

**Ground Control Point Survey Report**  
**Texas West & Central QL2 LiDAR Project**

**Contract # G16PC00020**  
**Task Order Number: 140G0218F0072**

**Prepared for:**  
***USGS – United States Geological Survey***



Prepared By:  
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## TABLE OF CONTENTS

1.	Introduction	
1.1	Project Summary .....	3
1.2	Points of Contact(s) .....	3
1.3	Project Area .....	4-16
2.	Project Details	
2.1	Survey Equipment.....	17
2.2	Survey Point Details.....	17
2.3	Network Design.....	17
2.4	Field Survey Procedures and Analysis.....	18-20
2.5	Adjustment.....	21
2.6	Data processing Procedures.....	21
3.	Final Coordinates.....	22-37
4.	GPS Observation & Re-Observation Schedule.....	38-48
5.	Point Comparison Report.....	49-59
6.	Deliverables.....	Sent via Electronic Transfer
	Including: a) Point Documentation Report & Photos of Survey Points	
	b) Final Coordinate List in Excel Format	
	c) NGS Data Sheets for Project Controls	

# 1. INTRODUCTION

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## 1.1 *Project Summary*

Dewberry Engineers Inc. is under contract to USGS United States Geological Survey to provide 371 Ground Control Points in the States of Texas. Under the above referenced USGS Task Order, Dewberry is tasked to complete the quality assurance of LiDAR mapping products. As part of this work Dewberry staff will complete Ground Control Point surveys that will be used to evaluate the mapping accuracy. The ground survey was conducted between the dates of March 4, 2018 and March 16, 2018.

Existing NGS Control Points were located and surveyed to check the accuracy of the RTK/GPS survey equipment with the results shown in Section 2.4 of this Report.

As an internal QA/QC procedure and to verify that the Check Points meet the 95% confidence level approximately 50% of the points were re-observed and are shown in Section 5 of this report.

Final horizontal coordinates are referenced to UTM Zone 13, NAD83 (2011) in meters. Final Vertical elevations are referenced to NAVD88 in meters using Geoid model 2012B (Geoid12B).

