Ground Control Survey Report





UNITED STATES GEOLOGICAL SURVEY CO San Juan 2017 D17

TASK ORDER NUMBER: G17PD01197

Contractor: Woolpert, Inc. Woolpert Project # 77866

September 2017

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UNITED STATES GEOLOGICAL SURVEY - CO San Juan 2017 D17

Task Order G17PD01197

Woolpert

4454 Idea Center Boulevard Dayton, Ohio 45430.1500 Phone: 937.461.5660

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Section 1: Survey Report

TASK ORDER NAME: UNITED STATES GEOLOGICAL SURVEY – CO San Juan Lidar 2017 D17

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This report contains a comprehensive outline of the Ground Control Survey that supported the Colorado San Juan airborne LiDAR collection. All surveys were performed in such a way as to achieve ground control accuracies that meet or exceed the National Mapping Accuracy Standards.

Project Area

The project area consists of approximately 232 square miles over portions of San Juan County, CO.

Purpose

The purpose of this survey was to establish three-dimensional coordinates for 45 LiDAR primary control points and 75 ground classification check points. The points were collected per the flight layout and were uniformly dispersed over the project area.

Date of Survey

Ground control field missions took place on September 25th through October 4th, 2017.

Monumentation

Prior to aerial acquisition, Woolpert field crews performed a field reconnaissance to verify the existence and suitability of preselected existing National Geodetic Survey (NGS) control stations. These existing NSRS control stations were utilized as checks to ensure that quality x, y, and z coordinate values were computed for each of the newly established LiDAR control stations. Recovery information sheets for the existing NGS control stations can be found in Section 4 of this report. A control diagram showing the ground control stations used to support this mapping project can be found in Section 5 of this report.

Accuracy Standards

The relative accuracy of the lidar data will be ≤ 8 cm RMSEZ between adjacent swaths with a maximum difference of ± 16 cm. The data collected shall meet the National Standard for Spatial Database Accuracy (NSSDA) accuracy standards. The NSSDA standards specify that vertical accuracy be reported at the 95 percent confidence level for data tested by an independent source of higher accuracy. The accuracy (ACCz) for the derived DEM shall be calculated in three ways, and reported in the metadata accordingly. The RMSEZ (Non-Vegetated) is required to meet ≤ 10.0 cm. The Non-Vegetated Vertical Accuracy (NVA) is required to meet ≤ 19.6 cm at a 95% confidence level, derived according to NSSDA, i.e., based on RMSEZ of 10.0 cm in the "open terrain" and/or "urban" land cover categories. The Vegetated Vertical Accuracy (VVA) is required to meet ≤ 29.4 cm at a 95th percentile level, derived according to ASPRS Guidelines, Vertical Accuracy Reporting for Lidar Data, i.e., based on the 95th percentile error in Vegetated land cover categories combined (Brush Lands/Trees and Forested Areas).

GPS Equipment

Woolpert utilized 2 Trimble Navigation R8 Model 3 GNSS dual-frequency GPS receivers, 1 Trimble Navigation R10 Model GNSS dual-frequency GPS receiver and 1 TSC3 data collector for this project.

Methodology

Real-Time Kinematic (RTK) GPS

The field crew utilized Real-Time Kinematic (RTK) and GPS Rapid Static methods throughout the ground control data collection process. Using these techniques, observations were performed on a total of 45 LiDAR control points and 75 ground classification check points. The survey was conducted using a 1-second epoch rate, in a fixed solution RTK mode, with each observation lasting between 60 to 180 seconds. Each station was occupied twice to insure the necessary horizontal and vertical accuracies were being met for this LiDAR / photogrammetric project.

GPS Data Analysis and Processing

The field crew chief processed all session baselines each day using Trimble Navigation's Trimble Business Center (TBC) Version 4.01 baseline processor with the accompanying broadcast ephemeris. Daily processing ensured the integrity of the network as it was constructed, and allowed the field crews to immediately reschedule observations of poor baselines.

Datum Reference and Final Coordinates

The spatial reference system for this project is will be UTM Zone 13 North. The datum shall be NAD83 (2011) meters to 2 decimal places horizontal and NAVD88 Meters vertical using the latest geoid model (GEOID12B) Units for both the horizontal and vertical datum will be expressed in meters to two (2) decimal places.

Quality Assurance

Existing NSRS published continuously operating reference stations were utilized to assure that there were no discrepancies in the field observation data. Close examinations of the residuals showed no distortions in orientation or scale. The ground control data meets positional accuracies necessary to support 1.0 point per 0.3 meters squared (1' GSD) data at 95% confidence level as outlined in the Geospatial Positioning Accuracy Standards, Part 3: National Standard for Spatial Data Accuracy (NSSDA), published by the Federal Geographic Data Committee (FGDC-STD-007.3-1998).

Section 2: Ground Control / Geodetic Control Coordinate Listings

• Coordinate System: Grid

Horizontal Datum: NAD83 2011 UTM 13 North

• Vertical Datum: NAVD88

Geoid Model: GEOID 12B

Units: Meter

Point	UTM Zone 13 North		Ortho Height	Description	
No.	UTM Northing (m)	UTM Easting (m)	(NAVD88) (m)	2001.	
1001	4186692.15	254464.14	3184.33	LiDAR Control	
1002	4187969.59	255832.44	2997.22	LiDAR Control	
1003	4189456.77	260596.52	2903.80	LiDAR Control	
1003 A	4189423.61	260611.50	2903.12	LiDAR Control	
1004	4193940.95	253899.27	3253.30	LiDAR Control	
1005	4200794.91	274666.83	3351.39	LiDAR Control	
1006	4190829.08	271741.37	2952.86	LiDAR Control	
1007	4194050.34	276249.70	3444.80	LiDAR Control	
1008	4201493.06	276937.39	3850.43	LiDAR Control	
1009	4183346.63	264506.40	3174.50	LiDAR Control	
1010	4185184.12	265701.74	3106.80	LiDAR Control	
1011	4187424.76	265115.37	2820.25	LiDAR Control	
1011 A	4187492.06	265099.36	2821.09	LiDAR Control	
1012	4188740.84	266079.63	2842.96	LiDAR Control	
1012 A	4188780.78	266120.22	2845.05	LiDAR Control	
1013	4189837.36	265233.45	2902.08	LiDAR Control	
1013 A	4189795.59	265247.31	2899.88	LiDAR Control	
1014	4189998.37	268857.59	2924.80	LiDAR Control	
1014 A	4189906.84	268832.65	2890.98	LiDAR Control	
1015	4184652.20	272808.00	3289.48	LiDAR Control	
1016	4184895.67	276817.21	3632.16	LiDAR Control	
1016 A	4184877.50	276847.91	3631.02	LiDAR Control	

Point	UTM Zone 13 North		Ortho Height	Description	
No.	UTM Northing (m)	UTM Easting (m)	(NAVD88) (m)		
1017	4197641.15	261331.23	3368.25	LiDAR Control	
1017 A	4197729.59	261394.58	3372.51	LiDAR Control	
1018	4186631.49	275239.64	3791.60	LiDAR Control	
1019	4188941.49	262449.52	2878.27	LiDAR Control	
1020	4192903.20	255470.42	3592.99	LiDAR Control	
1020 A	4192894.42	255513.91	3590.62	LiDAR Control	
1021	4192405.01	258555.12	3178.50	LiDAR Control	
1021 A	4192364.37	258338.93	3199.16	LiDAR Control	
1021 B	4192450.43	258575.45	3177.14	LiDAR Control	
1022	4197177.76	270929.23	3571.56	LiDAR Control	
1022 A	4197196.14	270898.84	3577.97	LiDAR Control	
1023	4195413.17	264992.99	3111.46	LiDAR Control	
1024	4179898.49	260787.70	3229.22	LiDAR Control	
1025	4180909.38	263119.13	3226.21	LiDAR Control	
1026	4180601.74	262539.67	3245.35	LiDAR Control	
1027	4179821.91	262148.23	3314.65	LiDAR Control	
1028	4177794.38	257201.38	3030.89	LiDAR Control	
1029	4173198.34	253557.19	2859.17	LiDAR Control	
1030	4189256.10	267460.77	2862.01	LiDAR Control	
1031	4189542.15	267964.83	2886.68	LiDAR Control	
1032	4189966.90	269714.92	2933.63	LiDAR Control	
1033	4190376.08	270788.21	2951.94	LiDAR Control	
1033 A	4190321.33	270791.57	2930.94	LiDAR Control	
2001	4198815.95	261948.26	3340.54	NVA	
2001 A	4198788.70	261910.12	3342.19	NVA	
2001 B	4198826.92	261967.17	3339.75	NVA	
2002	4179870.15	260779.24	3226.06	NVA	
2002 A	4179840.54	260751.94	3223.24	NVA	
2003	4193701.24	254493.08	3335.87	NVA	
2003 A	4193687.33	254523.37	3339.50	NVA	
2004	4187508.28	264914.24	2821.55	NVA	
2004 A	4187497.21	264751.52	2822.84	NVA	
2004 B	4187467.30	265040.66	2820.17	NVA	
2005	4190064.82	270169.58	2933.89	NVA	

Point	UTM Zone 13 North		Ortho Height	Description	
No.	UTM Northing (m)	UTM Easting (m)	(NAVD88) (m)		
2005 A	4190026.56	270218.15	2916.48	NVA	
2006	4196075.88	274342.44	3073.48	NVA	
2007	4201493.43	273211.01	3471.85	NVA	
2008	4185746.75	276105.32	3768.57	NVA	
2009	4192793.23	260148.36	3047.52	NVA	
2009 A	4192814.44	260115.63	3050.53	NVA	
2010	4199163.64	267445.03	3507.81	NVA	
2010 A	4199209.57	267432.54	3511.40	NVA	
2011	4192491.56	264408.86	3022.07	NVA	
2012	4196331.73	265563.52	3143.04	NVA	
2012 A	4196367.44	265578.27	3144.23	NVA	
2013	4192672.45	276705.09	3393.42	NVA	
2013 A	4193562.87	275893.83	3264.45	NVA	
2014	4185153.37	253149.63	3253.52	NVA	
2014 A	4185195.08	253137.49	3252.24	NVA	
2014 B	4185149.56	253125.91	3254.61	NVA	
2015	4190198.54	255092.32	3648.17	NVA	
2015 A	4190158.70	255071.98	3639.27	NVA	
2016	4187817.81	256877.21	2980.30	NVA	
2017	4188616.16	258529.99	2950.45	NVA	
2017 A	4188584.40	258497.45	2950.70	NVA	
2018	4197977.98	270197.99	3747.00	NVA	
2018 A	4198004.17	270102.55	3738.50	NVA	
2019	4198177.76	273668.84	3821.65	NVA	
2020	4199671.59	274152.38	3644.92	NVA	
2020 A	4199683.28	274120.39	3650.73	NVA	
2021	4201518.66	275393.25	3626.92	NVA	
2022	4188509.13	272930.23	3052.74	NVA	
2023	4187405.69	270027.71	3231.41	NVA	
2023 A	4187416.68	270025.54	3230.57	NVA	
2024	4196671.78	271938.12	3373.00	NVA	
2025	4197058.21	258833.01	3758.65	NVA	
2025 A	4197082.61	258877.66	3752.69	NVA	
2025 B	4197069.45	258965.88	3750.23	NVA	

Point	UTM Zone 13 North		Ortho Height	Description	
No.	UTM Northing (m)	UTM Easting (m)	(NAVD88) (m)	Description.	
3001	4198824.02	261940.38	3339.23	VVA	
3001 A	4198728.23	261867.08	3341.69	VVA	
3001 B	4198816.86	261900.29	3342.37	VVA	
3002	4185220.74	253213.94	3249.61	VVA	
3002 A	4185224.31	253105.05	3251.67	VVA	
3002 B	4185123.35	253125.93	3254.35	VVA	
3003	4179873.90	260809.79	3227.82	VVA	
3003 A	4179823.28	260794.54	3217.37	VVA	
3004	4193726.64	274078.29	2997.90	VVA	
3004 A	4193744.26	273993.42	2991.51	VVA	
3005	4188239.26	257926.99	2965.92	VVA	
3005 A	4188276.35	257968.74	2964.71	VVA	
3006	4190721.87	271620.58	2949.20	VVA	
3006 A	4190749.81	271581.65	2946.86	VVA	
3007	4187545.91	265079.25	2820.30	VVA	
3007 A	4187570.63	265105.35	2820.70	VVA	
3008	4192323.78	260204.54	3071.27	VVA	
3008 A	4192302.36	260179.21	3067.10	VVA	
3009	4195213.14	259212.60	3199.29	VVA	
3009 A	4195205.29	259180.04	3200.97	VVA	
3009 B	4195245.66	259185.33	3203.11	VVA	
3010	4198622.11	267343.28	3429.25	VVA	
3010 A	4198652.64	267360.20	3430.59	VVA	
3011	4196704.63	265936.05	3158.77	VVA	
3011 A	4196727.95	265999.22	3160.75	VVA	
3012	4192437.06	264401.10	3014.45	VVA	
3013	4200760.46	274701.64	3345.01	VVA	
3013 A	4200737.92	274676.49	3339.26	VVA	
3014	4183304.00	264507.27	3176.25	VVA	
3014 A	4183389.05	264488.84	3176.82	VVA	

• Coordinate System: Geodetic

• Horizontal Datum: NAD83 (2011) Epoch 2010.00

• Vertical Datum: NAVD88

Units: Meter

Point No.	Geodetic Coordinates NAD-83 (2011) Epoch 2010.00		Ellipsoid	Description	
Tomic No.	Latitude (N)	Longitude (W)	Height (m)	Description	
1001	37°47'40.65413"	-107°47'18.90549"	3168.58	LiDAR Control	
1002	37°48'23.37525"	-107°46'24.57122"	2981.51	LiDAR Control	
1003	37°49'16.11662"	-107°43'11.73023"	2888.20	LiDAR Control	
1003 A	37°49'15.05587"	-107°43'11.07881"	2887.53	LiDAR Control	
1004	37°51'35.03103"	-107°47'50.84720"	3237.59	LiDAR Control	
1005	37°55'36.53357"	-107°33'49.52874"	3336.23	LiDAR Control	
1006	37°50'10.87714"	-107°35'37.89787"	2937.53	LiDAR Control	
1007	37°51'59.31611"	-107°32'37.22280"	3429.60	LiDAR Control	
1008	37°56'01.17965"	-107°32'17.39104"	3835.35	LiDAR Control	
1009	37°46'01.73557"	-107°40'24.83115"	3158.98	LiDAR Control	
1010	37°47'02.39848"	-107°39'38.16082"	3091.33	LiDAR Control	
1011	37°48'14.48130"	-107°40'04.72102"	2804.75	LiDAR Control	
1011 A	37°48'16.64772"	-107°40'05.45324"	2805.59	LiDAR Control	
1012	37°48'58.02942"	-107°39'26.86011"	2827.49	LiDAR Control	
1012 A	37°48'59.36140"	-107°39'25.24778"	2829.57	LiDAR Control	
1013	37°49'32.78813"	-107°40'02.71244"	2886.60	LiDAR Control	
1013 A	37°49'31.44727"	-107°40'02.09739"	2884.39	LiDAR Control	
1014	37°49'41.33732"	-107°37'34.80273"	2909.41	LiDAR Control	
1014 A	37°49'38.34789"	-107°37'35.71682"	2875.59	LiDAR Control	
1015	37°46'51.61530"	-107°34'47.33028"	3274.25	LiDAR Control	
1016	37°47'03.06332"	-107°32'03.85697"	3616.99	LiDAR Control	
1016 A	37°47'02.50133"	-107°32'02.58317"	3615.85	LiDAR Control	
1017	37°53'42.07130"	-107°42'51.44078"	3352.77	LiDAR Control	
1017 A	37°53'44.99756"	-107°42'48.95532"	3357.02	LiDAR Control	
1018	37°47'57.93890"	-107°33'10.22745"	3776.43	LiDAR Control	
1019	37°49'01.15851"	-107°41'55.41055"	2862.73	LiDAR Control	
1020	37°51'02.92058"	-107°46'45.35917"	3577.33	LiDAR Control	
1020 A	37°51'02.67802"	-107°46'43.57097"	3574.96	LiDAR Control	

