0.0019 m		
WD1J	WI1H	Az.	328°16'35"	0.006 sec	1 : 31672341	1 : 31619259
		ΔHt.	1.2688 m	0.0055 m		
		ΔElev.	0.4660 m	0.0055 m		
		Ellip Dist.	62816.0043 m	0.0020 m		
WD1J	YC1I	Az.	11°40'48"	0.007 sec	1 : 26280114	1 : 26304333
		ΔHt.	-3.9646 m	0.0058 m		
		ΔElev.	-5.4648 m	0.0058 m		
		Ellip Dist.	53334.3183 m	0.0020 m		
WI1H	ORVB	Az.	51°26'12"	0.005 sec	1 : 39845885	1 : 39890099
		ΔHt.	338.7530 m	0.0045 m		
		ΔElev.	336.1198 m	0.0045 m		

		Ellip Dist.	71376.7795 m	0.0018 m		
WI1H	P270	Az.	39°48'01"	0.025 sec	1 : 7952666	1 : 7957877
		ΔHt.	-13.6656 m	0.0044 m		
		ΔElev.	-14.0685 m	0.0044 m		
		Ellip Dist.	12737.9964 m	0.0016 m		
WI1H	P344	Az.	6°54'24"	0.003 sec	1 : 53863372	1 : 53888548
		ΔHt.	48.4696 m	0.0042 m		
		ΔElev.	46.4694 m	0.0042 m		
		Ellip Dist.	86509.3694 m	0.0016 m		
WI1H	YC1I	Az.	91°19'45"	0.009 sec	1 : 26346102	1 : 26338444
		ΔHt.	-5.2334 m	0.0054 m		
		ΔElev.	-5.9308 m	0.0054 m		
		Ellip Dist.	43843.2472 m	0.0017 m		
YC1I	ORVB	Az.	15°04'05"	0.007 sec	1 : 26739689	1 : 26809329
		ΔHt.	343.9864 m	0.0049 m		
		ΔElev.	342.0506 m	0.0049 m		
		Ellip Dist.	47061.4864 m	0.0018 m		
YC1I	P270	Az.	287°10'00"	0.010 sec	1 : 23391554	1 : 23356158
		ΔHt.	-8.4321 m	0.0049 m		
		ΔElev.	-8.1377 m	0.0049 m		
		Ellip Dist.	37277.4193 m	0.0016 m		
YC1I	P344	Az.	339°16'50"	0.003 sec	1 : 56844272	1 : 56807767
		ΔHt.	53.7030 m	0.0047 m		
		ΔElev.	52.4002 m	0.0047 m		
		Ellip Dist.	93105.9055 m	0.0016 m		

Date: 4/18/2023 2:10:17 PM	Project: C:\Users\bhocker\OneDrive - yuroktribe.nsn.us\Documents\Active_Projects\Sacramento_River_TopoBathy\C- Process\TBC\CSDS_Network_Verification\CSDS_BaseStationNetwork.vce	Trimble Business Center
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Appendix D : NGS Control Processing Reports

Project File Data	Coordinate System
Name: C:\Users\bhocker\OneDrive - yuroktribe.nsn.us\Documents\Active_Projects\Sacramento_River_TopoBathy\C-Process\TBC\CSDS_Network_Verification\CSDS-NGS_ControlVerification_Adjusted.vce	Name: World wide/UTM
Size: 265 KB	Zone: 10 North
Modified: 4/23/2023 10:48:36 AM (UTC:-7)	Datum: NAD83(2011)
Time zone: Pacific Standard Time	Global reference datum: NAD83(2011)
Reference number:	Global reference epoch: 2010
Description:	Geoid: GEOID18 (Conus)
Comment 1:	Vertical datum: NAVD88
Comment 2:	Calibrated site:
Comment 3:	

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GNSS Loop Closure Results

Summary

Legs in loop: 3
 Number of Loops: 47
 Number Passed: 47
 Number Failed: 0

	Length (Meter)	Δ3D (Meter)	ΔHoriz (Meter)	ΔVert (Meter)	PPM
Pass/Fail Criteria					1
Best		0.0013	0.0004	0.0008	0.003
Worst		0.0253	0.0191	-0.0244	0.249
Average Loop	254670.9212	0.0080	0.0037	0.0066	0.047
Standard Error	112719.4402	0.0099	0.0050	0.0085	0.056

Date: 4/23/2023 2:44:58 PM	Project: C:\Users\bhocker\OneDrive - yuroktribe.nsn.us\Documents\Active_Projects\Sacramento_River_TopoBathy\C-Process\TBC\CSDS_Network_Verification\CSDS-NGS_ControlVerification_Adjusted.vce	Trimble Business Center
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Project File Data		Coordinate System	
Name:	C:\Users\bhocker\OneDrive - yuroktribe.nsn.us\Documents\Active_Projects\Sacramento_River_TopoBathy\C-Process\TBC\CSDS_Network_Verification\CSDS-NGS_ControlVerification_Adjusted.vce	Name:	World wide/UTM
Size:	265 KB	Zone:	10 North
Modified:	4/23/2023 10:48:36 AM (UTC:-7)	Datum:	NAD83(2011)
Time zone:	Pacific Standard Time	Global reference datum:	NAD83(2011)
Reference number:		Global reference epoch:	2010
Description:		Geoid:	GEOID18 (Conus)
Comment 1:		Vertical datum:	NAVD88
Comment 2:		Calibrated site:	
Comment 3:			

Network Adjustment Report

Adjustment Settings

Set-Up Errors

GNSS

Error in Height of Antenna: 0.0000 m

Centering Error: 0.0000 m

Covariance Display

Horizontal:

Propagated Linear Error [E]: U.S.

Constant Term [C]: 0.0000 m

Scale on Linear Error [S]: 1.000

Three-Dimensional

Propagated Linear Error [E]: U.S.

Constant Term [C]: 0.0000 m

Scale on Linear Error [S]: 1.000

Adjustment Statistics

Number of Iterations for Successful Adjustment: 2

Network Reference Factor: 0.85

Chi Square Test (95%): Failed

Precision Confidence Level: DRMS

Degrees of Freedom: 81

Post Processed Vector Statistics

Reference Factor: 0.85
Redundancy Number: 81.00
A Priori Scalar: 1.00

Control Coordinate Comparisons

Values shown are control coordinates minus adjusted coordinates.

Point ID	ΔEasting (Meter)	ΔNorthing (Meter)	ΔElevation (Meter)	ΔHeight (Meter)
CH1G	0.0004	-0.0041	?	-0.0023
OR1K	-0.0053	0.0091	?	0.0101
RD1L	0.0062	-0.0113	?	0.0010
SACR	-0.0059	0.0098	?	-0.0044
WD1J	-0.0046	0.0112	?	-0.0067
WI1H	0.0039	0.0047	?	0.0029
YC1I	-0.0026	0.0049	?	0.0047

Control Point Constraints

Point ID	Type	East σ (Meter)	North σ (Meter)	Height σ (Meter)	Elevation σ (Meter)
Fixed = 0.000001(Meter)					

Adjusted Grid Coordinates

Point ID	Easting (Meter)	Easting Error (Meter)	Northing (Meter)	Northing Error (Meter)	Elevation (Meter)	Elevation Error (Meter)	Constraint
CH1G	597057.674	0.0004	4401895.188	0.0006	62.314	0.0028	
DH6394-STATIC	555168.148	0.0011	4487029.798	0.0014	139.902	0.0079	
DH6520-STATIC	583591.363	0.0019	4344671.685	0.0022	17.769	0.0123	
DH6521-STATIC	600660.303	0.0023	4322066.673	0.0027	18.465	0.0144	
DH6625-STATIC	575711.780	0.0018	4417762.025	0.0026	65.807	0.0122	
DL9132-STATIC	568199.104	0.0017	4474357.394	0.0024	115.750	0.0118	
DL9142-STATIC	566217.052	0.0022	4457255.716	0.0028	97.171	0.0147	
DL9190-STATIC	585967.046	0.0020	4387157.608	0.0029	37.025	0.0139	
DL9193-STATIC	608034.865	0.0022	4312289.131	0.0026	8.589	0.0164	
KS2014-STATIC	594909.162	0.0019	4333250.402	0.0021	12.605	0.0117	
KT0518-STATIC	584517.816	0.0023	4367972.776	0.0028	27.309	0.0150	

KT1807_STATIC	583915.696	0.0017	4399844.102	0.0024	47.890	0.0116	
LU2291_STATIC	566086.719	0.0021	4445793.934	0.0026	95.354	0.0141	
OR1K	624441.365	0.0004	4373844.254	0.0006	68.457	0.0029	
RD1L	560656.066	0.0004	4487051.675	0.0006	160.510	0.0029	
SACR	643204.817	0.0005	4279776.693	0.0006	37.944	0.0030	
WD1J	607210.874	0.0004	4281430.008	0.0006	31.274	0.0031	
W1IH	573472.345	0.0004	4334394.234	0.0006	31.729	0.0028	
YC1I	617298.870	0.0004	4333788.296	0.0006	25.797	0.0029	

Coordinates from a free adjustment should only be used for analysis of the inner accuracy of the network. They should not be distributed as final results.

Adjusted Geodetic Coordinates

Point ID	Latitude	Longitude	Height (Meter)	Height Error (Meter)	Constraint
CH1G	N39°45'41.22865"	W121°52'00.85226"	34.808	0.0028	
DH6394_STATIC	N40°31'55.82455"	W122°20'55.01507"	112.171	0.0079	
DH6520_STATIC	N39°14'50.41846"	W122°01'52.59865"	-11.682	0.0123	
DH6521_STATIC	N39°02'30.73484"	W121°50'12.69952"	-11.045	0.0144	
DH6625_STATIC	N39°54'23.62197"	W122°06'51.26071"	37.554	0.0122	
DL9132_STATIC	N40°25'01.37476"	W122°11'46.07180"	87.972	0.0118	
DL9142_STATIC	N40°15'47.33725"	W122°13'16.55420"	68.846	0.0147	
DL9190_STATIC	N39°37'47.54937"	W121°59'53.81494"	8.925	0.0139	
DL9193_STATIC	N38°57'10.44704"	W121°45'11.56480"	-21.096	0.0164	
KS2014_STATIC	N39°08'35.78986"	W121°54'06.27227"	-16.744	0.0117	
KT0518_STATIC	N39°27'25.84638"	W122°01'03.38421"	-1.341	0.0150	
KT1807_STATIC	N39°44'39.73470"	W122°01'14.04477"	19.898	0.0116	
LU2291_STATIC	N40°09'35.65596"	W122°13'26.31482"	66.824	0.0141	
OR1K	N39°30'18.80454"	W121°33'09.27196"	40.764	0.0029	
RD1L	N40°31'55.15364"	W122°17'01.75384"	132.824	0.0029	
SACR	N38°39'17.97101"	W121°21'15.19285"	7.489	0.0030	
WD1J	N38°40'29.91511"	W121°46'03.07604"	0.533	0.0031	
W1IH	N39°09'20.35597"	W122°08'58.73592"	1.791	0.0028	
YC1I	N39°08'43.41025"	W121°38'33.44741"	-3.444	0.0029	

Coordinates from a free adjustment should only be used for analysis of the inner accuracy of the network. They should not be distributed as final results.

Adjusted ECEF Coordinates

Point ID	X (Meter)	X Error (Meter)	Y (Meter)	Y Error (Meter)	Z (Meter)	Z Error (Meter)	3D Error (Meter)	Constraint
CH1G	-2592074.638	0.0012	-4169708.945	0.0019	4057682.618	0.0018	0.0029	
DH6394-STATIC	-2597547.338	0.0032	-4101204.972	0.0054	4123148.830	0.0052	0.0081	
DH6520-STATIC	-2623265.656	0.0054	-4193007.519	0.0082	4013611.903	0.0080	0.0127	
DH6521-STATIC	-2616619.070	0.0062	-4214118.530	0.0098	3995921.421	0.0093	0.0148	
DH6625-STATIC	-2604564.891	0.0051	-4149740.903	0.0081	4070056.666	0.0081	0.0126	
DL9132-STATIC	-2591035.089	0.0053	-4115110.117	0.0081	4113408.333	0.0074	0.0122	
DL9142-STATIC	-2598730.582	0.0062	-4123319.469	0.0098	4100370.174	0.0096	0.0151	
DL9190-STATIC	-2606562.726	0.0063	-4171650.681	0.0096	4046425.263	0.0086	0.0143	
DL9193-STATIC	-2613730.717	0.0067	-4223212.585	0.0114	3988239.030	0.0103	0.0168	
KS2014-STATIC	-2617635.653	0.0051	-4205122.506	0.0077	4004655.157	0.0076	0.0120	
KT0518-STATIC	-2614437.400	0.0065	-4181114.871	0.0100	4031633.138	0.0097	0.0154	
KT1807-STATIC	-2603885.255	0.0051	-4163760.717	0.0081	4056214.973	0.0072	0.0120	
LU2291-STATIC	-2602871.565	0.0058	-4129456.611	0.0095	4091613.979	0.0093	0.0145	
OR1K	-2578658.649	0.0012	-4199334.105	0.0019	4035776.929	0.0018	0.0029	
RD1L	-2592923.265	0.0012	-4104164.510	0.0020	4123146.523	0.0018	0.0030	
SACR	-2595053.377	0.0013	-4259028.376	0.0021	3962484.545	0.0019	0.0031	
WD1J	-2624975.370	0.0013	-4239015.417	0.0021	3964212.399	0.0020	0.0032	
W1IH	-2635351.683	0.0012	-4193034.763	0.0019	4005732.668	0.0018	0.0029	
YC1I	-2598519.024	0.0013	-4216800.108	0.0020	4004845.810	0.0019	0.0030	

Coordinates from a free adjustment should only be used for analysis of the inner accuracy of the network. They should not be distributed as final results.

Error Ellipse Components

Point ID	Semi-major axis (Meter)	Semi-minor axis (Meter)	Azimuth
CH1G	0.0008	0.0006	176°
DH6394-STATIC	0.0020	0.0016	174°
DH6520-STATIC	0.0031	0.0027	8°
DH6521-STATIC	0.0039	0.0032	15°
DH6625-STATIC	0.0037	0.0026	1°
DL9132-STATIC	0.0034	0.0024	179°
DL9142-STATIC	0.0040	0.0031	166°
DL9190-STATIC	0.0042	0.0028	12°
DL9193-STATIC	0.0037	0.0031	171°
KS2014-STATIC	0.0030	0.0026	180°
KT0518-STATIC	0.0040	0.0033	175°
KT1807-STATIC	0.0034	0.0024	5°

LU2291_STATIC	0.0037	0.0029	167°
OR1K	0.0008	0.0006	179°
RD1L	0.0009	0.0006	172°
SACR	0.0009	0.0006	171°
WD1J	0.0009	0.0006	178°
WI1H	0.0008	0.0006	1°
YC1I	0.0008	0.0006	176°

Adjusted GNSS Observations

Observation ID		Observation	A-posteriori Error	Residual	Standardized Residual
CH1G --> DH6394-STATIC (PV421)	Az.	334°31'50.9"	0.003 sec	0.006 sec	0.923
	ΔHt.	77.3629 m	0.0081 m	-0.0085 m	-0.379
	Ellip Dist.	94913.2373 m	0.0014 m	0.0174 m	3.098
RD1L --> DH6394-STATIC (PV419)	Az.	270°14'13.3"	0.051 sec	-0.044 sec	-3.023
	ΔHt.	-20.6527 m	0.0078 m	0.0033 m	1.183
	Ellip Dist.	5489.9308 m	0.0011 m	-0.0002 m	-0.575
OR1K --> WI1H (PV343)	Az.	233°10'40.9"	0.001 sec	0.000 sec	0.067
	ΔHt.	-38.9727 m	0.0021 m	-0.0049 m	-1.624
	Ellip Dist.	64470.5012 m	0.0004 m	-0.0022 m	-2.709
CH1G --> WD1J (PV291)	Az.	175°53'54.8"	0.001 sec	-0.002 sec	-2.255
	ΔHt.	-34.2756 m	0.0023 m	-0.0032 m	-0.814
	Ellip Dist.	120925.1209 m	0.0006 m	-0.0007 m	-0.590
OR1K --> WD1J (PV290)	Az.	191°28'28.5"	0.001 sec	0.001 sec	1.419
	ΔHt.	-40.2311 m	0.0022 m	-0.0025 m	-0.742
	Ellip Dist.	94028.8729 m	0.0005 m	-0.0022 m	-2.194
RD1L --> SACR (PV240)	Az.	158°44'14.1"	0.000 sec	0.002 sec	2.086
	ΔHt.	-125.3345 m	0.0024 m	-0.0044 m	-0.767
	Ellip Dist.	223167.2341 m	0.0006 m	0.0007 m	0.406
CH1G --> OR1K (PV156)	Az.	136°24'44.2"	0.002 sec	0.000 sec	-0.106
	ΔHt.	5.9556 m	0.0020 m	-0.0036 m	-1.212
	Ellip Dist.	39210.7720 m	0.0004 m	-0.0008 m	-1.797
CH1G --> SACR (PV242)	Az.	160°00'50.7"	0.001 sec	0.000 sec	0.193
	ΔHt.	-27.3189 m	0.0022 m	0.0027 m	0.680
	Ellip Dist.	130575.6134 m	0.0005 m	0.0020 m	1.772
YC1I --> DL9193_STATIC (PV402)	Az.	204°09'59.4"	0.021 sec	0.039 sec	1.770
	ΔHt.	-17.6523 m	0.0172 m	-0.0030 m	-0.176

	Ellip Dist.	23415.8707 m	0.0026 m	0.0032 m	1.184
WD1J --> SACR (PV288)	Az.	93°24'00.1"	0.003 sec	-0.006 sec	-1.767
	ΔHt.	6.9567 m	0.0023 m	-0.0029 m	-0.834
	Ellip Dist.	36039.3040 m	0.0003 m	-0.0001 m	-0.206
WI1H --> KT1807_STATIC (PV348)	Az.	9°36'22.9"	0.006 sec	-0.003 sec	-0.404
	ΔHt.	18.1066 m	0.0120 m	-0.0057 m	-0.360
	Ellip Dist.	66299.2717 m	0.0025 m	0.0096 m	1.726
CH1G --> KT1807_STATIC (PV123)	Az.	261°51'14.3"	0.038 sec	-0.030 sec	-1.674
	ΔHt.	-14.9105 m	0.0120 m	0.0020 m	0.221
	Ellip Dist.	13305.0516 m	0.0018 m	0.0000 m	0.024
RD1L --> DL9142_STATIC (PV209)	Az.	169°53'32.4"	0.015 sec	-0.019 sec	-1.574
	ΔHt.	-63.9782 m	0.0153 m	-0.0012 m	-0.101
	Ellip Dist.	30321.0813 m	0.0029 m	0.0003 m	0.190
RD1L --> YC1I (PV399)	Az.	160°10'25.0"	0.000 sec	-0.001 sec	-1.404
	ΔHt.	-136.2677 m	0.0024 m	-0.0009 m	-0.172
	Ellip Dist.	163444.3504 m	0.0006 m	-0.0021 m	-1.551
SACR --> WI1H (PV341)	Az.	309°06'08.7"	0.001 sec	-0.002 sec	-1.546
	ΔHt.	-5.6983 m	0.0022 m	-0.0020 m	-0.659
	Ellip Dist.	88598.1116 m	0.0004 m	0.0001 m	0.176
OR1K --> KT0518_STATIC (PV159)	Az.	262°33'14.5"	0.015 sec	-0.006 sec	-0.361
	ΔHt.	-42.1045 m	0.0156 m	-0.0003 m	-0.019
	Ellip Dist.	40363.6477 m	0.0025 m	0.0037 m	1.498
WI1H --> DL9193_STATIC (PV345)	Az.	123°08'14.4"	0.013 sec	-0.018 sec	-1.452
	ΔHt.	-22.8872 m	0.0172 m	0.0022 m	0.132
	Ellip Dist.	41039.0650 m	0.0025 m	0.0035 m	1.455
CH1G --> DL9142_STATIC (PV131)	Az.	331°36'23.6"	0.007 sec	-0.012 sec	-1.316
	ΔHt.	34.0374 m	0.0153 m	-0.0090 m	-0.447
	Ellip Dist.	63391.4749 m	0.0029 m	0.0075 m	1.139
RD1L --> LU2291_STATIC (PV205)	Az.	172°57'54.1"	0.011 sec	0.006 sec	0.612
	ΔHt.	-66.0000 m	0.0147 m	0.0116 m	0.859
	Ellip Dist.	41628.2097 m	0.0027 m	0.0026 m	1.296
WI1H --> DL9190_STATIC (PV351)	Az.	13°51'44.8"	0.008 sec	-0.001 sec	-0.099
	ΔHt.	7.1339 m	0.0145 m	-0.0048 m	-0.279
	Ellip Dist.	54240.0504 m	0.0031 m	0.0074 m	1.276
OR1K --> SACR (PV241)	Az.	169°37'53.8"	0.001 sec	0.001 sec	1.234
	ΔHt.	-33.2744 m	0.0021 m	0.0003 m	0.095
	Ellip Dist.	95937.8454 m	0.0005 m	0.0007 m	0.775
YC1I --> WI1H (PV396)	Az.	271°38'56.9"	0.002 sec	0.002 sec	0.623
	ΔHt.	5.2349 m	0.0022 m	0.0042 m	1.217

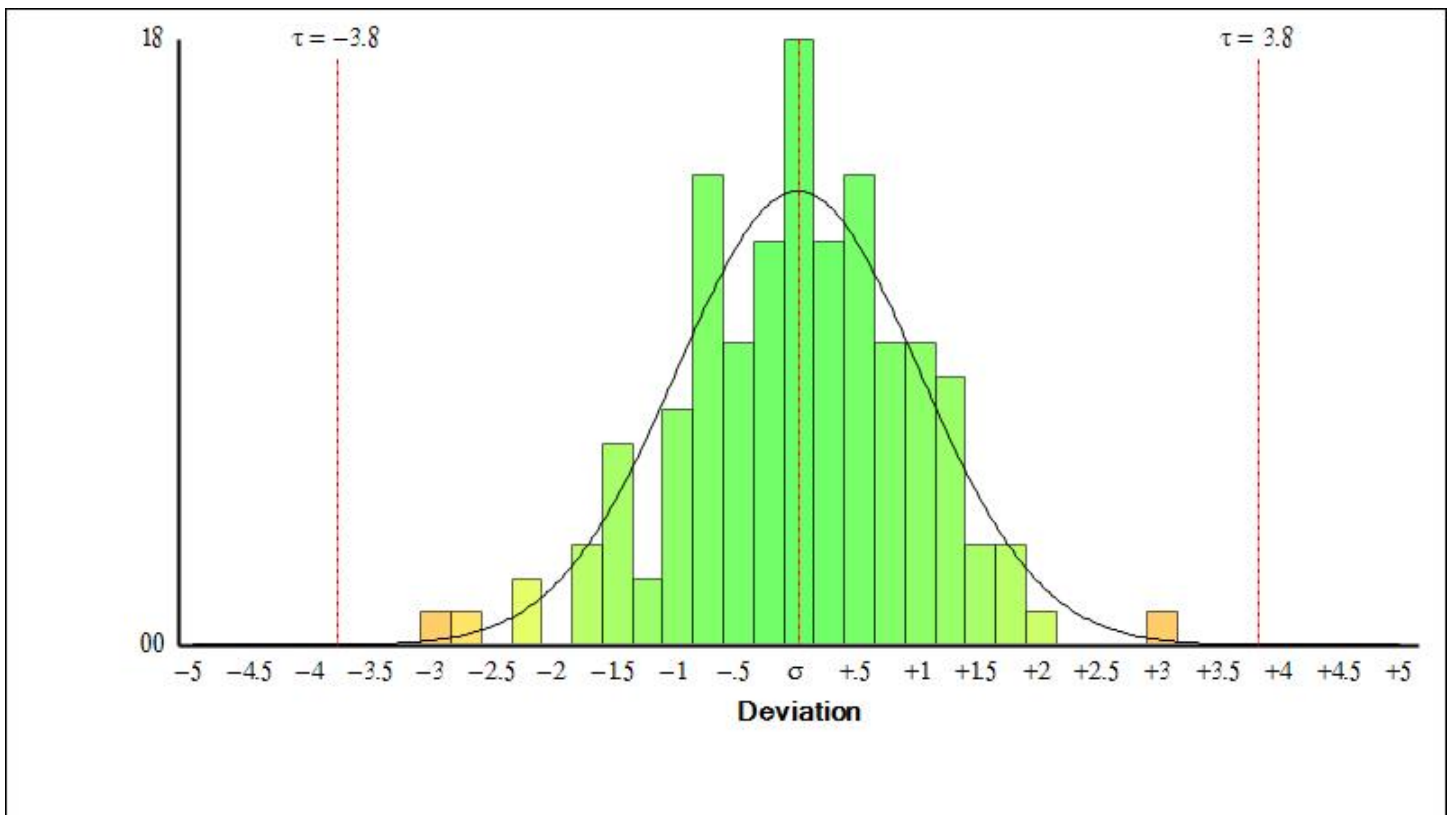
	Ellip Dist.	43843.2535 m	0.0003 m	-0.0001 m	-0.190
WD1J --> WI1H (PV340)	Az.	328°16'35.2"	0.001 sec	0.001 sec	0.680
	ΔHt.	1.2584 m	0.0023 m	-0.0011 m	-0.267
	Ellip Dist.	62816.0142 m	0.0005 m	0.0013 m	1.150
CH1G --> WI1H (PV344)	Az.	199°58'49.2"	0.001 sec	0.000 sec	0.297
	ΔHt.	-33.0172 m	0.0021 m	0.0020 m	0.619
	Ellip Dist.	71524.9399 m	0.0005 m	0.0010 m	1.104
CH1G --> DL9190_STATIC (PV126)	Az.	217°41'12.3"	0.026 sec	-0.010 sec	-0.512
	ΔHt.	-25.8832 m	0.0144 m	0.0016 m	0.129
	Ellip Dist.	18449.9408 m	0.0029 m	0.0018 m	1.092
SACR --> YC1I (PV398)	Az.	335°24'33.2"	0.001 sec	-0.002 sec	-1.076
	ΔHt.	-10.9332 m	0.0023 m	0.0001 m	0.027
	Ellip Dist.	59914.4239 m	0.0005 m	0.0011 m	0.997
CH1G --> KT0518_STATIC (PV122)	Az.	201°00'36.1"	0.015 sec	-0.015 sec	-1.075
	ΔHt.	-36.1489 m	0.0156 m	0.0002 m	0.014
	Ellip Dist.	36176.7737 m	0.0029 m	-0.0026 m	-0.937
CH1G --> LU2291_STATIC (PV127)	Az.	325°31'27.0"	0.009 sec	0.009 sec	1.067
	ΔHt.	32.0156 m	0.0147 m	-0.0119 m	-0.718
	Ellip Dist.	53741.3368 m	0.0027 m	0.0027 m	0.626
CH1G --> YC1I (PV401)	Az.	164°10'04.7"	0.001 sec	0.001 sec	0.438
	ΔHt.	-38.2520 m	0.0022 m	0.0037 m	1.026
	Ellip Dist.	71069.4180 m	0.0005 m	-0.0001 m	-0.085
WI1H --> KS2014_STATIC (PV346)	Az.	93°35'28.3"	0.021 sec	-0.014 sec	-0.651
	ΔHt.	-18.5354 m	0.0121 m	-0.0132 m	-1.014
	Ellip Dist.	21474.0177 m	0.0019 m	-0.0001 m	-0.051
WI1H --> DH6520_STATIC (PV350)	Az.	45°05'32.9"	0.030 sec	-0.022 sec	-1.002
	ΔHt.	-13.4736 m	0.0128 m	0.0039 m	0.424
	Ellip Dist.	14427.5906 m	0.0022 m	0.0006 m	0.361
YC1I --> KS2014_STATIC (PV403)	Az.	269°28'50.6"	0.020 sec	-0.012 sec	-0.611
	ΔHt.	-13.3005 m	0.0120 m	0.0108 m	0.980
	Ellip Dist.	22402.0123 m	0.0019 m	0.0000 m	-0.013
CH1G --> DL9132_STATIC (PV129)	Az.	339°00'50.4"	0.005 sec	-0.005 sec	-0.904
	ΔHt.	53.1637 m	0.0122 m	0.0076 m	0.515
	Ellip Dist.	78021.9456 m	0.0024 m	0.0043 m	0.911
WI1H --> DH6521_STATIC (PV349)	Az.	114°55'36.2"	0.020 sec	0.008 sec	0.488
	ΔHt.	-12.8360 m	0.0150 m	-0.0110 m	-0.904
	Ellip Dist.	29861.3352 m	0.0024 m	0.0002 m	0.113
YC1I --> DH6521_STATIC (PV406)	Az.	235°41'31.0"	0.026 sec	0.011 sec	0.356