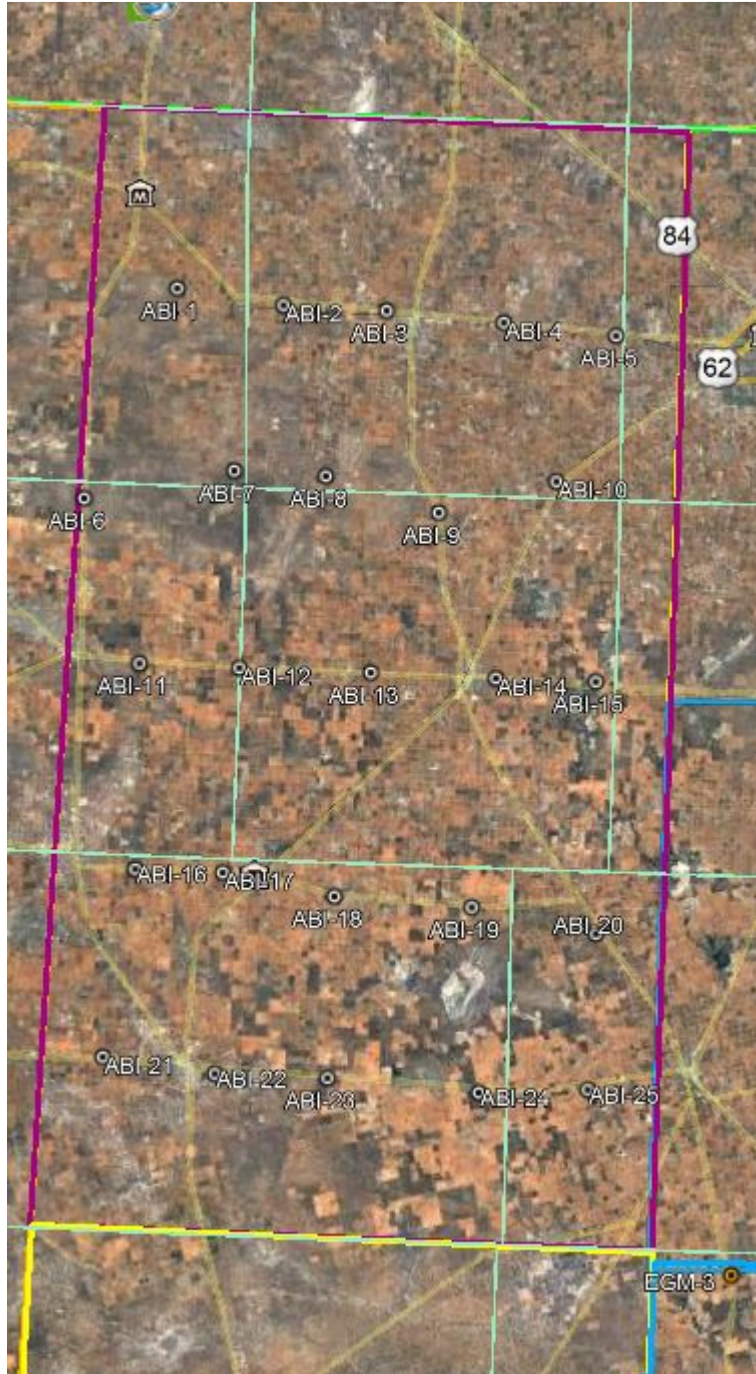
## 1.2 *Points of Contact*

Questions regarding the technical aspects of this report should be addressed to:

### **Dewberry Engineers Inc.**

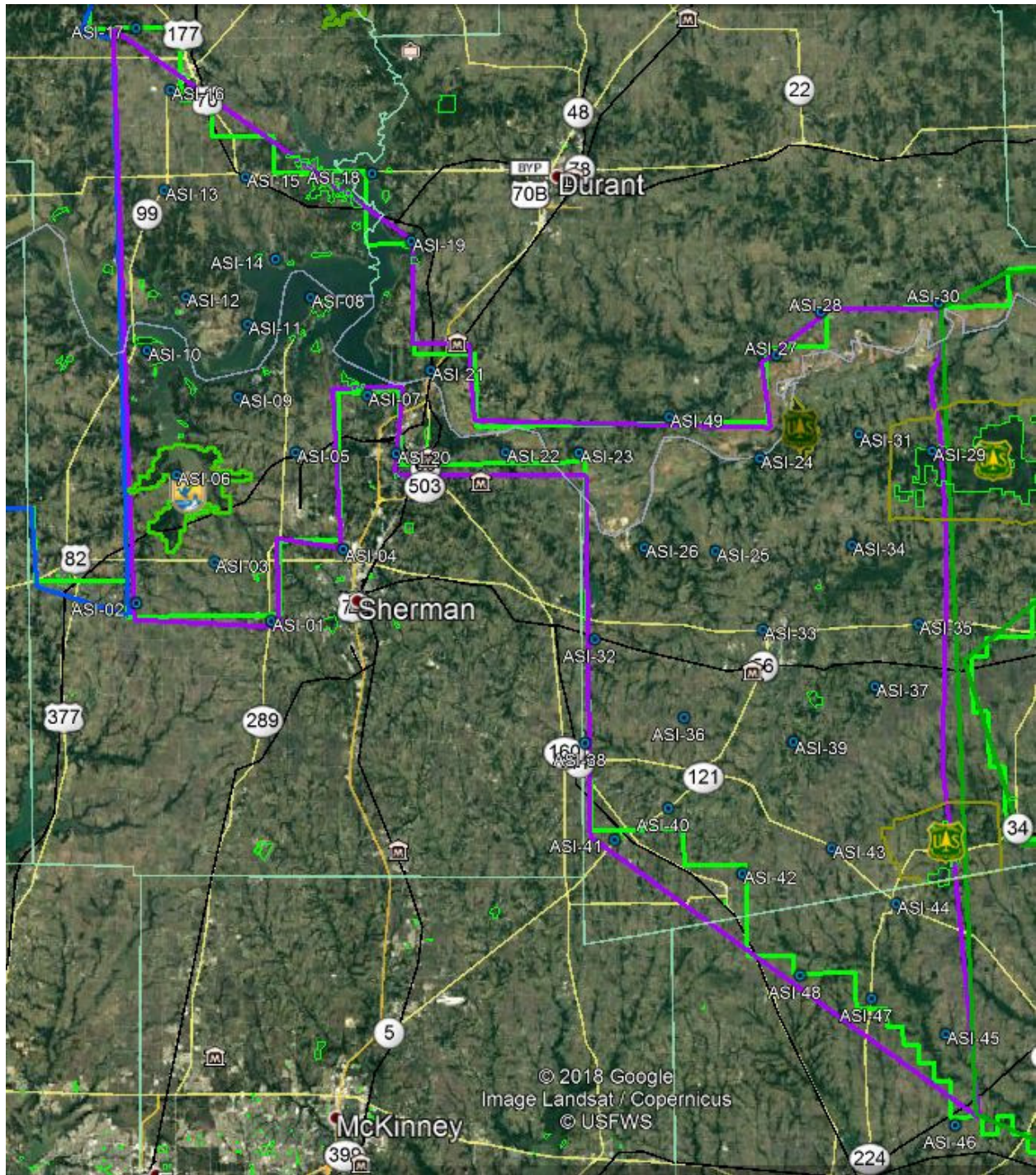
Gary D. Simpson, L.S.  
Senior Associate  
4601 Forbes Boulevard  
Suite 300  
Lanham, Maryland 20706  
(301) 364-1855 direct