Point No.	Geodetic Coordinates NA	AD-83 (2011) Epoch 2010.00	Ellipsoid	Description
Politi No.	Latitude (N)	Longitude (W)	Height (m)	Description
1021	37°50'49.73377"	-107°44'38.67847"	3162.88	LiDAR Control
1021 A	37°50'48.21028"	-107°44'47.46542"	3183.54	LiDAR Control
1021 B	37°50'51.22516"	-107°44'37.90197"	3161.52	LiDAR Control
1022	37°53'35.92798"	-107°36'18.33687"	3556.33	LiDAR Control
1022 A	37°53'36.49615"	-107°36'19.60081"	3562.74	LiDAR Control
1023	37°52'33.28805"	-107°40'19.06273"	3096.04	LiDAR Control
1024	37°44'06.50241"	-107°42'52.57549"	3213.57	LiDAR Control
1025	37°44'41.44967"	-107°41'18.61148"	3210.64	LiDAR Control
1026	37°44'30.93792"	-107°41'41.90191"	3229.76	LiDAR Control
1027	37°44'05.29624"	-107°41'56.96015"	3299.03	LiDAR Control
1028	37°42'54.90943"	-107°45'16.40572"	3015.08	LiDAR Control
1029	37°40'22.45188"	-107°47'39.48480"	2843.13	LiDAR Control
1030	37°49'16.00073"	-107°38'31.02503"	2846.58	LiDAR Control
1031	37°49'25.73435"	-107°38'10.75883"	2871.26	LiDAR Control
1032	37°49'41.09759"	-107°36'59.73142"	2918.25	LiDAR Control
1033	37°49'55.33366"	-107°36'16.33730"	2936.59	LiDAR Control
1033 A	37°49'53.56174"	-107°36'16.13746"	2915.59	LiDAR Control
2001	37°54'20.72904"	-107°42'27.60053"	3325.07	NVA
2001 A	37°54'19.80968"	-107°42'29.12842"	3326.72	NVA
2001 B	37°54'21.10218"	-107°42'26.84012"	3324.28	NVA
2002	37°44'05.57604"	-107°42'52.88705"	3210.41	NVA
2002 A	37°44'04.59056"	-107°42'53.96609"	3207.59	NVA
2003	37°51'27.83860"	-107°47'26.28109"	3320.18	NVA
2003 A	37°51'27.41740"	-107°47'25.02571"	3323.81	NVA
2004	37°48'17.00194"	-107°40'13.03476"	2806.05	NVA
2004 A	37°48'16.49228"	-107°40'19.66886"	2807.34	NVA
2004 B	37°48'15.79090"	-107°40'07.82251"	2804.67	NVA
2005	37°49'44.68431"	-107°36'41.26337"	2918.53	NVA
2005 A	37°49'43.48800"	-107°36'39.23497"	2901.12	NVA
2006	37°53'03.27999"	-107°33'57.48682"	3058.23	NVA
2007	37°55'57.87229"	-107°34'49.89481"	3456.67	NVA
2008	37°47'30.02469"	-107°32'33.87929"	3753.41	NVA
2009	37°51'03.82971"	-107°43'34.02299"	3031.95	NVA
2009 A	37°51'04.48588"	-107°43'35.38601"	3034.95	NVA

Point No.	Geodetic Coordinates NA	AD-83 (2011) Epoch 2010.00	Ellipsoid	Description
	Latitude (N)	Longitude (W)	Height (m)	2000.150.011
2010	37°54'37.11488"	-107°38'43.14931"	3492.50	NVA
2010 A	37°54'38.59236"	-107°38'43.71327"	3496.09	NVA
2011	37°50'58.05060"	-107°40'39.51853"	3006.60	NVA
2012	37°53'03.58956"	-107°39'56.80745"	3127.64	NVA
2012 A	37°53'04.76081"	-107°39'56.24587"	3128.83	NVA
2013	37°51'15.05351"	-107°32'17.06988"	3378.23	NVA
2013 A	37°51'43.19975"	-107°32'51.22994"	3249.23	NVA
2014	37°46'49.50911"	-107°48'10.70604"	3237.74	NVA
2014 A	37°46'50.84936"	-107°48'11.25278"	3236.47	NVA
2014 B	37°46'49.36259"	-107°48'11.66974"	3238.84	NVA
2015	37°49'34.90005"	-107°46'57.51725"	3632.48	NVA
2015 A	37°49'33.58945"	-107°46'58.29979"	3623.58	NVA
2016	37°48'19.45962"	-107°45'41.71045"	2964.62	NVA
2017	37°48'46.91257"	-107°44'35.15477"	2934.82	NVA
2017 A	37°48'45.85243"	-107°44'36.44605"	2935.06	NVA
2018	37°54'01.20234"	-107°36'49.16342"	3731.77	NVA
2018 A	37°54'01.96438"	-107°36'53.09745"	3723.28	NVA
2019	37°54'10.80873"	-107°34'27.40934"	3806.46	NVA
2020	37°54'59.66273"	-107°34'09.31325"	3629.74	NVA
2020 A	37°55'00.01310"	-107°34'10.63534"	3635.55	NVA
2021	37°56'00.64073"	-107°33'20.61491"	3611.81	NVA
2022	37°48'56.74563"	-107°34'46.68809"	3037.46	NVA
2023	37°48'18.36346"	-107°36'44.02133"	3216.11	NVA
2023 A	37°48'18.71773"	-107°36'44.12246"	3215.27	NVA
2024	37°53'20.43899"	-107°35'36.49513"	3357.76	NVA
2025	37°53'20.80817"	-107°44'32.91270"	3743.13	NVA
2025 A	37°53'21.64151"	-107°44'31.11624"	3737.17	NVA
2025 B	37°53'21.29900"	-107°44'27.49269"	3734.72	NVA
3001	37°54'20.98311"	-107°42'27.93270"	3323.76	VVA
3001 A	37°54'17.80933"	-107°42'30.81698"	3326.22	VVA
3001 B	37°54'20.71307"	-107°42'29.56395"	3326.90	VVA
3002	37°46'51.75514"	-107°48'08.16264"	3233.84	VVA
3002 A	37°46'51.76500"	-107°48'12.61329"	3235.89	VVA
3002 B	37°46'48.51325"	-107°48'11.63690"	3238.58	VVA

Point No.	Geodetic Coordinates NAD-83 (2011) Epoch 2010.00		Ellipsoid	Description
FOIII NO.	Latitude (N)	Longitude (W)	Height (m)	Description
3003	37°44'05.72629"	-107°42'51.64479"	3212.17	VVA
3003 A	37°44'04.07138"	-107°42'52.20696"	3201.72	VVA
3004	37°51'46.89483"	-107°34'05.64423"	2982.61	VVA
3004 A	37°51'47.39030"	-107°34'09.13385"	2976.22	VVA
3005	37°48'34.12243"	-107°44'59.33576"	2950.28	VVA
3005 A	37°48'35.36461"	-107°44'57.67468"	2949.06	VVA
3006	37°50'07.29339"	-107°35'42.71284"	2933.87	VVA
3006 A	37°50'08.16382"	-107°35'44.33548"	2931.53	VVA
3007	37°48'18.37429"	-107°40'06.33796"	2804.80	VVA
3007 A	37°48'19.19977"	-107°40'05.30037"	2805.20	VVA
3008	37°50'48.66772"	-107°43'31.16629"	3055.70	VVA
3008 A	37°50'47.94940"	-107°43'32.17585"	3051.52	VVA
3009	37°52'21.37132"	-107°44'15.17406"	3183.74	VVA
3009 A	37°52'21.08594"	-107°44'16.49596"	3185.41	VVA
3009 B	37°52'22.39908"	-107°44'16.32800"	3187.56	VVA
3010	37°54'19.46915"	-107°38'46.68283"	3413.93	VVA
3010 A	37°54'20.47445"	-107°38'46.02615"	3415.27	VVA
3011	37°53'16.02090"	-107°39'42.00834"	3143.38	VVA
3011 A	37°53'16.83524"	-107°39'39.45194"	3145.37	VVA
3012	37°50'56.27695"	-107°40'39.77168"	2998.98	VVA
3013	37°55'35.44790"	-107°33'48.06545"	3329.85	VVA
3013 A	37°55'34.69499"	-107°33'49.06962"	3324.10	VVA
3014	37°46'00.35446"	-107°40'24.74583"	3160.74	VVA
3014 A	37°46'03.09401"	-107°40'25.59750"	3161.30	VVA

Section 3: Ground / Geodetic Control Photos

This section contains the station recovery information sheets and photographs regarding the ground control positions established for the project. The stations appear as they are ordered in the final coordinate listing of Section 2.

The data is assembled on the following pages.



Project Name	San Juan LiDAR	Operator Name	Erik Noyer	
Project Number	77866	Date of Survey	30-Sep-17 LGC 093017 EN	
Station Name	1001	File Name	LGC_093017_EN	
Methodology	RTK base RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP LiDAR QC Point (LQC) Control Station Session #		
WGS 84 COORDINATES:	de N37°47'40.65475"	Receiver :		
Longitud Ellipsoidal Heig	W107°47'18.91812" ht 10398.083 SFT	R10 R8 Other, specify	6719	
Type of Mark		Antenna Height:	6.562 USFT 2.000 METERS	
Mark Stamping	7	Start Time :	Stop Ti	ime ·
		PDOP Begin :	PDOP I	End:
		Start Time :		ime :
		PDOP Begin:	PDOP I	End :
To Reach Descripti	on:	Weather Conditions: Witness Ties : Reference Object	RAIN 37° Distance	N-E-S-W
Sketch			EAST	
				Statement A
NORTH				
1	001 📤			



		30-Sep-17	
1002	File Name	LGC_093017_EN	
RTK base RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP LiDAR QC Point (LQC) Control Station Session #) X	
			-
e N37°48'23 37589"	Receiver:		
e W107°46'24.58385"	R10	6719	
ot 9784,325 SFT			
	Other, specify		
7	Antenna Height:		
		METERS	
3	Start Time :	Ston 7	Γime :
			End:
	PDOP Begin:		
			ē
on:	Witness Ties : Reference Object	RAIN 37° Distance	N-E-S-W
		WEST	
<u>.</u>	RTK VRS Rapid Static e N37°48'23,37589" e W107°46'24.58385" 1 9784,325 SFT	77866 1002 RTK base RTK VRS Rapid Static Photo Control Point (PCP) LiDAR Control Point (LCP LiDAR QC Point (LQC) Control Station Session # Receiver: R10 R8 Other, specify Antenna Height: Start Time: PDOP Begin: Start Time: PDOP Begin: Start Time: PDOP Begin: Weather Conditions:	Date of Survey 30-Sep-17 LGC_093017_EN



Project Name	San Juan LiDAR	Operator Name	Erik Noyer	
Project Number Station Name	77866 1003 A	Date of Survey File Name	03-Oct-17 LGC_100317_EN	
Methodology	RTK base X RTK VRS	Photo Control Point (PCP) LiDAR Control Point (LCF		
	Rapid Static	LiDAR QC Point (LQC) Control Station Session #	Н	
WGS 84 COORDINATES:	N2704011 E 05/5711	Decima		1
Lantud	e N37°49'15.05657" e W107°43'11.09138"	Receiver :	6719	
Ellipsoidal Heigh			0.12	
		Other, specify		
Type of Mark		Antenna Height:	6.562USFT	
Mark Stamping				
Mark Stamping		Start Time :	Stop Ti	me :
		PDOP Begin :	PDOP E	End :
		Start Time:	Stop Ti	me:
		PDOP Begin:	PDOP E	End:
To Reach Description	on:	Weather Conditions: Witness Ties : Reference Object	SUNNY 55° Distance	N-E-S-W
Sketch			SOUTH	
NORTH		nense i de		
	□ 1003 A			



Project Name	San Juan LiDAR	Operator Name	Erik Noyer	·
Project Number	77866	Date of Survey	30-Sep-17	
Station Name	1003	File Name	LGC_093017_EN	
Methodology	RTK base X RTK VRS Rapid Static	Photo Control Point (PCP LiDAR Control Point (LC LiDAR QC Point (LQC) Control Station Session #		
Longitu	de N37°49'16.11732'' de W107°43'11.74280'' 9478.204 SFT	Receiver : R10 R8	6719	
Empsolatii 1101g	N 34701204 51 1	Other, specify		
Type of Mark Mark Stamping		Antenna Height:	6.562 USFT 2.000 METERS	
wark samping	7	Start Time :	Stop Ti	me :
		PDOP Begin:	PDOP E	End:
		Start Time :	Stop Ti	me :
		PDOP Begin:	PDOP E	and :
To Reach Descript	ion :	Weather Conditions: Witness Ties: Reference Object	RAIN 37°	N-E-S-W
Sketch		<u> </u>	WEST	
NORTH 1	003		WEST	



San Juan LiDAR 77866				
	Operator Name	Erik Noyer 02-Oct-17	*	=
1004	Date of Survey File Name	LGC_1002	17 EN	
1004		_LGC_1002	I/_EN	
RTK base RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP LiDAR QC Point (LQC) Control Station Session #	y) X		
e N37°51'35,03098" e W107°47'50.84730" t 10622,007 SFT	Receiver : R10 R8	6719		
P	Other, specify Antenna Height:	6.562	_USFT	
	Start Time : PDOP Begin : Start Time : PDOP Begin :		Stop Time PDOP End Stop Time	:
on:	Weather Conditions: Witness Ties: Reference Object	CLOUDY	36° Distance	N-E-S-W
		WEST		
4 - 630 Rd				
	Rapid Static e N37°51'35.03098" e W107°47'50.84730" t 10622.007 SFT	RTK VRS Rapid Static LiDAR Control Point (LCF LiDAR QC Point (LQC) Control Station Session # Receiver: R10 R8 Other, specify Antenna Height: Start Time: PDOP Begin: Start Time: PDOP Begin: Weather Conditions:	LiDAR Control Point (LCP) X LiDAR QC Point (LQC) Control Station	LiDAR Control Point (LCP) X