	ΔHt.	-7.6012 m	0.0150 m	0.0166 m	0.904
	Ellip Dist.	20358.0071 m	0.0027 m	-0.0013 m	-0.403
RD1L --> DL9132_STATIC (PV207)	Az.	149°44'44.8"	0.027 sec	-0.018 sec	-0.815
	ΔHt.	-44.8520 m	0.0122 m	-0.0072 m	-0.705
	Ellip Dist.	14771.4042 m	0.0024 m	0.0010 m	0.821
CH1G --> DH6625_STATIC (PV130)	Az.	307°20'59.8"	0.019 sec	0.007 sec	0.432
	ΔHt.	2.7454 m	0.0126 m	-0.0009 m	-0.070
	Ellip Dist.	26605.2468 m	0.0022 m	-0.0014 m	-0.788
OR1K --> RD1L (PV196)	Az.	331°31'50.1"	0.001 sec	0.000 sec	-0.786
	ΔHt.	92.0601 m	0.0021 m	0.0002 m	0.070
	Ellip Dist.	129978.0540 m	0.0005 m	0.0004 m	0.605
YC1I --> DH6520_STATIC (PV407)	Az.	288°45'06.8"	0.013 sec	-0.014 sec	-0.767
	ΔHt.	-8.2387 m	0.0128 m	-0.0080 m	-0.457
	Ellip Dist.	35430.6867 m	0.0020 m	-0.0020 m	-0.759
RD1L --> WD1J (PV289)	Az.	167°41'49.6"	0.000 sec	0.000 sec	0.748
	ΔHt.	-132.2912 m	0.0024 m	0.0027 m	0.529
	Ellip Dist.	210891.6362 m	0.0007 m	0.0004 m	0.276
YC1I --> WD1J (PV397)	Az.	191°45'30.5"	0.001 sec	0.001 sec	0.726
	ΔHt.	3.9765 m	0.0023 m	-0.0002 m	-0.055
	Ellip Dist.	53334.3242 m	0.0005 m	-0.0004 m	-0.334
RD1L --> DH6625_STATIC (PV208)	Az.	168°12'11.5"	0.006 sec	0.004 sec	0.722
	ΔHt.	-95.2703 m	0.0126 m	0.0020 m	0.162
	Ellip Dist.	70930.7851 m	0.0027 m	-0.0013 m	-0.322
CH1G --> RD1L (PV197)	Az.	337°35'05.1"	0.001 sec	0.000 sec	-0.136
	ΔHt.	98.0157 m	0.0021 m	0.0009 m	0.337
	Ellip Dist.	92640.3359 m	0.0006 m	-0.0005 m	-0.688
OR1K --> YC1I (PV400)	Az.	191°01'39.9"	0.002 sec	-0.001 sec	-0.321
	ΔHt.	-44.2076 m	0.0021 m	0.0020 m	0.590
	Ellip Dist.	40696.7305 m	0.0004 m	0.0003 m	0.527
RD1L --> WI1H (PV342)	Az.	175°39'34.1"	0.000 sec	0.000 sec	0.050
	ΔHt.	-131.0328 m	0.0023 m	0.0024 m	0.494
	Ellip Dist.	153247.2751 m	0.0006 m	-0.0002 m	-0.103

Histogram of Standardized Residuals

Critical Tau Value: 3.8

Observations Failing the Tau Test: 0



Covariance Terms

From Point	To Point		Components	A-posteriori Error	Horiz. Precision (Ratio)	3D Precision (Ratio)
CH1G	DH6394-STATIC	Az.	334°31'50.9"	0.003 sec	1 : 65875213	1 : 65811526
		Δ Ht.	77.3629 m	0.0081 m		
		Δ Elev.	77.5882 m	0.0081 m		
		Ellip Dist.	94913.2373 m	0.0014 m		
CH1G	OR1K	Az.	136°24'44.2"	0.002 sec	1 : 102779581	1 : 102300814
		Δ Ht.	5.9556 m	0.0020 m		
		Δ Elev.	6.1435 m	0.0020 m		
		Ellip Dist.	39210.7720 m	0.0004 m		
CH1G	RD1L	Az.	337°35'05.1"	0.001 sec	1 : 166489137	1 : 166354079
		Δ Ht.	98.0157 m	0.0021 m		
		Δ Elev.	98.1961 m	0.0021 m		
		Ellip Dist.	92640.3359 m	0.0006 m		
CH1G	SACR	Az.	160°00'50.7"	0.001 sec	1 : 240678090	1 : 240390742
		Δ Ht.	-27.3189 m	0.0022 m		
		Δ Elev.	-24.3700 m	0.0022 m		
		Ellip Dist.	130575.6134 m	0.0005 m		
CH1G	WD1J	Az.	175°53'54.8"	0.001 sec	1 : 213126474	1 : 213117528

		ΔHt.	-34.2756 m	0.0023 m		
		ΔElev.	-31.0400 m	0.0023 m		
		Ellip Dist.	120925.1209 m	0.0006 m		
CH1G	WI1H	Az.	199°58'49.2"	0.001 sec	1 : 151463344	1 : 151847926
		ΔHt.	-33.0172 m	0.0021 m		
		ΔElev.	-30.5844 m	0.0021 m		
		Ellip Dist.	71524.9399 m	0.0005 m		
CH1G	YC1I	Az.	164°10'04.7"	0.001 sec	1 : 138607328	1 : 138466454
		ΔHt.	-38.2520 m	0.0022 m		
		ΔElev.	-36.5166 m	0.0022 m		
		Ellip Dist.	71069.4180 m	0.0005 m		
DH6520_STATIC	WI1H	Az.	225°10'02.2"	0.030 sec	1 : 6685993	1 : 6693941
		ΔHt.	13.4736 m	0.0128 m		
		ΔElev.	13.9601 m	0.0128 m		
		Ellip Dist.	14427.5906 m	0.0022 m		
DH6520_STATIC	YC1I	Az.	108°30'22.6"	0.013 sec	1 : 17710486	1 : 17702549
		ΔHt.	8.2387 m	0.0128 m		
		ΔElev.	8.0279 m	0.0128 m		
		Ellip Dist.	35430.6867 m	0.0020 m		
DH6521_STATIC	WI1H	Az.	295°07'26.4"	0.020 sec	1 : 12664052	1 : 12653222
		ΔHt.	12.8360 m	0.0150 m		
		ΔElev.	13.2647 m	0.0150 m		
		Ellip Dist.	29861.3352 m	0.0024 m		
DH6521_STATIC	YC1I	Az.	55°34'10.1"	0.026 sec	1 : 7588078	1 : 7606149
		ΔHt.	7.6012 m	0.0150 m		
		ΔElev.	7.3325 m	0.0150 m		
		Ellip Dist.	20358.0071 m	0.0027 m		
DH6625_STATIC	CH1G	Az.	127°11'29.5"	0.019 sec	1 : 12068861	1 : 12024548
		ΔHt.	-2.7454 m	0.0126 m		
		ΔElev.	-3.4934 m	0.0126 m		
		Ellip Dist.	26605.2468 m	0.0022 m		
DH6625_STATIC	RD1L	Az.	348°18'45.7"	0.006 sec	1 : 26194994	1 : 26160645
		ΔHt.	95.2703 m	0.0126 m		
		ΔElev.	94.7027 m	0.0126 m		
		Ellip Dist.	70930.7851 m	0.0027 m		
DL9132_STATIC	CH1G	Az.	158°48'07.1"	0.005 sec	1 : 31725365	1 : 31700385
		ΔHt.	-53.1637 m	0.0122 m		
		ΔElev.	-53.4365 m	0.0122 m		
		Ellip Dist.	78021.9456 m	0.0025 m		
DL9132_STATIC	RD1L	Az.	329°48'09.7"	0.027 sec	1 : 6310435	1 : 6319236
		ΔHt.	44.8520 m	0.0122 m		
		ΔElev.	44.7596 m	0.0122 m		

		Ellip Dist.	14771.4042 m	0.0023 m		
DL9142_STATIC	CH1G	Az.	151°22'43.4"	0.007 sec	1 : 21724778	1 : 21709845
		ΔHt.	-34.0374 m	0.0153 m		
		ΔElev.	-34.8573 m	0.0153 m		
		Ellip Dist.	63391.4749 m	0.0029 m		
DL9142_STATIC	RD1L	Az.	349°55'58.3"	0.015 sec	1 : 10383010	1 : 10392731
		ΔHt.	63.9782 m	0.0153 m		
		ΔElev.	63.3389 m	0.0153 m		
		Ellip Dist.	30321.0813 m	0.0029 m		
DL9190_STATIC	CH1G	Az.	37°36'10.2"	0.025 sec	1 : 6288277	1 : 6314002
		ΔHt.	25.8832 m	0.0144 m		
		ΔElev.	25.2891 m	0.0144 m		
		Ellip Dist.	18449.9408 m	0.0029 m		
DL9190_STATIC	WI1H	Az.	193°57'30.6"	0.008 sec	1 : 17459892	1 : 17465284
		ΔHt.	-7.1339 m	0.0145 m		
		ΔElev.	-5.2953 m	0.0145 m		
		Ellip Dist.	54240.0504 m	0.0031 m		
DL9193_STATIC	WI1H	Az.	303°23'13.6"	0.013 sec	1 : 16474105	1 : 16445774
		ΔHt.	22.8872 m	0.0172 m		
		ΔElev.	23.1406 m	0.0172 m		
		Ellip Dist.	41039.0650 m	0.0025 m		
DL9193_STATIC	YC1I	Az.	24°05'48.6"	0.021 sec	1 : 8948403	1 : 8970204
		ΔHt.	17.6523 m	0.0172 m		
		ΔElev.	17.2084 m	0.0172 m		
		Ellip Dist.	23415.8707 m	0.0026 m		
KS2014_STATIC	WI1H	Az.	273°44'51.8"	0.021 sec	1 : 11082896	1 : 11078731
		ΔHt.	18.5354 m	0.0121 m		
		ΔElev.	19.1245 m	0.0121 m		
		Ellip Dist.	21474.0177 m	0.0019 m		
KS2014_STATIC	YC1I	Az.	89°19'01.8"	0.020 sec	1 : 11577995	1 : 11579343
		ΔHt.	13.3005 m	0.0120 m		
		ΔElev.	13.1922 m	0.0120 m		
		Ellip Dist.	22402.0123 m	0.0019 m		
KT0518_STATIC	CH1G	Az.	20°54'50.2"	0.015 sec	1 : 12589538	1 : 12609583
		ΔHt.	36.1489 m	0.0156 m		
		ΔElev.	35.0048 m	0.0156 m		
		Ellip Dist.	36176.7737 m	0.0029 m		
KT0518_STATIC	OR1K	Az.	82°15'30.1"	0.015 sec	1 : 16526858	1 : 16531890
		ΔHt.	42.1045 m	0.0156 m		
		ΔElev.	41.1482 m	0.0156 m		
		Ellip Dist.	40363.6477 m	0.0024 m		

KT1807_STATIC	CH1G	Az.	81°45'20.5"	0.038 sec	1 : 7310926	1 : 7324485
		ΔHt.	14.9105 m	0.0120 m		
		ΔElev.	14.4235 m	0.0120 m		
		Ellip Dist.	13305.0516 m	0.0018 m		
KT1807_STATIC	WI1H	Az.	189°41'18.2"	0.006 sec	1 : 26473099	1 : 26491359
		ΔHt.	-18.1066 m	0.0120 m		
		ΔElev.	-16.1608 m	0.0120 m		
		Ellip Dist.	66299.2717 m	0.0025 m		
LU2291_STATIC	CH1G	Az.	145°17'41.3"	0.009 sec	1 : 20038179	1 : 20018328
		ΔHt.	-32.0156 m	0.0147 m		
		ΔElev.	-33.0405 m	0.0147 m		
		Ellip Dist.	53741.3368 m	0.0027 m		
LU2291_STATIC	RD1L	Az.	353°00'13.6"	0.011 sec	1 : 15246430	1 : 15255516
		ΔHt.	66.0000 m	0.0147 m		
		ΔElev.	65.1557 m	0.0147 m		
		Ellip Dist.	41628.2097 m	0.0027 m		
OR1K	RD1L	Az.	331°31'50.1"	0.001 sec	1 : 244340980	1 : 243783137
		ΔHt.	92.0601 m	0.0021 m		
		ΔElev.	92.0527 m	0.0021 m		
		Ellip Dist.	129978.0540 m	0.0005 m		
OR1K	SACR	Az.	169°37'53.8"	0.001 sec	1 : 190524261	1 : 190523416
		ΔHt.	-33.2744 m	0.0021 m		
		ΔElev.	-30.5135 m	0.0021 m		
		Ellip Dist.	95937.8454 m	0.0005 m		
OR1K	WD1J	Az.	191°28'28.5"	0.001 sec	1 : 179971830	1 : 180351761
		ΔHt.	-40.2311 m	0.0022 m		
		ΔElev.	-37.1834 m	0.0022 m		
		Ellip Dist.	94028.8729 m	0.0005 m		
OR1K	WI1H	Az.	233°10'40.9"	0.001 sec	1 : 168555308	1 : 169383935
		ΔHt.	-38.9727 m	0.0021 m		
		ΔElev.	-36.7278 m	0.0021 m		
		Ellip Dist.	64470.5012 m	0.0004 m		
OR1K	YC1I	Az.	191°01'39.9"	0.002 sec	1 : 90903702	1 : 91162523
		ΔHt.	-44.2076 m	0.0021 m		
		ΔElev.	-42.6601 m	0.0021 m		
		Ellip Dist.	40696.7305 m	0.0004 m		
RD1L	DH6394-STATIC	Az.	270°14'13.3"	0.052 sec	1 : 5040736	1 : 5005498
		ΔHt.	-20.6527 m	0.0078 m		
		ΔElev.	-20.6080 m	0.0078 m		
		Ellip Dist.	5489.9308 m	0.0011 m		
RD1L	SACR	Az.	158°44'14.1"	0.000 sec	1 : 349873431	1 : 349724632
		ΔHt.	-125.3345 m	0.0024 m		

		ΔElev.	-122.5662 m	0.0024 m		
		Ellip Dist.	223167.2341 m	0.0006 m		
RD1L	WD1J	Az.	167°41'49.6"	0.000 sec	1 : 324545437	1 : 324522734
		ΔHt.	-132.2912 m	0.0024 m		
		ΔElev.	-129.2361 m	0.0024 m		
		Ellip Dist.	210891.6362 m	0.0006 m		
RD1L	WI1H	Az.	175°39'34.1"	0.000 sec	1 : 259733821	1 : 259970433
		ΔHt.	-131.0328 m	0.0023 m		
		ΔElev.	-128.7805 m	0.0023 m		
		Ellip Dist.	153247.2751 m	0.0006 m		
RD1L	YC1I	Az.	160°10'25.0"	0.000 sec	1 : 269540990	1 : 269456006
		ΔHt.	-136.2677 m	0.0024 m		
		ΔElev.	-134.7128 m	0.0024 m		
		Ellip Dist.	163444.3504 m	0.0006 m		
SACR	WD1J	Az.	273°39'29.7"	0.003 sec	1 : 105799620	1 : 105349617
		ΔHt.	-6.9567 m	0.0023 m		
		ΔElev.	-6.6700 m	0.0023 m		
		Ellip Dist.	36039.3040 m	0.0003 m		
SACR	WI1H	Az.	309°06'08.7"	0.001 sec	1 : 196890765	1 : 195874920
		ΔHt.	-5.6983 m	0.0022 m		
		ΔElev.	-6.2144 m	0.0022 m		
		Ellip Dist.	88598.1116 m	0.0004 m		
SACR	YC1I	Az.	335°24'33.2"	0.001 sec	1 : 112866543	1 : 112588072
		ΔHt.	-10.9332 m	0.0023 m		
		ΔElev.	-12.1466 m	0.0023 m		
		Ellip Dist.	59914.4239 m	0.0005 m		
WD1J	WI1H	Az.	328°16'35.2"	0.001 sec	1 : 126584990	1 : 126134834
		ΔHt.	1.2584 m	0.0023 m		
		ΔElev.	0.4556 m	0.0023 m		
		Ellip Dist.	62816.0142 m	0.0005 m		
WD1J	YC1I	Az.	11°40'48.0"	0.001 sec	1 : 97382827	1 : 97570652
		ΔHt.	-3.9765 m	0.0023 m		
		ΔElev.	-5.4766 m	0.0023 m		
		Ellip Dist.	53334.3242 m	0.0005 m		
WI1H	YC1I	Az.	91°19'44.5"	0.002 sec	1 : 131748345	1 : 131660362
		ΔHt.	-5.2349 m	0.0022 m		
		ΔElev.	-5.9322 m	0.0022 m		
		Ellip Dist.	43843.2535 m	0.0003 m		

Date: 4/23/2023
2:51:27 PM

Project: C:\Users\bhocker\OneDrive -
yuroktribe.nsn.us\Documents\Active_Projects\Sacramento_River_TopoBathy\C-

Trimble Business
Center

Project File Data		Coordinate System	
Name:	C:\Users\bhocker\OneDrive - yuroktribe.nsn.us\Documents\Active_Projects\Sacramento_River_TopoBathy\C-Process\TBC\CSDS_Network_Verification\CSDS-NGS_ControlVerification_Adjusted.vce	Name:	World wide/UTM
Size:	265 KB	Zone:	10 North
Modified:	4/23/2023 10:48:36 AM (UTC:-7)	Datum:	NAD83(2011)
Time zone:	Pacific Standard Time	Global reference datum:	NAD83(2011)
Reference number:		Global reference epoch:	2010
Description:		Geoid:	GEOID18 (Conus)
Comment 1:		Vertical datum:	NAVD88
Comment 2:		Calibrated site:	
Comment 3:			

Network Adjustment Report

Adjustment Settings

Set-Up Errors

GNSS

Error in Height of Antenna: 0.0035 m

Centering Error: 0.0025 m

Covariance Display

Horizontal:

Propagated Linear Error [E]: U.S.

Constant Term [C]: 0.0000 m

Scale on Linear Error [S]: 1.000

Three-Dimensional

Propagated Linear Error [E]: U.S.

Constant Term [C]: 0.0000 m

Scale on Linear Error [S]: 1.000

Adjustment Statistics

Number of Iterations for Successful Adjustment: 2

Network Reference Factor: 0.99

Chi Square Test (95%): Passed

Precision Confidence Level: DRMS

Degrees of Freedom: 95

Post Processed Vector Statistics

Reference Factor: 0.99
Redundancy Number: 95.00
A Priori Scalar: 1.00

Control Point Constraints

Point ID	Type	East σ (Meter)	North σ (Meter)	Height σ (Meter)	Elevation σ (Meter)
CH1G	Local	Fixed	Fixed	Fixed	
OR1K	Local	Fixed	Fixed	Fixed	
RD1L	Local	Fixed	Fixed	Fixed	
SACR	Local	Fixed	Fixed	Fixed	
WD1J	Local	Fixed	Fixed	Fixed	
WIIH	Local	Fixed	Fixed	Fixed	
YC1I	Local	Fixed	Fixed	Fixed	
Fixed = 0.000001(Meter)					

Adjusted Grid Coordinates

Point ID	Easting (Meter)	Easting Error (Meter)	Northing (Meter)	Northing Error (Meter)	Elevation (Meter)	Elevation Error (Meter)	Constraint
CH1G	597057.674	?	4401895.184	?	62.311	?	LLh
DH6394_STATIC	555168.155	0.0031	4487029.783	0.0034	139.902	0.0102	
DH6520_STATIC	583591.365	0.0034	4344671.689	0.0037	17.773	0.0154	
DH6521_STATIC	600660.303	0.0038	4322066.679	0.0042	18.468	0.0180	
DH6625_STATIC	575711.784	0.0033	4417762.020	0.0041	65.805	0.0152	
DL9132_STATIC	568199.109	0.0033	4474357.383	0.0040	115.751	0.0148	
DL9142_STATIC	566217.058	0.0037	4457255.707	0.0044	97.171	0.0184	
DL9190_STATIC	585967.049	0.0035	4387157.605	0.0045	37.025	0.0173	
DL9193_STATIC	608034.864	0.0036	4312289.138	0.0041	8.593	0.0204	
KS2014_STATIC	594909.163	0.0034	4333250.407	0.0036	12.609	0.0145	
KT0518_STATIC	584517.816	0.0038	4367972.781	0.0043	27.310	0.0187	
KT1807_STATIC	583915.698	0.0033	4399844.097	0.0041	47.891	0.0145	
LU2291_STATIC	566086.724	0.0036	4445793.926	0.0041	95.353	0.0177	
OR1K	624441.360	?	4373844.263	?	68.467	?	LLh
RD1L	560656.072	?	4487051.663	?	160.511	?	LLh
SACR	643204.811	?	4279776.703	?	37.939	?	LLh
WD1J	607210.869	?	4281430.019	?	31.267	?	LLh
WIIH	573472.349	?	4334394.239	?	31.732	?	LLh

YC1I	617298.868	?	4333788.301	?	25.802	?	LLh
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Adjusted Geodetic Coordinates

Point ID	Latitude	Longitude	Height (Meter)	Height Error (Meter)	Constraint
CH1G	N39°45'41.22852"	W121°52'00.85224"	34.806	?	LLh
DH6394-STATIC	N40°31'55.82408"	W122°20'55.01477"	112.171	0.0102	
DH6520_STATIC	N39°14'50.41859"	W122°01'52.59857"	-11.679	0.0154	
DH6521_STATIC	N39°02'30.73503"	W121°50'12.69952"	-11.041	0.0180	
DH6625_STATIC	N39°54'23.62181"	W122°06'51.26057"	37.551	0.0152	
DL9132_STATIC	N40°25'01.37439"	W122°11'46.07158"	87.972	0.0148	
DL9142_STATIC	N40°15'47.33694"	W122°13'16.55398"	68.846	0.0184	
DL9190_STATIC	N39°37'47.54928"	W121°59'53.81485"	8.926	0.0173	
DL9193_STATIC	N38°57'10.44727"	W121°45'11.56482"	-21.092	0.0204	
KS2014_STATIC	N39°08'35.79002"	W121°54'06.27224"	-16.740	0.0145	
KT0518_STATIC	N39°27'25.84654"	W122°01'03.38420"	-1.340	0.0187	
KT1807_STATIC	N39°44'39.73455"	W122°01'14.04467"	19.898	0.0145	
LU2291_STATIC	N40°09'35.65571"	W122°13'26.31462"	66.822	0.0177	
OR1K	N39°30'18.80484"	W121°33'09.27217"	40.774	?	LLh
RD1L	N40°31'55.15327"	W122°17'01.75358"	132.825	?	LLh
SACR	N38°39'17.97133"	W121°21'15.19309"	7.485	?	LLh
WD1J	N38°40'29.91548"	W121°46'03.07622"	0.526	?	LLh
W1IH	N39°09'20.35612"	W122°08'58.73575"	1.794	?	LLh
YC1I	N39°08'43.41041"	W121°38'33.44751"	-3.439	?	LLh

Adjusted ECEF Coordinates

Point ID	X (Meter)	X Error (Meter)	Y (Meter)	Y Error (Meter)	Z (Meter)	Z Error (Meter)	3D Error (Meter)	Constraint
CH1G	-2592074.638	?	-4169708.946	?	4057682.613	?	?	LLh
DH6394-STATIC	-2597547.337	0.0049	-4101204.984	0.0072	4123148.819	0.0071	0.0112	
DH6520_STATIC	-2623265.654	0.0071	-4193007.521	0.0104	4013611.909	0.0102	0.0162	
DH6521_STATIC	-2616619.069	0.0080	-4214118.530	0.0123	3995921.428	0.0118	0.0188	
DH6625_STATIC	-2604564.889	0.0068	-4149740.906	0.0103	4070056.660	0.0104	0.0161	
DL9132_STATIC	-2591035.088	0.0069	-4115110.127	0.0104	4113408.325	0.0095	0.0156	
DL9142_STATIC	-2598730.580	0.0081	-4123319.477	0.0126	4100370.167	0.0121	0.0192	
DL9190_STATIC	-2606562.726	0.0082	-4171650.684	0.0121	4046425.261	0.0109	0.0182	
DL9193_STATIC	-2613730.716	0.0086	-4223212.583	0.0143	3988239.038	0.0129	0.0211	
KS2014_STATIC	-2617635.652	0.0067	-4205122.506	0.0098	4004655.163	0.0097	0.0153	

KT0518_STATIC	-2614437.398	0.0085	-4181114.869	0.0127	4031633.143	0.0123	0.0196	
KT1807_STATIC	-2603885.255	0.0068	-4163760.721	0.0103	4056214.969	0.0092	0.0154	
LU2291_STATIC	-2602871.563	0.0076	-4129456.617	0.0120	4091613.972	0.0118	0.0185	
OR1K	-2578658.655	?	-4199334.104	?	4035776.942	?	?	LLh
RD1L	-2592923.264	?	-4104164.520	?	4123146.515	?	?	LLh
SACR	-2595053.377	?	-4259028.365	?	3962484.550	?	?	LLh
WD1J	-2624975.367	?	-4239015.404	?	3964212.404	?	?	LLh
W11H	-2635351.679	?	-4193034.764	?	4005732.673	?	?	LLh
YC1I	-2598519.027	?	-4216800.107	?	4004845.817	?	?	LLh