### 1.3 *Project Areas*



***Airborne Imaging***





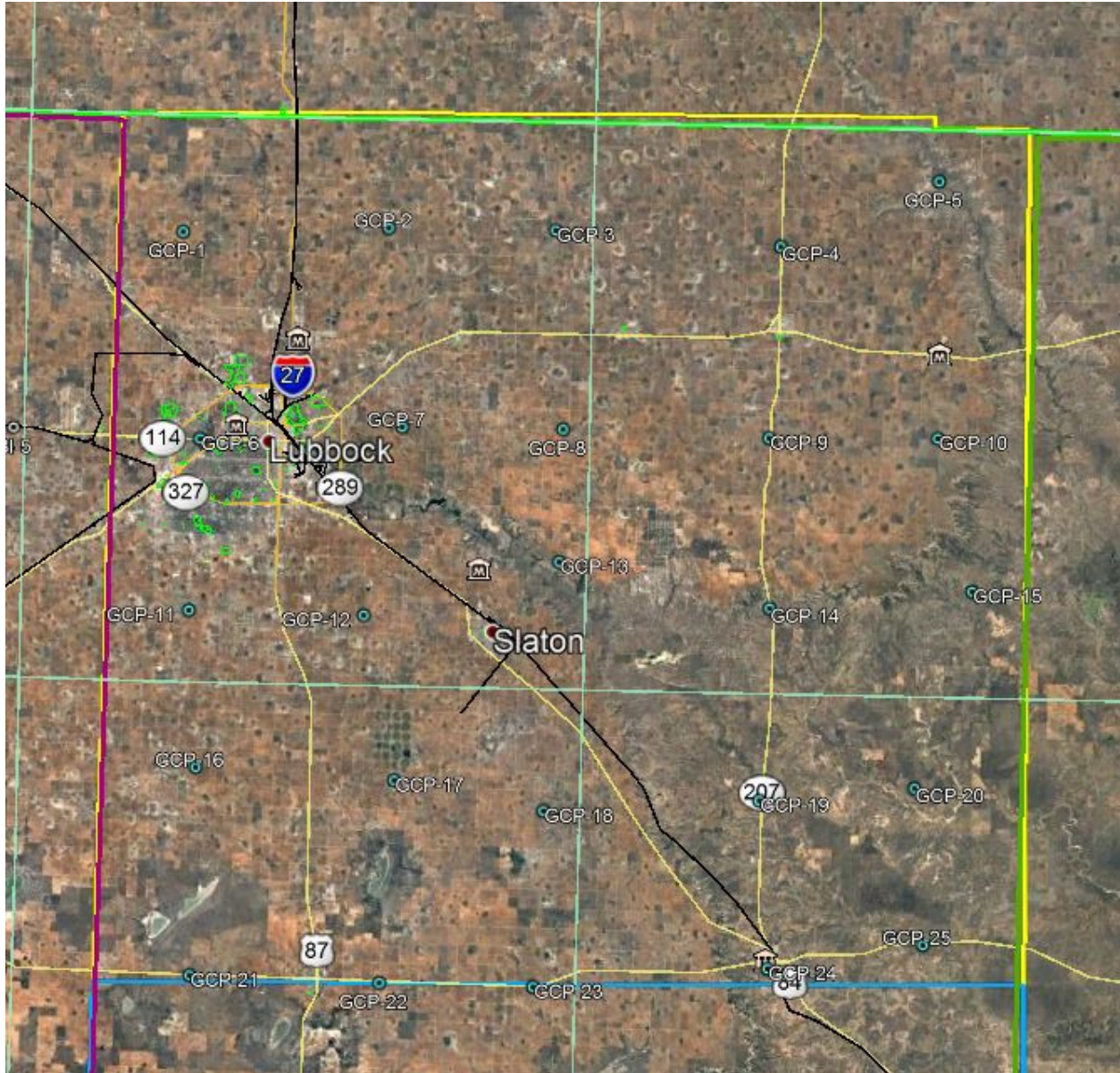