	2	
San Juan LiDAR	Operator Name	Erik Noyer
		28-Sep-17 LGC_092817_EN
1005	rne Name	LGC_092817_EN
RTK base RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP LiDAR QC Point (LQC) Control Station Session #	
e N37°55'36.56518''	Receiver ·	
e W107°33'49.62281"		6719
nt 10961.757 SFT	R8	
	Other, specify	
o	Antenna Height:	USFT
	Start Time :	Stop Time :
		PDOP End :
		Stop Time : PDOP End :
	TBOT Begin.	TDOT ENG.
on:	Weather Conditions: Witness Ties: Reference Object	SNOW 32° Distance N-E-S-W
	WEST	
9 4 1005		
	77866 1005 RTK base RTK VRS Rapid Static e N37°55'36,56518" e W107°33'49.62281" nt 10961.757 SFT	Date of Survey File Name RTK base RTK VRS Rapid Static Photo Control Point (PCP) LiDAR Control Point (LCP LiDAR QC Point (LQC) Control Station Session # Receiver: R10 R8 Other, specify Antenna Height: Start Time: PDOP Begin: Start Time: PDOP Begin: Start Time: PDOP Begin: Weather Conditions: Witness Ties: Reference Object WEST



Project Name	San Juan LiDAR	Operator Name	Erik Noyer		
Project Number	77866	Date of Survey	26-Sep-17		
Station Name	1006	File Name	LGC_09261	7_EN	
Methodology	RTK base RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP) LiDAR QC Point (LQC) Control Station Session #	X		
WGC 84 COORDINATES					
WGS 84 COORDINATES:	de N37°50'10.87792"	Receiver:			
Lautu	de W107035127 01039!!	R10	6710	i	
Longitu	de W107°35'37,91028"		6719		
Empsoidai Heig	ht 9640.031 SFT	R8			
		Other, specify		ļ	

Type of Mark	3	Antenna Height:		USFT	
			2.000	METERS	
Mark Stamping					
		Start Time :		Stop Time	:
		PDOP Begin:	-	PDOP End	:
		Start Time :	92		:
		PDOP Begin:		PDOP End	:
To Reach Descript	ion:	Weather Conditions: Witness Ties: Reference Object	SUNNY 55°	Distance	N-E-S-W
Sketch					
		WEST			See See
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NORTH				THE REAL PROPERTY.	Sul at 1
		the second second	TO SECOND		
Referred Pres	1006 📤				



		28-Sep-17	
1007	_ File Name	LGC_092817_EN	
RTK base RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP LiDAR QC Point (LQC) Control Station Session #	X	
e N37°51'59,34781" e W107°32'37,31675" nt 11268,076 SFT	Receiver: R10 R8 Other, specify	6719	
e	Antenna Height:	6.562 USFT 2.000 METERS	
	Start Time : PDOP Begin : Start Time : PDOP Begin :	Stop Tin PDOP E1 Stop Tin PDOP E1	nd : ne :
on :	Weather Conditions: Witness Ties: Reference Object	SUNNY 30°	N-E-S-W
	TATE OF THE PARTY		
<u>^</u> 1007	WEST		
	RTK VRS Rapid Static e N37°51'59,34781" e W107°32'37,31675" 11268.076 SFT	Date of Survey File Name	Date of Survey 28-Sep-17 LGC 092817 EN



D 1 - 15				
Project Name	San Juan LiDAR	Operator Name	Erik Noyer	
Project Number Station Name	77866 1008	Date of Survey File Name	29-Sep-17 LGC_092917_EN	
Methodology	RTK base X RTK VRS Rapid Static	Photo Control Point (PCP LiDAR Control Point (LC LiDAR QC Point (LQC) Control Station Session #) —	
Longitu	de N37°56′01.21129" de W107°32'17.48514" tht 12599.283 SFT	Receiver: R10 R8 Other, specify	6719	
Type of Mark Mark Stamping		Antenna Height:	6.562 USFT 2.000 METERS	
1 - 3		Start Time :	Stop T	ime :
		PDOP Begin : Start Time :	PDOP I	End:
		PDOP Begin :	PDOP I	End:
To Reach Descript	ion:	Witness Ties : Reference Object	Distance	N-E-S-W
Sketch NORTH			NORTH	
	41008		T T	



Project Name	San Juan LiDAR	Operator Name	Erik Noyer
Project Number	77866	Date of Survey	27-Sep-17 LGC 092717 EN
Station Name	1009	File Name	LGC_092717_EN
Methodology	RTK base RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP) LiDAR QC Point (LQC) Control Station Session #	X
Longitude	N37°46'01.73621" W107°40'24.84360"	Receiver:	6719
Ellipsoidal Heigh	t 10366,568 SFT	R8 Other, specify	
Type of Mark	·	Antenna Height:	6.562 USFT 2.000 METERS
Mark Stamping	7	Start Time :	Stop Time :
		PDOP Begin :	PDOP End :
		Start Time :	Stop Time :
		PDOP Begin:	PDOP End :
To Reach Description	n:	Witness Ties : Reference Object	Distance N-E-S-W
NORTH	4009	NORTH	



C I I'D I D	O N	The the Nation of States	
		LGC 092717 EN	
RTK base X RTK VRS Rapid Static	Photo Control Point (PCP)) 	
e N37°47'02.39915" e W107°39'38.17327" nt 10144.614 SFT	Receiver: R10 R8 Other, specify	6719	
	Antenna Height:	6.562 USFT 2.000 METERS	
	Start Time : PDOP Begin : Start Time : PDOP Begin :	PDOP End Stop Time	e : d : e :
on:	Weather Conditions: Witness Ties: Reference Object	CLOUDY 35°	N-E-S-W
	NODELL		
4 1010			
	RTK VRS Rapid Static e N37°47′02.39915′′ e W107°39′38.17327′′ nt 10144.614 SFT	T7866 1010 RTK base RTK VRS Rapid Static Photo Control Point (PCP LiDAR Control Point (LQC) Control Station Session # Receiver: R10 R8 Other, specify Antenna Height: Start Time: PDOP Begin: Start Time: POOP Begin: NORTH	Date of Survey 27-Sep-17 LGC 092717 EN



7					
Project Name	San Juan LiDAR	Operator Name	Erik Noyer		=
Project Number Station Name	77866 1011 A	Date of Survey File Name	03-Oct-17 LGC_10031	7 EN	
Station Name	1011 A	The Name	_LGC_10031	/_E/I	
Methodology	RTK base RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP) LiDAR QC Point (LQC) Control Station Session #	X		
WGS 84 COORDINATES:	J. N2704014 (4042)	Receiver :			
Lantuc	de N37°48'16.64843" W107°40'05.46573"	R10	6719	1	
Ellipsoidal Heig	ht 9207.152 SFT	R8	0/12	1	
2		Other, specify		1	
Type of Mark			6.562	USFT METERS	
Mark Stamping			2,000	WIETERS	
	3	Start Time :	-	Stop Time	
		PDOP Begin:		PDOP End	
		Start Time :	-	Stop Time	
		PDOP Begin :		PDOP End	`
To Reach Descripti	ion:	Weather Conditions: Witness Ties: Reference Object	SUNNY 55	Distance	N-E-S-W
Sketch			NORTH		35.
NORTH	51011 A				



D	a	0 11	T 11 37	
Project Name	San Juan LiDAR	Operator Name	Erik Noyer	
Project Number Station Name	77866 1011	Date of Survey File Name	25-Sep-17 LGC_092517_EN	
Methodology	RTK base X RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCF LiDAR QC Point (LQC) Control Station Session #		
Longitud	N37°48'14.48200" de W107°40'04.73351" htt 9204.398 SFT	Receiver: R10 R8 Other, specify	6719	
Type of Mark	-	Antenna Height:	6.562 USFT 2.000 METERS	
Mark Stamping	7	Start Time :	Stop Time	:
		PDOP Begin:	PDOP End	:
		Start Time : PDOP Begin :	Stop Time PDOP End	<u>:</u>
		FDOF Begin .	FDOF Elid	
To Reach Description	on:	Weather Conditions: Witness Ties: Reference Object	SUNNY 55° Distance	N-E-S-W
				+
Sketch			WEST	
NORTH	1011			



Project Name	San Juan LiDAR	Operator Name	Erik Noyer	
Project Number	77866	Date of Survey	03-Oct-17	
Station Name	1012 A	File Name	LGC_100317_EN	
Methodology	RTK base X RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCI LiDAR QC Point (LQC) Control Station Session #		
WGS 84 COORDINATES:	de N37°48'59,36213"	Receiver:		
Lautuc	de W107°39'25.26026"	R10	6719	
	ht 9285.836 SFT	R8	6719	
Empsoluai rieigi	9285,830 SF I	Other, specify		
		Other, speerly		
Type of Mark		Antenna Height:	6.562 USFT	
Type of Wark	17	Antenna Height.	2.000 METER	95
Mark Stamping			WETER	CS
Wark Stamping	9	Start Time :	Stor	Time :
		PDOP Begin :	Stop	OP End :
		Start Time :	Stat	Time :
		PDOP Begin :	PDC	OP End :
		1 Bot Begin .		T Lind .
To Reach Descripti	on:	Witness Ties : Reference Object	SUNNY 55° Distance	e N-E-S-W
Sketch			EAST	
NORTH		Address and Conception		
	□ 1012 A			



Project Name	San Juan LiDAR	Operator Name	Erik Noyer	
Project Number Station Name	77866 1012	Date of Survey	25-Sep-17 LGC_092517_EN	15
Station Name	1012	File Name	LGC_092517_EN	
Methodology	RTK base RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP) LiDAR QC Point (LQC) Control Station Session #	X	
WGS 84 COORDINATES:				
	N37°48'58,03015"	Receiver:		
	W107°39'26.87259"	R10	6719	
Ellipsoidal Height	9278,992 SFT	R8		
		Other, specify		
Tone of Mode		A	(E(2 LICET	
Type of Mark	1	Antenna Height:	USFT 	
Mark Stamping			METERS	
Mark Stamping	9	Start Time :	Stop Tim	ne :
		PDOP Begin :	PDOP En	
		Start Time :	Stop Tim	
		PDOP Begin:	PDOP En	
		Weather Conditions:	SUNNY 55°	
To Reach Description	n ·	Witness Ties:		
To Reach Beschpho		Reference Object	Distance	N-E-S-W
Sketch			WEST	
NORTH	1012 📤			



- · · · · · ·				
Project Name Project Number	San Juan LiDAR 77866	_ Operator Name Date of Survey	Erik Noyer 03-Oct-17	
Station Name	1013 A	File Name	LGC_100317_EN	
Methodology	RTK base X RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LC LiDAR QC Point (LQC) Control Station Session #		
Longitu	de N37°49'31.44800" de W107°40'02.10990" tht 9465.69 SFT	Receiver: R10 R8 Other, specify	6719	
Type of Mark	-	Antenna Height:	6.562 USFT 2.000 METERS	
Mark Stamping		Start Time: PDOP Begin: Start Time: PDOP Begin:	PDOP E	ne :
To Reach Descript	ion :	Weather Conditions: Witness Ties:	SUNNY 55°	
		Reference Object	Distance	N-E-S-W
Sketch				
			SOUTH	N. 思· ············
NORTH				
	1013 A			



Project Name	San Juan LiDAR	Operator Name	Erik Noyer	
Project Number Station Name	77866	Date of Survey	27-Sep-17	ar .
Station Name	1013	File Name	LGC_092717_EN	Y
Methodology	RTK base RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LC LiDAR QC Point (LQC) Control Station Session #		
WGS 84 COORDINATES: Latitud	e N37°49'32.78886"	Receiver:		
Longitud Ellipsoidal Heigh	e W107°40'02.72494" 9472.922 SFT	R10 R8 Other, specify	6719	
Type of Mark Mark Stamping	·	Antenna Height:	6.562 USF 2.000 MET	T TERS
Mark Stamping		Start Time :		Stop Time :
		PDOP Begin:	P	PDOP End :
		Start Time :		Stop Time :
		PDOP Begin:	P	PDOP End :
To Reach Description	on:	Witness Ties : Reference Object	Dista	ance N-E-S-W
Sketch		WEST		
NORTH		建 于自业生。		
	1013 🛆			



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Project Name Project Number	San Juan LiDAR 77866	Operator Name	Erik Noyer 03-Oct-17	*	
Station Name	1014 A	Date of Survey File Name	LGC_1003	17 FN	
Station Name	1014 A	riie name	_LGC_1003	I/_EN	
Methodology	RTK base	Photo Control Point (PCP)			
-	RTK VRS	LiDAR Control Point (LCF			
	Rapid Static	LiDAR QC Point (LQC)			
		Control Station	Н		
		Session #			
		Session "			
					1
WGS 84 COORDINATES:		Receiver:			
	de N37°49'38,34865"	R10	6719	7	
Ellingaidal Uaia	de W107°37'35.72927" pht 9436.802 SFT	R8	0/19	-	
Empsoluai rieig	9430,802 SF I	Other, specify		-	
		Other, specify		_	
Type of Mark		Antenna Height:	6.562	USFT	
**	*	8	2.000	METERS	
Mark Stamping					
	-	Start Time :		Stop Time	:
		PDOP Begin:		PDOP End	:
		Start Time :	-	Stop Time	:
		PDOP Begin:		PDOP End	: <u></u>
		W 1 C Pr	CHININIA F		
		Weather Conditions:	SUNNY 5	3-	
To Reach Descript	ion :	Witness Ties:			
		Reference Object		Distance	N-E-S-W
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Sketch				1	
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Project Name	San Juan LiDAR	Operator Name	Erik Noyer
Project Number Station Name	77866 1014	Date of Survey File Name	25-Sep-17 LGC 092517 EN
Station Name	1014	rue Name	EGC092517EN
Methodology	RTK base RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP) LiDAR QC Point (LQC) Control Station Session #	
wgs 84 COORDINATES: Latitud Longitud Ellipsoidal Heigh	e N37°49'41.33808" e W107°37'34.81518" at 9547.781 SFT	Receiver: R10 R8 Other, specify	6719
Type of Mark		Antenna Height:	6.562 USFT 2.000 METERS
Mark Stamping		Start Time : PDOP Begin : Start Time : PDOP Begin :	Stop Time : PDOP End : Stop Time : PDOP End : P
To Reach Description	on:	Weather Conditions: Witness Ties: Reference Object	SUNNY 55° Distance N-E-S-W
Sketch		WEST	
NORTH 10	014 📤		



Project Name	San Juan LiDAR	Operator Name	Erik Noyer	
Project Number Station Name	77866 1015	Date of Survey File Name	26-Sep-17 LGC_092617_EN	
Station Name	1013	The Name	LGC_092017_EN	
Methodology	RTK base	Photo Control Point (PCP)		
	RTK VRS	LiDAR Control Point (LCP)	X	
	Rapid Static	LiDAR QC Point (LQC)		
	_	Control Station		
		Session #		
WGS 84 COORDINATES:				
Latitu	de N37°46'51,61601"	Receiver:		
Longitu	de W107°34'47.34261"	R10	6719	
Ellipsoidal Heig	ght 10744.728 SFT	R8		
		Other, specify		
Type of Mark		Antenna Height:	6.562 USFT	
-, p-	-		2,000 METERS	
Mark Stamping			6 5	
		Start Time :	Stop Tir	ne :
		PDOP Begin :	PDOP E	nd :
		Start Time :	Stop Tir PDOP E	ne :
		PDOP Begin:	FDOF E	nu
		Weather Conditions:	SUNNY 55°	
To Reach Descript	ion	Witness Ties:		
To Reach Descript	ion .	Reference Object	Distance	N-E-S-W
		reference object	Distance	1, 2, 5, 1,
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Project Name	San Juan LiDAR	Operator Name	Erik Noyer	
Project Number Station Name	77866 1016 A	Date of Survey File Name	26-Sep-17 LGC_092617_EN	
Station Name	1010 A		EGC_092017_EN	
Methodology	RTK base RTK VRS Rapid Static X	Photo Control Point (PCP) LiDAR Control Point (LCP) LiDAR QC Point (LQC) Control Station Session #		
Longitud	N37°47'02.51468'' te W107°32'02.60772'' 11862.964 SFT	Receiver : R10 R8 Other, specify	6719	
Type of Mark	-	Antenna Height:	6.562 USFT 2.000 METERS	
Mark Stamping		Start Time : PDOP Begin :	Stop Time : PDOP End :	
		Start Time :	Stop Time :	
		PDOP Begin:	PDOP End :	
To Reach Description	on:	Witness Ties : Reference Object	Distance N-E-S-W	
Sketch		SOUTH		
NORTH	1018 A			