Error Ellipse Components

Point ID	Semi-major axis (Meter)	Semi-minor axis (Meter)	Azimuth
DH6394-STATIC	0.0049	0.0043	164°
DH6520_STATIC	0.0052	0.0049	9°
DH6521_STATIC	0.0060	0.0053	16°
DH6625_STATIC	0.0058	0.0047	1°
DL9132_STATIC	0.0057	0.0046	175°
DL9142_STATIC	0.0063	0.0052	162°
DL9190_STATIC	0.0065	0.0049	12°
DL9193_STATIC	0.0058	0.0051	171°
KS2014_STATIC	0.0051	0.0048	0°
KT0518_STATIC	0.0061	0.0054	175°
KT1807_STATIC	0.0058	0.0046	7°
LU2291_STATIC	0.0059	0.0050	164°

Adjusted GNSS Observations

Transformation Parameters

Deflection in Latitude:	0.010 sec (DRMS)	0.010 sec
Deflection in Longitude:	-0.016 sec (DRMS)	0.004 sec
Azimuth Rotation:	-0.003 sec (DRMS)	0.001 sec
Scale Factor:	0.99999989 (DRMS)	0.00000001

Observation ID		Observation	A-posteriori Error	Residual	Standardized Residual
OR1K --> SACR (PV241)	Az.	169°37'53.8"	0.001 sec	0.000 sec	-0.026
	ΔHt.	-33.2858 m	0.0015 m	-0.0109 m	-1.754
	Ellip Dist.	95937.8549 m	0.0007 m	0.0104 m	2.840

CH1G --> OR1K (PV156)	Az.	136°24'44.2"	0.001 sec	-0.030 sec	-1.579
	ΔHt.	5.9673 m	0.0011 m	0.0081 m	1.270
	Ellip Dist.	39210.7628 m	0.0003 m	-0.0099 m	-2.784
OR1K --> WI1H (PV343)	Az.	233°10'40.9"	0.001 sec	-0.031 sec	-2.744
	ΔHt.	-38.9742 m	0.0030 m	-0.0063 m	-1.097
	Ellip Dist.	64470.5035 m	0.0005 m	0.0002 m	0.053
OR1K --> RD1L (PV196)	Az.	331°31'50.1"	0.001 sec	-0.003 sec	-0.565
	ΔHt.	92.0505 m	0.0024 m	-0.0096 m	-1.642
	Ellip Dist.	129978.0447 m	0.0010 m	-0.0087 m	-2.461
OR1K --> YC1I (PV400)	Az.	191°01'39.9"	0.001 sec	-0.020 sec	-1.110
	ΔHt.	-44.2105 m	0.0011 m	-0.0009 m	-0.136
	Ellip Dist.	40696.7385 m	0.0003 m	0.0083 m	2.319
RD1L --> DH6394-STATIC (PV419)	Az.	270°14'13.2"	0.129 sec	-0.161 sec	-2.313
	ΔHt.	-20.6532 m	0.0102 m	0.0028 m	0.709
	Ellip Dist.	5489.9304 m	0.0031 m	-0.0006 m	-0.286
CH1G --> DH6394-STATIC (PV421)	Az.	334°31'50.9"	0.007 sec	0.007 sec	0.742
	ΔHt.	77.3645 m	0.0103 m	-0.0068 m	-0.259
	Ellip Dist.	94913.2353 m	0.0035 m	0.0154 m	2.253
OR1K --> WD1J (PV290)	Az.	191°28'28.5"	0.001 sec	-0.001 sec	-0.192
	ΔHt.	-40.2421 m	0.0025 m	-0.0134 m	-2.132
	Ellip Dist.	94028.8807 m	0.0007 m	0.0058 m	1.561
CH1G --> WI1H (PV344)	Az.	199°58'49.1"	0.001 sec	-0.003 sec	-0.323
	ΔHt.	-33.0069 m	0.0023 m	0.0122 m	1.953
	Ellip Dist.	71524.9381 m	0.0005 m	-0.0008 m	-0.216
CH1G --> YC1I (PV401)	Az.	164°10'04.7"	0.001 sec	-0.001 sec	-0.082
	ΔHt.	-38.2432 m	0.0011 m	0.0125 m	1.814
	Ellip Dist.	71069.4162 m	0.0005 m	-0.0019 m	-0.520
CH1G --> KT0518_STATIC (PV122)	Az.	201°00'36.2"	0.022 sec	0.001 sec	0.038
	ΔHt.	-36.1431 m	0.0187 m	0.0059 m	0.329
	Ellip Dist.	36176.7693 m	0.0042 m	-0.0070 m	-1.713
OR1K --> KT0518_STATIC (PV159)	Az.	262°33'14.5"	0.022 sec	-0.034 sec	-1.497
	ΔHt.	-42.1104 m	0.0187 m	-0.0062 m	-0.328
	Ellip Dist.	40363.6472 m	0.0038 m	0.0033 m	0.868
RD1L --> WI1H (PV342)	Az.	175°39'34.1"	0.001 sec	-0.001 sec	-0.290
	ΔHt.	-131.0244 m	0.0028 m	0.0106 m	1.398
	Ellip Dist.	153247.2754 m	0.0011 m	0.0001 m	0.031
SACR --> WI1H (PV341)	Az.	309°06'08.7"	0.001 sec	0.001 sec	0.129
	ΔHt.	-5.6883 m	0.0028 m	0.0079 m	1.336
	Ellip Dist.	88598.1103 m	0.0007 m	-0.0012 m	-0.336

YC1I --> WD1J (PV397)	Az.	191°45'30.5"	0.001 sec	0.011 sec	0.815
	ΔHt.	3.9683 m	0.0014 m	-0.0083 m	-1.215
	Ellip Dist.	53334.3241 m	0.0004 m	-0.0004 m	-0.106
SACR --> YC1I (PV398)	Az.	335°24'33.2"	0.001 sec	-0.001 sec	-0.101
	ΔHt.	-10.9246 m	0.0010 m	0.0086 m	1.203
	Ellip Dist.	59914.4246 m	0.0004 m	0.0017 m	0.459
CH1G --> KT1807_STATIC (PV123)	Az.	261°51'14.3"	0.062 sec	-0.045 sec	-1.161
	ΔHt.	-14.9065 m	0.0145 m	0.0060 m	0.550
	Ellip Dist.	13305.0511 m	0.0033 m	-0.0005 m	-0.166
WD1J --> WI1H (PV340)	Az.	328°16'35.3"	0.001 sec	0.011 sec	0.952
	ΔHt.	1.2680 m	0.0013 m	0.0085 m	1.160
	Ellip Dist.	62816.0110 m	0.0005 m	-0.0020 m	-0.537
WI1H --> KT1807_STATIC (PV348)	Az.	9°36'22.9"	0.010 sec	-0.005 sec	-0.474
	ΔHt.	18.1005 m	0.0146 m	-0.0119 m	-0.624
	Ellip Dist.	66299.2694 m	0.0041 m	0.0074 m	1.077
RD1L --> WD1J (PV289)	Az.	167°41'49.6"	0.001 sec	0.003 sec	1.046
	ΔHt.	-132.2922 m	0.0033 m	0.0013 m	0.175
	Ellip Dist.	210891.6345 m	0.0016 m	-0.0013 m	-0.351
RD1L --> LU2291_STATIC (PV205)	Az.	172°57'54.1"	0.018 sec	0.008 sec	0.490
	ΔHt.	-66.0010 m	0.0177 m	0.0106 m	0.652
	Ellip Dist.	41628.2104 m	0.0041 m	0.0034 m	1.008
CH1G --> DL9142_STATIC (PV131)	Az.	331°36'23.6"	0.012 sec	-0.008 sec	-0.641
	ΔHt.	34.0398 m	0.0184 m	-0.0066 m	-0.277
	Ellip Dist.	63391.4748 m	0.0045 m	0.0074 m	0.922
CH1G --> WD1J (PV291)	Az.	175°53'54.8"	0.001 sec	0.002 sec	0.327
	ΔHt.	-34.2748 m	0.0022 m	-0.0026 m	-0.359
	Ellip Dist.	120925.1182 m	0.0009 m	-0.0034 m	-0.918
WI1H --> DL9193_STATIC (PV345)	Az.	123°08'14.4"	0.019 sec	-0.017 sec	-0.893
	ΔHt.	-22.8877 m	0.0204 m	0.0017 m	0.086
	Ellip Dist.	41039.0642 m	0.0039 m	0.0027 m	0.718
WI1H --> KS2014_STATIC (PV346)	Az.	93°35'28.3"	0.034 sec	-0.016 sec	-0.463
	ΔHt.	-18.5361 m	0.0146 m	-0.0138 m	-0.884
	Ellip Dist.	21474.0167 m	0.0034 m	-0.0010 m	-0.303
YC1I --> DL9193_STATIC (PV402)	Az.	204°09'59.4"	0.033 sec	0.030 sec	0.879
	ΔHt.	-17.6514 m	0.0204 m	-0.0021 m	-0.101
	Ellip Dist.	23415.8706 m	0.0039 m	0.0030 m	0.755
RD1L --> DL9142_STATIC (PV209)	Az.	169°53'32.4"	0.025 sec	-0.019 sec	-0.875
	ΔHt.	-63.9779 m	0.0184 m	-0.0010 m	-0.065
	Ellip Dist.	30321.0824 m	0.0045 m	0.0014 m	0.517

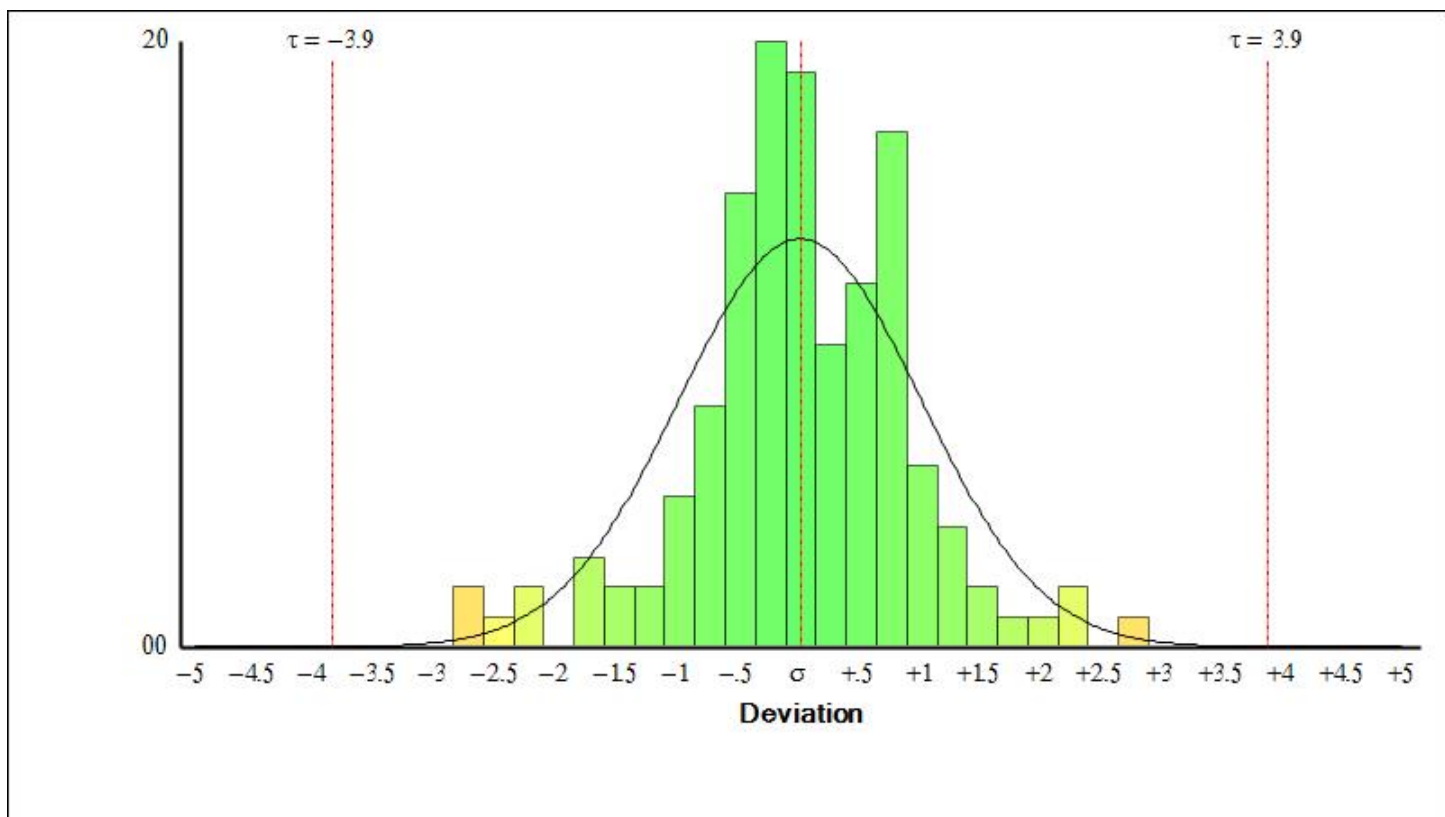
YC1I --> WI1H (PV396)	Az.	271°38'56.9"	0.001 sec	-0.001 sec	-0.060
	ΔHt.	5.2363 m	0.0021 m	0.0057 m	0.868
	Ellip Dist.	43843.2517 m	0.0003 m	-0.0019 m	-0.530
YC1I --> KS2014_STATIC (PV403)	Az.	269°28'50.6"	0.033 sec	-0.015 sec	-0.467
	ΔHt.	-13.2997 m	0.0146 m	0.0116 m	0.863
	Ellip Dist.	22402.0115 m	0.0034 m	-0.0009 m	-0.266
CH1G --> LU2291_STATIC (PV127)	Az.	325°31'27.0"	0.014 sec	0.012 sec	0.861
	ΔHt.	32.0167 m	0.0177 m	-0.0108 m	-0.548
	Ellip Dist.	53741.3372 m	0.0041 m	0.0030 m	0.541
WI1H --> DH6520_STATIC (PV350)	Az.	45°05'32.9"	0.050 sec	-0.037 sec	-0.850
	ΔHt.	-13.4739 m	0.0154 m	0.0036 m	0.314
	Ellip Dist.	14427.5903 m	0.0036 m	0.0003 m	0.107
YC1I --> DH6521_STATIC (PV406)	Az.	235°41'31.0"	0.040 sec	0.002 sec	0.045
	ΔHt.	-7.6004 m	0.0180 m	0.0174 m	0.795
	Ellip Dist.	20358.0065 m	0.0040 m	-0.0019 m	-0.411
WI1H --> DH6521_STATIC (PV349)	Az.	114°55'36.2"	0.029 sec	0.009 sec	0.356
	ΔHt.	-12.8367 m	0.0180 m	-0.0116 m	-0.793
	Ellip Dist.	29861.3344 m	0.0038 m	-0.0006 m	-0.175
RD1L --> DL9132_STATIC (PV207)	Az.	149°44'44.8"	0.048 sec	-0.010 sec	-0.237
	ΔHt.	-44.8526 m	0.0148 m	-0.0078 m	-0.632
	Ellip Dist.	14771.4052 m	0.0039 m	0.0020 m	0.790
RD1L --> YC1I (PV399)	Az.	160°10'25.0"	0.001 sec	0.000 sec	-0.096
	ΔHt.	-136.2607 m	0.0026 m	0.0058 m	0.789
	Ellip Dist.	163444.3497 m	0.0012 m	-0.0028 m	-0.746
WI1H --> DL9190_STATIC (PV351)	Az.	13°51'44.8"	0.013 sec	-0.004 sec	-0.267
	ΔHt.	7.1284 m	0.0173 m	-0.0103 m	-0.503
	Ellip Dist.	54240.0486 m	0.0046 m	0.0056 m	0.781
RD1L --> SACR (PV240)	Az.	158°44'14.1"	0.001 sec	0.002 sec	0.720
	ΔHt.	-125.3358 m	0.0036 m	-0.0061 m	-0.762
	Ellip Dist.	223167.2340 m	0.0017 m	0.0007 m	0.176
YC1I --> DH6520_STATIC (PV407)	Az.	288°45'06.8"	0.021 sec	-0.012 sec	-0.489
	ΔHt.	-8.2376 m	0.0155 m	-0.0069 m	-0.330
	Ellip Dist.	35430.6858 m	0.0035 m	-0.0029 m	-0.724
CH1G --> DL9132_STATIC (PV129)	Az.	339°00'50.4"	0.009 sec	-0.003 sec	-0.326
	ΔHt.	53.1651 m	0.0148 m	0.0091 m	0.510
	Ellip Dist.	78021.9456 m	0.0040 m	0.0042 m	0.711
WD1J --> SACR (PV288)	Az.	93°24'00.1"	0.001 sec	0.001 sec	0.051
	ΔHt.	6.9563 m	0.0017 m	-0.0032 m	-0.480

	Ellip Dist.	36039.3066 m	0.0003 m	0.0025 m	0.707
RD1L --> DH6625_STATIC (PV208)	Az.	168°12'11.5"	0.010 sec	0.006 sec	0.583
	ΔHt.	-95.2716 m	0.0152 m	0.0006 m	0.039
	Ellip Dist.	70930.7861 m	0.0041 m	-0.0003 m	-0.058
CH1G --> DL9190_STATIC (PV126)	Az.	217°41'12.3"	0.041 sec	-0.019 sec	-0.513
	ΔHt.	-25.8785 m	0.0173 m	0.0062 m	0.430
	Ellip Dist.	18449.9407 m	0.0044 m	0.0017 m	0.583
CH1G --> RD1L (PV197)	Az.	337°35'05.1"	0.001 sec	0.003 sec	0.347
	ΔHt.	98.0177 m	0.0015 m	0.0030 m	0.488
	Ellip Dist.	92640.3369 m	0.0007 m	0.0005 m	0.142
CH1G --> DH6625_STATIC (PV130)	Az.	307°20'59.8"	0.030 sec	0.011 sec	0.417
	ΔHt.	2.7460 m	0.0152 m	-0.0002 m	-0.015
	Ellip Dist.	26605.2468 m	0.0036 m	-0.0015 m	-0.461
CH1G --> SACR (PV242)	Az.	160°00'50.7"	0.001 sec	-0.001 sec	-0.107
	ΔHt.	-27.3185 m	0.0021 m	0.0030 m	0.436
	Ellip Dist.	130575.6122 m	0.0010 m	0.0009 m	0.231

Histogram of Standardized Residuals

Critical Tau Value: 3.9

Observations Failing the Tau Test: 0



Covariance Terms

From Point	To Point		Components	A-posteriori Error	Horiz. Precision (Ratio)	3D Precision (Ratio)
CH1G	DH6394-STATIC	Az.	334°31'50.9"	0.007 sec	1 : 27482800	1 : 27474186
		Δ Ht.	77.3654 m	0.0102 m		
		Δ Elev.	77.5906 m	0.0102 m		
		Ellip Dist.	94913.2251 m	0.0035 m		
CH1G	OR1K	Az.	136°24'44.2"	0.000 sec	1 : 0	1 : 0
		Δ Ht.	5.9680 m	0.0000 m		
		Δ Elev.	6.1559 m	0.0000 m		
		Ellip Dist.	39210.7586 m	0.0000 m		
CH1G	RD1L	Az.	337°35'05.1"	0.000 sec	1 : 0	1 : 0
		Δ Ht.	98.0190 m	0.0000 m		
		Δ Elev.	98.1995 m	0.0000 m		
		Ellip Dist.	92640.3270 m	0.0000 m		
CH1G	SACR	Az.	160°00'50.7"	0.000 sec	1 : 0	1 : 0
		Δ Ht.	-27.3210 m	0.0000 m		
		Δ Elev.	-24.3721 m	0.0000 m		
		Ellip Dist.	130575.5982 m	0.0000 m		
CH1G	WD1J	Az.	175°53'54.8"	0.000 sec	1 : 0	1 : 0

		ΔHt.	-34.2800 m	0.0000 m		
		ΔElev.	-31.0444 m	0.0000 m		
		Ellip Dist.	120925.1052 m	0.0000 m		
CH1G	W11H	Az.	199°58'49.1"	0.000 sec	1 : 0	1 : 0
		ΔHt.	-33.0120 m	0.0000 m		
		ΔElev.	-30.5792 m	0.0000 m		
		Ellip Dist.	71524.9304 m	0.0000 m		
CH1G	YC1I	Az.	164°10'04.7"	0.000 sec	1 : 0	1 : 0
		ΔHt.	-38.2450 m	0.0000 m		
		ΔElev.	-36.5096 m	0.0000 m		
		Ellip Dist.	71069.4085 m	0.0000 m		
DH6520_STATIC	W11H	Az.	225°10'02.2"	0.050 sec	1 : 4018264	1 : 4020884
		ΔHt.	13.4727 m	0.0154 m		
		ΔElev.	13.9592 m	0.0154 m		
		Ellip Dist.	14427.5888 m	0.0036 m		
DH6520_STATIC	YC1I	Az.	108°30'22.6"	0.021 sec	1 : 10287475	1 : 10285225
		ΔHt.	8.2397 m	0.0154 m		
		ΔElev.	8.0288 m	0.0154 m		
		Ellip Dist.	35430.6820 m	0.0034 m		
DH6521_STATIC	W11H	Az.	295°07'26.4"	0.029 sec	1 : 7989882	1 : 7986062
		ΔHt.	12.8352 m	0.0180 m		
		ΔElev.	13.2639 m	0.0180 m		
		Ellip Dist.	29861.3312 m	0.0037 m		
DH6521_STATIC	YC1I	Az.	55°34'10.1"	0.040 sec	1 : 5056068	1 : 5063451
		ΔHt.	7.6022 m	0.0180 m		
		ΔElev.	7.3335 m	0.0180 m		
		Ellip Dist.	20358.0043 m	0.0040 m		
DH6625_STATIC	CH1G	Az.	127°11'29.5"	0.030 sec	1 : 7331533	1 : 7315987
		ΔHt.	-2.7451 m	0.0152 m		
		ΔElev.	-3.4932 m	0.0152 m		
		Ellip Dist.	26605.2439 m	0.0036 m		
DH6625_STATIC	RD1L	Az.	348°18'45.7"	0.010 sec	1 : 17327530	1 : 17312059
		ΔHt.	95.2739 m	0.0152 m		
		ΔElev.	94.7063 m	0.0152 m		
		Ellip Dist.	70930.7784 m	0.0041 m		
DL9132_STATIC	CH1G	Az.	158°48'07.1"	0.009 sec	1 : 19636204	1 : 19628621
		ΔHt.	-53.1663 m	0.0148 m		
		ΔElev.	-53.4392 m	0.0148 m		
		Ellip Dist.	78021.9371 m	0.0040 m		
DL9132_STATIC	RD1L	Az.	329°48'09.7"	0.048 sec	1 : 3789203	1 : 3791917
		ΔHt.	44.8527 m	0.0148 m		
		ΔElev.	44.7603 m	0.0148 m		

		Ellip Dist.	14771.4037 m	0.0039 m		
DL9142_STATIC	CH1G	Az.	151°22'43.4"	0.012 sec	1 : 14239689	1 : 14234743
		ΔHt.	-34.0401 m	0.0184 m		
		ΔElev.	-34.8599 m	0.0184 m		
		Ellip Dist.	63391.4679 m	0.0045 m		
DL9142_STATIC	RD1L	Az.	349°55'58.3"	0.025 sec	1 : 6792929	1 : 6800106
		ΔHt.	63.9789 m	0.0184 m		
		ΔElev.	63.3396 m	0.0184 m		
		Ellip Dist.	30321.0791 m	0.0045 m		
DL9190_STATIC	CH1G	Az.	37°36'10.2"	0.041 sec	1 : 4195653	1 : 4207738
		ΔHt.	25.8801 m	0.0173 m		
		ΔElev.	25.2859 m	0.0173 m		
		Ellip Dist.	18449.9387 m	0.0044 m		
DL9190_STATIC	WI1H	Az.	193°57'30.6"	0.013 sec	1 : 11873530	1 : 11875928
		ΔHt.	-7.1319 m	0.0173 m		
		ΔElev.	-5.2932 m	0.0173 m		
		Ellip Dist.	54240.0427 m	0.0046 m		
DL9193_STATIC	WI1H	Az.	303°23'13.6"	0.020 sec	1 : 10699411	1 : 10688539
		ΔHt.	22.8861 m	0.0204 m		
		ΔElev.	23.1396 m	0.0204 m		
		Ellip Dist.	41039.0597 m	0.0038 m		
DL9193_STATIC	YCI1	Az.	24°05'48.6"	0.033 sec	1 : 5927009	1 : 5935724
		ΔHt.	17.6531 m	0.0204 m		
		ΔElev.	17.2092 m	0.0204 m		
		Ellip Dist.	23415.8680 m	0.0040 m		
KS2014_STATIC	WI1H	Az.	273°44'51.8"	0.034 sec	1 : 6387943	1 : 6386881
		ΔHt.	18.5345 m	0.0145 m		
		ΔElev.	19.1236 m	0.0145 m		
		Ellip Dist.	21474.0144 m	0.0034 m		
KS2014_STATIC	YCI1	Az.	89°19'01.8"	0.033 sec	1 : 6664872	1 : 6665321
		ΔHt.	13.3015 m	0.0145 m		
		ΔElev.	13.1932 m	0.0145 m		
		Ellip Dist.	22402.0090 m	0.0034 m		
KT0518_STATIC	CH1G	Az.	20°54'50.3"	0.022 sec	1 : 8622683	1 : 8631504
		ΔHt.	36.1458 m	0.0187 m		
		ΔElev.	35.0016 m	0.0187 m		
		Ellip Dist.	36176.7655 m	0.0042 m		
KT0518_STATIC	OR1K	Az.	82°15'30.0"	0.022 sec	1 : 10631965	1 : 10633769
		ΔHt.	42.1138 m	0.0187 m		
		ΔElev.	41.1575 m	0.0187 m		
		Ellip Dist.	40363.6429 m	0.0038 m		