***Aerial Services, Inc.***





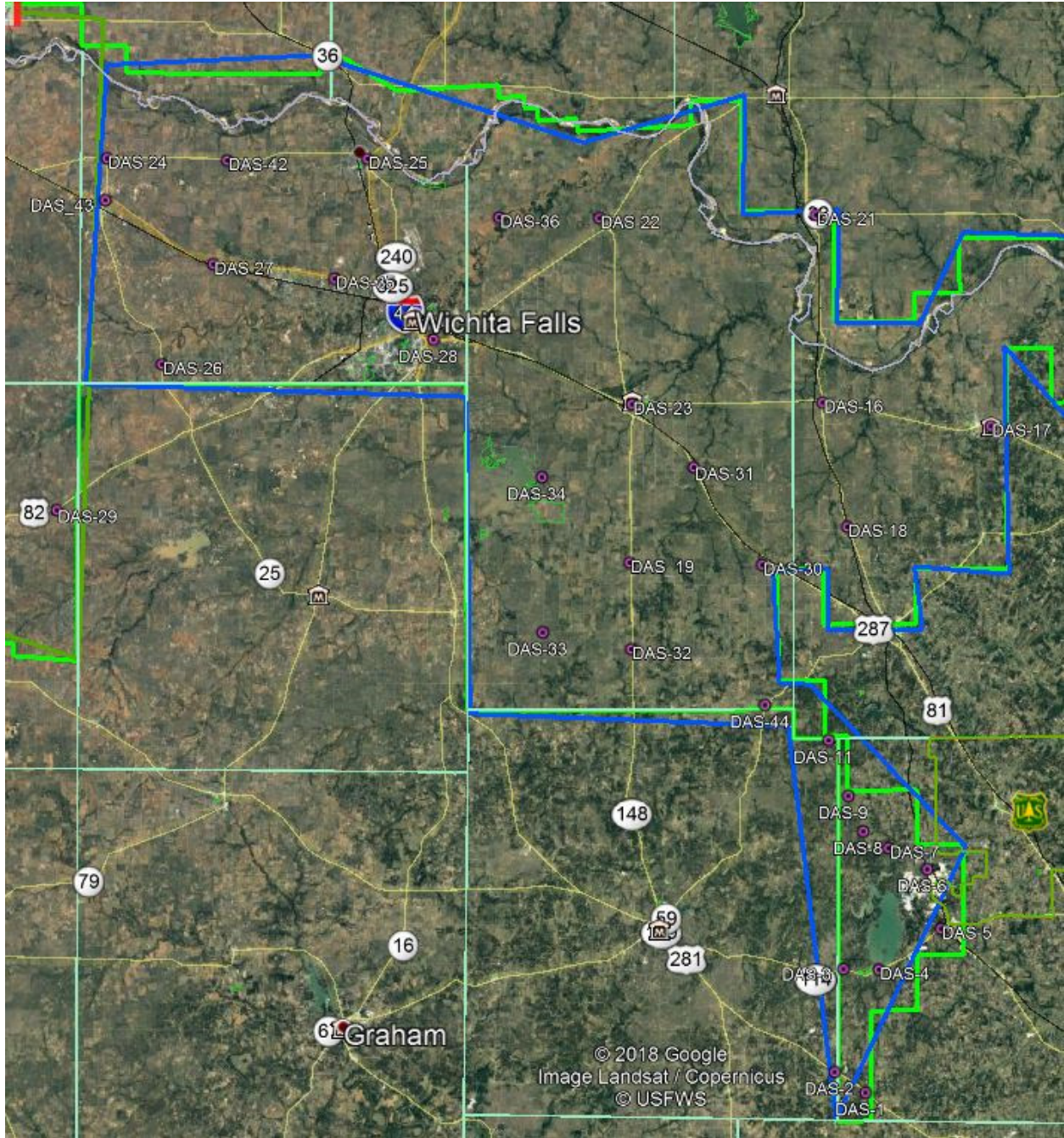
***Axis Geospatial***