						_
Project Name	San Juan LiDAR 77866	Operator Name	Erik Noyer			_
Project Number Station Name	1016	Date of Survey File Name	26-Sep-17 LGC_0926	17 FN		_
Station Ivanic	1010	The Name		L/_EIN		-
Methodology	RTK base	Photo Control Point (PCP)	\Box			
-	RTK VRS	LiDAR Control Point (LCP)	X			
	Rapid Static X	LiDAR QC Point (LQC)	П			
		Control Station	П			
		Session #	_			
WGS 84 COORDINATES:					1-	_
	e N37°47'03.08395"	Receiver:				
Longitud	e W107°32'03.87954"	R10		1		
Ellipsoidal Heigh	t 11853,329 SFT	R8	2150	1		
		Other, specify				
T () ()			(5(2	LICET		
Type of Mark	ř <u> </u>	Antenna Height:	2,000	USFT		
Mark Stamping				_METERS		
Mark Stamping	9	Start Time :	*	Ston Time	:	
		PDOP Begin :		PDOP End	:	_
		Start Time :		Stop Time	:	_
		PDOP Begin:	-	PDOP End	:	
		Weather Conditions:	SUNNY 55	0		
		weather conditions.	SURINI 33			_
To Reach Description	on:	Witness Ties:				
		Reference Object		Distance	N-E-S-W	
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Sketch		WEST				_
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	1018 A					
	1018 A					
	1016 A					



Project Name Project Number Station Name Methodology	Point (PCP)
Methodology RTK base RTK VRS Rapid Static WGS 84 COORDINATES: Latitude Longitude Longitude Ellipsoidal Height Type of Mark Mark Stamping Mark Stamping Methodology RTK base RTK VRS Rapid Static RECEIVER: LiDAR Control LiDAR QC Pc Control Station Session # Receiver: R10 R8 Other, specify Antenna Height Start Time: PDOP Begin: Start Time: PDOP Begin: Start Time: PDOP Begin: Weather Cond	Cont (PCP) X Doint (LCP) X Doint (LQC) Doint (LQC) X Doint (LQC) X Doint (LQC) Doi
Methodology RTK base RTK VRS Rapid Static WGS 84 COORDINATES: Latitude Longitude Longitude W107°42'48.95529" Ellipsoidal Height Type of Mark Mark Stamping Start Time: PDOP Begin: Start Time: PDOP Begin: Start Time: PDOP Begin: Start Time: PDOP Begin:	Point (PCP)
RTK VRS Rapid Static LiDAR Control LiDAR QC Po Control Station Session # Receiver: Latitude Longitude W107°42'48.95529" Ellipsoidal Height Type of Mark Mark Stamping Start Time: PDOP Begin: Start Time: PDOP Begin: Start Time: PDOP Begin: Weather Cond	6719
Latitude N37°53'44,99761" Receiver : R10 R8	ht: 6.562 USFT 2.000 METERS Stop Time : PDOP End : PDO
Type of Mark Antenna Height Mark Stamping Start Time: PDOP Begin: Start Time: PDOP Begin: Weather Cond	ht: 6.562 USFT 2.000 METERS Stop Time : PDOP End : PDO
Start Time: PDOP Begin: Start Time: PDOP Begin: Weather Cond To Reach Description: Witness Ties:	Stop Time : PDOP End : Stop Time : PDOP End :
To Reach Description : Witness Ties :	ditions: CLOUDY 40°
Reference Obj	ECT DISTANCE IN-E-3-W
NORTH 1017 A	WEST



Project Name Project Number Station Name RTK base Rapid Static RTK VRS Rapid Static Project Number Station Name Operator Name Date of Survey File Name Date of Survey File Name Photo Control Point (PCP) LiDAR Control Point (LCP) LiDAR QC Point (LQC) Control Station Session #		
Station Name 1017 File Name LGC_	i-17 100117_EN	
Methodology RTK base RTK VRS Rapid Static RTK VRS Rapid Static RTK VRS Rapid Static REPHOTO Control Point (PCP) LiDAR Control Point (LCP) LiDAR QC Point (LQC) Control Station	100117_EN	
Methodology RTK base RTK VRS Rapid Static RTK VRS Rapid Static RTK VRS Rapid Static REPHOTO Control Point (PCP) LiDAR Control Point (LCP) LiDAR QC Point (LQC) Control Station		
WGS 84 COORDINATES:		
Latitude N37°53'42.07134" Receiver:		
Longitude W107°42'51.44075" R10 671	19	
Ellipsoidal Height 10999.882 SFT R8		
Other, specify		
Type of Mark Antenna Height: 6.5		
2,0	00 METERS	
Mark Stamping		
Start Time :	Stop Time	:
PDOP Begin:	PDOP End	
Start Time :	Stop Time	:
PDOP Begin:	PDOP End	:
		*
To Reach Description : Witness Ties : Reference Object	Distance	N-E-S-W
Reference object	Distance	IN-E-S-W
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NORTH 1017 P		



77866	Date of Survey	26-Sep-17		
1018	File Name	LGC 092617	7 EN	
RTK base RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP) LiDAR QC Point (LQC) Control Station Session #	X		
				1
N37°47'57,93964"				
W107°33'10.23976"		6719		
t 12392,298 SFT	R8			
8	Other, specify			
	, 1			
	Antenna Height:	6.562	USET	
P	Antenna Height.			
			METERS	
S				
			Stop Time :	
		-	PDOP End:	
	Start Time :		Stop Time :	
	PDOP Begin:		PDOP End:	
	3	-		
n:	Witness Ties : Reference Object		Distance	N-E-S-W
	WEST		AN C	
1013				
	RTK VRS Rapid Static E N37°47'57.93964" E W107°33'10.23976" I 12392.298 SFT	Date of Survey File Name	Date of Survey File Name 26-Sep-17	Date of Survey File Name Photo Control Point (PCP) LiDAR Control Point (LCP) LiDAR Control Point (LCP) LiDAR Control Station Session #



Project Name	San Juan LiDAR	Operator Name	Erik Noyer
Project Number	77866	Date of Survey	27-Sep-17
Station Name	1019	File Name	LGC_092717_EN
Methodology	RTK base RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP) LiDAR QC Point (LQC) Control Station Session #	X
WCC 84 COORDINATES			
WGS 84 COORDINATES:	de N37°49'01.15921"	Receiver:	
	de W107°41'55.42308"	R10	6719
Ellipsoidal Heig	ht 9394,612 SFT	R8	3.13
		Other, specify	
		Section of the Control of the Contro	
Type of Mark	-	Antenna Height:	6.562USFT
			2.000 METERS
Mark Stamping	7		-
		Start Time :	Stop Time :
		PDOP Begin :	PDOP End :
		Start Time :	Stop Time :
		PDOP Begin:	PDOP End :
To Reach Descripti	on:	Weather Conditions: Witness Ties : Reference Object	Distance N-E-S-W
Sketch		SOUTH	
NORTH	1019		



P 1 37			7 11 31
Project Name Project Number	San Juan LiDAR 77866	Operator Name Date of Survey	Erik Noyer 02-Oct-17
Station Name	1020 A	File Name	LGC_100217_EN
Methodology	RTK base RTK VRS Rapid Static	Photo Control Point (PCI LiDAR Control Point (Lu LiDAR QC Point (LQC) Control Station Session #	P) X
Longitud	de N37°51'02.67795" de W107°46'43.57102" ht 11728.835 SFT	Receiver : R10 R8 Other, specify	6719
Type of Mark	-	Antenna Height:	6.562 USFT 2.000 METERS
Mark Stamping		Start Time : PDOP Begin : Start Time : PDOP Begin :	Stop Time :
To Reach Descripti	on:	Weather Conditions: Witness Ties: Reference Object	SNOW 32° Distance N-E-S-W
Sketch			EAST
NORTH			
102	00	□ 1020 A	



D '	C I I'DAD	O	7 U.N.		
Project Name Project Number	San Juan LiDAR 77866	Operator Name Date of Survey	Erik Noyer 02-Oct-17		
Station Name	1020	File Name	LGC_100217_EN		
Methodology	RTK base RTK VRS Rapid Static	Photo Control Point (PCF LiDAR Control Point (LC LiDAR QC Point (LQC) Control Station Session #	P) X		
WGS 84 COORDINATES:					
	de N37°51'02,92051"	Receiver:			
Longitue	de W107°46'45.35923"	R10	6719		
Ellipsoidal Heig	tht 11736,625 SFT	R8			
		Other, specify			
Type of Mark		Antenna Height:	6.562 USFT		
			2.000 METERS		
Mark Stamping	fi-				
		Start Time :	Stop Time :		
		PDOP Begin : Start Time :	PDOP End : Stop Time :		
		PDOP Begin :	PDOP End :		
To Reach Descripti	ion:	Weather Conditions: Witness Ties : Reference Object	Distance N-E-S-W		
Sketch			EAST		
NORTH					
102	0 -	□ 1020 A			



Project Name	San Juan LiDAR	Operator Name	Erik Noyer	
Project Number Station Name	77866 1021 A	Date of Survey File Name	02-Oct-17 LGC_100217_EN	
Methodology	RTK base RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP LiDAR QC Point (LQC) Control Station		
wgs 84 COORDINATES: Latitud Longitud Ellipsoidal Heigl	le N37°50'48.21022" le W107°44'47.46541" lt 10444.66 SFT	Receiver: R10 R8 Other, specify	6719	
Type of Mark	-	Antenna Height:	6.562 USFT 2.000 METERS	
Mark Stamping	7	Start Time :	Stop Tir	me :
		PDOP Begin:	PDOP E	nd:
		Start Time :	Stop Tir	ne :
		PDOP Begin:	PDOP E	na :
To Reach Description	on:	Weather Conditions: Witness Ties: Reference Object	SNOW 32°	N-E-S-W
		Reference Object	Distance	N-L-S-W
Sketch			NORTH	ļ.
NORTH				
	□ 1021 A			





Project Name	San Juan LiDAR	Operator Name	Erik Noyer	
Project Number Station Name	77866	Date of Survey File Name	02-Oct-17 LGC_100217_EN	
Station Name	1021	_ File Name	LGC_100217_EN	
Methodology	RTK base X RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP LiDAR QC Point (LQC)) <u>X</u>	
		Control Station Session #		
WGS 84 COORDINATES:	de N37°50'49,73372"	Receiver:		,
Longitue	de W107°44'38.67847"	R10	6719	
Ellipsoidal Heig	ht 10376,885 SFT	R8		
		Other, specify		
Type of Mark		_ Antenna Height:	6.562USFT 	
Mark Stamping		_		
		Start Time:	Stop Time	:
		PDOP Begin :	PDOP End	1:
		Start Time : PDOP Begin :	Stop Time PDOP End	ː
		PDOF Begin .	FBOT End	
To Reach Descripti	ion :	Weather Conditions: Witness Ties: Reference Object	CLOUDY 38° Distance	N-E-S-W
Sketch			EAST	
NORTH			EAST	
	□ 1021 B			
	021			
		The second second		



Project Name	San Juan LiDAR	Operator Name	Erik Noyer		
Project Number	77866	Date of Survey	29-Sep-17		
Station Name	1022 A	File Name	LGC_092917_EN		
Methodology	RTK base RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP LiDAR QC Point (LQC) Control Station Session #	(Y) X		
WGS 84 COORDINATES:					
Latitu	ide N37°53'36,52775"	Receiver:			
	wide W107°36'19.69480"	R10	6719		
Ellipsoidal Heig	ght 11704.891 SFT	R8			
		Other, specify			
T		TT.' 1.	(= ()	LICETE	
Type of Mark	T-	Antenna Height:		USFT	
Morle Ctompine				METERS	
Mark Stamping	p——————————	Start Time :		Stan Time :	
		PDOP Begin :		DDOP End	
		Start Time :		Stop Time :	
		PDOP Begin :		PDOP End :	
		1 DOI Degin .		TOOT ENG.	
To Reach Descript	tion :	Weather Conditions: Witness Ties : Reference Object	CLOUDY 3	Distance	N-E-S-W
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Sketch					
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Project Name	San Juan LiDAR	Operator Name	Erik Noyer	
Project Number	77866	Date of Survey	29-Sep-17	
Station Name	1022	File Name	LGC_092917_EN	
Methodology	RTK base RTK VRS Rapid Static	Photo Control Point (PCF LiDAR Control Point (LC LiDAR QC Point (LQC) Control Station Session #		
WGS 84 COORDINATES:	de N37°53'35.95958"	Receiver:		
	de W107°36'18.43086"	R10	6719	
	ht 11683.86 SFT	R8	0712	
Empsolati Heig	1100000 511	Other, specify		
Type of Mark	r	Antenna Height:	6.562 USFT	
12101 2121 121			METE	ERS
Mark Stamping	3	a		
		Start Time :	St	op Time :
		PDOP Begin :		OOP End :
		Start Time :	SI	op Time :
		PDOP Begin:	FL	OOP End :
To Reach Descripti	ion:	Weather Conditions: Witness Ties: Reference Object	CLOUDY 32° Distar	ice N-E-S-W
Sketch		<u> </u>		
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STATE OF THE STATE	9022	N-W-SI	3.4/13	三 学 基础
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Project Name	San Juan LiDAR	Operator Name	Erik Noyer	
Project Number	77866	Date of Survey	27-Sep-17 LGC 092717 EN	
Station Name	1023	File Name	LGC_092/1/_EN	
Methodology	RTK base RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP) LiDAR QC Point (LQC) Control Station Session #	X	
WGS 84 COORDINATES:	de N37°52'33,28883"	Receiver:		
	de W107°40'19.07528"	R10	6719	
	ht 10160,084 SFT	R8		
	3.	Other, specify		
Type of Mark	3	Antenna Height:	6.562 USFT	,
Mark Stamping			2,000 METERS	
Mark Stamping		Start Time :	Ston	Time :
		PDOP Begin :	PDOI	P End :
		Start Time :	Stop	Time :
		PDOP Begin:	PDOI	P End :
To Reach Descripti	ion:	Witness Ties : Reference Object	SUNNY 28° Distance	N-E-S-W
Sketch		WEST	,	
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Project Name	San Juan LiDAR	Operator Name	Erik Noyer	
Project Number Station Name	77866 1024	Date of Survey File Name	29-Sep-17 LGC_092917_EN	
Methodology	RTK base RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP) LiDAR QC Point (LQC) Control Station Session #		
Longitud	de N37°44'06.50241" de W107°42'52.57549" ht 10543,192 SFT	Receiver: R10 R8 Other, specify Antenna Height: Start Time: PDOP Begin: Start Time: PDOP Begin:	6.562 USFT 2.000 METERS Stop Tin PDOP E Stop Tin PDOP E	nd :
To Reach Description	on:	Weather Conditions: Witness Ties: Reference Object	CLOUDY 39° Distance	N-E-S-W
Sketch		1	WEST	
NORTH 10	024 📤			