KT1807_STATIC	CH1G	Az.	81°45'20.5"	0.063 sec	1 : 3997387	1 : 4002802
		ΔHt.	14.9076 m	0.0145 m		
		ΔElev.	14.4206 m	0.0145 m		
		Ellip Dist.	13305.0497 m	0.0033 m		
KT1807_STATIC	WI1H	Az.	189°41'18.2"	0.010 sec	1 : 16228486	1 : 16234060
		ΔHt.	-18.1044 m	0.0145 m		
		ΔElev.	-16.1586 m	0.0145 m		
		Ellip Dist.	66299.2623 m	0.0041 m		
LU2291_STATIC	CH1G	Az.	145°17'41.3"	0.014 sec	1 : 13138750	1 : 13130369
		ΔHt.	-32.0164 m	0.0177 m		
		ΔElev.	-33.0413 m	0.0177 m		
		Ellip Dist.	53741.3314 m	0.0041 m		
LU2291_STATIC	RD1L	Az.	353°00'13.6"	0.018 sec	1 : 10065957	1 : 10069832
		ΔHt.	66.0026 m	0.0177 m		
		ΔElev.	65.1582 m	0.0177 m		
		Ellip Dist.	41628.2060 m	0.0041 m		
OR1K	RD1L	Az.	331°31'50.1"	0.000 sec	1 : 0	1 : 0
		ΔHt.	92.0510 m	0.0000 m		
		ΔElev.	92.0436 m	0.0000 m		
		Ellip Dist.	129978.0307 m	0.0000 m		
OR1K	SACR	Az.	169°37'53.8"	0.000 sec	1 : 0	1 : 0
		ΔHt.	-33.2890 m	0.0000 m		
		ΔElev.	-30.5280 m	0.0000 m		
		Ellip Dist.	95937.8445 m	0.0000 m		
OR1K	WD1J	Az.	191°28'28.5"	0.000 sec	1 : 0	1 : 0
		ΔHt.	-40.2480 m	0.0000 m		
		ΔElev.	-37.2003 m	0.0000 m		
		Ellip Dist.	94028.8706 m	0.0000 m		
OR1K	WI1H	Az.	233°10'40.9"	0.000 sec	1 : 0	1 : 0
		ΔHt.	-38.9800 m	0.0000 m		
		ΔElev.	-36.7351 m	0.0000 m		
		Ellip Dist.	64470.4966 m	0.0000 m		
OR1K	YC1I	Az.	191°01'39.9"	0.000 sec	1 : 0	1 : 0
		ΔHt.	-44.2130 m	0.0000 m		
		ΔElev.	-42.6655 m	0.0000 m		
		Ellip Dist.	40696.7341 m	0.0000 m		
RD1L	DH6394-STATIC	Az.	270°14'13.2"	0.129 sec	1 : 1788208	1 : 1785373
		ΔHt.	-20.6536 m	0.0102 m		
		ΔElev.	-20.6089 m	0.0102 m		
		Ellip Dist.	5489.9299 m	0.0031 m		
RD1L	SACR	Az.	158°44'14.1"	0.000 sec	1 : 0	1 : 0
		ΔHt.	-125.3400 m	0.0000 m		

		ΔElev.	-122.5716 m	0.0000 m		
		Ellip Dist.	223167.2101 m	0.0000 m		
RD1L	WD1J	Az.	167°41'49.6"	0.000 sec	1 : 0	1 : 0
		ΔHt.	-132.2990 m	0.0000 m		
		ΔElev.	-129.2439 m	0.0000 m		
		Ellip Dist.	210891.6118 m	0.0000 m		
RD1L	WI1H	Az.	175°39'34.1"	0.000 sec	1 : 0	1 : 0
		ΔHt.	-131.0310 m	0.0000 m		
		ΔElev.	-128.7787 m	0.0000 m		
		Ellip Dist.	153247.2589 m	0.0000 m		
RD1L	YCIH	Az.	160°10'25.0"	0.000 sec	1 : 0	1 : 0
		ΔHt.	-136.2640 m	0.0000 m		
		ΔElev.	-134.7090 m	0.0000 m		
		Ellip Dist.	163444.3321 m	0.0000 m		
SACR	WD1J	Az.	273°39'29.7"	0.000 sec	1 : 0	1 : 0
		ΔHt.	-6.9590 m	0.0000 m		
		ΔElev.	-6.6723 m	0.0000 m		
		Ellip Dist.	36039.3027 m	0.0000 m		
SACR	WI1H	Az.	309°06'08.7"	0.000 sec	1 : 0	1 : 0
		ΔHt.	-5.6910 m	0.0000 m		
		ΔElev.	-6.2071 m	0.0000 m		
		Ellip Dist.	88598.1008 m	0.0000 m		
SACR	YCIH	Az.	335°24'33.2"	0.000 sec	1 : 0	1 : 0
		ΔHt.	-10.9240 m	0.0000 m		
		ΔElev.	-12.1374 m	0.0000 m		
		Ellip Dist.	59914.4181 m	0.0000 m		
WD1J	WI1H	Az.	328°16'35.3"	0.000 sec	1 : 0	1 : 0
		ΔHt.	1.2680 m	0.0000 m		
		ΔElev.	0.4652 m	0.0000 m		
		Ellip Dist.	62816.0042 m	0.0000 m		
WD1J	YCIH	Az.	11°40'48.1"	0.000 sec	1 : 0	1 : 0
		ΔHt.	-3.9650 m	0.0000 m		
		ΔElev.	-5.4651 m	0.0000 m		
		Ellip Dist.	53334.3183 m	0.0000 m		
WI1H	YCIH	Az.	91°19'44.5"	0.000 sec	1 : 0	1 : 0
		ΔHt.	-5.2330 m	0.0000 m		
		ΔElev.	-5.9304 m	0.0000 m		
		Ellip Dist.	43843.2470 m	0.0000 m		

Date: 4/23/2023
2:48:22 PM

Project: C:\Users\bhocker\OneDrive -
yuroktribe.nsn.us\Documents\Active_Projects\Sacramento_River_TopoBathy\C-

Trimble Business
Center

Appendix E : CSDS Station OPUS Reports

FILE: chl1g TR245610905529

1008 NOTE: You provided a zero or negative antenna height.
1008 If ARP HGT = 0.0, OPUS solves for the position of your selected antenna's reference
point (ARP).
1008 If ARP HGT < 0.0, OPUS solves for a location inside or above the antenna
1008

NGS OPUS SOLUTION REPORT
=====

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information:

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7C0a3ab28a462f43f3a32c08db3c75531c%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638170246847765204%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C&sdata=QPp%2FcCsyIm3EY9DFKpQl6jlx9B%2FRdEq4r9eykBHEV8A%3D&reserved=0>

USER: BHOCKER@YUROKTRIBE.NSN.US
RINEX FILE: chl1g0630.23o

DATE: April 13, 2023
TIME: 23:17:40 UTC

SOFTWARE:	page5 2008.25 master270.pl 160321	START:	2023/03/04 00:00:00
EPHEMERIS:	igs22516.eph [precise]	STOP:	2023/03/04 23:59:00
NAV FILE:	brdc0630.23n	OBS USED:	61816 / 66449 : 93%
ANT NAME:	TRM57971.00 NONE	# FIXED AMB:	360 / 377 : 95%
ARP HEIGHT:	0	OVERALL RMS:	0.014 (m)

REF FRAME: NAD_83 (2011) (EPOCH:2010.0000) ITRF2014 (EPOCH:2023.1712)

X:	-2592074.648 (m)	0.007 (m)	-2592075.703 (m)	0.007 (m)
Y:	-4169708.951 (m)	0.012 (m)	-4169707.586 (m)	0.012 (m)
Z:	4057682.607 (m)	0.008 (m)	4057682.551 (m)	0.008 (m)

LAT:	39 45 41.22817	0.011 (m)	39 45 41.23926	0.011 (m)
E LON:	238 7 59.14751	0.005 (m)	238 7 59.07961	0.005 (m)
W LON:	121 52 0.85249	0.005 (m)	121 52 0.92039	0.005 (m)
EL HGT:	34.810 (m)	0.011 (m)	34.311 (m)	0.011 (m)
ORTHO HGT:	62.315 (m)	0.043 (m)	[NAVD88 (Computed using GEOID18)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 10)	SPC (0402 CA 2)
Northing (Y) [meters]	4401895.173	732548.450
Easting (X) [meters]	597057.669	2011404.895
Convergence [degrees]	0.72477778	0.08391389
Point Scale	0.99971597	0.99998438
Combined Factor	0.99971051	0.99997892

US NATIONAL GRID DESIGNATOR: 10SEK9705801895 (NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE (m)
DL9240 P345	HOOKERDOME	CN2005	CORS GRP	N401616.430 W1221614.848 66279.3
AI4496	ORVB	OROVILLE	DAM GRM	N393316.644 W1213000.994 38954.5
DL9239 P344	VINAHELIT	KCN2006	CORS GRP	N395544.829 W1220140.644 23164.0

NEAREST NGS PUBLISHED CONTROL POINT

DH6531	EAST	N394540.684 W1215124.202	872.5
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

FILE: or1k TR245881842265

1008 NOTE: You provided a zero or negative antenna height.
1008 If ARP HGT = 0.0, OPUS solves for the position of your selected antenna's reference
point (ARP).
1008 If ARP HGT < 0.0, OPUS solves for a location inside or above the antenna
1008

NGS OPUS SOLUTION REPORT
=====

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information:

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7Ca3a102f2df034ca5f4a208db3c7557ae%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638170246952288627%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCI6Mn0%3D%7C3000%7C%7C&sdata=2XquNGifp5ksu8P%2FLtMLbMroIfwWcR30DiTObt%2FWBqY%3D&reserved=0>

USER: BHOCKER@YUROKTRIBE.NSN.US DATE: April 13, 2023
RINEX FILE: or1k0630.23o TIME: 23:17:48 UTC

SOFTWARE: page5 2008.25 master271.pl 160321 START: 2023/03/04 00:00:00
EPHEMERIS: igs22516.eph [precise] STOP: 2023/03/04 23:59:00
NAV FILE: brdc0630.23n OBS USED: 60084 / 66563 : 90%
ANT NAME: TRM57971.00 # FIXED AMB: 368 / 394 : 93%
ARP HEIGHT: 0 OVERALL RMS: 0.017 (m)

REF FRAME: NAD_83(2011) (EPOCH:2010.0000) ITRF2014 (EPOCH:2023.1712)

X:	-2578658.651 (m)	0.016 (m)	-2578659.704 (m)	0.016 (m)
Y:	-4199334.102 (m)	0.013 (m)	-4199332.732 (m)	0.013 (m)
Z:	4035776.920 (m)	0.010 (m)	4035776.863 (m)	0.010 (m)

LAT:	39 30 18.80435	0.004 (m)	39 30 18.81565	0.004 (m)
E LON:	238 26 50.72791	0.007 (m)	238 26 50.66034	0.007 (m)
W LON:	121 33 9.27209	0.007 (m)	121 33 9.33966	0.007 (m)
EL HGT:	40.757 (m)	0.022 (m)	40.245 (m)	0.022 (m)
ORTHO HGT:	68.451 (m)	0.048 (m)	[NAVD88 (Computed using GEOID18)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 10)	SPC (0402 CA 2)
Northing (Y) [meters]	4373844.248	704187.452
Easting (X) [meters]	624441.362	2038479.219
Convergence [degrees]	0.92089444	0.28208611
Point Scale	0.99979066	0.99994155
Combined Factor	0.99978427	0.99993516

US NATIONAL GRID DESIGNATOR: 10SFJ2444173844 (NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE (m)
DL9239	P344 VINAHELITKCN2006 CORS GRP	N395544.829	W1220140.644	62262.4
AI4496	ORVB OROVILLE DAM GRM	N393316.644	W1213000.994	7098.8
AF9713	SUTB SUTTER BUTTES CORS POINT	N391220.996	W1214914.103	40483.8

NEAREST NGS PUBLISHED CONTROL POINT

KS1205	205 B	N393031.000	W1213312.000	381.7
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

FILE: rd11 TR249205214305

1008 NOTE: You provided a zero or negative antenna height.
1008 If ARP HGT = 0.0, OPUS solves for the position of your selected antenna's reference
point (ARP).
1008 If ARP HGT < 0.0, OPUS solves for a location inside or above the antenna
1008

NGS OPUS SOLUTION REPORT
=====

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information:

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7C51f70ddc02c74457ad7108db3c761f35%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638170250284385468%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCI6Mn0%3D%7C3000%7C%7C&sdata=9hB3t6ZSHX3ri8RfHnyQR9JMxiyhVHeoti7OdqraxdE%3D&reserved=0>

USER: BHOCKER@YUROKTRIBE.NSN.US
RINEX FILE: rd110630.23o

DATE: April 13, 2023
TIME: 23:23:23 UTC

SOFTWARE: page5 2008.25 master273.pl 160321	START: 2023/03/04 00:00:00
EPHEMERIS: igs22516.eph [precise]	STOP: 2023/03/04 23:59:00
NAV FILE: brdc0630.23n	OBS USED: 60215 / 64374 : 94%
ANT NAME: TRM115000.00 NONE	# FIXED AMB: 263 / 272 : 97%
ARP HEIGHT: 0	OVERALL RMS: 0.012 (m)

REF FRAME: NAD_83 (2011) (EPOCH:2010.0000) ITRF2014 (EPOCH:2023.1712)

X:	-2592923.260 (m)	0.004 (m)	-2592924.307 (m)	0.004 (m)
Y:	-4104164.505 (m)	0.004 (m)	-4104163.162 (m)	0.004 (m)
Z:	4123146.506 (m)	0.003 (m)	4123146.452 (m)	0.003 (m)

LAT:	40 31 55.15338	0.004 (m)	40 31 55.16418	0.004 (m)
E LON:	237 42 58.24624	0.004 (m)	237 42 58.17812	0.004 (m)
W LON:	122 17 1.75376	0.004 (m)	122 17 1.82188	0.004 (m)
EL HGT:	132.808 (m)	0.004 (m)	132.335 (m)	0.004 (m)
ORTHO HGT:	160.494 (m)	0.053 (m)	[NAVD88 (Computed using GEOID18)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 10)	SPC (0401 CA 1)
Northing (Y) [meters]	4487051.667	633134.208
Easting (X) [meters]	560656.068	1975954.844
Convergence [degrees]	0.46543889	-0.18558611
Point Scale	0.99964529	0.99990855
Combined Factor	0.99962446	0.99988772

US NATIONAL GRID DESIGNATOR: 10TEK6065687052 (NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE (m)
DN7517	P060 POLLARDFLT CN2005	CORS GRP	N405951.462 W1222453.528	52882.8
DM7550	P349 WONDERLAND CN2005	CORS GRP	N404351.894 W1221909.609	22313.2
DK6407	P341 WHISKYTOWN CN2005	CORS GRP	N403902.348 W1223624.785	30359.8

NEAREST NGS PUBLISHED CONTROL POINT

LU0024	K 742	N403113.000 W1221741.000	1595.0
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

FILE: sacr TR246503260169

1008 NOTE: You provided a zero or negative antenna height.
1008 If ARP HGT = 0.0, OPUS solves for the position of your selected antenna's reference
point (ARP).
1008 If ARP HGT < 0.0, OPUS solves for a location inside or above the antenna
1008

NGS OPUS SOLUTION REPORT
=====

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information:

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7C64b5b9fdd1cd4b6b0f4a08db3c75846b%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638170247695982929%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCI6Mn0%3D%7C3000%7C%7C&sdata=BxH1IwzgZWZYIsl0abGvJpxr%2BrAtfJ9B2UqUDHq9hQs%3D&reserved=0>

USER: BHOCKER@YUROKTRIBE.NSN.US
RINEX FILE: sacr0630.23o

DATE: April 13, 2023
TIME: 23:19:04 UTC

SOFTWARE: page5 2008.25 master291.pl 160321 START: 2023/03/04 00:00:00
EPHEMERIS: igs22516.eph [precise] STOP: 2023/03/04 23:59:00
NAV FILE: brdc0630.23n OBS USED: 64010 / 67427 : 95%
ANT NAME: TRM55971.00 NONE # FIXED AMB: 299 / 309 : 97%
ARP HEIGHT: 0 OVERALL RMS: 0.014 (m)

REF FRAME: NAD_83(2011) (EPOCH:2010.0000) ITRF2014 (EPOCH:2023.1712)

X:	-2595053.378 (m)	0.010 (m)	-2595054.432 (m)	0.010 (m)
Y:	-4259028.373 (m)	0.009 (m)	-4259026.984 (m)	0.009 (m)
Z:	3962484.532 (m)	0.010 (m)	3962484.476 (m)	0.010 (m)

LAT:	38 39 17.97073	0.006 (m)	38 39 17.98222	0.006 (m)
E LON:	238 38 44.80706	0.008 (m)	238 38 44.73992	0.008 (m)
W LON:	121 21 15.19294	0.008 (m)	121 21 15.26008	0.008 (m)
EL HGT:	7.480 (m)	0.013 (m)	6.947 (m)	0.013 (m)
ORTHO HGT:	37.934 (m)	0.049 (m)	[NAVD88 (Computed using GEOID18)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 10)	SPC (0402 CA 2)
Northing (Y) [meters]	4279776.684	609909.460
Easting (X) [meters]	643204.815	2056208.531
Convergence [degrees]	1.02817778	0.40714444
Point Scale	0.99985254	0.99994262
Combined Factor	0.99985137	0.99994145

US NATIONAL GRID DESIGNATOR: 10SFH4320579777 (NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE (m)
DL9235 P267	DIXONAVIATCN2005 CORS GRP	N382249.194	W1214923.591	51015.0
DN4106 P256	FALLMANPRPCN2005 CORS GRP	N375555.058	W1213617.369	83197.5
DL9236 P268	FINCHFARMSCN2005 CORS GRP	N382824.680	W1213847.027	32469.1

NEAREST NGS PUBLISHED CONTROL POINT

DH8725	SACRAMENTO COOP CORS ARP	N383917.971	W1212115.193	0.0
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

FILE: ycli TR247261464278

1008 NOTE: You provided a zero or negative antenna height.
1008 If ARP HGT = 0.0, OPUS solves for the position of your selected antenna's reference
point (ARP).
1008 If ARP HGT < 0.0, OPUS solves for a location inside or above the antenna
1008

NGS OPUS SOLUTION REPORT
=====

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information:

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7C8e70a7007fc2447fc09608db3c75abel%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638170248335466290%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCI6Mn0%3D%7C3000%7C%7C&sdata=bXX%2F4Bd5EMZqiieXezspdBjWDb73ZTPaoFoCy6Wm7DI%3D&reserved=0>

USER: BHOCKER@YUROKTRIBE.NSN.US
RINEX FILE: ycli0630.23o

DATE: April 13, 2023
TIME: 23:20:10 UTC

SOFTWARE:	page5 2008.25 master292.pl 160321	START:	2023/03/04 00:00:00
EPHEMERIS:	igs22516.eph [precise]	STOP:	2023/03/04 23:59:00
NAV FILE:	brdc0630.23n	OBS USED:	59760 / 67074 : 89%
ANT NAME:	TRM55971.00 NONE	# FIXED AMB:	429 / 457 : 94%
ARP HEIGHT:	0	OVERALL RMS:	0.017 (m)

REF FRAME: NAD_83 (2011) (EPOCH:2010.0000) ITRF2014 (EPOCH:2023.1712)

X:	-2598519.024 (m)	0.006 (m)	-2598520.081 (m)	0.006 (m)
Y:	-4216800.096 (m)	0.006 (m)	-4216798.716 (m)	0.006 (m)
Z:	4004845.793 (m)	0.001 (m)	4004845.738 (m)	0.001 (m)

LAT:	39 8 43.41005	0.006 (m)	39 8 43.42135	0.006 (m)
E LON:	238 21 26.55234	0.004 (m)	238 21 26.48473	0.004 (m)
W LON:	121 38 33.44766	0.004 (m)	121 38 33.51527	0.004 (m)
EL HGT:	-3.462 (m)	0.006 (m)	-3.978 (m)	0.006 (m)
ORTHO HGT:	25.779 (m)	0.045 (m)	[NAVD88 (Computed using GEOID18)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 10)	SPC (0402 CA 2)
Northing (Y) [meters]	4333788.290	664207.330
Easting (X) [meters]	617298.864	2030892.012
Convergence [degrees]	0.85699722	0.22531389
Point Scale	0.99976942	0.99991523
Combined Factor	0.99976996	0.99991577

US NATIONAL GRID DESIGNATOR: 10SFJ1729933788 (NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE (m)
AF9713	SUTB SUTTER BUTTES CORS POINT	N391220.996	W1214914.103	16790.3
DL9236	P268 FINCHFARMSCN2005 CORS GRP	N382824.680	W1213847.027	74585.6
DG8215	P271 WOODLAND1_CN2004 CORS GRP	N383926.447	W1214252.326	54537.3

NEAREST NGS PUBLISHED CONTROL POINT

KS1838	WALT	N390832.409	W1213838.158	357.6
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

FILE: wdlj TR246787745846

1008 NOTE: You provided a zero or negative antenna height.
1008 If ARP HGT = 0.0, OPUS solves for the position of your selected antenna's reference
point (ARP).
1008 If ARP HGT < 0.0, OPUS solves for a location inside or above the antenna
1008

NGS OPUS SOLUTION REPORT
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All computed coordinate accuracies are listed as peak-to-peak values.
For additional information:

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7C65507b7171824568582d08db3c759932%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638170248043456917%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=kiVXhDrdE5X7iSGy8LGfYgU0Dp8xTwlmfvFkIAVhu2I%3D&reserved=0>

USER: BHOCKER@YUROKTRIBE.NSN.US
RINEX FILE: wdlj063a.23o

DATE: April 13, 2023
TIME: 23:19:38 UTC

SOFTWARE: page5 2008.25 master274.pl 160321	START: 2023/03/04 00:00:00
EPHEMERIS: igs22516.eph [precise]	STOP: 2023/03/04 23:59:00
NAV FILE: brdc0630.23n	OBS USED: 59456 / 67253 : 88%
ANT NAME: TRM55971.00 NONE	# FIXED AMB: 383 / 420 : 91%
ARP HEIGHT: 0	OVERALL RMS: 0.017 (m)

REF FRAME: NAD_83 (2011) (EPOCH:2010.0000) ITRF2014 (EPOCH:2023.1712)

X:	-2624975.365 (m)	0.004 (m)	-2624976.426 (m)	0.004 (m)
Y:	-4239015.402 (m)	0.013 (m)	-4239014.007 (m)	0.013 (m)
Z:	3964212.381 (m)	0.010 (m)	3964212.329 (m)	0.010 (m)

LAT:	38 40 29.91497	0.006 (m)	38 40 29.92634	0.006 (m)
E LON:	238 13 56.92379	0.007 (m)	238 13 56.85611	0.007 (m)
W LON:	121 46 3.07621	0.007 (m)	121 46 3.14389	0.007 (m)
EL HGT:	0.510 (m)	0.015 (m)	-0.013 (m)	0.015 (m)
ORTHO HGT:	31.251 (m)	0.063 (m)	[NAVD88 (Computed using GEOID18)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 10)	SPC (0402 CA 2)
Northing (Y) [meters]	4281430.003	611953.957
Easting (X) [meters]	607210.870	2020229.381
Convergence [degrees]	0.77025278	0.14656944
Point Scale	0.99974154	0.99994008
Combined Factor	0.99974146	0.99994000

US NATIONAL GRID DESIGNATOR: 10SFH0721181430 (NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE (m)
AF9713	SUTB SUTTER BUTTES CORS POINT	N391220.996	W1214914.103	59117.8
DL9235	P267 DIXONAVIATCN2005 CORS GRP	N382249.194	W1214923.591	33066.0
DG8215	P271 WOODLAND1_CN2004 CORS GRP	N383926.447	W1214252.326	5009.6

NEAREST NGS PUBLISHED CONTROL POINT

JS2223	H 201	N384034.000	W1214559.000	159.9
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

FILE: wilh TR247030419780

1008 NOTE: You provided a zero or negative antenna height.
1008 If ARP HGT = 0.0, OPUS solves for the position of your selected antenna's reference
point (ARP).
1008 If ARP HGT < 0.0, OPUS solves for a location inside or above the antenna
1008

NGS OPUS SOLUTION REPORT
=====

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information:

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7C6852d9d0a34e438e9dd808db3c7594a8%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638170247938152292%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCI6Mn0%3D%7C3000%7C%7C&sdata=925ylkjD%2BWKKFugpaTCTRRpnLBgsYmCaYYcbxgo2uk%3D&reserved=0>

USER: BHOCKER@YUROKTRIBE.NSN.US
RINEX FILE: wilh063a.23o

DATE: April 13, 2023
TIME: 23:19:31 UTC

SOFTWARE: page5 2008.25 master290.pl 160321 START: 2023/03/04 00:00:00
EPHEMERIS: igs22516.eph [precise] STOP: 2023/03/04 23:59:00
NAV FILE: brdc0630.23n OBS USED: 56375 / 64198 : 88%
ANT NAME: TRM55971.00 NONE # FIXED AMB: 392 / 414 : 95%
ARP HEIGHT: 0 OVERALL RMS: 0.017 (m)

REF FRAME: NAD_83 (2011) (EPOCH:2010.0000) ITRF2014 (EPOCH:2023.1712)

X:	-2635351.692 (m)	0.002 (m)	-2635352.759 (m)	0.002 (m)
Y:	-4193034.771 (m)	0.008 (m)	-4193033.383 (m)	0.008 (m)
Z:	4005732.665 (m)	0.009 (m)	4005732.614 (m)	0.009 (m)

LAT:	39 9 20.35566	0.009 (m)	39 9 20.36682	0.009 (m)
E LON:	237 51 1.26392	0.004 (m)	237 51 1.19556	0.004 (m)
W LON:	122 8 58.73608	0.004 (m)	122 8 58.80444	0.004 (m)
EL HGT:	1.799 (m)	0.008 (m)	1.296 (m)	0.008 (m)
ORTHO HGT:	31.737 (m)	0.062 (m)	[NAVD88 (Computed using GEOID18)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 10)	SPC (0402 CA 2)
Northing (Y) [meters]	4334394.225	665296.486
Easting (X) [meters]	573472.341	1987066.004
Convergence [degrees]	0.53696111	-0.09435000
Point Scale	0.99966647	0.99991544
Combined Factor	0.99966619	0.99991516

US NATIONAL GRID DESIGNATOR: 10SEJ7347234394 (NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE (m)
DN9091	P334 SHEETIRON_CN2007 CORS GRP	N392936.918	W1224409.083	62988.9
AF9713	SUTB SUTTER BUTTES CORS POINT	N391220.996	W1214914.103	28981.5
DK6398	P206 CRAZYCREEKCN2006 CORS GRP	N384640.128	W1223432.803	55888.9

NEAREST NGS PUBLISHED CONTROL POINT

KT0435	L 1079	N390914.460	W1220903.690	217.3
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

Appendix F : NGS Control OPUS Reports

NGS OPUS SOLUTION REPORT

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All computed coordinate accuracies are listed as peak-to-peak values.