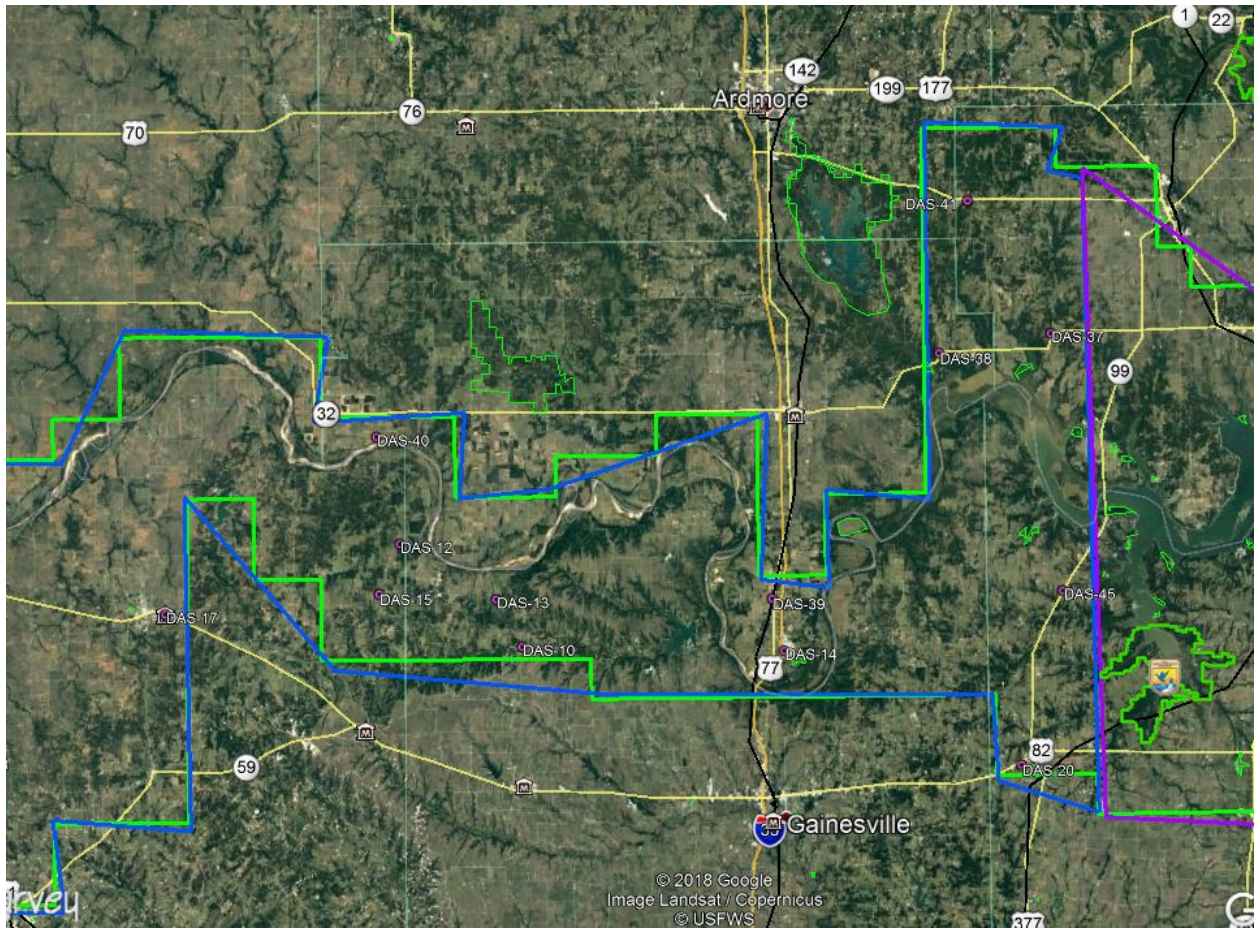
***Axis Geospatial***





***Digital Aerial