	4		
San Juan LiDAR 77866	Operator Name	Erik Noyer	
	Date of Survey	29-Sep-17 LGC 092917 FN	
RTK base RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP) LiDAR QC Point (LQC) Control Station Session #		
W107°41'18.61145"	Receiver: R10 R8 Other, specify	6719	
P	Antenna Height:	6.562 USFT	.c
	Start Time: PDOP Begin: Start Time: PDOP Begin:	Stop PDO Stop	o Time : P End : Time : P End :
n ·	Weather Conditions:	CLOUDY 40°	
	Reference Object	Distance	e N-E-S-W
	<u>!</u>	NORTH	
<u>^</u> 25	To Change Days		
	RTK base RTK VRS Rapid Static e N37°44'41.44970" e W107°41'18.61145" tt 10533.559 SFT	RTK base RTK VRS Rapid Static Photo Control Point (PCP) LiDAR Control Point (LCP) LiDAR QC Point (LQC) Control Station Session # Receiver: R10 R8 Other, specify Antenna Height: Start Time: PDOP Begin: Start Time: PDOP Begin: Start Time: PDOP Begin: Weather Conditions:	RTK base X Photo Control Point (PCP) LiDAR Control Point (LCP) LiDAR QC Point (LCP) LiDAR QC Point (LQC) Control Station Session # Receiver : R10



Project Name	San Juan LiDAR	Operator Name	Erik Noyer
Project Number Station Name	77866 1026	Date of Survey File Name	29-Sep-17 LGC_092917_EN
Methodology	RTK base X RTK VRS Rapid Static	Photo Control Point (PCP LiDAR Control Point (LC LiDAR QC Point (LQC) Control Station Session #	
Longitu	de N37°44'30,93794" de W107°41'41,90188" ght 10596,313 SFT	Receiver: R10 R8 Other, specify	6719
Type of Mark	-	Antenna Height:	6.562 USFT 2.000 METERS
Mark Stamping		Start Time : PDOP Begin : Start Time : PDOP Begin :	Stop Time : PDOP End : Stop Time : PDOP End :
To Reach Descript	ion :	Weather Conditions: Witness Ties:	CLOUDY 40°
		Reference Object	Distance N-E-S-W
Sketch NORTH			EAST



Project Name	San Juan LiDAR	Operator Name	Erik Noyer	
Project Number Station Name	77866 1027	Date of Survey File Name	29-Sep-17 LGC_092917_EN	
Station Name	1027		LGC_092917_EN	
Methodology	RTK base RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP LiDAR QC Point (LQC) Control Station Session #		
Longitud	le N37°44'05,29625" le W107°41'56,96012" ht 10823,565 SFT	Receiver: R10 R8 Other, specify	6719	
Type of Mark			6.562 USFT 2.000 METERS	
Mark Stamping	j	Start Time : PDOP Begin : Start Time :	Stop Time	e : d : e :
		PDOP Begin :	PDOP End	
To Reach Description	on:	Weather Conditions: Witness Ties: Reference Object	CLOUDY 39°	N-E-S-W
Sketch			WEST	
NORTH	1027			



Project Number Project Number Station Name Project Number Proj					
Station Name 1028	Project Name	San Juan LiDAR	Operator Name	Erik Noyer	
Methodology RTK base RTK VRS Rapid Static Photo Control Point (PCP) LiDAR Control Point (LCP) LiDAR QC Point (LCP) RESIDENT RE				29-Sep-17	
LiDAR QC Point (LQC)	Station Name	1028	File Name	LGC_092917_EN	
Latitude N37*42*54.90938" Receiver: R10 6719 R8 Ellipsoidal Height 8891.981 SFT R8 Chter, specify	Methodology	RTK VRS	LiDAR Control Point (LCP) LiDAR QC Point (LQC) Control Station	X	
Latitude N37*42*54.90938" Receiver: R10 6719 R8 Ellipsoidal Height 8891.981 SFT R8 Chter, specify	WGC 84 COORDINATES				i -
R10 6719 R8		lo N37942'54 00039"	Decemen:		
Ellipsoidal Height 9891,981 SFT Type of Mark Mark Stamping Start Time: PDOP Begin: PDOP Begin: PDOP Begin: PDOP End: Stop Time: PDOP Begin: PDOP End: Stort Time: PDOP Begin: PDOP End: Stop Time: PDOP End: Stort Time: PDOP End: Stort Time: PDOP End: Weather Conditions: CLOUDY 36° To Reach Description: Witness Ties: Reference Object NORTH	Lautuc	W107945'16 40578"	_	6719	
Other, specify Antenna Height: 6.562 USFT 2.000 METERS Mark Stamping Start Time: PDOP Begin: Start Time: PDOP Begin: Start Time: PDOP Begin: PDOP Begin: PDOP End: Weather Conditions: CLOUDY 36° To Reach Description: Witness Ties: Reference Object Distance N-E-S-W Sketch NORTH	Fllinsoidal Heig	ht 9891 981 SFT		0715	
Type of Mark Mark Stamping Start Time: PDOP Begin: PDOP End: Weather Conditions: CLOUDY 36° To Reach Description: Witness Ties: Reference Object Distance N-E-S-W NORTH NORTH	Empsoidai ricig	3031,301 51 1			
Nark Stamping Start Time : Stop Time : PDOP End : Stop Time : PDOP End : Stop Time : PDOP Begin : Stop Time : PDOP Begin : PDOP End : Stop Time : PDOP Begin : PDOP End : PDOP End : PDOP End : PDOP End : PDOP End : PDOP End : PDOP End : PDOP End : PDOP End : PDOP End : PDOP End : PDOP End : PDOP End : PDOP End :			Other, speerly		
Nark Stamping Start Time : Stop Time : PDOP Begin : PDOP End : Start Time : Stop Time : PDOP Begin : Start Time : Stop Time : PDOP Begin : PDOP End : Stop Time : PDOP Begin : PDOP End : Stop Time : PDOP Begin : PDOP End : Stop Time : PDOP End : Sto	Type of Mark		Antenna Height	6.562 USFT	
Mark Stamping Start Time: PDOP Begin: Stop Time: Stop Time: PDOP Begin: PDOP Begin: Start Time: PDOP Begin: PDOP Begin: PDOP Begin: PDOP End: Weather Conditions: CLOUDY 36° To Reach Description: Witness Ties: Reference Object Distance N-E-S-W Sketch NORTH	Type of Wark	7	- Antenna Height.		
Start Time: PDOP Begin: Start Time: Stop Time: PDOP End: Start Time: PDOP Begin: Stop Time: PDOP End: PDOP End: Stop Time: PDOP End: PDOP End: Stop Time: PDOP End: PDOP End	Mark Stamping			WETERS	
PDOP Begin: Start Time: PDOP Begin: PDOP End: Stop Time: PDOP End: Weather Conditions: Witness Ties: Reference Object NORTH NORTH	Mark Stamping	9	Start Time :	Stop Tit	ne ·
Start Time: PDOP Begin: Weather Conditions: CLOUDY 36° To Reach Description: Witness Ties: Reference Object Distance N-E-S-W Sketch NORTH				PDOP F	nd :
Weather Conditions: Witness Ties: Reference Object Distance N-E-S-W Sketch NORTH				Stop Ti	ne ·
Weather Conditions: CLOUDY 36° Witness Ties: Reference Object Distance N-E-S-W Sketch NORTH				PDOP F	nd ·
To Reach Description : Witness Ties : Reference Object Distance N-E-S-W			Too begin.		
NORTH	To Reach Descripti	on:		Distance	N-E-S-W
NORTH TO SERVICE OF THE SERVICE OF T					
NORTH A COO A	C1 - (- 1		NODTH		
	NORTH	1028 📤			



Project Name	San Juan LiDAR	Operator Name	Erik Noyer		
Project Number	77866	Date of Survey	29-Sep-17		
Station Name	1029	File Name	LGC_09291	7_EN	-
Methodology	RTK base X RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP) LiDAR QC Point (LQC) Control Station Session #			
			·i		
WGS 84 COORDINATES:	N37°40'22,45174"	Receiver:			
	W107°47'39.48490"	R10	6719	1	
Ellipsoidal Height		R8	0/12	1	
Empsoldar Heigh	7027,041 01-1	Other, specify		1	
		other, speeny		J	
Type of Mark		Antenna Height:	6.562	USFT	
-) P				METERS	
Mark Stamping					
		Start Time :		Stop Time :	
		PDOP Begin:	<i>3</i>	PDOP End :	
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		PDOP Begin:		PDOP End:	
To Reach Descriptio	n :	Weather Conditions: Witness Ties:	CLOUDY 4	1()°	
_		Reference Object	-	Distance	N-E-S-W
Sketch					
NORTH	HWN 350		NORTH		
10	29 🛕				



Project Name	San Juan LiDAR	Operator Name	Erik Noyer	
Project Number Station Name	77866 1030	Date of Survey File Name	25-Sep-17 LGC_092517_EN	
Methodology	RTK base X RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP LiDAR QC Point (LQC) Control Station Session #		
Longitude Ellipsoidal Heigh Type of Mark	e N37°49'16.00147" e W107°38'31.03749" t 9341.621 SFT	Receiver: R10 R8 Other, specify Antenna Height:	6.562 USFT 2.000 METERS	
Mark Stamping	7	Start Time :	Stop Time	:
		PDOP Begin:	PDOP End	:
		Start Time : PDOP Begin :	Stop Time PDOP End	:
To Reach Descriptio	n:	Weather Conditions: Witness Ties: Reference Object	SUNNY 55° Distance	N-E-S-W
Sketch NORTH	1030 📤		NORTH	



Project Name	San Juan LiDAR	Operator Name	Erik Noyer	
Project Number	77866	Date of Survey	25-Sep-17	
Station Name	1031	File Name	LGC_092517_EN	
Methodology	RTK base RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP) LiDAR QC Point (LQC) Control Station Session #	X	
WGS 84 COORDINATES:				
	de N37°49'25.73510"	Receiver:		
Longitud	de W107°38'10.77129"	R10	6719	
Ellipsoidal Heig	ht 9422.598 SFT	R8	0.125	
Passam		Other, specify		
		, - ,		
Type of Mark		Antenna Height:	6.562 USFT	
			2,000 METERS	
Mark Stamping			00 000 000 000 000 000 000 000 000 000	
1 0	9	Start Time :	Stop Tii	ne :
		PDOP Begin:	PDOP E	nd :
		Start Time :	Stop Tii	ne :
		PDOP Begin:	PDOP E	nd :
To Reach Descripti	on:	Weather Conditions: Witness Ties: Reference Object	SUNNY 55° Distance	N-E-S-W
Sketch NORTH	1031		WEST	
The same of the sa	STATE OF THE PARTY			



Project Name	San Juan LiDAR	Operator Name	Erik Noyer
Project Number Station Name	77866 1032	Date of Survey File Name	26-Sep-17 LGC 092617 EN
Station Name	1032	rue Name	LGC_092017_EN
Methodology	RTK base RTK VRS Rapid Static	Photo Control Point (PCP LiDAR Control Point (LC LiDAR QC Point (LQC) Control Station Session #	
wgs 84 COORDINATES: Latitud Longitud Ellipsoidal Heigh	N37°49'41.09835" le W107°36'59.74385" nt 9576.786 SFT	Receiver: R10 R8 Other, specify	6719
Type of Mark	·	Antenna Height:	6.562 USFT 2.000 METERS
Mark Stamping		Start Time : PDOP Begin : Start Time : PDOP Begin :	Stop Time : PDOP End : Stop Time : PDOP End :
To Reach Descripti	on:	Weather Conditions: Witness Ties: Reference Object	SUNNY 55° Distance N-E-S-W
Sketch			
\uparrow		EAST	
NORTH	1032 📤		



Project Name	San Juan LiDAR	Operator Name	Erik Noyer	
Project Number	77866	Date of Survey	03-Oct-17	
Station Name	1033 A	File Name	LGC_100317_EN	
Methodology	RTK base RTK VRS Rapid Static	Photo Control Point (PCP) LiDAR Control Point (LCP) LiDAR QC Point (LQC) Control Station Session #	X	
	N37°49'53.56252" le W107°36'16.14989" nt 9568.049 SFT	Receiver: R10 R8 Other, specify	6719	
Type of Mark Mark Stamping		Antenna Height:	6.562 USFT 2.000 METERS	
Walk Salinping		Start Time : PDOP Begin : Start Time : PDOP Begin :	PDOP Er	ne :
		Weather Conditions:	SUNNY 55°	
To Reach Description	on:	Witness Ties:		
		Reference Object	Distance	N-E-S-W
Sketch			WEST	
NORTH	□ 1033 A			



Project Name	San Juan LiDAR	Operator Name	Erik Noyer	
Project Number Station Name	77866 1033	Date of Survey File Name	26-Sep-17 LGC_092617_EN	
Station Name	1033		EGC_092017_EN	
Methodology	RTK base	Photo Control Point (PCP)		
2.0	RTK VRS	LiDAR Control Point (LCP)	X	
	Rapid Static	LiDAR QC Point (LQC)		
	_	Control Station		
		Session #	=	
WGS 84 COORDINATES:				i -
	ide N37°49'55,33443"	Receiver:		
Longitu	ide W107°36'16.34972"	R10	6719	
Ellipsoidal Heig	9636.940 SFT	R8		
		Other, specify		
T () ()		T	CECO LICET	
Type of Mark	7-	Antenna Height:	2.000 USFT METERS	
Mark Stamping			METERS	
Wark Stamping	P	Start Time :	Ston Ti	ime :
		PDOP Begin :	PDOP I	End:
		Start Time :	Stop Ti	ime :
		PDOP Begin:	PDOP I	End:
		Weather Conditions:	SUNNY 55°	
		weather conditions.	SUMMI 33	
To Reach Descript	tion :	Witness Ties:		
		Reference Object	Distance	N-E-S-W
			= -	
Sketch		WEST		<u> </u>
^		WEST		
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Section 4: Existing NGS Datasheets