For additional information:

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7Cd51a1255182f44d8704008db3490b69d%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161568386420417%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=A0XpO9aztnlFpW20GogPtm%2BLlVAoeSvJ4t9p7R5%2Fdze%3D&reserved=0>

USER: BHOCKER@YUROKTRIBE.NSN.US
RINEX FILE: dh63090w.23o

DATE: April 03, 2023
TIME: 22:13:31 UTC

SOFTWARE: page5 2008.25 master273.pl 160321 START: 2023/03/31 22:22:00
EPHEMERIS: igr22555.eph [rapid] STOP: 2023/04/01 00:30:00
NAV FILE: brdc0900.23n OBS USED: 5923 / 6664 : 89%
ANT NAME: TRMR10 NONE # FIXED AMB: 41 / 48 : 85%
ARP HEIGHT: 1.55 OVERALL RMS: 0.014 (m)

REF FRAME: NAD_83 (2011) (EPOCH:2010.0000) ITRF2014 (EPOCH:2023.2465)

X:	-2597547.354 (m)	0.006 (m)	-2597548.403 (m)	0.006 (m)
Y:	-4101205.002 (m)	0.009 (m)	-4101203.658 (m)	0.009 (m)
Z:	4123148.807 (m)	0.027 (m)	4123148.753 (m)	0.027 (m)

LAT:	40 31 55.82327	0.022 (m)	40 31 55.83403	0.022 (m)
E LON:	237 39 4.98503	0.006 (m)	237 39 4.91681	0.006 (m)
W LON:	122 20 55.01497	0.006 (m)	122 20 55.08319	0.006 (m)
EL HGT:	112.182 (m)	0.017 (m)	111.710 (m)	0.017 (m)
ORTHO HGT:	139.913 (m)	0.074 (m)	[NAVD88 (Computed using GEOID18)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 10)	SPC (0401 CA 1)
Northing (Y) [meters]	4487029.758	633174.680
Easting (X) [meters]	555168.151	1970465.565
Convergence [degrees]	0.42333056	-0.22795278
Point Scale	0.99963746	0.99990854
Combined Factor	0.99961987	0.99989094

US NATIONAL GRID DESIGNATOR: 10TEK5516887030 (NAD 83)

BASE STATIONS USED					
PID	DESIGNATION		LATITUDE	LONGITUDE	DISTANCE (m)
DM7550	P349 WONDERLANDCN2005	CORS GRP	N404351.894	W1221909.609	22227.9
DN7517	P060 POLLARDFLTcn2005	CORS GRP	N405951.462	W1222453.528	51993.4
DL9240	P345 HOOKERDOMEcn2005	CORS GRP	N401616.430	W1221614.848	29719.8

NEAREST NGS PUBLISHED CONTROL POINT			
DH6394	5 SHA 11.70	N403155.824	W1222055.015 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

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8002 updating descriptions

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgeodesy.noaa.gov%2Fmarks%2Frecording%2F&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7Cd51a1255182f44d8704008db3490b69d%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161568386420417%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=%2B0arm55FLpVPibERiR%2Ff1tlnw13aEecgYU2OB4p5V20%3D&reserved=0>

NGS OPUS SOLUTION REPORT

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All computed coordinate accuracies are listed as peak-to-peak values.

For additional information:

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7Cc8a199fabf72445074a408db349375b1%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161580180995826%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=5jmbW3aGlzhMgy7z1HH2q5joqCSTE2WsqdW2pUIb3lw%3D&reserved=0>

USER: BHOCKER@YUROKTRIBE.NSN.US
RINEX FILE: dh65092s.23o

DATE: April 03, 2023
TIME: 22:33:10 UTC

SOFTWARE: page5 2008.25 master274.pl 160321 START: 2023/04/02 18:33:00
EPHEMERIS: igu22560.eph [ultra-rapid] STOP: 2023/04/02 20:33:00
NAV FILE: brdc0920.23n OBS USED: 4981 / 5045 : 99%
ANT NAME: TRMR10 NONE # FIXED AMB: 24 / 32 : 75%
ARP HEIGHT: 1.55 OVERALL RMS: 0.019 (m)

REF FRAME: NAD_83 (2011) (EPOCH:2010.0000) ITRF2014 (EPOCH:2023.2515)

X:	-2623265.674 (m)	0.024 (m)	-2623266.739 (m)	0.024 (m)
Y:	-4193007.479 (m)	0.036 (m)	-4193006.096 (m)	0.036 (m)
Z:	4013611.891 (m)	0.035 (m)	4013611.838 (m)	0.035 (m)

LAT:	39 14 50.41867	0.014 (m)	39 14 50.42980	0.014 (m)
E LON:	237 58 7.39981	0.039 (m)	237 58 7.33156	0.039 (m)
W LON:	122 1 52.60019	0.039 (m)	122 1 52.66844	0.039 (m)
EL HGT:	-11.709 (m)	0.041 (m)	-12.213 (m)	0.041 (m)
ORTHO HGT:	17.743 (m)	0.089 (m)	[NAVD88 (Computed using GEOID18)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 10)	SPC (0402 CA 2)
Northing (Y) [meters]	4344671.691	675464.170
Easting (X) [meters]	583591.326	1997300.192
Convergence [degrees]	0.61291667	-0.01971944
Point Scale	0.99968603	0.99991869
Combined Factor	0.99968787	0.99992053

US NATIONAL GRID DESIGNATOR: 10SEJ8359144672 (NAD 83)

BASE STATIONS USED					
PID	DESIGNATION		LATITUDE	LONGITUDE	DISTANCE (m)
DN9091	P334 SHEETIRON_CN2007	CORS GRP	N392936.918	W1224409.083	66624.9
AI4496	ORVB OROVILLE DAM GRM		N393316.644	W1213000.994	57062.2
DK6398	P206 CRAZYCREEKCN2006	CORS GRP	N384640.128	W1223432.803	70293.8

NEAREST NGS PUBLISHED CONTROL POINT			
DH6520	HARBISON	N391450.417	W1220152.598 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

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<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgeodesy.noaa.gov%2Fmarks%2Fsharing%2F&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7Cc8a199fabf72445074a408db349375b1%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161580180995826%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=iGL2iv9aV93nGNkmbHYHXl2t7vEqR7bcxvYKG2tZXdg%3D&reserved=0> or

8002 updating descriptions

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgeodesy.noaa.gov%2Fmarks%2Frecording%2F&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7Cc8a199fabf72445074a408db349375b1%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161580180995826%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=iGL2iv9aV93nGNkmbHYHXl2t7vEqR7bcxvYKG2tZXdg%3D&reserved=0>

NGS OPUS SOLUTION REPORT

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All computed coordinate accuracies are listed as peak-to-peak values.

For additional information:

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7C32bacd60ee334b743dfc08db3493b9e7%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161581331221187%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=evLyTHLGZlKoMDvuqvkR RqNFimZFV2Fc4ha%2BiVjmeEo%3D&reserved=0>

USER: BHOCKER@YUROKTRIBE.NSN.US
RINEX FILE: dh65092v.23o

DATE: April 03, 2023
TIME: 22:35:05 UTC

SOFTWARE: page5 2008.25 master271.pl 160321 START: 2023/04/02 21:37:00
EPHEMERIS: igu22560.eph [ultra-rapid] STOP: 2023/04/02 23:37:00
NAV FILE: brdc0920.23n OBS USED: 5217 / 6129 : 85%
ANT NAME: TRMR10 NONE # FIXED AMB: 43 / 53 : 81%
ARP HEIGHT: 1.55 OVERALL RMS: 0.018 (m)

REF FRAME: NAD_83 (2011) (EPOCH:2010.0000)

ITRF2014 (EPOCH:2023.2519)

X:	-2616619.077 (m)	0.021 (m)	-2616620.140 (m)	0.021 (m)
Y:	-4214118.527 (m)	0.013 (m)	-4214117.141 (m)	0.013 (m)
Z:	3995921.402 (m)	0.038 (m)	3995921.348 (m)	0.038 (m)

LAT:	39 2 30.73434	0.028 (m)	39 2 30.74557	0.028 (m)
E LON:	238 9 47.30015	0.016 (m)	238 9 47.23222	0.016 (m)
W LON:	121 50 12.69985	0.016 (m)	121 50 12.76778	0.016 (m)
EL HGT:	-11.056 (m)	0.027 (m)	-11.570 (m)	0.027 (m)
ORTHO HGT:	18.454 (m)	0.079 (m)	[NAVD88 (Computed using GEOID18)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 10)	SPC (0402 CA 2)
Northing (Y) [meters]	4322066.657	652667.621
Easting (X) [meters]	600660.296	2014122.597
Convergence [degrees]	0.73270833	0.10285278
Point Scale	0.99972476	0.99991495
Combined Factor	0.99972649	0.99991668

US NATIONAL GRID DESIGNATOR: 10SFJ0066022067 (NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE (m)
AF9713	SUTB SUTTER BUTTES CORS POINT	N391220.996	W1214914.103	18268.7
AI4496	ORVB OROVILLE DAM GRM	N393316.644	W1213000.994	63905.3
DG8215	P271 WOODLAND1_CN2004 CORS GRP	N383926.447	W1214252.326	43987.8

NEAREST NGS PUBLISHED CONTROL POINT

DH6521	WILSON BEND	N390230.735	W1215012.699	0.0
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

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8002 updating descriptions

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgeodesy.noaa.gov%2Fmarks%2Frecording%2F&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7C32bacd60ee334b743dfc08db3493b9e7%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161581331221187%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=hqzD%2FUyJ0l2IAcVfJc9IYH u0SIcef%2FYJsqNlcDvCWc%3D&reserved=0>

NGS OPUS SOLUTION REPORT

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All computed coordinate accuracies are listed as peak-to-peak values.

For additional information:

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7C9e4674e87dcd4c8b8aa708db3492b5e9%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161576960769808%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=qROldBrBABmwMG3rWJw%2F9FOTKFl0QKfhDPQZhTkuka0%3D&reserved=0>

USER: BHOCKER@YUROKTRIBE.NSN.US
RINEX FILE: dh66091v.23o

DATE: April 03, 2023
TIME: 22:27:49 UTC

SOFTWARE: page5 2008.25 master290.pl 160321 START: 2023/04/01 21:48:00
EPHEMERIS: igr22556.eph [rapid] STOP: 2023/04/01 23:50:00
NAV FILE: brdc0910.23n OBS USED: 6100 / 6300 : 97%
ANT NAME: TRMR10 NONE # FIXED AMB: 38 / 40 : 95%
ARP HEIGHT: 1.55 OVERALL RMS: 0.013 (m)

REF FRAME: NAD_83 (2011) (EPOCH:2010.0000) ITRF2014 (EPOCH:2023.2492)

X:	-2604564.888 (m)	0.016 (m)	-2604565.946 (m)	0.016 (m)
Y:	-4149740.895 (m)	0.035 (m)	-4149739.532 (m)	0.035 (m)
Z:	4070056.639 (m)	0.020 (m)	4070056.584 (m)	0.020 (m)

LAT:	39 54 23.62147	0.009 (m)	39 54 23.63242	0.009 (m)
E LON:	237 53 8.73920	0.005 (m)	237 53 8.67098	0.005 (m)
W LON:	122 6 51.26080	0.005 (m)	122 6 51.32902	0.005 (m)
EL HGT:	37.530 (m)	0.042 (m)	37.040 (m)	0.042 (m)
ORTHO HGT:	65.783 (m)	0.081 (m)	[NAVD88 (Computed using GEOID18)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 10)	SPC (0401 CA 1)
Northing (Y) [meters]	4417762.009	563658.095
Easting (X) [meters]	575711.778	1990231.158
Convergence [degrees]	0.56827500	-0.07470000
Point Scale	0.99967057	1.00002484
Combined Factor	0.99966468	1.00001895

US NATIONAL GRID DESIGNATOR: 10SEK7571217762 (NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE (m)
AI4496	ORVB OROVILLE DAM GRM	N393316.644	W1213000.994	65555.4
DL9240	P345 HOOKERDOME CN2005 CORS GRP	N401616.430	W1221614.848	42636.5
DN5653	P339 VALENTINE_CN2007 CORS GRP	N400202.784	W1224005.644	49414.4

NEAREST NGS PUBLISHED CONTROL POINT

DH6625	MICHIGAN	N395423.622	W1220651.259	0.0
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

8002 Was this collected on a published mark? Please help update

8002 NGS records by sharing

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgeodesy.noaa.gov%2Fmarks%2Fsharing%2F&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7C9e4674e87dcd4c8b8aa708db3492b5e9%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161576960769808%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=ybVeFexD4DLjsz7Qxpf2ft9xYIa5Q0LP2dPpWsQzneA%3D&reserved=0> or

8002 updating descriptions

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgeodesy.noaa.gov%2Fmarks%2Frecording%2F&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7C9e4674e87dcd4c8b8aa708db3492b5e9%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161576960769808%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=ybVeFexD4DLjsz7Qxpf2ft9xYIa5Q0LP2dPpWsQzneA%3D&reserved=0>

NGS OPUS SOLUTION REPORT

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All computed coordinate accuracies are listed as peak-to-peak values.

For additional information:

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7C8bc101736d414f46a81408db3492e010%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161577661342639%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=f3C09rUtmwo5641aE69MpkHT0mfYriwuO8PvJaVIBJQ%3D&reserved=0>

USER: BHOCKER@YUROKTRIBE.NSN.US
RINEX FILE: dl91091p.23o

DATE: April 03, 2023
TIME: 22:28:59 UTC

SOFTWARE: page5 2008.25 master251.pl 160321 START: 2023/04/01 15:16:00
EPHEMERIS: igr22556.eph [rapid] STOP: 2023/04/01 17:52:00
NAV FILE: brdc0910.23n OBS USED: 5927 / 6860 : 86%
ANT NAME: TRMR10 NONE # FIXED AMB: 42 / 53 : 79%
ARP HEIGHT: 1.55 OVERALL RMS: 0.016 (m)

REF FRAME: NAD_83 (2011) (EPOCH:2010.0000) ITRF2014 (EPOCH:2023.2485)

X:	-2591035.090 (m)	0.008 (m)	-2591036.141 (m)	0.008 (m)
Y:	-4115110.137 (m)	0.027 (m)	-4115108.789 (m)	0.027 (m)
Z:	4113408.318 (m)	0.016 (m)	4113408.263 (m)	0.016 (m)

LAT:	40 25 1.37402	0.006 (m)	40 25 1.38486	0.006 (m)
E LON:	237 48 13.92858	0.008 (m)	237 48 13.86040	0.008 (m)
W LON:	122 11 46.07142	0.008 (m)	122 11 46.13960	0.008 (m)
EL HGT:	87.975 (m)	0.031 (m)	87.497 (m)	0.031 (m)
ORTHO HGT:	115.753 (m)	0.078 (m)	[NAVD88 (Computed using GEOID18)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 10)	SPC (0401 CA 1)
Northing (Y) [meters]	4474357.372	620351.759
Easting (X) [meters]	568199.113	1983355.285
Convergence [degrees]	0.52120556	-0.12824722
Point Scale	0.99965725	0.99992110
Combined Factor	0.99964345	0.99990730

US NATIONAL GRID DESIGNATOR: 10TEK6819974357 (NAD 83)

BASE STATIONS USED					
PID	DESIGNATION		LATITUDE	LONGITUDE	DISTANCE (m)
DM7550	P349 WONDERLANDCN2005	CORS GRP	N404351.894	W1221909.609	36400.5
DN5653	P339 VALENTINE_CN2007	CORS GRP	N400202.784	W1224005.644	58514.7
DK6407	P341 WHISKYTOWNCN2005	CORS GRP	N403902.348	W1223624.785	43408.2

NEAREST NGS PUBLISHED CONTROL POINT			
DL9132	ASH	N402501.375	W1221146.072 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

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<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgeodesy.noaa.gov%2Fmarks%2Fsharing%2F&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7C8bc101736d414f46a81408db3492e010%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161577661342639%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=EJzRl%2BQLB16FD6ffKutNT2wcMr0cyAem2vA5JWoLQHk%3D&reserved=0> or

8002 updating descriptions

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgeodesy.noaa.gov%2Fmarks%2Frecording%2F&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7C8bc101736d414f46a81408db3492e010%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161577661342639%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=EJzRl%2BQLB16FD6ffKutNT2wcMr0cyAem2vA5JWoLQHk%3D&reserved=0>

NGS OPUS SOLUTION REPORT

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All computed coordinate accuracies are listed as peak-to-peak values.

For additional information:

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7Cf81a73177338435e542f08db34928051%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161576068492558%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=qJ%2FoFapaUvPdO9oTMeGFvd2l2qzYS8PAwx2chnXBOA%3D&reserved=0>

USER: BHOCKER@YUROKTRIBE.NSN.US
RINEX FILE: dl91091s.23o

DATE: April 03, 2023
TIME: 22:26:18 UTC

SOFTWARE: page5 2008.25 master272.pl 160321 START: 2023/04/01 18:39:00
EPHEMERIS: igr22556.eph [rapid] STOP: 2023/04/01 20:40:00
NAV FILE: brdc0910.23n OBS USED: 4655 / 5008 : 93%
ANT NAME: TRMR10 NONE # FIXED AMB: 37 / 46 : 80%
ARP HEIGHT: 1.55 OVERALL RMS: 0.017 (m)

REF FRAME: NAD_83 (2011) (EPOCH:2010.0000) ITRF2014 (EPOCH:2023.2488)

X:	-2598730.595 (m)	0.074 (m)	-2598731.649 (m)	0.074 (m)
Y:	-4123319.409 (m)	0.052 (m)	-4123318.056 (m)	0.052 (m)
Z:	4100370.141 (m)	0.064 (m)	4100370.086 (m)	0.064 (m)

LAT:	40 15 47.33737	0.012 (m)	40 15 47.34821	0.012 (m)
E LON:	237 46 43.44395	0.055 (m)	237 46 43.37569	0.055 (m)
W LON:	122 13 16.55605	0.055 (m)	122 13 16.62431	0.055 (m)
EL HGT:	68.791 (m)	0.097 (m)	68.311 (m)	0.097 (m)
ORTHO HGT:	97.116 (m)	0.132 (m)	[NAVD88 (Computed using GEOID18)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 10)	SPC (0401 CA 1)
Northing (Y) [meters]	4457255.719	603268.922
Easting (X) [meters]	566217.009	1981179.081
Convergence [degrees]	0.50331389	-0.14468333
Point Scale	0.99965397	0.99994412
Combined Factor	0.99964318	0.99993333

US NATIONAL GRID DESIGNATOR: 10TEK6621757256 (NAD 83)

BASE STATIONS USED					
PID	DESIGNATION		LATITUDE	LONGITUDE	DISTANCE (m)
DL9240	P345 HOOKERDOME	CN2005	CORS GRP	N401616.430 W1221614.848	4307.8
DN5653	P339 VALENTINE	CN2007	CORS GRP	N400202.784 W1224005.644	45809.0
DL9239	P344 VINAHELIT	KCN2006	CORS GRP	N395544.829 W1220140.644	40588.0

NEAREST NGS PUBLISHED CONTROL POINT			
DL9142	BEND BRIDGE	N401547.336 W1221316.553	0.1

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

8002 Was this collected on a published mark? Please help update

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<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgeodesy.noaa.gov%2Fmarks%2Fsharing%2F&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7Cf81a73177338435e542f08db34928051%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161576068492558%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=K3g3uhU04VDypgoUQEkwumdas0TuXjJB4pAZb751OAM%3D&reserved=0> or

8002 updating descriptions

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgeodesy.noaa.gov%2Fmarks%2Frecording%2F&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7Cf81a73177338435e542f08db34928051%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161576068492558%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=K3g3uhU04VDypgoUQEkwumdas0TuXjJB4pAZb751OAM%3D&reserved=0>

NGS OPUS SOLUTION REPORT

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All computed coordinate accuracies are listed as peak-to-peak values.

For additional information:

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7Ce3f4e32fdc314afbc2d08db34935f6c%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161579814617516%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=dBE%2BGPYgZnfDx%2FvY%2FJJk7KbGiEx2vfkTH6IkK7C%2F%2Ba0%3D&reserved=0>

USER: BHOCKER@YUROKTRIBE.NSN.US
RINEX FILE: dl91092p.23o

DATE: April 03, 2023
TIME: 22:32:33 UTC

SOFTWARE: page5 2008.25 master256.pl 160321 START: 2023/04/02 15:27:00
EPHEMERIS: igu22560.eph [ultra-rapid] STOP: 2023/04/02 17:28:00
NAV FILE: brdc0920.23n OBS USED: 5395 / 5729 : 94%
ANT NAME: TRMR10 NONE # FIXED AMB: 39 / 42 : 93%
ARP HEIGHT: 1.55 OVERALL RMS: 0.016 (m)

REF FRAME: NAD_83 (2011) (EPOCH:2010.0000) ITRF2014 (EPOCH:2023.2512)

X:	-2606562.757 (m)	0.011 (m)	-2606563.817 (m)	0.011 (m)
Y:	-4171650.700 (m)	0.016 (m)	-4171649.330 (m)	0.016 (m)
Z:	4046425.253 (m)	0.010 (m)	4046425.198 (m)	0.010 (m)

LAT:	39 37 47.54845	0.005 (m)	39 37 47.55950	0.005 (m)
E LON:	238 0 6.18440	0.001 (m)	238 0 6.11626	0.001 (m)
W LON:	121 59 53.81560	0.001 (m)	121 59 53.88374	0.001 (m)
EL HGT:	8.944 (m)	0.021 (m)	8.446 (m)	0.021 (m)
ORTHO HGT:	37.044 (m)	0.076 (m)	[NAVD88 (Computed using GEOID18)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 10)	SPC (0402 CA 2)
Northing (Y) [meters]	4387157.579	717931.601
Easting (X) [meters]	585967.031	2000147.480
Convergence [degrees]	0.63896111	0.00108333
Point Scale	0.99969099	0.99995988
Combined Factor	0.99968959	0.99995848

US NATIONAL GRID DESIGNATOR: 10SEJ8596787158 (NAD 83)

BASE STATIONS USED					
PID	DESIGNATION		LATITUDE	LONGITUDE	DISTANCE (m)
DN9091	P334 SHEETIRON_CN2007	CORS GRP	N392936.918	W1224409.083	65204.1
DK6404	P336 HUBBARDRDGCN2007	CORS GRP	N393141.074	W1222549.687	38815.6
DL9239	P344 VINAHELITKCN2006	CORS GRP	N395544.829	W1220140.644	33322.5

NEAREST NGS PUBLISHED CONTROL POINT			
DL9190	ORDBEND	N393747.549	W1215953.815 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

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<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgeodesy.noaa.gov%2Fmarks%2Fsharing%2F&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7Ce3f4e32fdc314afbc2d08db34935f6c%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161579814617516%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=JZFdJL5JkqhBRFh55f8GvrlBjCHBEfeCSTCQ3IAj0R0%3D&reserved=0> or

8002 updating descriptions

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgeodesy.noaa.gov%2Fmarks%2Frecording%2F&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7Ce3f4e32fdc314afbc2d08db34935f6c%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161579814617516%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=JZFdJL5JkqhBRFh55f8GvrlBjCHBEfeCSTCQ3IAj0R0%3D&reserved=0>

NGS OPUS SOLUTION REPORT

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All computed coordinate accuracies are listed as peak-to-peak values.

For additional information:

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7C766c86e2dfce40fbc37d08db349468f4%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161584259751576%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=7WuRQbRCFYvZe2qpBKMh32zPnMXhI%2Ff%2Bz53K%2FLTsU9c%3D&reserved=0>

USER: BHOCKER@YUROKTRIBE.NSN.US
RINEX FILE: dl91092w.23o

DATE: April 03, 2023
TIME: 22:39:52 UTC

SOFTWARE: page5 2008.25 master272.pl 160321 START: 2023/04/02 22:44:00
EPHEMERIS: igu22560.eph [ultra-rapid] STOP: 2023/04/03 00:47:00
NAV FILE: brdc0920.23n OBS USED: 5864 / 6409 : 91%
ANT NAME: TRMR10 NONE # FIXED AMB: 38 / 42 : 90%
ARP HEIGHT: 2.05 OVERALL RMS: 0.016 (m)

REF FRAME: NAD_83 (2011) (EPOCH:2010.0000) ITRF2014 (EPOCH:2023.2520)

X:	-2613730.718 (m)	0.035 (m)	-2613731.779 (m)	0.035 (m)
Y:	-4223212.592 (m)	0.009 (m)	-4223211.205 (m)	0.009 (m)
Z:	3988239.013 (m)	0.028 (m)	3988238.959 (m)	0.028 (m)

LAT:	38 57 10.44648	0.012 (m)	38 57 10.45778	0.012 (m)
E LON:	238 14 48.43532	0.027 (m)	238 14 48.36754	0.027 (m)
W LON:	121 45 11.56468	0.027 (m)	121 45 11.63246	0.027 (m)
EL HGT:	-21.101 (m)	0.036 (m)	-21.618 (m)	0.036 (m)
ORTHO HGT:	8.584 (m)	0.085 (m)	[NAVD88 (Computed using GEOID18)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 10)	SPC (0402 CA 2)
Northing (Y) [meters]	4312289.114	642807.905
Easting (X) [meters]	608034.868	2021390.692
Convergence [degrees]	0.78390833	0.15559167
Point Scale	0.99974372	0.99991731
Combined Factor	0.99974703	0.99992062

US NATIONAL GRID DESIGNATOR: 10SFJ0803512289 (NAD 83)

BASE STATIONS USED					
PID	DESIGNATION		LATITUDE	LONGITUDE	DISTANCE (m)
DM7544	P196 MEACHUMFLCN2006 CORS GRP		N381753.304	W1224433.457	112720.4
DO7031	CASR SANTA ROSA CA CORS ARP		N382626.414	W1224449.165	103475.1
DH8725	SACR SACRAMENTO COOP CORS ARP		N383917.971	W1212115.193	47905.2

NEAREST NGS PUBLISHED CONTROL POINT			
DL9193	PELGER	N385710.446 W1214511.564	0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

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<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgeodesy.noaa.gov%2Fmarks%2Fsharing%2F&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7C766c86e2dfce40fbc37d08db349468f4%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161584259751576%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=s4x9%2F7Z0Z8v8spSlr3XSCdRnKGlcVYvErPwAncuz2zs%3D&reserved=0> or

8002 updating descriptions

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgeodesy.noaa.gov%2Fmarks%2Frecording%2F&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7C766c86e2dfce40fbc37d08db349468f4%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161584259751576%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=s4x9%2F7Z0Z8v8spSlr3XSCdRnKGlcVYvErPwAncuz2zs%3D&reserved=0>

NGS OPUS SOLUTION REPORT

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All computed coordinate accuracies are listed as peak-to-peak values.