Solutions***



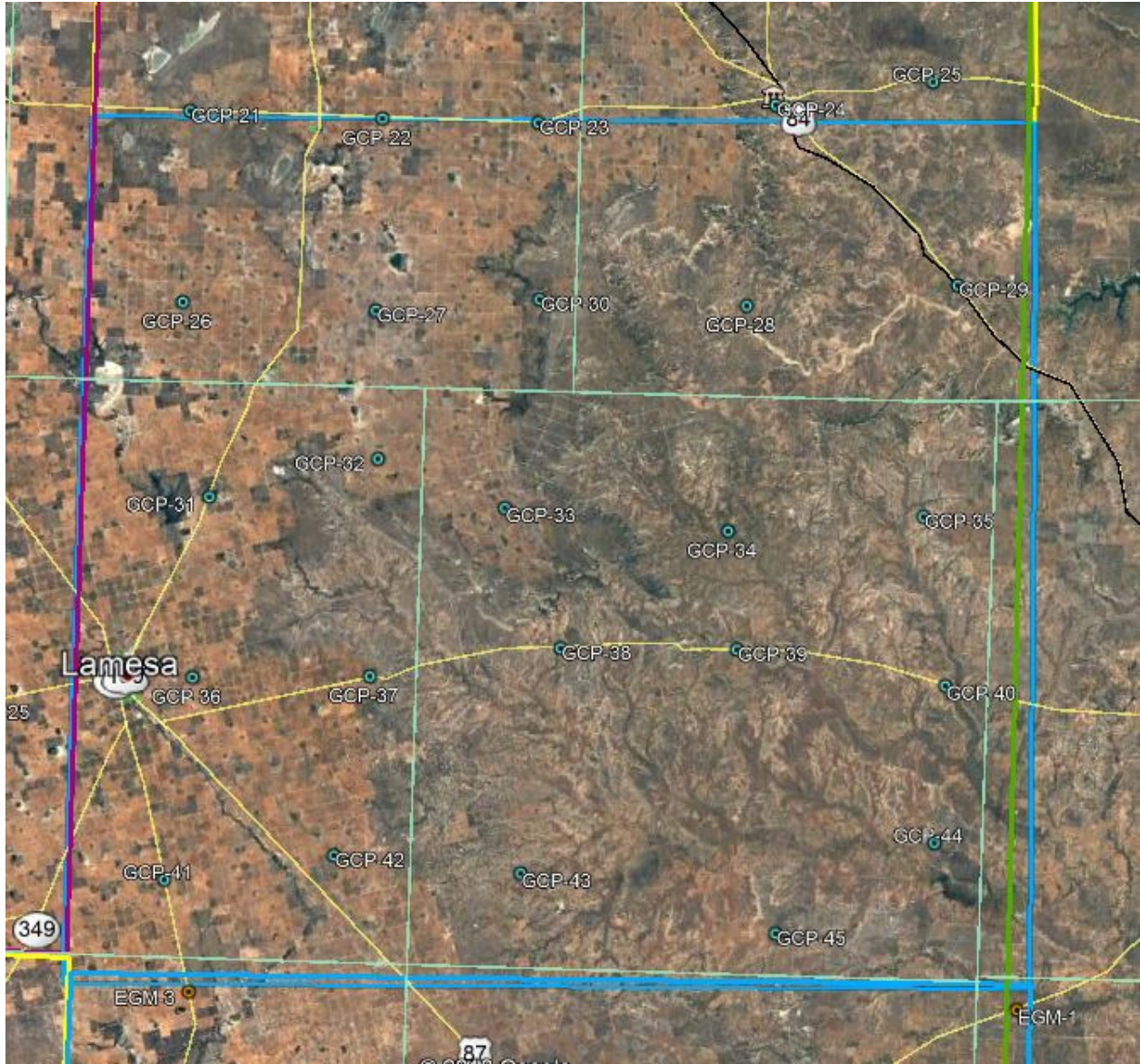


***Digital Aerial Solutions***