This section contains the published National Geodetic Survey (NGS) datasheets for those existing monumented control stations that were used to establish 3-dimensional coordinates for each of the newly established ground control survey points for the project.

```
National Geodetic Survey, Retrieval Date = OCTOBER 2, 2017
HL0394 DESIGNATION - G 441
HL0394 PID - HL0394
HL0394 STATE/COUNTY- CO/SAN JUAN
HL0394 COUNTRY - US
HL0394 USGS QUAD - ENGINEER MOUNTAIN (1975)
HL0394
HL0394
                             *CURRENT SURVEY CONTROL
HL0394
HL0394* NAD 83(2011) POSITION- 37 40 24.08919(N) 107 47 25.32229(W) ADJUSTED
HL0394* NAD 83(2011) ELLIP HT- 2865.195 (meters) (06/27/12) ADJUSTED
HL0394* NAD 83(2011) EPOCH - 2010.00
HL0394* NAVD 88 ORTHO HEIGHT - 2881.240 (meters)
                                                 9452.87 (feet) ADJUSTED
HL0394
HL0394 GEOID HEIGHT - -16.022 (meters)
                                                                  GEOID12B
HL0394 NAD 83(2011) X - -1,545,072.224 (meters)
                                                                  COMP
HL0394 NAD 83(2011) Y - -4,815,117.662 (meters)
                                                                  COMP
HL0394 NAD 83(2011) Z - 3,878,562.187 (meters)
                                                                  COMP

      HL0394
      LAPLACE CORR
      -
      7.91 (seconds)
      DEFLI

      HL0394
      DYNAMIC HEIGHT
      -
      2877.107 (meters)
      9439.31 (feet)
      COMP

                                                                 DEFLEC12B
HL0394 MODELED GRAVITY - 979,091.2
                                                                  NAVD 88
                                       (mgal)
HL0394
HL0394 VERT ORDER - FIRST CLASS II
HL0394
HL0394 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
HL0394 Standards:
             FGDC (95% conf, cm) Standard deviation (cm) CorrNE
Horiz Ellip SD_N SD_E SD_h (unitless)
HL0394
HL0394
HL0394 -----
HL0394 NETWORK 1.71 3.80 0.70 0.68 1.94 -0.29796352
HL0394 -----
HL0394 Click here for local accuracies and other accuracy information.
HL0394
HL0394
HL0394. The horizontal coordinates were established by GPS observations
HL0394.and adjusted by the National Geodetic Survey in June 2012.
HL0394
HL0394.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
HL0394.been affixed to the stable North American tectonic plate. See
HL0394.NA2011 for more information.
HL0394
HL0394. The horizontal coordinates are valid at the epoch date displayed above
HL0394.which is a decimal equivalence of Year/Month/Day.
HL0394
HL0394. The orthometric height was determined by differential leveling and
HL0394.adjusted by the NATIONAL GEODETIC SURVEY
```

```
HL0394.in June 1991.
HL0394
HL0394. Significant digits in the geoid height do not necessarily reflect accuracy.
HL0394.GEOID12B height accuracy estimate available here.
HL0394. The X, Y, and Z were computed from the position and the ellipsoidal ht.
HL0394
HL0394. The Laplace correction was computed from DEFLEC12B derived deflections.
HL0394. The ellipsoidal height was determined by GPS observations
HL0394.and is referenced to NAD 83.
HL0394
HL0394. The dynamic height is computed by dividing the NAVD 88
HL0394.geopotential number by the normal gravity value computed on the
HL0394.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
HL0394.degrees latitude (g = 980.6199 gals.).
HL0394
HL0394. The modeled gravity was interpolated from observed gravity values.
HL0394. The following values were computed from the NAD 83(2011) position.
HL0394
HL0394;
                           North
                                         East
                                                  Units Scale Factor Converg.
HL0394;SPC CO S
                        419,003.761
                                      712,374.713
                                                  MT 0.99994932 -1 24 17.5
HL0394;SPC CO S
                    - 1,374,681.51 2,337,182.70
                                                   sFT 0.99994932
                                                                     -1 24 17.5
HL0394;UTM 13
                    - 4,173,238.466 253,905.722
                                                   MT
                                                       1.00034602
                                                                     -1 42 22.4
HL0394
HL0394!
                    - Elev Factor x Scale Factor =
                                                        Combined Factor
HL0394!SPC CO S
                        0.99955060
                                   Х
                                       0.99994932 =
                                                        0.99949994
HL0394!UTM 13
                        0.99955060 x
                                        1.00034602 =
                                                        0.99989646
HL0394
HL0394 U.S. NATIONAL GRID SPATIAL ADDRESS: 13SBB5390573238(NAD 83)
HL0394
HL0394
                                SUPERSEDED SURVEY CONTROL
HL0394
HL0394 NAD 83(2007) - 37 40 24.08874(N)
                                            107 47 25.32253(W) AD(2002.00) 0
HL0394 ELLIP H (02/10/07) 2865.218 (m)
                                                               GP(2002.00)
HL0394 ELLIP H (12/03/02) 2865.210 (m)
                                                                         ) 4 2
                                                               GP(
HL0394 NAD 83(1992) - 37 40 24.08841(N)
                                            107 47 25.32182(W) AD(
                                                                         ) 1
                                                                         ) 3 1
HL0394 ELLIP H (07/06/97) 2865.213
                                     (m)
                                                               GP (
HL0394 NAVD 88
                           2881.24
                                                 9452.9
                                                           (f) LEVELING
                                     (m)
HL0394
HL0394.Superseded values are not recommended for survey control.
HL0394.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
HL0394. See file dsdata.pdf to determine how the superseded data were derived.
HL0394 MARKER: DB = BENCH MARK DISK
HL0394 SETTING: 66 = SET IN ROCK OUTCROP
HL0394 STAMPING: G 441 1985
HL0394 MARK LOGO: NGS
HL0394 MAGNETIC: O = OTHER; SEE DESCRIPTION
HL0394 STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
HL0394+STABILITY: POSITION/ELEVATION WELL
HL0394 SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
```

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HL0394+SATELLITE: SATELLITE OBSERVATIONS - July 08, 1993
HL0394
HL0394 HISTORY - Date Condition
HL0394 HISTORY - 1985 MONUMENTED
                                              Report By
                                              NGS
HL0394 HISTORY
                  - 19910709 GOOD
                                             USPSOD
HL0394 HISTORY - 19930708 GOOD
                                              NGS
HL0394
HL0394
                               STATION DESCRIPTION
HT.0394
HL0394'DESCRIBED BY NATIONAL GEODETIC SURVEY 1985
HL0394'27.5 KM (17.1 MI) SOUTH FROM SILVERTON.
HL0394'27.5 KM (17.1 MI) SOUTHERLY ALONG U.S. HIGHWAY 550 FROM ITS JUNCTION
HL0394'WITH STATE HIGHWAY 110 IN SILVERTON, NEAR THE WEST END OF A 2- BY
HL0394'12-FOOT EXPOSED AREA OF BEDROCK AT THE NORTH END OF A SMALL HIGHWAY
HL0394'CUT AND THE SOUTHEAST END OF A SMALL HIGHWAY PULLOUT, 5.6 KM (3.5 MI)
HL0394'SOUTH OF THE SUMMIT OF COAL BANK PASS, AND 23.5 (77.1 FT) EAST OF THE
HL0394'CENTERLINE OF THE HIGHWAY.
HL0394'THE MARK IS 0.4 METERS E FROM A WITNESS POST
HL0394'THE MARK IS 1.5 M ABOVE THE HIGHWAY.
HL0394
HL0394
                               STATION RECOVERY (1991)
HL0394
HL0394'RECOVERY NOTE BY US POWER SQUADRON 1991 (WLR)
HL0394'RECOVERED IN GOOD CONDITION.
HL0394
                              STATION RECOVERY (1993)
HL0394
HL0394'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1993 (RSC)
HL0394'RECOVERED AS DESCRIBED.
National Geodetic Survey, Retrieval Date = SEPTEMBER 30, 2017
HL0429 DESIGNATION - L 439
HL0429 PID - HL0429
HL0429 STATE/COUNTY- CO/SAN JUAN
HL0429 COUNTRY - US
HL0429 USGS QUAD - SILVERTON (1955)
HL0429
HL0429
                              *CURRENT SURVEY CONTROL
HL0429
HL0429* NAD 83(1986) POSITION- 37 50 04.0 (N) 107 43 28.5
                                                            (W)
HL0429* NAVD 88 ORTHO HEIGHT - 3038.530 (meters) 9968.91 (feet) ADJUSTED
HL0429
HL0429 GEOID HEIGHT -
                               -15.587 (meters)
                                                                   GEOID12B
HL0429 DYNAMIC HEIGHT -
                             3034.097 (meters) 9954.37 (feet) COMP
HL0429 MODELED GRAVITY - 979,060.4 (mgal)
                                                                   NAVD 88
HL0429
HL0429 VERT ORDER
                   - FIRST CLASS II
HL0429
HL0429. The horizontal coordinates were established by autonomous hand held GPS
HL0429.observations and have an estimated accuracy of +/-10 meters.
HL0429. The orthometric height was determined by differential leveling and
HL0429.adjusted by the NATIONAL GEODETIC SURVEY
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```
HL0429.in June 1991.
HL0429
HL0429. Significant digits in the gooid height do not necessarily reflect accuracy.
HL0429.GEOID12B height accuracy estimate available here.
HL0429.Photographs are available for this station.
HL0429
HL0429. The dynamic height is computed by dividing the NAVD 88
HL0429.geopotential number by the normal gravity value computed on the
HL0429. Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
HL0429.degrees latitude (g = 980.6199 gals.).
HL0429
HL0429. The modeled gravity was interpolated from observed gravity values.
HL0429
HL0429;
                           North
                                         East
                                                 Units Estimated Accuracy
HL0429; SPC CO S
                        436,737.
                                      718,602.
                                                    MT (+/-10 \text{ meters HH2 GPS})
HL0429 U.S. NATIONAL GRID SPATIAL ADDRESS: 13SBB6022990944 (NAD 83)
HL0429
HL0429
                                SUPERSEDED SURVEY CONTROL
HL0429
HL0429.No superseded survey control is available for this station.
HL0429 MARKER: DB = BENCH MARK DISK
HL0429 SETTING: 66 = SET IN ROCK OUTCROP
HL0429 STAMPING: L 439 1985
HL0429 MARK LOGO: NGS
HL0429 STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
HL0429
HL0429 HISTORY
                    - Date
                               Condition
                                                Report By
HL0429 HISTORY
                    - 1985
                               MONUMENTED
                                                NGS
                    - 19910705 GOOD
HL0429 HISTORY
                                                USPSOD
HL0429 HISTORY
                    - 20090723 GOOD
                                                GEOCAC
HL0429
HL0429
                                STATION DESCRIPTION
HL0429
HL0429'DESCRIBED BY NATIONAL GEODETIC SURVEY 1985
HL0429'6.4 KM (4.0 MI) NORTH FROM SILVERTON.
HL0429'6.4 KM (4.0 MI) NORTHERLY ALONG U.S. HIGHWAY 550 FROM ITS JUNCTION
HL0429'WITH STATE HIGHWAY 110 IN SILVERTON, 0.5 KM (0.3 MI) NORTH OF MILEPOST
HL0429'74, IN THE SOUTH END OF A 10- BY 24-FOOT EXPOSED AREA OF OUTCROPPING
HL0429'BEDROCK, 9.0 M (29.5 FT) EAST OF THE CENTERLINE OF THE HIGHWAY, 2.5 M
HL0429'(8.2 FT) NORTHWEST OF THE CENTER OF A TRACK ROAD, AND 0.5 M (1.6 FT)
HL0429'NORTH OF THE SOUTH END OF THE BEDROCK.
HL0429'THE MARK IS 0.3 METERS SE FROM A WITNESS POST
HL0429'THE MARK IS 1.3 M ABOVE THE HIGHWAY.
HL0429
HL0429
                                STATION RECOVERY (1991)
HL0429
HL0429'RECOVERY NOTE BY US POWER SQUADRON 1991 (WLR)
HL0429'RECOVERED IN GOOD CONDITION.
HL0429
HL0429
                                STATION RECOVERY (2009)
HL0429
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HL0429'RECOVERED IN GOOD CONDITION.
National Geodetic Survey, Retrieval Date = SEPTEMBER 25, 2017
HL0424 *******
HL0424 DESIGNATION - M 439
HL0424 PID
                      HL0424
HL0424 STATE/COUNTY- CO/SAN JUAN
HL0424 COUNTRY -
                       US
HL0424 USGS QUAD - SILVERTON (1955)
HL0424
HL0424
                               *CURRENT SURVEY CONTROL
HL0424
HL0424* NAD 83(1986) POSITION- 37 48 19. (N) 107 40 15.
                                                                (W)
HL0424* NAVD 88 ORTHO HEIGHT - 2822.745 (meters)
                                                     9260.96 (feet) ADJUSTED
HL0424
                                 -15.506 (meters)
HL0424 GEOID HEIGHT -
                                                                      GEOID12B
HL0424 DYNAMIC HEIGHT -
                                2818.684 (meters)
                                                      9247.63
                                                               (feet) COMP
HL0424 MODELED GRAVITY -
                             979,089.6
                                        (mgal)
                                                                      NAVD 88
HL0424
HL0424 VERT ORDER
                    - FIRST
                                    CLASS II
HL0424
HL0424. The horizontal coordinates were scaled from a topographic map and have
HL0424.an estimated accuracy of +/- 6 seconds.
HL0424.
HL0424. The orthometric height was determined by differential leveling and
HL0424.adjusted by the NATIONAL GEODETIC SURVEY
HL0424.in June 1991.
HL0424
HL0424. Significant digits in the geoid height do not necessarily reflect accuracy.
HL0424.GEOID12B height accuracy estimate available here.
HL0424
HL0424. The dynamic height is computed by dividing the NAVD 88
HL0424.geopotential number by the normal gravity value computed on the
HL0424. Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
HL0424.degrees latitude (g = 980.6199 gals.).
HL0424. The modeled gravity was interpolated from observed gravity values.
HL0424
HL0424;
                                                Units Estimated Accuracy
                           North
                                         East
HL0424; SPC CO S -
                        433,390.
                                      723,260.
                                                  MT (+/-180 \text{ meters Scaled})
HL0424
HL0424 U.S. NATIONAL GRID SPATIAL ADDRESS: 13SBB648875 (NAD 83)
HL0424
HL0424
                                SUPERSEDED SURVEY CONTROL
HL0424
HL0424. No superseded survey control is available for this station.
HL0424
HL0424 MARKER: I = METAL ROD
HL0424 SETTING: 15 = METAL ROD DRIVEN INTO GROUND. SEE TEXT FOR ADDITIONAL
HL0424+WITH SETTING: INFORMATION.
HL0424 STAMPING: M 439 1985
HL0424 MARK LOGO: NGS
HL0424 PROJECTION: FLUSH
```

HL0429'RECOVERY NOTE BY GEOCACHING 2009 (TFW)