For additional information:

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7Cc007c1bd98a94b2fa61b08db34942d52%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161583264044765%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=OA%2BSzqGkeMU1bbqapqVW3Ux0h2w2dGbW8kDZbC%2FOlGc%3D&reserved=0>

USER: BHOCKER@YUROKTRIBE.NSN.US
RINEX FILE: ks20092v.23o

DATE: April 03, 2023
TIME: 22:38:17 UTC

SOFTWARE: page5 2008.25 master257.pl 160321 START: 2023/04/02 21:00:00
EPHEMERIS: igu22560.eph [ultra-rapid] STOP: 2023/04/02 23:10:00
NAV FILE: brdc0920.23n OBS USED: 6162 / 6282 : 98%
ANT NAME: TRMR10 NONE # FIXED AMB: 36 / 36 : 100%
ARP HEIGHT: 1.55 OVERALL RMS: 0.014 (m)

REF FRAME: NAD_83 (2011) (EPOCH:2010.0000) ITRF2014 (EPOCH:2023.2518)

X:	-2617635.659 (m)	0.023 (m)	-2617636.722 (m)	0.023 (m)
Y:	-4205122.511 (m)	0.019 (m)	-4205121.127 (m)	0.019 (m)
Z:	4004655.149 (m)	0.010 (m)	4004655.095 (m)	0.010 (m)

LAT:	39 8 35.78950	0.012 (m)	39 8 35.80069	0.012 (m)
E LON:	238 5 53.72765	0.012 (m)	238 5 53.65961	0.012 (m)
W LON:	121 54 6.27235	0.012 (m)	121 54 6.34039	0.012 (m)
EL HGT:	-16.744 (m)	0.025 (m)	-17.253 (m)	0.025 (m)
ORTHO HGT:	12.605 (m)	0.073 (m)	[NAVD88 (Computed using GEOID18)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 10)	SPC (0402 CA 2)
Northing (Y) [meters]	4333250.391	663916.195
Easting (X) [meters]	594909.160	2008493.795
Convergence [degrees]	0.69333889	0.06194722
Point Scale	0.99971091	0.99991519
Combined Factor	0.99971354	0.99991782

US NATIONAL GRID DESIGNATOR: 10SEJ9490933250 (NAD 83)

BASE STATIONS USED					
PID	DESIGNATION		LATITUDE	LONGITUDE	DISTANCE (m)
DK6398	P206 CRAZYCREEKCN2006	CORS GRP	N384640.128	W1223432.803	71129.1
DK6404	P336 HUBBARDRDGCN2007	CORS GRP	N393141.074	W1222549.687	62476.1
AI4496	ORVB OROVILLE DAM GRM		N393316.644	W1213000.994	57301.6

NEAREST NGS PUBLISHED CONTROL POINT			
KS2014	HPGN CA 03 04	N390835.791	W1215406.271 0.1

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

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8002 updating descriptions

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgeodesy.noaa.gov%2Fmarks%2Frecording%2F&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7Cc007c1bd98a94b2fa61b08db34942d52%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161583264044765%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=K3fGnvVOteZsMN9Ffg69qi908yRvF2jOKkZzheshplE%3D&reserved=0>

NGS OPUS SOLUTION REPORT

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All computed coordinate accuracies are listed as peak-to-peak values.

For additional information:

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7C072d9cf0e9bc4c42ae8408db3493f363%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161582329896018%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=fdOYdu%2F76NBhD6aMpijchGNPVn16s4%2B4d66MiWRWWHwA%3D&reserved=0>

USER: BHOCKER@YUROKTRIBE.NSN.US
RINEX FILE: kt05092s.23o

DATE: April 03, 2023
TIME: 22:36:41 UTC

SOFTWARE: page5 2008.25 master274.pl 160321 START: 2023/04/02 18:01:00
EPHEMERIS: igu22560.eph [ultra-rapid] STOP: 2023/04/02 20:03:00
NAV FILE: brdc0920.23n OBS USED: 4868 / 5431 : 90%
ANT NAME: TRMR10 NONE # FIXED AMB: 51 / 62 : 82%
ARP HEIGHT: 1.55 OVERALL RMS: 0.019 (m)

REF FRAME: NAD_83 (2011) (EPOCH:2010.0000) ITRF2014 (EPOCH:2023.2515)

X:	-2614437.402 (m)	0.018 (m)	-2614438.464 (m)	0.018 (m)
Y:	-4181114.738 (m)	0.061 (m)	-4181113.362 (m)	0.061 (m)
Z:	4031633.052 (m)	0.034 (m)	4031632.997 (m)	0.034 (m)

LAT:	39 27 25.84652	0.013 (m)	39 27 25.85758	0.013 (m)
E LON:	237 58 56.61275	0.048 (m)	237 58 56.54456	0.048 (m)
W LON:	122 1 3.38725	0.048 (m)	122 1 3.45544	0.048 (m)
EL HGT:	-1.482 (m)	0.054 (m)	-1.983 (m)	0.054 (m)
ORTHO HGT:	27.168 (m)	0.098 (m)	[NAVD88 (Computed using GEOID18)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 10)	SPC (0402 CA 2)
Northing (Y) [meters]	4367972.779	698759.151
Easting (X) [meters]	584517.743	1998484.681
Convergence [degrees]	0.62435000	-0.01110000
Point Scale	0.99968795	0.99993576
Combined Factor	0.99968818	0.99993599

US NATIONAL GRID DESIGNATOR: 10SEJ8451867973 (NAD 83)

BASE STATIONS USED					
PID	DESIGNATION		LATITUDE	LONGITUDE	DISTANCE (m)
DL9239	P344 VINAHELITKCN2006	CORS GRP	N395544.829	W1220140.644	52406.5
DN9091	P334 SHEETIRON_CN2007	CORS GRP	N392936.918	W1224409.083	61972.2
DK6404	P336 HUBBARDRDGCN2007	CORS GRP	N393141.074	W1222549.687	36379.0

NEAREST NGS PUBLISHED CONTROL POINT			
KT0518	Y 852	N392725.846	W1220103.384 0.1

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

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8002 updating descriptions

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgeodesy.noaa.gov%2Fmarks%2Frecording%2F&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7C072d9cf0e9bc4c42ae8408db3493f363%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161582329896018%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=LihlPgNQI79yAHrsn8D6%2BsZm2Tg6Rq%2BDbyylshj7ws8%3D&reserved=0>

NGS OPUS SOLUTION REPORT

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All computed coordinate accuracies are listed as peak-to-peak values.

For additional information:

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7Cf8b84f4fb67f46a8ca8208db3493d750%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161581824933975%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=SWdM04afwwNqiPW%2FE9PoBt0uzajBV7H%2BKtQggs%2BB2M4%3D&reserved=0>

USER: BHOCKER@YUROKTRIBE.NSN.US
RINEX FILE: kt18092p.23o

DATE: April 03, 2023
TIME: 22:35:54 UTC

SOFTWARE: page5 2008.25 master296.pl 160321 START: 2023/04/02 15:11:00
EPHEMERIS: igu22560.eph [ultra-rapid] STOP: 2023/04/02 17:12:00
NAV FILE: brdc0920.23n OBS USED: 5489 / 5675 : 97%
ANT NAME: TRMR10 NONE # FIXED AMB: 32 / 41 : 78%
ARP HEIGHT: 1.55 OVERALL RMS: 0.017 (m)

REF FRAME: NAD_83 (2011) (EPOCH:2010.0000) ITRF2014 (EPOCH:2023.2512)

X:	-2603885.285 (m)	0.024 (m)	-2603886.344 (m)	0.024 (m)
Y:	-4163760.752 (m)	0.028 (m)	-4163759.385 (m)	0.028 (m)
Z:	4056214.971 (m)	0.027 (m)	4056214.916 (m)	0.027 (m)

LAT:	39 44 39.73369	0.002 (m)	39 44 39.74471	0.002 (m)
E LON:	237 58 45.95495	0.007 (m)	237 58 45.88680	0.007 (m)
W LON:	122 1 14.04505	0.007 (m)	122 1 14.11320	0.007 (m)
EL HGT:	19.932 (m)	0.045 (m)	19.438 (m)	0.045 (m)
ORTHO HGT:	47.925 (m)	0.087 (m)	[NAVD88 (Computed using GEOID18)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 10)	SPC (0402 CA 2)
Northing (Y) [meters]	4399844.070	730643.741
Easting (X) [meters]	583915.689	1998237.115
Convergence [degrees]	0.62625000	-0.01296667
Point Scale	0.99968669	0.99998090
Combined Factor	0.99968356	0.99997777

US NATIONAL GRID DESIGNATOR: 10SEJ8391699844 (NAD 83)

		BASE STATIONS USED		
PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE (m)
AI4496	ORVB OROVILLE DAM GRM	N393316.644	W1213000.994	49378.2
DN5653	P339 VALENTINE_CN2007 CORS GRP	N400202.784	W1224005.644	64071.3
DK6404	P336 HUBBARDRDGCN2007 CORS GRP	N393141.074	W1222549.687	42603.4

		NEAREST NGS PUBLISHED CONTROL POINT	
KT1807	HAMILTON	N394439.735	W1220114.045 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

NGS OPUS SOLUTION REPORT

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All computed coordinate accuracies are listed as peak-to-peak values.

For additional information:

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=05%7C01%7CBHOCKER%40yuroktribe.nsn.us%7C4b95a6d1728946f241ec08db34932e13%7C018a2f5b5407447bab7c9e7e29dd6ea5%7C0%7C0%7C638161579000305017%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IklhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=dC2MQOFuxrf%2FNiKkrH9NdKaAOmRpYZ3EglZg88FGD%2FI%3D&reserved=0>

USER: BHOCKER@YUROKTRIBE.NSN.US
RINEX FILE: lu22091w.23o

DATE: April 03, 2023
TIME: 22:31:10 UTC

SOFTWARE: page5 2008.25 master294.pl 160321 START: 2023/04/01 22:11:00
EPHEMERIS: igr22556.eph [rapid] STOP: 2023/04/02 00:20:00
NAV FILE: brdc0910.23n OBS USED: 2543 / 2681 : 95%
ANT NAME: TRMR10 NONE # FIXED AMB: 17 / 28 : 61%
ARP HEIGHT: 1.55 OVERALL RMS: 0.015 (m)

REF FRAME: NAD_83 (2011) (EPOCH:2010.0000) ITRF2014 (EPOCH:2023.2493)

X:	-2602871.673 (m)	0.016 (m)	-2602872.729 (m)	0.016 (m)
Y:	-4129456.592 (m)	0.011 (m)	-4129455.236 (m)	0.011 (m)
Z:	4091613.950 (m)	0.046 (m)	4091613.895 (m)	0.046 (m)

LAT:	40 9 35.65440	0.029 (m)	40 9 35.66524	0.029 (m)
E LON:	237 46 33.68089	0.016 (m)	237 46 33.61260	0.016 (m)
W LON:	122 13 26.31911	0.016 (m)	122 13 26.38740	0.016 (m)
EL HGT:	66.837 (m)	0.038 (m)	66.355 (m)	0.038 (m)
ORTHO HGT:	95.367 (m)	0.078 (m)	[NAVD88 (Computed using GEOID18)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 10)	SPC (0401 CA 1)
Northing (Y) [meters]	4445793.885	591805.857
Easting (X) [meters]	566086.618	1980919.099
Convergence [degrees]	0.50049167	-0.14645556
Point Scale	0.99965376	0.99996357
Combined Factor	0.99964328	0.99995309

US NATIONAL GRID DESIGNATOR: 10TEK6608745794 (NAD 83)

BASE STATIONS USED					
PID	DESIGNATION		LATITUDE	LONGITUDE	DISTANCE (m)
DK6407	P341 WHISKYTOWN	CN2005	CORS GRP	N403902.348 W1223624.785	63454.2
DM7550	P349 WONDERLAND	CN2005	CORS GRP	N404351.894 W1221909.609	63941.0
DN5653	P339 VALENTINE	CN2007	CORS GRP	N400202.784 W1224005.644	40389.7

NEAREST NGS PUBLISHED CONTROL POINT			
LU2291	HPGN CA 02 22	N400935.655 W1221326.314	0.1

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

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Appendix G : Additional Control Reports

Project File Data		Coordinate System	
Name:	C:\Active_Projects\Sacramento_River_TopoBathy\C-Process\TBC\AdditionalControl\RBL1_20230923.vce	Name:	World wide/UTM
Size:	113 KB	Zone:	10 North
Modified:	09/24/2023 09:56:33 (UTC:-7)	Datum:	NAD83(2011)
Time zone:	Pacific Standard Time	Global reference datum:	NAD83(2011)
Reference number:		Global reference epoch:	2010
Description:		Geoid:	GEOID18 (Conus)
Comment 1:		Vertical datum:	NAVD88
Comment 2:		Calibrated site:	
Comment 3:			

Network Adjustment Report

Adjustment Settings

Set-Up Errors

GNSS

Error in Height of Antenna: 0.0000 m

Centering Error: 0.0000 m

Covariance Display

Horizontal:

Propagated Linear Error [E]: U.S.

Constant Term [C]: 0.0000 m

Scale on Linear Error [S]: 1.000

Three-Dimensional

Propagated Linear Error [E]: U.S.

Constant Term [C]: 0.0000 m

Scale on Linear Error [S]: 1.000

Adjustment Statistics

Number of Iterations for Successful Adjustment: 2

Network Reference Factor: 0.42

Chi Square Test (95%): Failed

Precision Confidence Level: DRMS

Degrees of Freedom: 84

Post Processed Vector Statistics

Reference Factor:0.42

Redundancy Number:84.00

A Priori Scalar:1.00

Control Coordinate Comparisons

Values shown are control coordinates minus adjusted coordinates.

Point ID	ΔEasting (Meter)	ΔNorthing (Meter)	ΔElevation (Meter)	ΔHeight (Meter)
chl g	0.0072	-0.0070	?	-0.0034
orl k	-0.0033	0.0070	?	0.0018
rdl l	0.0069	-0.0096	?	-0.0049
sac r	-0.0058	0.0058	?	-0.0161
wdl j	-0.0118	0.0070	?	0.0160
wil h	0.0045	0.0062	?	-0.0047
ycl i	-0.0160	0.0037	?	0.0173

Control Point Constraints

Point ID	Type	East σ (Meter)	North σ (Meter)	Height σ (Meter)	Elevation σ (Meter)
Fixed = 0.000001(Meter)					

Adjusted Grid Coordinates

Point ID	Easting (Meter)	Easting Error (Meter)	Northing (Meter)	Northing Error (Meter)	Elevation (Meter)	Elevation Error (Meter)	Constraint
chl g	597057.667	0.0003	4401895.191	0.0005	62.315	0.0021	
ldl k	653009.535	0.0004	4222467.077	0.0007	24.374	0.0027	
orl k	624441.363	0.0003	4373844.256	0.0004	68.466	0.0020	
RBL 1	563764.672	0.0003	4445479.847	0.0005	103.206	0.0020	
rdl l	560656.066	0.0003	4487051.673	0.0005	160.516	0.0021	
sacr	643204.817	0.0003	4279776.697	0.0005	37.955	0.0021	
wdl j	607210.881	0.0003	4281430.012	0.0006	31.251	0.0024	
wil h	573472.344	0.0003	4334394.233	0.0004	31.737	0.0019	
ycl i	617298.884	0.0003	4333788.297	0.0005	25.785	0.0022	

Coordinates from a free adjustment should only be used for analysis of the inner accuracy of the network. They should not be distributed as final results.

Adjusted Geodetic Coordinates

Point ID	Latitude	Longitude	Height (Meter)	Height Error (Meter)	Constraint
chl g	N39°45'41.22875"	W121°52'00.85254"	34.809	0.0021	
ldl k	N38°08'13.57351"	W121°15'14.58243"	-6.813	0.0027	
orl k	N39°30'18.80461"	W121°33'09.27204"	40.772	0.0020	
RBL 1	N40°09'26.11589"	W122°15'04.57859"	74.576	0.0020	
rdl l	N40°31'55.15358"	W122°17'01.75387"	132.830	0.0021	
sacr	N38°39'17.97114"	W121°21'15.19285"	7.501	0.0021	
wdl j	N38°40'29.91525"	W121°46'03.07573"	0.510	0.0024	
wil h	N39°09'20.35592"	W122°08'58.73594"	1.799	0.0019	
ycl i	N39°08'43.41028"	W121°38'33.44685"	-3.456	0.0022	

Coordinates from a free adjustment should only be used for analysis of the inner accuracy of the network. They should not be distributed as final results.

Adjusted ECEF Coordinates

Point ID	X	X Error	Y	Y Error	Z	Z Error	3D Error	Constraint
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	(Meter)	(Meter)	(Meter)	(Meter)	(Meter)	(Meter)	(Meter)	
chl g	-2592074.643	0.0009	-4169708.940	0.0014	4057682.621	0.0014	0.0022	
ldl k	-2606122.599	0.0012	-4294072.592	0.0019	3917420.654	0.0017	0.0028	
orl k	-2578658.653	0.0009	-4199334.108	0.0013	4035776.936	0.0013	0.0020	
RBL 1	-2604942.954	0.0009	-4128381.644	0.0014	4091394.090	0.0013	0.0021	
rdl l	-2592923.268	0.0009	-4104164.514	0.0015	4123146.525	0.0014	0.0022	
sacr	-2595053.380	0.0009	-4259028.381	0.0015	3962484.555	0.0013	0.0022	
wdl j	-2624975.353	0.0010	-4239015.403	0.0016	3964212.388	0.0015	0.0025	
wil h	-2635351.687	0.0008	-4193034.768	0.0013	4005732.671	0.0012	0.0019	
ycl i	-2598519.008	0.0009	-4216800.106	0.0015	4004845.803	0.0014	0.0023	

Coordinates from a free adjustment should only be used for analysis of the inner accuracy of the network. They should not be distributed as final results.

Error Ellipse Components

Point ID	Semi-major axis (Meter)	Semi-minor axis (Meter)	Azimuth
chl g	0.0007	0.0004	168°
ldl k	0.0010	0.0005	163°
orl k	0.0006	0.0004	171°
RBL 1	0.0007	0.0004	162°
rdl l	0.0008	0.0004	165°
sacr	0.0008	0.0004	162°
wdl j	0.0008	0.0004	171°
wil h	0.0006	0.0004	171°
ycl i	0.0007	0.0004	167°

Adjusted GNSS Observations

Observation ID		Observation	A-posteriori Error	Residual	Standardized Residual
orl k --> wil h (PV19)	Az.	233°10'40.9"	0.002 sec	-0.002 sec	-0.706
	Δ Ht.	-38.9735 m	0.0028 m	-0.0001 m	-0.013
	Ellip Dist.	64470.5022 m	0.0005 m	-0.0040 m	-3.453
sacr --> RBL 1 (PV32)	Az.	335°25'41.4"	0.000 sec	-0.001 sec	-1.668
	Δ Ht.	67.0749 m	0.0031 m	-0.0077 m	-1.445
	Ellip Dist.	183809.5458 m	0.0008 m	0.0045 m	2.931

rd1l --> RBL1 (PV33)	Az.	176°11'13.9"	0.002 sec	-0.005 sec	-2.508
	ΔHt.	-58.2540 m	0.0028 m	-0.0012 m	-0.367
	Ellip Dist.	41702.5840 m	0.0006 m	0.0012 m	2.727
ycli --> RBL1 (PV29)	Az.	335°15'22.5"	0.001 sec	0.004 sec	2.664
	ΔHt.	78.0322 m	0.0031 m	0.0028 m	0.460
	Ellip Dist.	123895.1351 m	0.0007 m	-0.0006 m	-0.324
chl g --> wilh (PV21)	Az.	199°58'49.1"	0.001 sec	0.000 sec	-0.281
	ΔHt.	-33.0108 m	0.0029 m	-0.0001 m	-0.004
	Ellip Dist.	71524.9420 m	0.0006 m	-0.0037 m	-2.491
rd1l --> wilh (PV18)	Az.	175°39'34.1"	0.001 sec	0.001 sec	2.155
	ΔHt.	-131.0312 m	0.0029 m	-0.0062 m	-1.548
	Ellip Dist.	153247.2748 m	0.0007 m	-0.0022 m	-1.693
wd1j --> RBL1 (PV31)	Az.	345°56'51.2"	0.001 sec	-0.001 sec	-0.832
	ΔHt.	74.0659 m	0.0033 m	0.0044 m	0.720
	Ellip Dist.	169757.6941 m	0.0008 m	0.0037 m	2.121
sacr --> wilh (PV17)	Az.	309°06'08.7"	0.001 sec	-0.001 sec	-0.556
	ΔHt.	-5.7024 m	0.0030 m	0.0072 m	1.411
	Ellip Dist.	88598.1087 m	0.0006 m	-0.0027 m	-2.058
or1k --> RBL1 (PV34)	Az.	320°39'39.4"	0.001 sec	-0.004 sec	-2.020
	ΔHt.	33.8037 m	0.0030 m	-0.0009 m	-0.172
	Ellip Dist.	93906.2474 m	0.0007 m	0.0009 m	0.597
wilh --> RBL1 (PV30)	Az.	355°32'53.3"	0.001 sec	0.001 sec	1.101
	ΔHt.	72.7772 m	0.0029 m	-0.0006 m	-0.120
	Ellip Dist.	111547.1209 m	0.0007 m	0.0023 m	1.526
chl g --> RBL1 (PV36)	Az.	323°21'08.3"	0.002 sec	-0.004 sec	-1.446
	ΔHt.	39.7665 m	0.0030 m	0.0002 m	0.041
	Ellip Dist.	54863.1694 m	0.0007 m	0.0017 m	1.084
wd1j --> ld1k (PV14)	Az.	142°55'38.5"	0.002 sec	0.002 sec	0.664
	ΔHt.	-7.3232 m	0.0038 m	-0.0026 m	-0.380
	Ellip Dist.	74674.3339 m	0.0009 m	-0.0025 m	-1.366
or1k --> rd1l (PV4)	Az.	331°31'50.1"	0.001 sec	0.000 sec	-0.421
	ΔHt.	92.0577 m	0.0030 m	-0.0034 m	-0.715
	Ellip Dist.	129978.0501 m	0.0007 m	-0.0019 m	-1.322
chl g --> ycli (PV28)	Az.	164°10'04.6"	0.001 sec	-0.002 sec	-0.691
	ΔHt.	-38.2657 m	0.0032 m	0.0087 m	1.311
	Ellip Dist.	71069.4255 m	0.0008 m	0.0014 m	0.708
or1k --> wd1j (PV13)	Az.	191°28'28.5"	0.001 sec	0.002 sec	1.278
	ΔHt.	-40.2622 m	0.0033 m	-0.0022 m	-0.363

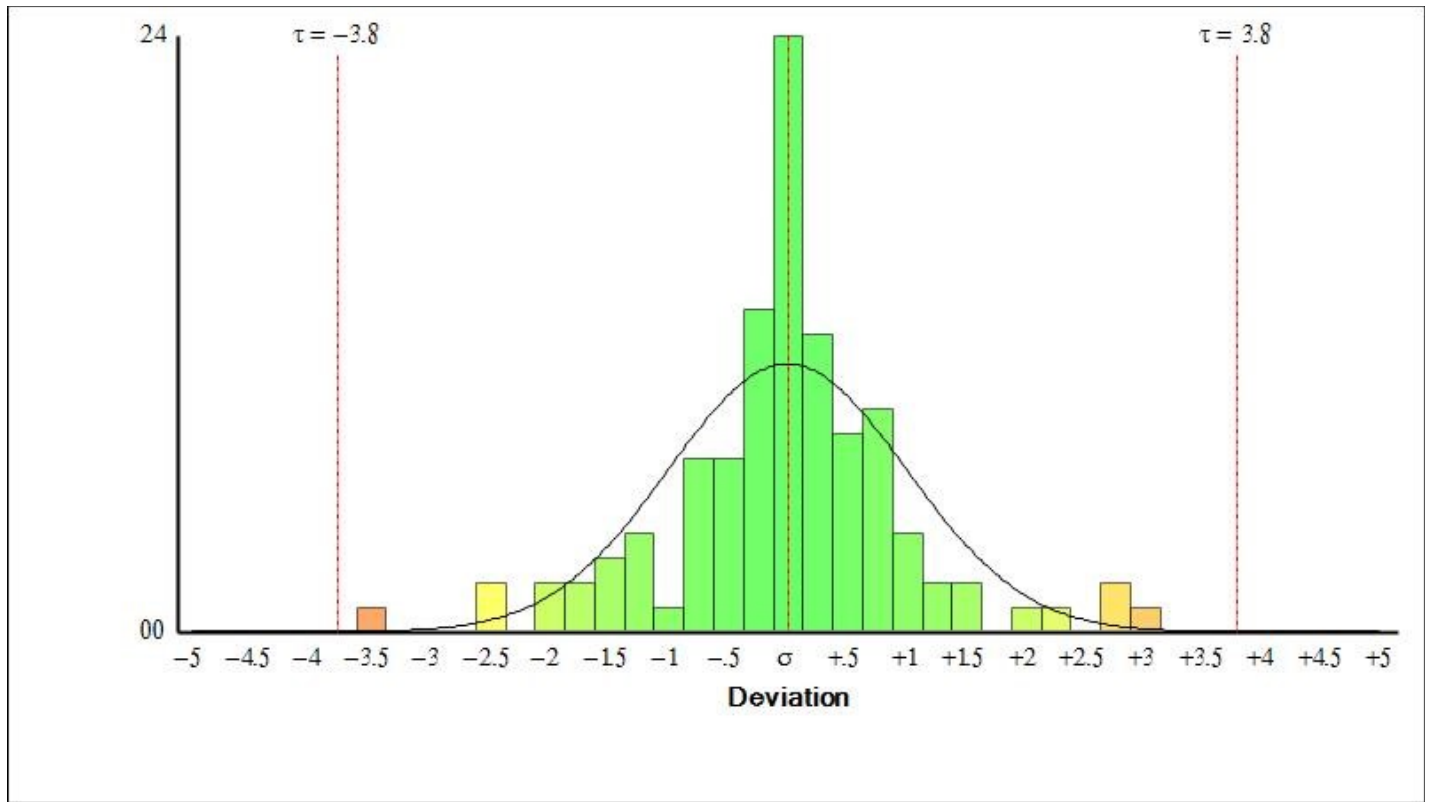
	Ellip Dist.	94028.8691 m	0.0008 m	-0.0023 m	-1.272
ycli --> wilh (PV22)	Az.	271°38'56.9"	0.003 sec	-0.005 sec	-1.220
	ΔHt.	5.2550 m	0.0030 m	0.0040 m	0.713
	Ellip Dist.	43843.2675 m	0.0004 m	0.0005 m	0.675
chl g --> rd1l (PV6)	Az.	337°35'05.1"	0.001 sec	0.000 sec	0.233
	ΔHt.	98.0205 m	0.0031 m	-0.0058 m	-1.005
	Ellip Dist.	92640.3291 m	0.0008 m	-0.0011 m	-0.613
ycli --> wd1j (PV23)	Az.	191°45'30.5"	0.002 sec	0.003 sec	0.881
	ΔHt.	3.9663 m	0.0034 m	0.0058 m	0.909
	Ellip Dist.	53334.3224 m	0.0008 m	-0.0009 m	-0.464
or1k --> sacr (PV8)	Az.	169°37'53.8"	0.001 sec	0.001 sec	0.870
	ΔHt.	-33.2712 m	0.0030 m	0.0026 m	0.540
	Ellip Dist.	95937.8438 m	0.0007 m	0.0005 m	0.326
or1k --> ycli (PV26)	Az.	191°01'39.9"	0.002 sec	0.000 sec	0.030
	ΔHt.	-44.2285 m	0.0031 m	0.0039 m	0.661
	Ellip Dist.	40696.7287 m	0.0006 m	-0.0008 m	-0.867
chl g --> ld1k (PV1)	Az.	163°23'27.0"	0.001 sec	0.000 sec	-0.028
	ΔHt.	-41.6226 m	0.0036 m	-0.0008 m	-0.115
	Ellip Dist.	187988.0204 m	0.0010 m	0.0018 m	0.835
ycli --> ld1k (PV27)	Az.	163°03'40.2"	0.001 sec	-0.001 sec	-0.818
	ΔHt.	-3.3568 m	0.0037 m	-0.0004 m	-0.047
	Ellip Dist.	116929.1035 m	0.0010 m	-0.0006 m	-0.248
wd1j --> wilh (PV16)	Az.	328°16'35.2"	0.002 sec	-0.001 sec	-0.215
	ΔHt.	1.2886 m	0.0032 m	0.0017 m	0.279
	Ellip Dist.	62816.0137 m	0.0007 m	0.0014 m	0.777
wd1j --> sacr (PV11)	Az.	93°24'00.1"	0.004 sec	-0.001 sec	-0.176
	ΔHt.	6.9910 m	0.0033 m	-0.0046 m	-0.762
	Ellip Dist.	36039.2966 m	0.0005 m	0.0004 m	0.480
sacr --> ld1k (PV9)	Az.	171°18'50.0"	0.002 sec	-0.001 sec	-0.527
	ΔHt.	-14.3142 m	0.0036 m	-0.0005 m	-0.091
	Ellip Dist.	58149.8282 m	0.0009 m	0.0002 m	0.110
RBL1 --> ld1k (PV35)	Az.	158°39'28.5"	0.000 sec	0.000 sec	0.203
	ΔHt.	-81.3891 m	0.0037 m	-0.0012 m	-0.068
	Ellip Dist.	240266.2552 m	0.0010 m	0.0022 m	0.424
chl g --> wd1j (PV15)	Az.	175°53'54.7"	0.001 sec	0.001 sec	0.420
	ΔHt.	-34.2994 m	0.0034 m	-0.0020 m	-0.305
	Ellip Dist.	120925.1208 m	0.0008 m	-0.0007 m	-0.364
chl g --> or1k (PV3)	Az.	136°24'44.2"	0.003 sec	0.002 sec	0.414