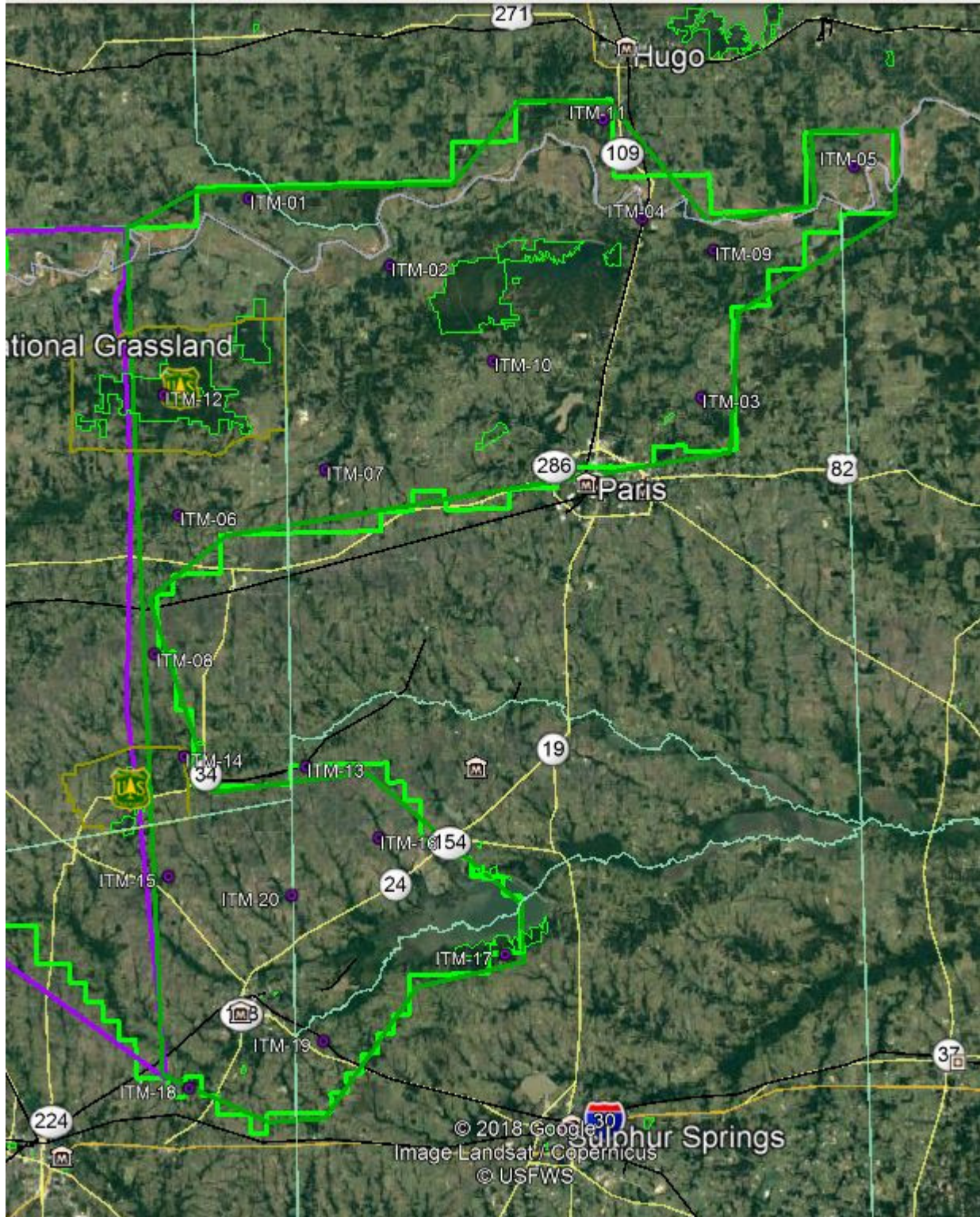
***Eagle Mapping***





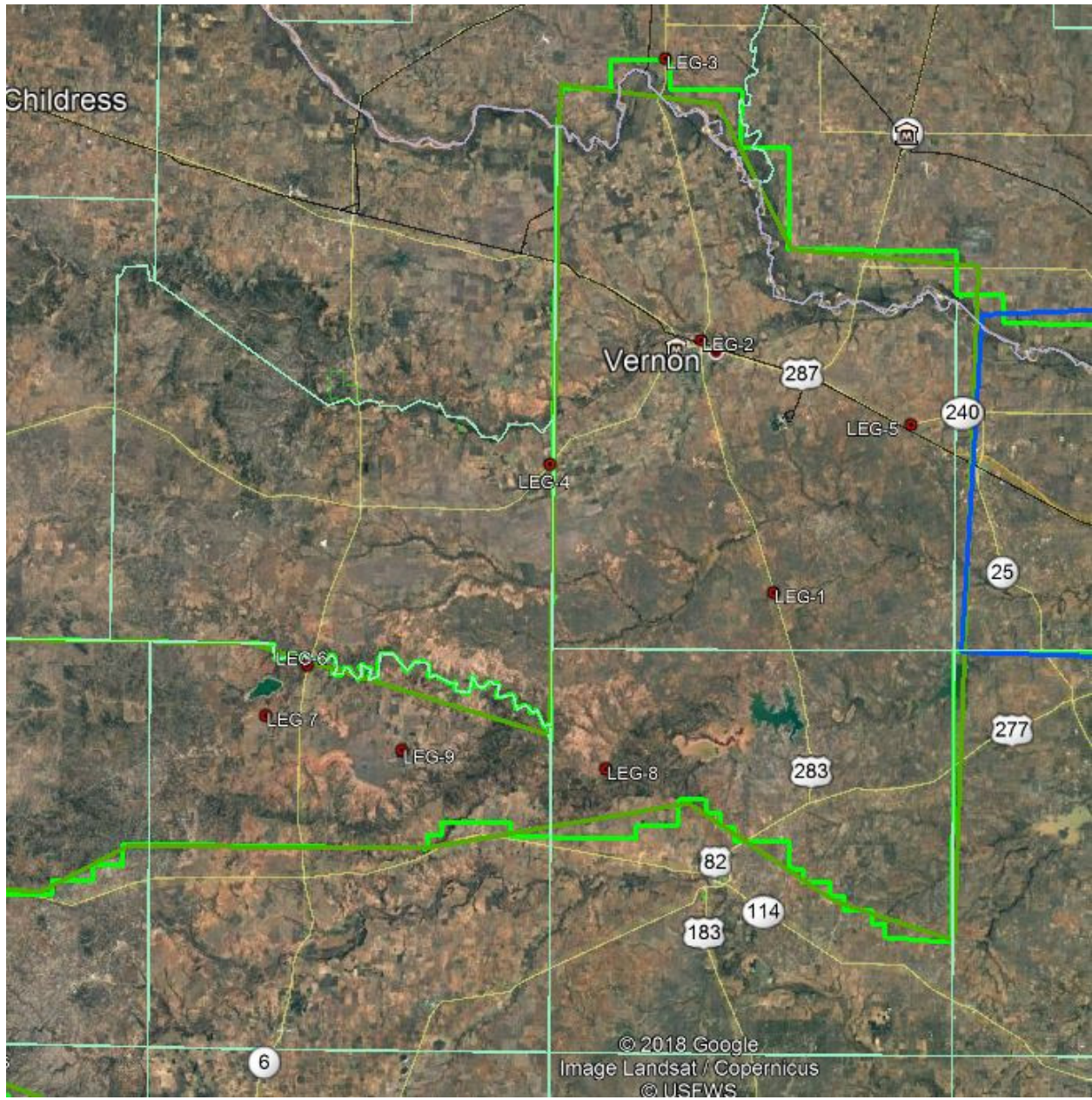