```
HL0424 STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
HL0424 ROD/PIPE-DEPTH: 2.4 meters
HL0424
HL0424 HISTORY - Date Condition
HL0424 HISTORY - 1985 MONUMENTED
                                             Report By
                                             NGS
HL0424 HISTORY - 19910705 GOOD
                                             USPSOD
HL0424
HL0424
                              STATION DESCRIPTION
HT.0424
HL0424'DESCRIBED BY NATIONAL GEODETIC SURVEY 1985
HL0424'IN SILVERTON.
HL0424'IN SILVERTON, AT THE JUNCTION OF U.S. HIGHWAY 550 AND STATE HIGHWAY
HL0424'110, IN A TRIANGLE FORMED BY THE HIGHWAY JUNCTION, 48.1 M (157.8 FT)
HL0424'NORTHWEST OF THE CENTERLINE OF STATE HIGHWAY 110, 21.2 M (69.6 FT)
HL0424'SOUTH OF A PAVED ROAD, 20.9 M (68.6 FT) NORTHEAST OF THE CENTERLINE OF
HL0424'U.S. HIGHWAY 550, AND 1.6 M (5.2 FT) NORTHEAST OF A UTILITY POLE.
HL0424'NOTE--ACCESS TO DATUM POINT IS HAD THROUGH A 5-INCH LOGO CAP.
HL0424'THE MARK IS 0.45 METERS SW FROM A WITNESS POST
HL0424'THE MARK IS 0.6 M BELOW THE HIGHWAY.
HL0424
HL0424
                              STATION RECOVERY (1991)
HL0424
HL0424'RECOVERY NOTE BY US POWER SQUADRON 1991 (WLR)
HL0424'RECOVERED IN GOOD CONDITION.
National Geodetic Survey, Retrieval Date = SEPTEMBER 27, 2017
HL0411 DESIGNATION - M 441
HL0411 PID
              - HL0411
HL0411 STATE/COUNTY- CO/SAN JUAN
HL0411 COUNTRY - US
HL0411 USGS QUAD - SNOWDON PEAK (1972)
HL0411
HL0411
                             *CURRENT SURVEY CONTROL
HL0411
HL0411* NAD 83(2011) POSITION- 37 43 57.28346(N) 107 43 13.22977(W)
                                                                 ADJUSTED
HL0411* NAD 83(2011) ELLIP HT- 3172.356 (meters) (06/27/12) ADJUSTED
HL0411* NAD 83(2011) EPOCH - 2010.00
                                                10459.53 (feet) ADJUSTED
HL0411* NAVD 88 ORTHO HEIGHT - 3188.070 (meters)
HL0411
HL0411 GEOID HEIGHT - -15.671 (meters)
                                                                  GEOID12B
HL0411 NAD 83(2011) X - -1,538,036.011 (meters)
                                                                  COMP
HL0411 NAD 83(2011) Y - -4,813,403.016 (meters)
                                                                  COMP
HL0411 NAD 83(2011) Z - 3,883,952.969 (meters)
                                                                  COMP
HL0411 LAPLACE CORR - 6.88 (seconds)
HL0411 DYNAMIC HEIGHT -
                             3183.339 (meters) 10444.00 (feet) COMP
HL0411 MODELED GRAVITY - 979,029.3 (mgal)
                                                                 NAVD 88
HL0411
HL0411 VERT ORDER - FIRST CLASS II
HL0411
HL0411 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
HL0411 Standards:
HL0411
              FGDC (95% conf, cm)
                                   Standard deviation (cm)
                                                              CorrNE
HL0411
                 Horiz Ellip
                                                            (unitless)
                                      SD N SDE SD h
```

```
HL0411 -----
HL0411 NETWORK 1.42 2.94
                               0.58 0.58 1.50 -0.20059309
HL0411 -----
HL0411 Click here for local accuracies and other accuracy information.
HL0411
HL0411
HL0411. The horizontal coordinates were established by GPS observations
HL0411.and adjusted by the National Geodetic Survey in June 2012.
HL0411.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
HL0411.been affixed to the stable North American tectonic plate. See
HL0411.NA2011 for more information.
HL0411. The horizontal coordinates are valid at the epoch date displayed above
HL0411.which is a decimal equivalence of Year/Month/Day.
HL0411. The orthometric height was determined by differential leveling and
HL0411.adjusted by the NATIONAL GEODETIC SURVEY
HL0411.in June 1991.
HL0411
HL0411. Significant digits in the good height do not necessarily reflect accuracy.
HL0411.GEOID12B height accuracy estimate available here.
HL0411
HL0411. The X, Y, and Z were computed from the position and the ellipsoidal ht.
HL0411. The Laplace correction was computed from DEFLEC12B derived deflections.
HL0411
HL0411. The ellipsoidal height was determined by GPS observations
HL0411.and is referenced to NAD 83.
HL0411
HL0411. The dynamic height is computed by dividing the NAVD 88
HL0411.geopotential number by the normal gravity value computed on the
HL0411.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
HL0411.degrees latitude (g = 980.6199 gals.).
HL0411. The modeled gravity was interpolated from observed gravity values.
HL0411. The following values were computed from the NAD 83(2011) position.
HL0411
                                      East Units Scale Factor Converg.
HL0411;
                         North
HL0411;SPC CO S - 425,425.376 718,706.525 MT 0.99994696 -1 21 42.9 HL0411;SPC CO S - 1,395,749.75 2,357,956.32 SFT 0.99994696 -1 21 42.9
HL0411;UTM 13
                  - 4,179,628.979 260,273.762 MT 1.00030790 -1 39 56.1
HL0411
HL0411!
                  - Elev Factor x Scale Factor =
                                                    Combined Factor
HT<sub>1</sub>0411
HL0411 U.S. NATIONAL GRID SPATIAL ADDRESS: 13SBB6027379628(NAD 83)
HL0411
HL0411
                              SUPERSEDED SURVEY CONTROL
HL0411
HL0411 NAD 83(2007) - 37 43 57.28300(N) 107 43 13.23004(W) AD(2002.00) 0
HL0411 ELLIP H (02/10/07) 3172.379 (m)
                                                           GP(2002.00)
```

```
HL0411 ELLIP H (12/03/02) 3172.372 (m)
                                                              GP(
                                                                      ) 4 2
                                        107 43 13.22925(W) AD(
HL0411 NAD 83(1992) - 37 43 57.28268(N)
                                                                       ) 1
HL0411 ELLIP H (07/06/97) 3172.373 (m)
                                                             GP(
                                                                       ) 3 1
HL0411 NAVD 88 (07/06/97) 3188.0 (m) GEOID96 model used GPS OBS
HL0411
HL0411.Superseded values are not recommended for survey control.
HL0411
HL0411.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
HL0411. See file dsdata.pdf to determine how the superseded data were derived.
HL0411
HL0411 MARKER: DB = BENCH MARK DISK
HL0411 SETTING: 66 = SET IN ROCK OUTCROP
HL0411 STAMPING: M 441 1985
HL0411 MARK LOGO: NGS
HL0411 MAGNETIC: O = OTHER; SEE DESCRIPTION
HL0411 STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
HL0411+STABILITY: POSITION/ELEVATION WELL
HL0411 SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
HL0411+SATELLITE: SATELLITE OBSERVATIONS - July 08, 1993
HL0411
HL0411 HISTORY - Date
HL0411 HISTORY - 1985
                              Condition
                                               Report By
                            MONUMENTED
                   - 1985
                                               NGS
                 - 19910708 GOOD
HL0411 HISTORY
                                               USPSOD
HL0411 HISTORY
                  - 19930708 GOOD
                                               NGS
HL0411
HL0411
                               STATION DESCRIPTION
HL0411
HL0411'DESCRIBED BY NATIONAL GEODETIC SURVEY 1985
HL0411'12.8 KM (7.95 MI) SOUTH FROM SILVERTON.
HL0411'12.8 KM (7.95 MI) SOUTHERLY ALONG U.S. HIGHWAY 550 FROM ITS JUNCTION
HL0411'WITH STATE HIGHWAY 110 IN SILVERTON, IN A 4- BY 20-FOOT EXPOSED AREA
HL0411'OF BEDROCK IN A SMALL HIGHWAY CUT, 2.4 KM (1.5 MI) SOUTHWEST OF THE
HL0411'SUMMIT OF MOLAS PASS, 57.5 M (188.6 FT) EAST OF THE ENTRANCE TO THE
HL0411'EAST LIME CREEK REST AREA, AND 9.1 M (29.8 FT) NORTH OF THE CENTERLINE
HL0411'OF THE HIGHWAY.
HL0411'THE MARK IS 0.2 METERS W FROM A WITNESS POST
HL0411'THE MARK IS 0.5 M ABOVE THE HIGHWAY.
HL0411
HL0411
                                STATION RECOVERY (1991)
HT<sub>1</sub>0411
HL0411'RECOVERY NOTE BY US POWER SOUADRON 1991 (WLR)
HL0411'RECOVERED IN GOOD CONDITION.
HL0411
HL0411
                               STATION RECOVERY (1993)
HL0411
HL0411'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1993 (RSC)
HL0411'RECOVERED AS DESCRIBED.
National Geodetic Survey, Retrieval Date = AUGUST 10, 2017
- This is a Cooperative Base Network Control Station.
HL0646 CBN
HL0646 DESIGNATION - V T
                  - HL0646
HL0646 PID
HL0646 STATE/COUNTY- CO/SAN JUAN
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HL0646 COUNTRY - US
HL0646 USGS QUAD - SILVERTON (1955)
HL0646
HL0646
                             *CURRENT SURVEY CONTROL
HL0646
HL0646* NAD 83(2011) POSITION- 37 47 58.62946(N) 107 40 26.79222(W) ADJUSTED
HL0646* NAD 83(2011) ELLIP HT- 2911.787 (meters) (06/27/12) ADJUSTED
HL0646* NAD 83(2011) EPOCH - 2010.00
HL0646* NAVD 88 ORTHO HEIGHT - 2927.3 (meters) 9604. (feet) GPS OBS
HL0646
HL0646 NAVD 88 orthometric height was determined with geoid model GEOID12A
HL0646 GEOID HEIGHT - -15.509 (meters)
                                                                  GEOID12A
HL0646 GEOID HEIGHT
                               -15.509 (meters)
                                                                   GEOID12B
HL0646 NAD 83(2011) X - -1,532,704.759 (meters) HL0646 NAD 83(2011) Y - -4,810,102.130 (meters)
                                                                   COMP
                                                                   COMP
HL0646 NAD 83(2011) Z - 3,889,678.416 (meters)
                                                                   COMP
HL0646 LAPLACE CORR -
                               -1.48 (seconds)
                                                                   DEFLEC12B
HL0646
HL0646 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
HL0646 Standards:
            FGDC (95% conf, cm) Standard deviation (cm)
Horiz Ellip SD_N SD_E SD_h
HL0646
HL0646
                                    SD_N SD_E SD_h (unitless)
HL0646 -----
HL0646 NETWORK 0.93 2.27 0.41 0.35 1.16 0.04224476
HL0646 -----
HL0646 Click <a href="here">here</a> for local accuracies and other accuracy information.
HL0646
HL0646
HL0646. The horizontal coordinates were established by GPS observations
HL0646.and adjusted by the National Geodetic Survey in June 2012.
HL0646.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
HL0646.been affixed to the stable North American tectonic plate. See
HL0646.NA2011 for more information.
HL0646. The horizontal coordinates are valid at the epoch date displayed above
HL0646.which is a decimal equivalence of Year/Month/Day.
HL0646
HL0646. The orthometric height was determined by GPS observations and a
HL0646.high-resolution geoid model.
HL0646
HL0646.Significant digits in the geoid height do not necessarily reflect accuracy.
HL0646.GEOID12B height accuracy estimate available <a href="here">here</a>.
HL0646. The X, Y, and Z were computed from the position and the ellipsoidal ht.
HL0646
HL0646. The Laplace correction was computed from DEFLEC12B derived deflections.
HL0646. The ellipsoidal height was determined by GPS observations
HL0646.and is referenced to NAD 83.
HL0646
HL0646. The following values were computed from the NAD 83(2011) position.
HL0646
                         North East Units Scale Factor Converg.
HL0646;
```

```
HL0646;SPC CO S - 432,768.079 722,953.773 MT 0.99994558 -1 20 00.8 HL0646;SPC CO S - 1,419,839.94 2,371,890.84 SFT 0.99994558 -1 20 00.8 HL0646;UTM 13 - 4,186,951.531 264,561.524 MT 1.00028279 -1 38 23.0
HL0646
HL0646!
                       - Elev Factor x Scale Factor = Combined Factor
HLU040! - Elev Factor x Scale Factor = Combined Factor = 0.99954330 x 0.99994558 = 0.99948890 HL0646!UTM 13 - 0.99954330 x 1.00028279 = 0.99982596
HL0646
HL0646:
                          Primary Azimuth Mark
                                                                             Grid Az
HL0646:SPC CO S - KENDALL 2
                                                                             104 02 53.8
                      - KENDALL 2
HL0646:UTM 13
                                                                             104 21 16.0
HL0646
HL0646 U.S. NATIONAL GRID SPATIAL ADDRESS: 13SBB6456186951 (NAD 83)
HL0646
HL0646|------
                                                              Distance Geod. Az |
HL0646| PID Reference Object
HL0646| HL0644 KENDALL 2
                                                            APPROX. 2.9 KM 1024253.0 |
HL0646|------
HL0646
HL0646
                                       SUPERSEDED SURVEY CONTROL
HL0646
HL0646 NAD 83(2007) - 37 47 58.62907(N) 107 40 26.79248(W) AD(2002.00) 0
HL0646 ELLIP H (02/10/07) 2911.810 (m)
                                                                            GP(2002.00)
HL0646 ELLIP H (10/21/02) 2911.815 (m) GP( ) 4 2

HL0646 NAD 83(1992) - 37 47 58.62850(N) 107 40 26.79158(W) AD( ) B

HL0646 ELLIP H (05/26/92) 2911.826 (m) GP( ) 4 1

HL0646 NAD 83(1986) - 37 47 58.62077(N) 107 40 26.80551(W) AD( ) 3

HL0646 NAD 27 - 37 47 58.64276(N) 107 40 24.59773(W) AD( ) 3
HL0646 NAVD 88 (03/16/99) 2927.3 (m) UNKNOWN model used GPS OBS
HL0646 NAVD 88 (07/06/97) 2927.2 (m) GEOID96 model used GPS OBS HL0646 NAVD 88 (05/26/92) 2926.7 (m) UNKNOWN model used GPS OBS HL0646 NGVD 29 (07/19/86) 2925.3 (m) 9597. (f) VERT AND
                                                          9597. (f) VERT ANG
HL0646
HL0646. Superseded values are not recommended for survey control.
HL0646
HL0646.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
HL0646.See file <u>dsdata.pdf</u> to determine how the superseded data were derived.
HL0646
HL0646 MARKER: DB = BENCH MARK DISK
HL0646 SETTING: 66 = SET IN ROCK OUTCROP
HL0646 STAMPING: VABM 9599 V T 1952
HL0646 MARK LOGO: USGS
HL0646 PROJECTION: FLUSH
HL0646 MAGNETIC: O = OTHER; SEE DESCRIPTION
HL0646 STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
HL0646+STABILITY: POSITION/ELEVATION WELL
HL0646 SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
HL0646+SATELLITE: SATELLITE OBSERVATIONS - May 30, 2014
HL0646
HL0646 HISTORY - Date Condition