	ΔHt.	5.9628 m	0.0030 m	0.0016 m	0.280
	Ellip Dist.	39210.7760 m	0.0006 m	-0.0001 m	-0.108
sacr --> yc1i (PV24)	Az.	335°24'33.2"	0.001 sec	0.001 sec	0.279
	ΔHt.	-10.9573 m	0.0032 m	-0.0007 m	-0.111
	Ellip Dist.	59914.4156 m	0.0008 m	-0.0007 m	-0.396
or1k --> ld1k (PV2)	Az.	170°13'09.5"	0.001 sec	0.000 sec	0.010
	ΔHt.	-47.5853 m	0.0035 m	0.0025 m	0.391
	Ellip Dist.	154074.2993 m	0.0009 m	0.0003 m	0.138
wilh --> ld1k (PV20)	Az.	145°07'51.1"	0.001 sec	0.000 sec	0.134
	ΔHt.	-8.6118 m	0.0035 m	0.0004 m	0.072
	Ellip Dist.	137341.6896 m	0.0009 m	-0.0006 m	-0.355
rd1l --> wd1j (PV12)	Az.	167°41'49.6"	0.000 sec	0.001 sec	0.297
	ΔHt.	-132.3199 m	0.0035 m	-0.0021 m	-0.108
	Ellip Dist.	210891.6321 m	0.0009 m	-0.0004 m	-0.061
rd1l --> yc1i (PV25)	Az.	160°10'25.0"	0.001 sec	0.000 sec	-0.073
	ΔHt.	-136.2862 m	0.0032 m	0.0011 m	0.210
	Ellip Dist.	163444.3525 m	0.0008 m	0.0000 m	0.028
rd1l --> ld1k (PV5)	Az.	161°12'24.3"	0.000 sec	0.000 sec	0.003
	ΔHt.	-139.6430 m	0.0038 m	0.0027 m	0.154
	Ellip Dist.	280309.7630 m	0.0010 m	-0.0011 m	-0.203
rd1l --> sacr (PV7)	Az.	158°44'14.1"	0.000 sec	0.000 sec	0.008
	ΔHt.	-125.3289 m	0.0033 m	-0.0014 m	-0.087
	Ellip Dist.	223167.2290 m	0.0009 m	-0.0009 m	-0.190
chl g --> sacr (PV10)	Az.	160°00'50.7"	0.001 sec	0.000 sec	0.146
	ΔHt.	-27.3084 m	0.0031 m	-0.0004 m	-0.072
	Ellip Dist.	130575.6148 m	0.0008 m	0.0000 m	0.028

Histogram of Standardized Residuals

Critical Tau Value: 3.8

Observations Failing the Tau Test: 0



Covariance Terms

From Point	To Point		Components	A-posteriori Error	Horiz. Precision (Ratio)	3D Precision (Ratio)
chl g	ld1 k	Az.	163°23'27.0"	0.001 sec	1 : 193027553	1 : 192980090
		Δ Ht.	-41.6226 m	0.0036 m		
		Δ Elev.	-37.9406 m	0.0036 m		
		Ellip Dist.	187988.0204 m	0.0010 m		
chl g	or1 k	Az.	136°24'44.2"	0.003 sec	1 : 64630580	1 : 64327395
		Δ Ht.	5.9628 m	0.0030 m		
		Δ Elev.	6.1507 m	0.0030 m		
		Ellip Dist.	39210.7760 m	0.0006 m		
chl g	RBL1	Az.	323°21'08.3"	0.002 sec	1 : 76525773	1 : 76301924
		Δ Ht.	39.7665 m	0.0030 m		
		Δ Elev.	40.8914 m	0.0030 m		
		Ellip Dist.	54863.1694 m	0.0007 m		
chl g	rd1 l	Az.	337°35'05.1"	0.001 sec	1 : 118421957	1 : 118318061
		Δ Ht.	98.0205 m	0.0031 m		
		Δ Elev.	98.2010 m	0.0031 m		
		Ellip Dist.	92640.3291 m	0.0008 m		
chl g	sacr	Az.	160°00'50.7"	0.001 sec	1 : 165318802	1 : 165191932

		ΔHt.	-27.3084 m	0.0031 m		
		ΔElev.	-24.3595 m	0.0031 m		
		Ellip Dist.	130575.6148 m	0.0008 m		
chl g	wdlj	Az.	175°53'54.7"	0.001 sec	1 : 144923971	1 : 145055658
		ΔHt.	-34.2994 m	0.0034 m		
		ΔElev.	-31.0638 m	0.0034 m		
		Ellip Dist.	120925.1208 m	0.0008 m		
chl g	wilh	Az.	199°58'49.1"	0.001 sec	1 : 111439854	1 : 111893075
		ΔHt.	-33.0108 m	0.0029 m		
		ΔElev.	-30.5779 m	0.0029 m		
		Ellip Dist.	71524.9420 m	0.0006 m		
chl g	ycli	Az.	164°10'04.6"	0.001 sec	1 : 92315345	1 : 92278526
		ΔHt.	-38.2657 m	0.0032 m		
		ΔElev.	-36.5303 m	0.0032 m		
		Ellip Dist.	71069.4255 m	0.0008 m		
ldlk	orlk	Az.	350°24'23.3"	0.001 sec	1 : 166231852	1 : 166443201
		ΔHt.	47.5853 m	0.0035 m		
		ΔElev.	44.0913 m	0.0035 m		
		Ellip Dist.	154074.2993 m	0.0009 m		
ldlk	RBL1	Az.	339°17'15.3"	0.000 sec	1 : 239514131	1 : 239344237
		ΔHt.	81.3891 m	0.0037 m		
		ΔElev.	78.8320 m	0.0037 m		
		Ellip Dist.	240266.2552 m	0.0010 m		
ldlk	rd1l	Az.	341°51'34.7"	0.000 sec	1 : 270852211	1 : 270779846
		ΔHt.	139.6430 m	0.0038 m		
		ΔElev.	136.1416 m	0.0038 m		
		Ellip Dist.	280309.7629 m	0.0010 m		
ldlk	sacr	Az.	351°22'34.0"	0.002 sec	1 : 61186921	1 : 61305776
		ΔHt.	14.3142 m	0.0036 m		
		ΔElev.	13.5811 m	0.0036 m		
		Ellip Dist.	58149.8282 m	0.0010 m		
ldlk	wdlj	Az.	323°14'46.9"	0.002 sec	1 : 81054795	1 : 80645964
		ΔHt.	7.3232 m	0.0038 m		
		ΔElev.	6.8768 m	0.0038 m		
		Ellip Dist.	74674.3339 m	0.0009 m		
ldlk	wilh	Az.	325°41'24.7"	0.001 sec	1 : 156804927	1 : 156161719
		ΔHt.	8.6118 m	0.0035 m		
		ΔElev.	7.3627 m	0.0035 m		
		Ellip Dist.	137341.6896 m	0.0009 m		
ldlk	ycli	Az.	343°18'13.7"	0.001 sec	1 : 120546610	1 : 120514307
		ΔHt.	3.3568 m	0.0037 m		

		ΔElev.	1.4103 m	0.0037 m		
		Ellip Dist.	116929.1035 m	0.0010 m		
orlk	RBL1	Az.	320°39'39.4"	0.001 sec	1 : 142037213	1 : 141482321
		ΔHt.	33.8037 m	0.0030 m		
		ΔElev.	34.7407 m	0.0030 m		
		Ellip Dist.	93906.2474 m	0.0007 m		
orlk	rd1l	Az.	331°31'50.1"	0.001 sec	1 : 181919422	1 : 181512659
		ΔHt.	92.0577 m	0.0030 m		
		ΔElev.	92.0503 m	0.0030 m		
		Ellip Dist.	129978.0501 m	0.0007 m		
orlk	sacr	Az.	169°37'53.8"	0.001 sec	1 : 131147564	1 : 131237663
		ΔHt.	-33.2712 m	0.0030 m		
		ΔElev.	-30.5102 m	0.0030 m		
		Ellip Dist.	95937.8438 m	0.0007 m		
orlk	wdlj	Az.	191°28'28.5"	0.001 sec	1 : 125377868	1 : 125822042
		ΔHt.	-40.2622 m	0.0033 m		
		ΔElev.	-37.2145 m	0.0033 m		
		Ellip Dist.	94028.8691 m	0.0007 m		
orlk	wilh	Az.	233°10'40.9"	0.002 sec	1 : 136591896	1 : 137493724
		ΔHt.	-38.9735 m	0.0028 m		
		ΔElev.	-36.7286 m	0.0028 m		
		Ellip Dist.	64470.5022 m	0.0005 m		
orlk	ycli	Az.	191°01'39.9"	0.002 sec	1 : 63164688	1 : 63429316
		ΔHt.	-44.2285 m	0.0031 m		
		ΔElev.	-42.6810 m	0.0031 m		
		Ellip Dist.	40696.7287 m	0.0006 m		
rd1l	RBL1	Az.	176°11'13.9"	0.002 sec	1 : 68962457	1 : 69049065
		ΔHt.	-58.2540 m	0.0028 m		
		ΔElev.	-57.3096 m	0.0028 m		
		Ellip Dist.	41702.5840 m	0.0006 m		
rd1l	sacr	Az.	158°44'14.1"	0.000 sec	1 : 264250187	1 : 264175211
		ΔHt.	-125.3289 m	0.0033 m		
		ΔElev.	-122.5605 m	0.0033 m		
		Ellip Dist.	223167.2290 m	0.0008 m		
rd1l	wdlj	Az.	167°41'49.6"	0.000 sec	1 : 237804707	1 : 237843566
		ΔHt.	-132.3199 m	0.0035 m		
		ΔElev.	-129.2648 m	0.0035 m		
		Ellip Dist.	210891.6321 m	0.0009 m		
rd1l	wilh	Az.	175°39'34.1"	0.001 sec	1 : 212865731	1 : 213041985
		ΔHt.	-131.0312 m	0.0029 m		
		ΔElev.	-128.7789 m	0.0029 m		

		Ellip Dist.	153247.2748 m	0.0007 m		
rd1l	ycli	Az.	160°10'25.0"	0.001 sec	1 : 209223418	1 : 209175709
		ΔHt.	-136.2862 m	0.0032 m		
		ΔElev.	-134.7312 m	0.0032 m		
		Ellip Dist.	163444.3525 m	0.0008 m		
sacr	RBL1	Az.	335°25'41.4"	0.000 sec	1 : 232725440	1 : 232449408
		ΔHt.	67.0749 m	0.0031 m		
		ΔElev.	65.2509 m	0.0031 m		
		Ellip Dist.	183809.5458 m	0.0008 m		
sacr	wdlj	Az.	273°39'29.7"	0.004 sec	1 : 75713468	1 : 75102477
		ΔHt.	-6.9910 m	0.0033 m		
		ΔElev.	-6.7043 m	0.0033 m		
		Ellip Dist.	36039.2966 m	0.0005 m		
sacr	wilh	Az.	309°06'08.7"	0.001 sec	1 : 140732996	1 : 139816687
		ΔHt.	-5.7024 m	0.0030 m		
		ΔElev.	-6.2184 m	0.0030 m		
		Ellip Dist.	88598.1087 m	0.0006 m		
sacr	ycli	Az.	335°24'33.2"	0.002 sec	1 : 77136485	1 : 76983146
		ΔHt.	-10.9573 m	0.0032 m		
		ΔElev.	-12.1708 m	0.0032 m		
		Ellip Dist.	59914.4156 m	0.0008 m		
wdlj	RBL1	Az.	345°56'51.2"	0.001 sec	1 : 203741139	1 : 203739981
		ΔHt.	74.0659 m	0.0033 m		
		ΔElev.	71.9552 m	0.0033 m		
		Ellip Dist.	169757.6941 m	0.0008 m		
wdlj	wilh	Az.	328°16'35.2"	0.002 sec	1 : 86712334	1 : 86437511
		ΔHt.	1.2887 m	0.0032 m		
		ΔElev.	0.4859 m	0.0032 m		
		Ellip Dist.	62816.0137 m	0.0007 m		
wdlj	ycli	Az.	11°40'48.1"	0.002 sec	1 : 68311115	1 : 68533467
		ΔHt.	-3.9663 m	0.0034 m		
		ΔElev.	-5.4665 m	0.0034 m		
		Ellip Dist.	53334.3224 m	0.0008 m		
wilh	RBL1	Az.	355°32'53.3"	0.001 sec	1 : 162574981	1 : 162743550
		ΔHt.	72.7773 m	0.0029 m		
		ΔElev.	71.4693 m	0.0029 m		
		Ellip Dist.	111547.1209 m	0.0007 m		
wilh	ycli	Az.	91°19'44.5"	0.003 sec	1 : 104274636	1 : 103974599
		ΔHt.	-5.2550 m	0.0030 m		
		ΔElev.	-5.9523 m	0.0030 m		
		Ellip Dist.	43843.2675 m	0.0004 m		

ycli	RBL1	Az.	335°15'22.5"	0.001 sec	1 : 165390592	1 : 165165452
		ΔHt.	78.0322 m	0.0031 m		
		ΔElev.	77.4217 m	0.0031 m		
		Ellip Dist.	123895.1351 m	0.0007 m		

Date: 09/24/2023 09:58:51	Project: C: \\Active_Projects\\Sacramento_River_TopoBathy\\C- Process\\TBC\\AdditionalControl\\RBL1_20230923.vce	Trimble Business Center
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Project File Data		Coordinate System	
Name:	C:\Active_Projects\Sacramento_River_TopoBathy\C-Process\TBC\AdditionalControl\RBL1_20230923.vce	Name:	World wide/UTM
Size:	113 KB	Zone:	10 North
Modified:	09/24/2023 09:56:33 (UTC:-7)	Datum:	NAD83(2011)
Time zone:	Pacific Standard Time	Global reference datum:	NAD83(2011)
Reference number:		Global reference epoch:	2010
Description:		Geoid:	GEOID18 (Conus)
Comment 1:		Vertical datum:	NAVD88
Comment 2:		Calibrated site:	
Comment 3:			

Network Adjustment Report

Adjustment Settings

Set-Up Errors

GNSS

Error in Height of Antenna: 0.0000 m

Centering Error: 0.0000 m

Covariance Display

Horizontal:

Propagated Linear Error [E]: U.S.

Constant Term [C]: 0.0000 m

Scale on Linear Error [S]: 1.000

Three-Dimensional

Propagated Linear Error [E]: U.S.

Constant Term [C]: 0.0000 m

Scale on Linear Error [S]: 1.000

Adjustment Statistics

Number of Iterations for Successful Adjustment: 2

Network Reference Factor: 0.42

Chi Square Test (95%): Failed

Precision Confidence Level: DRMS

Degrees of Freedom: 84

Post Processed Vector Statistics

Reference Factor: 0.42
Redundancy Number: 84.00
A Priori Scalar: 1.00

Control Coordinate Comparisons

Values shown are control coordinates minus adjusted coordinates.

Point ID	Δ Easting (Meter)	Δ Northing (Meter)	Δ Elevation (Meter)	Δ Height (Meter)
chl g	0.0131	-0.0131	?	0.0125
orl k	0.0026	0.0010	?	0.0177
rdl l	0.0129	-0.0158	?	0.0109
wdl j	-0.0060	0.0013	?	0.0320
wil h	0.0105	0.0003	?	0.0113
ycl i	-0.0102	-0.0022	?	0.0333

Control Point Constraints

Point ID	Type	East σ (Meter)	North σ (Meter)	Height σ (Meter)	Elevation σ (Meter)
sacr	Local	Fixed	Fixed	Fixed	
Fixed = 0.000001(Meter)					

Adjusted Grid Coordinates

Point ID	Easting (Meter)	Easting Error (Meter)	Northing (Meter)	Northing Error (Meter)	Elevation (Meter)	Elevation Error (Meter)	Constraint
chl g	597057.661	0.0004	4401895.197	0.0008	62.299	0.0031	
ldl k	653009.529	0.0005	4222467.082	0.0009	24.358	0.0036	
orl k	624441.357	0.0004	4373844.262	0.0007	68.450	0.0030	
RBL l	563764.666	0.0005	4445479.853	0.0008	103.190	0.0031	
rdl l	560656.060	0.0005	4487051.679	0.0008	160.500	0.0033	
sacr	643204.811	?	4279776.703	?	37.939	?	LLh
wdl j	607210.875	0.0005	4281430.018	0.0008	31.235	0.0033	
wil h	573472.338	0.0005	4334394.239	0.0007	31.721	0.0030	
ycl i	617298.878	0.0005	4333788.303	0.0008	25.769	0.0032	

Adjusted Geodetic Coordinates

Point ID	Latitude	Longitude	Height (Meter)	Height Error (Meter)	Constraint
chl g	N39°45'41.22895"	W121°52'00.85278"	34.794	0.0031	
ldl k	N38°08'13.57370"	W121°15'14.58266"	-6.829	0.0036	
orl k	N39°30'18.80481"	W121°33'09.27228"	40.756	0.0030	
RBL 1	N40°09'26.11609"	W122°15'04.57884"	74.560	0.0031	
rdl l	N40°31'55.15379"	W122°17'01.75412"	132.814	0.0033	
sacr	N38°39'17.97133"	W121°21'15.19309"	7.485	?	LLh
wdl j	N38°40'29.91544"	W121°46'03.07597"	0.494	0.0033	
wil h	N39°09'20.35611"	W122°08'58.73619"	1.783	0.0030	
ycl i	N39°08'43.41048"	W121°38'33.44709"	-3.472	0.0032	

Adjusted ECEF Coordinates

Point ID	X (Meter)	X Error (Meter)	Y (Meter)	Y Error (Meter)	Z (Meter)	Z Error (Meter)	3D Error (Meter)	Constraint
chl g	-2592074.639	0.0014	-4169708.924	0.0022	4057682.615	0.0020	0.0033	
ldl k	-2606122.596	0.0016	-4294072.576	0.0025	3917420.648	0.0023	0.0037	
orl k	-2578658.650	0.0013	-4199334.091	0.0021	4035776.930	0.0019	0.0031	
RBL 1	-2604942.951	0.0013	-4128381.627	0.0022	4091394.084	0.0020	0.0032	
rdl l	-2592923.265	0.0014	-4104164.498	0.0023	4123146.520	0.0021	0.0034	
sacr	-2595053.377	?	-4259028.365	?	3962484.550	?	?	LLh
wdl j	-2624975.349	0.0015	-4239015.386	0.0023	3964212.383	0.0021	0.0035	
wil h	-2635351.683	0.0013	-4193034.751	0.0021	4005732.666	0.0019	0.0031	
ycl i	-2598519.004	0.0014	-4216800.089	0.0023	4004845.797	0.0021	0.0034	

Error Ellipse Components

Point ID	Semi-major axis (Meter)	Semi-minor axis (Meter)	Azimuth
chl g	0.0011	0.0006	165°
ldl k	0.0013	0.0007	164°
orl k	0.0010	0.0006	166°
RBL 1	0.0011	0.0006	161°
rdl l	0.0012	0.0006	163°
wdl j	0.0011	0.0006	167°

wilh	0.0010	0.0006	161°
ycli	0.0011	0.0006	164°

Adjusted GNSS Observations

Observation ID		Observation	A-posteriori Error	Residual	Standardized Residual
orlk --> wilh (PV19)	Az.	233°10'40.9"	0.002 sec	-0.002 sec	-0.706
	Δ Ht.	-38.9735 m	0.0028 m	-0.0001 m	-0.013
	Ellip Dist.	64470.5024 m	0.0005 m	-0.0040 m	-3.453
sacr --> RBL1 (PV32)	Az.	335°25'41.4"	0.000 sec	-0.001 sec	-1.668
	Δ Ht.	67.0751 m	0.0031 m	-0.0077 m	-1.445
	Ellip Dist.	183809.5463 m	0.0008 m	0.0045 m	2.931
rd1l --> RBL1 (PV33)	Az.	176°11'13.9"	0.002 sec	-0.005 sec	-2.508
	Δ Ht.	-58.2540 m	0.0028 m	-0.0012 m	-0.367
	Ellip Dist.	41702.5841 m	0.0006 m	0.0012 m	2.727
ycli --> RBL1 (PV29)	Az.	335°15'22.5"	0.001 sec	0.004 sec	2.664
	Δ Ht.	78.0324 m	0.0031 m	0.0028 m	0.460
	Ellip Dist.	123895.1354 m	0.0007 m	-0.0006 m	-0.324
chl g --> wilh (PV21)	Az.	199°58'49.1"	0.001 sec	0.000 sec	-0.281
	Δ Ht.	-33.0108 m	0.0029 m	-0.0001 m	-0.004
	Ellip Dist.	71524.9422 m	0.0006 m	-0.0037 m	-2.491
rd1l --> wilh (PV18)	Az.	175°39'34.1"	0.001 sec	0.001 sec	2.155
	Δ Ht.	-131.0314 m	0.0029 m	-0.0062 m	-1.548
	Ellip Dist.	153247.2752 m	0.0007 m	-0.0022 m	-1.693
wdlj --> RBL1 (PV31)	Az.	345°56'51.2"	0.001 sec	-0.001 sec	-0.832
	Δ Ht.	74.0661 m	0.0033 m	0.0044 m	0.720
	Ellip Dist.	169757.6945 m	0.0008 m	0.0037 m	2.121
sacr --> wilh (PV17)	Az.	309°06'08.7"	0.001 sec	-0.001 sec	-0.556
	Δ Ht.	-5.7023 m	0.0030 m	0.0072 m	1.411
	Ellip Dist.	88598.1089 m	0.0006 m	-0.0027 m	-2.058
orlk --> RBL1 (PV34)	Az.	320°39'39.4"	0.001 sec	-0.004 sec	-2.020
	Δ Ht.	33.8038 m	0.0030 m	-0.0009 m	-0.172
	Ellip Dist.	93906.2476 m	0.0007 m	0.0009 m	0.597
wilh --> RBL1 (PV30)	Az.	355°32'53.3"	0.001 sec	0.001 sec	1.101
	Δ Ht.	72.7774 m	0.0029 m	-0.0006 m	-0.120
	Ellip Dist.	111547.1212 m	0.0007 m	0.0023 m	1.526