HL0646 HISTORY - 1952 MONUMENTED

HL0646 HISTORY - 1952 GOOD
                                                         Report By
                                                         USGS
                                                         USGS
HL0646 HISTORY - 19910628 GOOD
                                                         NGS
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- 19930708 GOOD
HL0646 HISTORY
HL0646 HISTORY
                                                CODOT
HL0646 HISTORY
                   - 20140530 GOOD
                                                WOOLPT
HL0646
HL0646
                                STATION DESCRIPTION
HL0646
HL0646'DESCRIBED BY US GEOLOGICAL SURVEY 1952
HL0646'STATION IS LOCATED ABOUT 1.0 MI. SSW. OF SILVERTON, COLORADO, AND
HL0646'205 FT. E. OF HIGHWAY, ON THE HIGHEST POINT OF A SMALL KNOLL.
HL0646'
HL0646'TO REACH FROM THE POST OFFICE AT SILVERTON, DRIVE S. ALONG HIGHWAY
HL0646'550 FOR 1.9 MI. TO WIDE GRADUAL CURVE AND STATION SITE.
HL0646'
HL0646'STATION MARK--STANDARD TABLET, STAMPED ---V.T. 1952 VABM 9598---,
HL0646'CEMENTED IN GRANITE OUTCROP.
HL0646'REFERENCE MARKS--NONE.
HT.0646
HL0646
                                STATION RECOVERY (1952)
HT.0646
HL0646'RECOVERY NOTE BY US GEOLOGICAL SURVEY 1952
HL0646'RECOVERED IN GOOD CONDITION.
HL0646
HL0646
                                STATION RECOVERY (1991)
HL0646
HL0646'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1991
HL0646'STATION IS LOCATED ABOUT 1.5 KM (0.9 MI) SOUTHWEST OF SILVERTON, IN
HL0646'THE SAN JUAN NATIONAL FOREST, 1 KM (0.6 MI) SOUTHEAST OF A HAIRPIN
HL0646'HIGHWAY CURVE, JUST OFF US HIGHWAY 550, IN THE MIDDLE OF A SLOPING
HL0646'NORTHWEST-SOUTHEAST RIDGE THAT PARALLELS THE HIGHWAY AND IS ON THE
HL0646'EAST SLOPE OF SULTAN MOUNTAIN. OWNERSHIP--US FOREST SERVICE.
HL0646'TO REACH FROM THE JUNCTION OF US HIGHWAY 550 AND STATE HIGHWAY 110 AT
HL0646'THE SOUTHWEST END OF A LARGE TRAFFIC TRIANGLE JUST SOUTHWEST OF
HL0646'SILVERTON, GO SOUTHWEST ON HIGHWAY 550 FOR 0.75 MI (1.21 KM) TO A
HL0646'TRACK ROAD AND GATE ON THE RIGHT JUST PAST A HAIRPIN CURVE. CONTINUE
HL0646'UPGRADE FOR 0.35 MI (0.56 KM) TO A NARROW TURNOUT ON THE LEFT
HL0646'OPPOSITE A BROKEN ROCK FACE AND THE END OF TRUCK TRAVEL. CONTINUE
HL0646'UPHILL FOR 0.9 MI (1.4 KM) TO A TURNOUT ON THE LEFT AND ENOUGH ROOM
HL0646'TO TURN AROUND. PACK DOWN INTO RAVINE, THEN RIGHT, SOUTHEAST, FOR
HL0646'150 FT (45.7 M), THEN LEFT, EASTERLY, UP SIDE OF RIDGE FOR 150 FT
HL0646'(45.7 M) TO STATION.
HL0646'NOTE--300 FT PACK TO STATION.
HL0646'STATION MARK PROJECTS 5 MM FROM A DRILL HOLE IN A 1 M (3.3 FT) X 2.6 M
HL0646'(8.5 FT) X 0.1 M (0.3 FT) HIGH ROCK OUTCROP ABOUT 60 M (196.8 FT)
HL0646'NORTHWEST OF HIGH GROUND. IT IS ABOUT 100 M (328.1 FT) NORTHEAST OF,
HL0646'AND 5 M (16.4 FT) HIGHER THAN THE HIGHWAY, 150 M (492.1 FT) EAST OF
HL0646'THE TURNOUT, 0.9 M (3.0 FT) WEST OF A FIBERGLASS WITNESS POST, 7.8 M
HL0646'(25.6 FT) WEST-SOUTHWEST OF A 40-CM SPRUCE TREE, 6.0 M (19.7 FT)
HL0646'NORTHWEST OF THE NORTHWEST AND HIGHEST END OF A 1 M (3.3 FT) X 1 M
HL0646'(3.3 FT) X 0.5 M (1.6 FT) HIGH BOULDER SITTING ON TOP OF THE GROUND.
HL0646'DESCRIBED BY G.R.HEID
HL0646
HL0646
                                STATION RECOVERY (1993)
HL0646
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HL0646'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1993 (RSC)
HL0646'RECOVERED AS DESCRIBED.
HL0646
HL0646
                             STATION RECOVERY (1998)
HL0646
HL0646'RECOVERY NOTE BY COLORADO DEPARTMENT OF TRANSPORTATION 1998 (RSC)
HL0646'RECOVERED AS DESCRIBED.
HL0646
HI-0646
                             STATION RECOVERY (2014)
HL0646
HL0646'RECOVERY NOTE BY WOOLPERT CONSULTANTS 2014 (ZJH)
HL0646'RECOVERED AS DESCRIBED.
National Geodetic Survey, Retrieval Date = SEPTEMBER 30, 2017
HL0433 DESIGNATION - Z 439
HL0433 PID - HL0433
HL0433 STATE/COUNTY- CO/SAN JUAN
HL0433 COUNTRY - US
HL0433 USGS QUAD - SILVERTON (1955)
HL0433
HL0433
                            *CURRENT SURVEY CONTROL
HL0433
HL0433* NAD 83(2011) POSITION- 37 52 10.82536(N) 107 43 22.91904(W) ADJUSTED
HL0433* NAD 83(2011) ELLIP HT- 3106.415 (meters) (06/27/12) ADJUSTED
HL0433* NAD 83(2011) EPOCH - 2010.00
HL0433* NAVD 88 ORTHO HEIGHT - 3121.872 (meters)
                                               10242.34 (feet) ADJUSTED
HL0433
                        -15.539 (meters)
HL0433 GEOID HEIGHT
                                                               GEOID12B
HL0433 NAD 83(2011) X - -1,535,405.702 (meters)
                                                               COMP
HL0433 NAD 83(2011) Y - -4,804,392.831 (meters)
                                                               COMP
HL0433 NAD 83(2011) Z - 3,895,941.729 (meters)
                                                               COMP
HL0433 LAPLACE CORR - 7.25 (seconds) DEFLI
HL0433 DYNAMIC HEIGHT - 3117.264 (meters) 10227.22 (feet) COMP
                                                               DEFLEC12B
HL0433 MODELED GRAVITY - 979,040.2 (mgal)
                                                               NAVD 88
HL0433
HL0433 VERT ORDER - FIRST CLASS II
HL0433
HL0433 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
HL0433 Standards:
       FGDC (95% conf, cm) Standard deviation (cm) CorrNE

Horiz Ellip SD_N SD_E SD_h (unitless)
HL0433
HL0433
HL0433 -----
                                    0.66 0.52 2.26 0.04155984
HL0433 NETWORK 1.46 4.43
HL0433 -----
HL0433 Click here for local accuracies and other accuracy information.
HL0433
HT<sub>1</sub>0433
HL0433. The horizontal coordinates were established by GPS observations
HL0433.and adjusted by the National Geodetic Survey in June 2012.
HL0433
HL0433.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
HL0433.been affixed to the stable North American tectonic plate. See
HL0433.NA2011 for more information.
```

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HL0433
HL0433. The horizontal coordinates are valid at the epoch date displayed above
HL0433.which is a decimal equivalence of Year/Month/Day.
HL0433. The orthometric height was determined by differential leveling and
HL0433.adjusted by the NATIONAL GEODETIC SURVEY
HL0433.in June 1991.
HL0433
HL0433.Significant digits in the geoid height do not necessarily reflect accuracy.
HL0433.GEOID12B height accuracy estimate available here.
HL0433. The X, Y, and Z were computed from the position and the ellipsoidal ht.
HL0433
HL0433. The Laplace correction was computed from DEFLEC12B derived deflections.
HL0433
HL0433. The ellipsoidal height was determined by GPS observations
HL0433.and is referenced to NAD 83.
HL0433. The dynamic height is computed by dividing the NAVD 88
HL0433.geopotential number by the normal gravity value computed on the
HL0433.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
HL0433.degrees latitude (g = 980.6199 gals.).
HL0433
HL0433. The modeled gravity was interpolated from observed gravity values.
HL0433. The following values were computed from the NAD 83(2011) position.
HL0433
HL0433;
                                                 Units Scale Factor Converg.
                           North
                                         East
HL0433; SPC CO S
                       440,642.428
                                      718,831.429
                                                  MT 0.99994559
                                                                    -1 21 48.8
HL0433;SPC CO S
                    - 1,445,674.37 2,358,366.11
                                                   sFT 0.99994559
                                                                     -1 21 48.8
HL0433;UTM 13
                    - 4,194,850.647 260,480.074
                                                  MT 1.00030666
                                                                     -1 40 20.6
HL0433
HL0433!
                    - Elev Factor x Scale Factor =
                                                        Combined Factor
HL0433!SPC CO S
                        0.99951279 x
                                      0.99994559 =
                                                        0.99945841
                                       1.00030666 =
HL0433!UTM 13
                        0.99951279 x
                                                        0.99981930
HL0433
HL0433 U.S. NATIONAL GRID SPATIAL ADDRESS: 13SBB6048094850(NAD 83)
HL0433
HL0433
                                SUPERSEDED SURVEY CONTROL
HL0433
HL0433 NAD 83(2007) - 37 52 10.82498(N)
                                            107 43 22.91930(W) AD(2002.00) 0
HL0433 ELLIP H (02/10/07) 3106.438 (m)
                                                               GP(2002.00)
HL0433 ELLIP H (12/03/02) 3106.440
                                    (m)
                                                               GP(
                                                                         ) 4 2
HL0433 NAD 83(1992) - 37 52 10.82441(N)
                                            107 43 22.91854(W) AD(
                                                                         ) 1
HL0433 ELLIP H (03/16/99) 3106.447
                                                               GP(
                                                                         ) 4 1
                                     (m)
HL0433 NAVD 88
                           3121.87
                                     (m)
                                                10242.3
                                                           (f) LEVELING
HL0433
HL0433. Superseded values are not recommended for survey control.
HL0433.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
HL0433.See file dsdata.pdf to determine how the superseded data were derived.
HL0433
HL0433 MARKER: DV = VERTICAL CONTROL DISK
HL0433 SETTING: 80 = SET IN A BOULDER
```

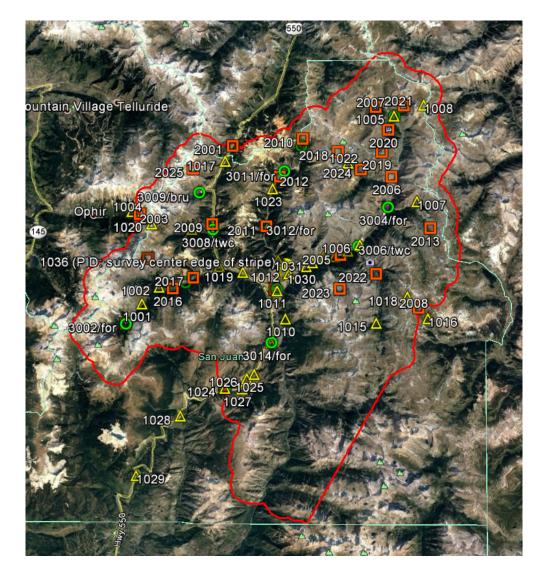
```
HL0433 STAMPING: Z 439 1985
HL0433 MARK LOGO: NGS
HL0433 PROJECTION: FLUSH
HL0433 MAGNETIC: O = OTHER; SEE DESCRIPTION
HL0433 STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
HL0433+STABILITY: SURFACE MOTION
HL0433 SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
HL0433+SATELLITE: SATELLITE OBSERVATIONS - May 29, 2014
HT.0433
HL0433 HISTORY
                   - Date
                               Condition
                                                Report By
HL0433 HISTORY
                    - 1985
                               MONUMENTED
                                                NGS
HL0433 HISTORY
                    - 19910706 GOOD
                                                USPSOD
HL0433 HISTORY
                    - 19980715 GOOD
                                                CODOT
HL0433 HISTORY
                    - 20090723 GOOD
                                                GEOCAC
HL0433 HISTORY
                    - 20140529 GOOD
                                                WOOLPT
HL0433
HL0433
                                STATION DESCRIPTION
HL0433
HL0433'DESCRIBED BY NATIONAL GEODETIC SURVEY 1985
HL0433'10.4 KM (6.45 MI) NORTH FROM SILVERTON.
HL0433'10.4 KM (6.45 MI) NORTHERLY ALONG U.S. HIGHWAY 550 FROM ITS JUNCTION
HL0433'WITH STATE HIGHWAY 110 IN SILVERTON, NEAR THE CENTER OF THE SOUTHERN
HL0433'HALF OF A 6- BY 10-FOOT EXPOSED AREA OF BEDROCK IN A HIGHWAY CUT,
HL0433'0.5 KM (0.3 MI) SOUTH OF MILEPOST 77, AND 12.4 M (40.7 FT) EAST OF THE
HL0433'CENTERLINE OF THE NORTHBOUND LANES OF THE HIGHWAY.
HL0433'THE MARK IS 0.3 METERS W FROM A WITNESS POST
HL0433'THE MARK IS 1.5 M ABOVE THE HIGHWAY.
HL0433
HL0433
                                STATION RECOVERY (1991)
HL0433
HL0433'RECOVERY NOTE BY US POWER SQUADRON 1991 (WLR)
HL0433'RECOVERED IN GOOD CONDITION.
HL0433
HL0433
                                STATION RECOVERY (1998)
HL0433
HL0433'RECOVERY NOTE BY COLORADO DEPARTMENT OF TRANSPORTATION 1998 (RSC)
HL0433'THE STATION IS LOCATED ABOUT 11 MI (17.7 KM) SOUTH OF OURAY, 5 MI (8.0
HL0433'KM) NORTH-NORTHWEST OF SILVERTON AND 3 MI (4.8 KM) SOUTH OF RED
HL0433'MOUNTAIN PASS, AT U. S. HIGHWAY 550 MILEPOST 76.75.
HL0433'OWNERSHIP--COLORADO DEPT. OF TRANSPORTATION RIGHT-OF-WAY TO REACH THE
HL0433'STATION FROM THE INTERSECTION OF STATE HIGHWAY 110 AND U. S. HIGHWAY
HL0433'550 IN SILVERTON, GO NORTHERLY FOR 6.45 MI (10.38 KM) TO THE STATION
HL0433'ON THE RIGHT IN THE MIDDLE OF A LARGE ROADCUT THE MARK IS A STANDARD
HL0433'DISK SET INTO THE TOP OF A LARGE BROWN BOULDER MEASURING 2.3 M (7.5
HL0433'FT) BY 1.5 M.IT IS 15.2 M (49.9 FT) EAST FROM THE CENTER LINE OF U.
HL0433'S. HIGHWAY 550, 1.4 M (4.6 FT) NORTHWEST FROM A WITNESS POST AND
HL0433'ABOUT 1.4 M (4.6 FT) ABOVE THE HIGHWAY.
HL0433
HL0433
                                STATION RECOVERY (2009)
HL0433
HL0433'RECOVERY NOTE BY GEOCACHING 2009 (TFW)
HL0433'RECOVERED IN GOOD CONDITION.
HL0433
HL0433
                                STATION RECOVERY (2014)
```

HL0433'RECOVERY NOTE BY WOOLPERT CONSULTANTS 2014 (ZJH) HL0433'RECOVERED AS DESCRIBED.

Section 5: GPS Control Diagram

This section contains a graphical representation of the new and existing control stations used for the project.

Overview of Control Network





Not to Scale