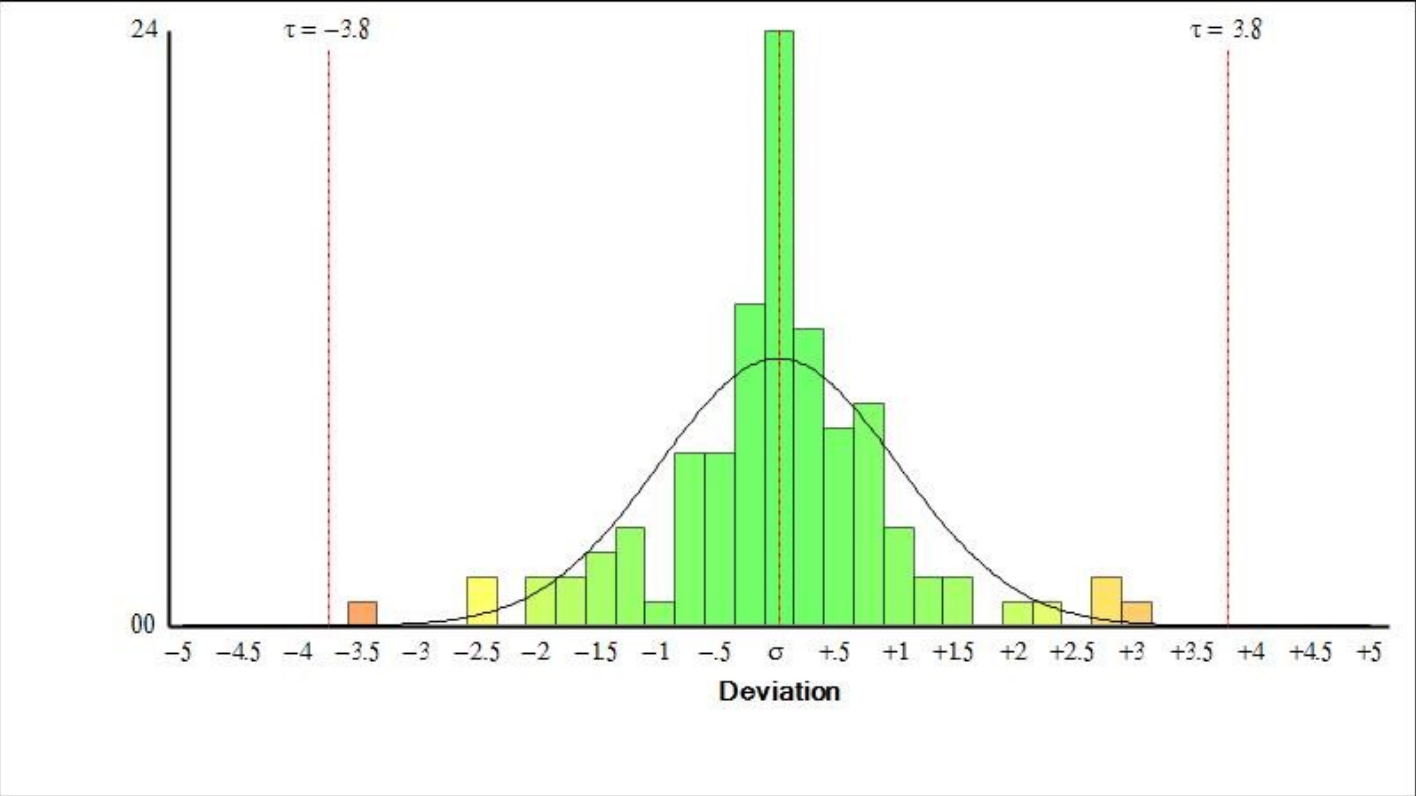
chl g --> RBL1 (PV36)	Az.	323°21'08.3"	0.002 sec	-0.004 sec	-1.446
	ΔHt.	39.7666 m	0.0030 m	0.0002 m	0.041
	Ellip Dist.	54863.1695 m	0.0007 m	0.0017 m	1.084
wdl j --> ld1k (PV14)	Az.	142°55'38.5"	0.002 sec	0.002 sec	0.664
	ΔHt.	-7.3232 m	0.0038 m	-0.0026 m	-0.380
	Ellip Dist.	74674.3341 m	0.0009 m	-0.0025 m	-1.366
or1k --> rd1l (PV4)	Az.	331°31'50.1"	0.001 sec	0.000 sec	-0.421
	ΔHt.	92.0579 m	0.0030 m	-0.0034 m	-0.715
	Ellip Dist.	129978.0504 m	0.0007 m	-0.0019 m	-1.322
chl g --> ycli (PV28)	Az.	164°10'04.6"	0.001 sec	-0.002 sec	-0.691
	ΔHt.	-38.2658 m	0.0032 m	0.0087 m	1.311
	Ellip Dist.	71069.4256 m	0.0008 m	0.0014 m	0.708
or1k --> wdl j (PV13)	Az.	191°28'28.5"	0.001 sec	0.002 sec	1.278
	ΔHt.	-40.2623 m	0.0033 m	-0.0022 m	-0.363
	Ellip Dist.	94028.8693 m	0.0008 m	-0.0023 m	-1.272
ycli --> wilh (PV22)	Az.	271°38'56.9"	0.003 sec	-0.005 sec	-1.220
	ΔHt.	5.2550 m	0.0030 m	0.0040 m	0.713
	Ellip Dist.	43843.2676 m	0.0004 m	0.0005 m	0.675
chl g --> rd1l (PV6)	Az.	337°35'05.1"	0.001 sec	0.000 sec	0.233
	ΔHt.	98.0206 m	0.0031 m	-0.0058 m	-1.005
	Ellip Dist.	92640.3294 m	0.0008 m	-0.0011 m	-0.613
ycli --> wdl j (PV23)	Az.	191°45'30.5"	0.002 sec	0.003 sec	0.881
	ΔHt.	3.9663 m	0.0034 m	0.0058 m	0.909
	Ellip Dist.	53334.3225 m	0.0008 m	-0.0009 m	-0.464
or1k --> sacr (PV8)	Az.	169°37'53.8"	0.001 sec	0.001 sec	0.870
	ΔHt.	-33.2713 m	0.0030 m	0.0026 m	0.540
	Ellip Dist.	95937.8441 m	0.0007 m	0.0005 m	0.326
or1k --> ycli (PV26)	Az.	191°01'39.9"	0.002 sec	0.000 sec	0.030
	ΔHt.	-44.2285 m	0.0031 m	0.0039 m	0.661
	Ellip Dist.	40696.7288 m	0.0006 m	-0.0008 m	-0.867
chl g --> ld1k (PV1)	Az.	163°23'27.0"	0.001 sec	0.000 sec	-0.028
	ΔHt.	-41.6228 m	0.0036 m	-0.0008 m	-0.115
	Ellip Dist.	187988.0209 m	0.0010 m	0.0018 m	0.835
ycli --> ld1k (PV27)	Az.	163°03'40.2"	0.001 sec	-0.001 sec	-0.818
	ΔHt.	-3.3570 m	0.0037 m	-0.0004 m	-0.047
	Ellip Dist.	116929.1038 m	0.0010 m	-0.0006 m	-0.248
wdl j --> wilh (PV16)	Az.	328°16'35.2"	0.002 sec	-0.001 sec	-0.215
	ΔHt.	1.2887 m	0.0032 m	0.0017 m	0.279

	Ellip Dist.	62816.0139 m	0.0007 m	0.0014 m	0.777
wdlj --> sacr (PV11)	Az.	93°24'00.1"	0.004 sec	-0.001 sec	-0.176
	ΔHt.	6.9910 m	0.0033 m	-0.0046 m	-0.762
	Ellip Dist.	36039.2967 m	0.0005 m	0.0004 m	0.480
sacr --> ld1k (PV9)	Az.	171°18'50.0"	0.002 sec	-0.001 sec	-0.527
	ΔHt.	-14.3142 m	0.0036 m	-0.0005 m	-0.091
	Ellip Dist.	58149.8283 m	0.0009 m	0.0002 m	0.110
RBL1 --> ld1k (PV35)	Az.	158°39'28.5"	0.000 sec	0.000 sec	0.203
	ΔHt.	-81.3893 m	0.0037 m	-0.0012 m	-0.068
	Ellip Dist.	240266.2558 m	0.0010 m	0.0022 m	0.424
chl g --> wdlj (PV15)	Az.	175°53'54.7"	0.001 sec	0.001 sec	0.420
	ΔHt.	-34.2995 m	0.0034 m	-0.0020 m	-0.305
	Ellip Dist.	120925.1211 m	0.0008 m	-0.0007 m	-0.364
chl g --> or1k (PV3)	Az.	136°24'44.2"	0.003 sec	0.002 sec	0.414
	ΔHt.	5.9627 m	0.0030 m	0.0016 m	0.280
	Ellip Dist.	39210.7761 m	0.0006 m	-0.0001 m	-0.108
sacr --> yc1i (PV24)	Az.	335°24'33.2"	0.001 sec	0.001 sec	0.279
	ΔHt.	-10.9573 m	0.0032 m	-0.0007 m	-0.111
	Ellip Dist.	59914.4157 m	0.0008 m	-0.0007 m	-0.396
or1k --> ld1k (PV2)	Az.	170°13'09.5"	0.001 sec	0.000 sec	0.010
	ΔHt.	-47.5855 m	0.0035 m	0.0025 m	0.391
	Ellip Dist.	154074.2997 m	0.0009 m	0.0003 m	0.138
wilh --> ld1k (PV20)	Az.	145°07'51.1"	0.001 sec	0.000 sec	0.134
	ΔHt.	-8.6120 m	0.0035 m	0.0004 m	0.072
	Ellip Dist.	137341.6900 m	0.0009 m	-0.0006 m	-0.355
rd1l --> wdlj (PV12)	Az.	167°41'49.6"	0.000 sec	0.001 sec	0.297
	ΔHt.	-132.3201 m	0.0035 m	-0.0021 m	-0.108
	Ellip Dist.	210891.6327 m	0.0009 m	-0.0004 m	-0.061
rd1l --> yc1i (PV25)	Az.	160°10'25.0"	0.001 sec	0.000 sec	-0.073
	ΔHt.	-136.2864 m	0.0032 m	0.0011 m	0.210
	Ellip Dist.	163444.3529 m	0.0008 m	0.0000 m	0.028
rd1l --> ld1k (PV5)	Az.	161°12'24.3"	0.000 sec	0.000 sec	0.002
	ΔHt.	-139.6434 m	0.0038 m	0.0027 m	0.154
	Ellip Dist.	280309.7637 m	0.0010 m	-0.0011 m	-0.203
rd1l --> sacr (PV7)	Az.	158°44'14.1"	0.000 sec	0.000 sec	0.008
	ΔHt.	-125.3291 m	0.0033 m	-0.0014 m	-0.087
	Ellip Dist.	223167.2295 m	0.0009 m	-0.0009 m	-0.190
chl g --> sacr (PV10)	Az.	160°00'50.7"	0.001 sec	0.000 sec	0.146

	ΔHt.	-27.3085 m	0.0031 m	-0.0004 m	-0.072
	Ellip Dist.	130575.6151 m	0.0008 m	0.0000 m	0.028

Histogram of Standardized Residuals

Critical Tau Value: 3.8
 Observations Failing the Tau Test: 0



Covariance Terms

From Point	To Point		Components	A-posteriori Error	Horiz. Precision (Ratio)	3D Precision (Ratio)
chl g	ld lk	Az.	163°23'27.0"	0.001 sec	1 : 192578968	1 : 192532292
		ΔHt.	-41.6228 m	0.0036 m		
		ΔElev.	-37.9408 m	0.0036 m		
		Ellip Dist.	187988.0209 m	0.0010 m		
chl g	or lk	Az.	136°24'44.2"	0.003 sec	1 : 64603296	1 : 64300551
		ΔHt.	5.9627 m	0.0030 m		
		ΔElev.	6.1507 m	0.0030 m		

		Ellip Dist.	39210.7761 m	0.0006 m		
chl g	RBL1	Az.	323°21'08.3"	0.002 sec	1 : 76495120	1 : 76271928
		ΔHt.	39.7666 m	0.0030 m		
		ΔElev.	40.8915 m	0.0030 m		
		Ellip Dist.	54863.1695 m	0.0007 m		
chl g	rd1l	Az.	337°35'05.1"	0.001 sec	1 : 118279470	1 : 118178067
		ΔHt.	98.0206 m	0.0031 m		
		ΔElev.	98.2011 m	0.0031 m		
		Ellip Dist.	92640.3294 m	0.0008 m		
chl g	sacr	Az.	160°00'50.7"	0.001 sec	1 : 164281266	1 : 164169193
		ΔHt.	-27.3085 m	0.0031 m		
		ΔElev.	-24.3597 m	0.0031 m		
		Ellip Dist.	130575.6151 m	0.0008 m		
chl g	wdlj	Az.	175°53'54.7"	0.001 sec	1 : 144624146	1 : 144756247
		ΔHt.	-34.2995 m	0.0034 m		
		ΔElev.	-31.0639 m	0.0034 m		
		Ellip Dist.	120925.1211 m	0.0008 m		
chl g	wilh	Az.	199°58'49.1"	0.001 sec	1 : 111305390	1 : 111756746
		ΔHt.	-33.0108 m	0.0029 m		
		ΔElev.	-30.5780 m	0.0029 m		
		Ellip Dist.	71524.9422 m	0.0006 m		
chl g	ycli	Az.	164°10'04.6"	0.001 sec	1 : 92258862	1 : 92221877
		ΔHt.	-38.2658 m	0.0032 m		
		ΔElev.	-36.5304 m	0.0032 m		
		Ellip Dist.	71069.4256 m	0.0008 m		
ld1k	or1k	Az.	350°24'23.3"	0.001 sec	1 : 165979138	1 : 166189551
		ΔHt.	47.5855 m	0.0035 m		
		ΔElev.	44.0915 m	0.0035 m		
		Ellip Dist.	154074.2997 m	0.0009 m		
ld1k	RBL1	Az.	339°17'15.3"	0.000 sec	1 : 238677597	1 : 238514272
		ΔHt.	81.3893 m	0.0037 m		
		ΔElev.	78.8323 m	0.0037 m		
		Ellip Dist.	240266.2558 m	0.0010 m		
ld1k	rd1l	Az.	341°51'34.7"	0.000 sec	1 : 269468321	1 : 269405441
		ΔHt.	139.6434 m	0.0038 m		
		ΔElev.	136.1419 m	0.0038 m		
		Ellip Dist.	280309.7637 m	0.0010 m		
ld1k	sacr	Az.	351°22'34.0"	0.002 sec	1 : 61253021	1 : 61370699
		ΔHt.	14.3142 m	0.0036 m		
		ΔElev.	13.5811 m	0.0036 m		
		Ellip Dist.	58149.8283 m	0.0009 m		

ldlk	wdlj	Az.	323°14'46.9"	0.002 sec	1 : 81066676	1 : 80657510
		ΔHt.	7.3232 m	0.0038 m		
		ΔElev.	6.8769 m	0.0038 m		
		Ellip Dist.	74674.3341 m	0.0009 m		
ldlk	wilh	Az.	325°41'24.7"	0.001 sec	1 : 156600259	1 : 155961437
		ΔHt.	8.6120 m	0.0035 m		
		ΔElev.	7.3628 m	0.0035 m		
		Ellip Dist.	137341.6900 m	0.0009 m		
ldlk	ycli	Az.	343°18'13.7"	0.001 sec	1 : 120446213	1 : 120414591
		ΔHt.	3.3570 m	0.0037 m		
		ΔElev.	1.4105 m	0.0037 m		
		Ellip Dist.	116929.1038 m	0.0010 m		
orlk	RBL1	Az.	320°39'39.4"	0.001 sec	1 : 141798081	1 : 141248409
		ΔHt.	33.8038 m	0.0030 m		
		ΔElev.	34.7408 m	0.0030 m		
		Ellip Dist.	93906.2476 m	0.0007 m		
orlk	rdll	Az.	331°31'50.1"	0.001 sec	1 : 181364901	1 : 180968030
		ΔHt.	92.0579 m	0.0030 m		
		ΔElev.	92.0504 m	0.0030 m		
		Ellip Dist.	129978.0504 m	0.0007 m		
orlk	sacr	Az.	169°37'53.8"	0.001 sec	1 : 130566889	1 : 130666242
		ΔHt.	-33.2713 m	0.0030 m		
		ΔElev.	-30.5103 m	0.0030 m		
		Ellip Dist.	95937.8441 m	0.0007 m		
orlk	wdlj	Az.	191°28'28.5"	0.001 sec	1 : 125191987	1 : 125634947
		ΔHt.	-40.2623 m	0.0033 m		
		ΔElev.	-37.2146 m	0.0033 m		
		Ellip Dist.	94028.8693 m	0.0008 m		
orlk	wilh	Az.	233°10'40.9"	0.002 sec	1 : 136287301	1 : 137182696
		ΔHt.	-38.9735 m	0.0028 m		
		ΔElev.	-36.7286 m	0.0028 m		
		Ellip Dist.	64470.5024 m	0.0005 m		
orlk	ycli	Az.	191°01'39.9"	0.002 sec	1 : 63149900	1 : 63413955
		ΔHt.	-44.2285 m	0.0031 m		
		ΔElev.	-42.6810 m	0.0031 m		
		Ellip Dist.	40696.7288 m	0.0006 m		
rdll	RBL1	Az.	176°11'13.9"	0.002 sec	1 : 68922662	1 : 69009850
		ΔHt.	-58.2540 m	0.0028 m		
		ΔElev.	-57.3096 m	0.0028 m		
		Ellip Dist.	41702.5841 m	0.0006 m		
rdll	sacr	Az.	158°44'14.1"	0.000 sec	1 : 261159667	1 : 261136303

		ΔHt.	-125.3291 m	0.0033 m		
		ΔElev.	-122.5608 m	0.0033 m		
		Ellip Dist.	223167.2295 m	0.0009 m		
rd1l	wdlj	Az.	167°41'49.6"	0.000 sec	1 : 236567626	1 : 236611546
		ΔHt.	-132.3201 m	0.0035 m		
		ΔElev.	-129.2650 m	0.0035 m		
		Ellip Dist.	210891.6327 m	0.0009 m		
rd1l	wilh	Az.	175°39'34.1"	0.001 sec	1 : 212074782	1 : 212253658
		ΔHt.	-131.0314 m	0.0029 m		
		ΔElev.	-128.7791 m	0.0029 m		
		Ellip Dist.	153247.2752 m	0.0007 m		
rd1l	ycli	Az.	160°10'25.0"	0.001 sec	1 : 208507775	1 : 208463817
		ΔHt.	-136.2864 m	0.0032 m		
		ΔElev.	-134.7314 m	0.0032 m		
		Ellip Dist.	163444.3529 m	0.0008 m		
sacr	RBL1	Az.	335°25'41.4"	0.000 sec	1 : 230358065	1 : 230135084
		ΔHt.	67.0751 m	0.0031 m		
		ΔElev.	65.2511 m	0.0031 m		
		Ellip Dist.	183809.5463 m	0.0008 m		
sacr	wdlj	Az.	273°39'29.7"	0.004 sec	1 : 75606159	1 : 74989021
		ΔHt.	-6.9910 m	0.0033 m		
		ΔElev.	-6.7043 m	0.0033 m		
		Ellip Dist.	36039.2967 m	0.0005 m		
sacr	wilh	Az.	309°06'08.7"	0.001 sec	1 : 139658866	1 : 138764283
		ΔHt.	-5.7023 m	0.0030 m		
		ΔElev.	-6.2183 m	0.0030 m		
		Ellip Dist.	88598.1089 m	0.0006 m		
sacr	ycli	Az.	335°24'33.2"	0.002 sec	1 : 76928871	1 : 76778260
		ΔHt.	-10.9573 m	0.0032 m		
		ΔElev.	-12.1707 m	0.0032 m		
		Ellip Dist.	59914.4157 m	0.0008 m		
wdlj	RBL1	Az.	345°56'51.2"	0.001 sec	1 : 203008895	1 : 203012475
		ΔHt.	74.0661 m	0.0033 m		
		ΔElev.	71.9554 m	0.0033 m		
		Ellip Dist.	169757.6945 m	0.0008 m		
wdlj	wilh	Az.	328°16'35.2"	0.002 sec	1 : 86623474	1 : 86350233
		ΔHt.	1.2887 m	0.0032 m		
		ΔElev.	0.4860 m	0.0032 m		
		Ellip Dist.	62816.0139 m	0.0007 m		
wdlj	ycli	Az.	11°40'48.1"	0.002 sec	1 : 68272300	1 : 68494611
		ΔHt.	-3.9663 m	0.0034 m		

		ΔElev.	-5.4664 m	0.0034 m		
		Ellip Dist.	53334.3225 m	0.0008 m		
wilh	RBL1	Az.	355°32'53.3"	0.001 sec	1 : 162284331	1 : 162452676
		ΔHt.	72.7774 m	0.0029 m		
		ΔElev.	71.4694 m	0.0029 m		
		Ellip Dist.	111547.1212 m	0.0007 m		
wilh	ycli	Az.	91°19'44.5"	0.003 sec	1 : 104161096	1 : 103863016
		ΔHt.	-5.2550 m	0.0030 m		
		ΔElev.	-5.9524 m	0.0030 m		
		Ellip Dist.	43843.2676 m	0.0004 m		
ycli	RBL1	Az.	335°15'22.5"	0.001 sec	1 : 165096560	1 : 164873508
		ΔHt.	78.0324 m	0.0031 m		
		ΔElev.	77.4218 m	0.0031 m		
		Ellip Dist.	123895.1354 m	0.0008 m		

Date: 09/24/2023 10:08:45	Project: C: \\Active_Projects\\Sacramento_River_TopoBathy\\C- Process\\TBC\\AdditionalControl\\RBL1_20230923.vce	Trimble Business Center
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FILE: CC1_02591220_5s.24o OP1720448590995

NGS OPUS SOLUTION REPORT

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All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: <https://www.ngs.noaa.gov/OPUS/about.jsp#accuracy>

USER: bhocker@yuroktribe.nsn.us
RINEX FILE: cc1_122q.24o

DATE: July 08, 2024
TIME: 14:24:47 UTC

SOFTWARE: page5 2008.25 master273.pl 160321	START: 2024/05/01 16:33:00
EPHEMERIS: igs23123.eph [precise]	STOP: 2024/05/01 23:39:00
NAV FILE: brdc1220.24n	OBS USED: 17412 / 18275 : 95%
ANT NAME: TRMR12I NONE	# FIXED AMB: 83 / 85 : 98%
ARP HEIGHT: 1.800	OVERALL RMS: 0.015(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) ITRF2014 (EPOCH:2024.3329)

X:	-2602581.674(m)	0.001(m)	-2602582.745(m)	0.001(m)
Y:	-4100361.451(m)	0.012(m)	-4100360.098(m)	0.012(m)
Z:	4120830.197(m)	0.006(m)	4120830.138(m)	0.006(m)

LAT:	40 30 16.90798	0.011(m)	40 30 16.91849	0.011(m)
E LON:	237 35 45.18388	0.005(m)	237 35 45.11468	0.005(m)
W LON:	122 24 14.81612	0.005(m)	122 24 14.88532	0.005(m)
EL HGT:	113.535(m)	0.004(m)	113.064(m)	0.004(m)
ORTHO HGT:	141.406(m)	0.060(m)	[NAVD88 (Computed using GEOID18)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 10)	SPC (0401 CA 1)
Northing (Y) [meters]	4483946.588	630144.069
Easting (X) [meters]	550488.207	1965749.578
Convergence [degrees]	0.38704167	-0.26424444
Point Scale	0.99963138	0.99991117
Combined Factor	0.99961358	0.99989336

US NATIONAL GRID DESIGNATOR: 10TEK5048883947(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DL9240 P345	HOOKERDOME CN2005 CORS GRP	N401616.430	W1221614.848	28288.9
DM7550 P349	WONDERLAND CN2005 CORS GRP	N404351.894	W1221909.609	26144.1
DN7517 P060	POLLARD FLTCN2005 CORS GRP	N405951.462	W1222453.528	54750.3

NEAREST NGS PUBLISHED CONTROL POINT

LU1929	SKY	N403019.289	W1222246.034	2091.6
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

FILE: CC1_02591230_5s.24o OP1720448636671

NGS OPUS SOLUTION REPORT

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All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: <https://www.ngs.noaa.gov/OPUS/about.jsp#accuracy>

USER: bhocker@yuroktribe.nsn.us
RINEX FILE: cc1_123q.24o

DATE: July 08, 2024
TIME: 14:25:41 UTC

SOFTWARE: page5 2008.25 master274.pl 160321	START: 2024/05/02 16:19:00
EPHEMERIS: igs23124.eph [precise]	STOP: 2024/05/03 00:03:00
NAV FILE: brdc1230.24n	OBS USED: 19685 / 20686 : 95%
ANT NAME: TRMR12I NONE	# FIXED AMB: 80 / 91 : 88%
ARP HEIGHT: 1.800	OVERALL RMS: 0.017(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) ITRF2014 (EPOCH:2024.3356)

X:	-2602581.678(m)	0.005(m)	-2602582.749(m)	0.005(m)
Y:	-4100361.453(m)	0.010(m)	-4100360.099(m)	0.010(m)
Z:	4120830.197(m)	0.010(m)	4120830.138(m)	0.010(m)

LAT:	40 30 16.90787	0.015(m)	40 30 16.91842	0.015(m)
E LON:	237 35 45.18377	0.002(m)	237 35 45.11458	0.002(m)
W LON:	122 24 14.81623	0.002(m)	122 24 14.88542	0.002(m)
EL HGT:	113.538(m)	0.002(m)	113.067(m)	0.002(m)
ORTHO HGT:	141.409(m)	0.060(m)	[NAVD88 (Computed using GEOID18)]	

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 10)	SPC (0401 CA 1)
Northing (Y) [meters]	4483946.584	630144.066
Easting (X) [meters]	550488.204	1965749.576
Convergence [degrees]	0.38704167	-0.26424444
Point Scale	0.99963138	0.99991117
Combined Factor	0.99961358	0.99989336

US NATIONAL GRID DESIGNATOR: 10TEK5048883947(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DL9240 P345	HOOKERDOME CN2005 CORS GRP	N401616.430	W1221614.848	28288.9
DM7550 P349	WONDERLAND CN2005 CORS GRP	N404351.894	W1221909.609	26144.1
DN5653 P339	VALENTINE_CN2007 CORS GRP	N400202.784	W1224005.644	56889.9

NEAREST NGS PUBLISHED CONTROL POINT

LU1929	SKY	N403019.289	W1222246.034	2091.6
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

FILE: CC1_02591220_5s.24o OP1720448590995

NGS OPUS SOLUTION REPORT

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For additional information: <https://www.ngs.noaa.gov/OPUS/about.jsp#accuracy>

USER: bhocker@yuroktribe.nsn.us
RINEX FILE: cc1_122q.24o

DATE: July 08, 2024
TIME: 14:24:47 UTC

SOFTWARE: page5 2008.25 master273.pl 160321	START: 2024/05/01 16:33:00
EPHEMERIS: igs23123.eph [precise]	STOP: 2024/05/01 23:39:00
NAV FILE: brdc1220.24n	OBS USED: 17412 / 18275 : 95%
ANT NAME: TRMR12I NONE	# FIXED AMB: 83 / 85 : 98%
ARP HEIGHT: 1.800	OVERALL RMS: 0.015(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) ITRF2014 (EPOCH:2024.3329)

X:	-2602581.674(m)	0.001(m)	-2602582.745(m)	0.001(m)
Y:	-4100361.451(m)	0.012(m)	-4100360.098(m)	0.012(m)
Z:	4120830.197(m)	0.006(m)	4120830.138(m)	0.006(m)

LAT:	40 30 16.90798	0.011(m)	40 30 16.91849	0.011(m)
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ORTHO HGT:	141.406(m)	0.060(m)	[NAVD88 (Computed using GEOID18)]	

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	UTM (Zone 10)	SPC (0401 CA 1)
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Easting (X) [meters]	550488.207	1965749.578
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Point Scale	0.99963138	0.99991117
Combined Factor	0.99961358	0.99989336

US NATIONAL GRID DESIGNATOR: 10TEK5048883947(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DL9240 P345	HOOKERDOME CN2005 CORS GRP	N401616.430	W1221614.848	28288.9
DM7550 P349	WONDERLAND CN2005 CORS GRP	N404351.894	W1221909.609	26144.1
DN7517 P060	POLLARD FLTCN2005 CORS GRP	N405951.462	W1222453.528	54750.3

NEAREST NGS PUBLISHED CONTROL POINT

LU1929	SKY	N403019.289	W1222246.034	2091.6
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FILE: CC1_02591230_5s.24o OP1720448636671

NGS OPUS SOLUTION REPORT

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For additional information: <https://www.ngs.noaa.gov/OPUS/about.jsp#accuracy>

USER: bhocker@yuroktribe.nsn.us
RINEX FILE: cc1_123q.24o

DATE: July 08, 2024
TIME: 14:25:41 UTC

SOFTWARE: page5 2008.25 master274.pl 160321	START: 2024/05/02 16:19:00
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NAV FILE: brdc1230.24n	OBS USED: 19685 / 20686 : 95%
ANT NAME: TRMR12I NONE	# FIXED AMB: 80 / 91 : 88%
ARP HEIGHT: 1.800	OVERALL RMS: 0.017(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) ITRF2014 (EPOCH:2024.3356)

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Z:	4120830.197(m)	0.010(m)	4120830.138(m)	0.010(m)

LAT:	40 30 16.90787	0.015(m)	40 30 16.91842	0.015(m)
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W LON:	122 24 14.81623	0.002(m)	122 24 14.88542	0.002(m)
EL HGT:	113.538(m)	0.002(m)	113.067(m)	0.002(m)
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Easting (X) [meters]	550488.204	1965749.576
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Point Scale	0.99963138	0.99991117
Combined Factor	0.99961358	0.99989336

US NATIONAL GRID DESIGNATOR: 10TEK5048883947(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
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DM7550 P349	WONDERLAND CN2005 CORS GRP	N404351.894	W1221909.609	26144.1
DN5653 P339	VALENTINE_CN2007 CORS GRP	N400202.784	W1224005.644	56889.9

NEAREST NGS PUBLISHED CONTROL POINT

LU1929	SKY	N403019.289	W1222246.034	2091.6
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