***Eagle Mapping***





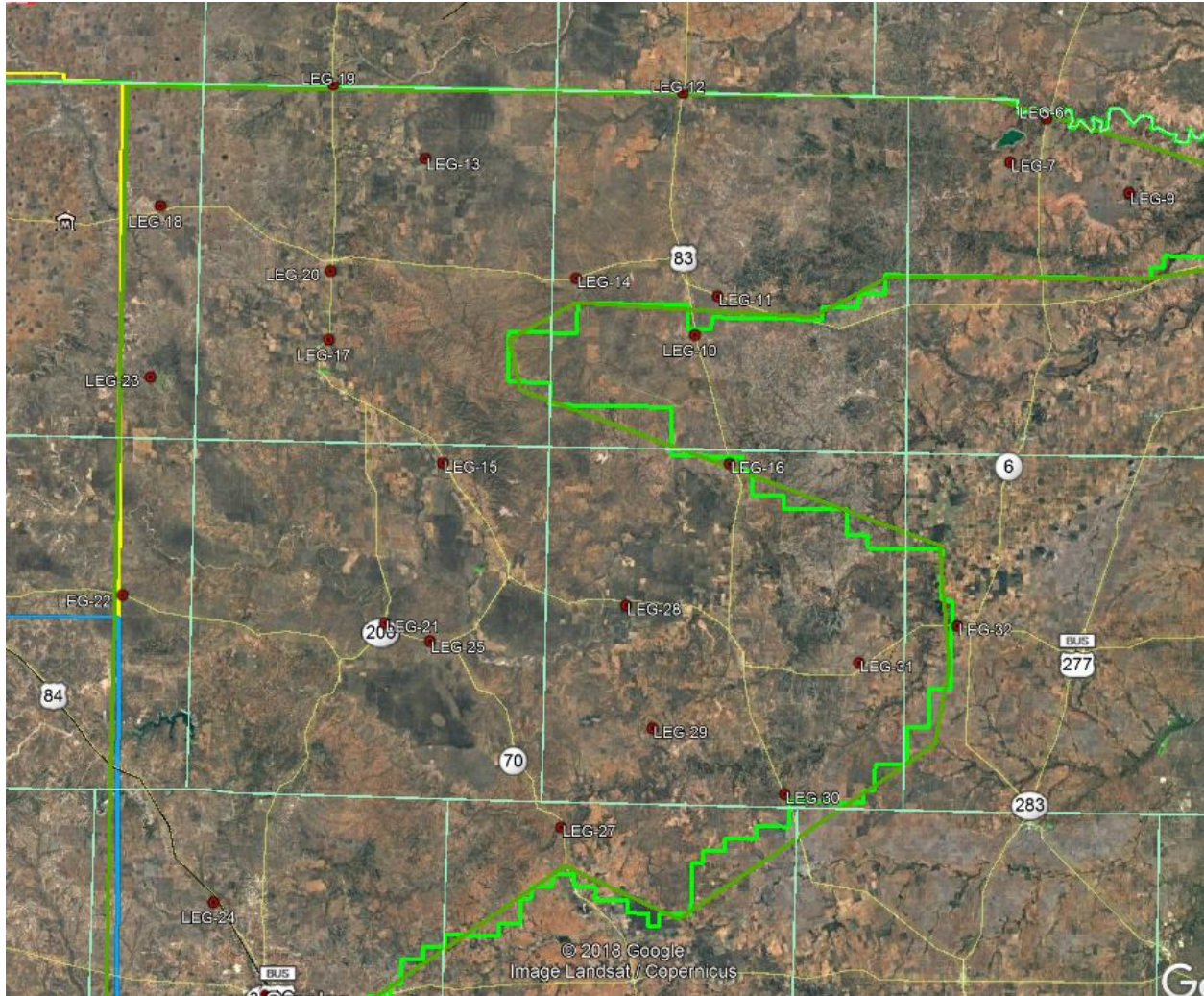
*Intermap*





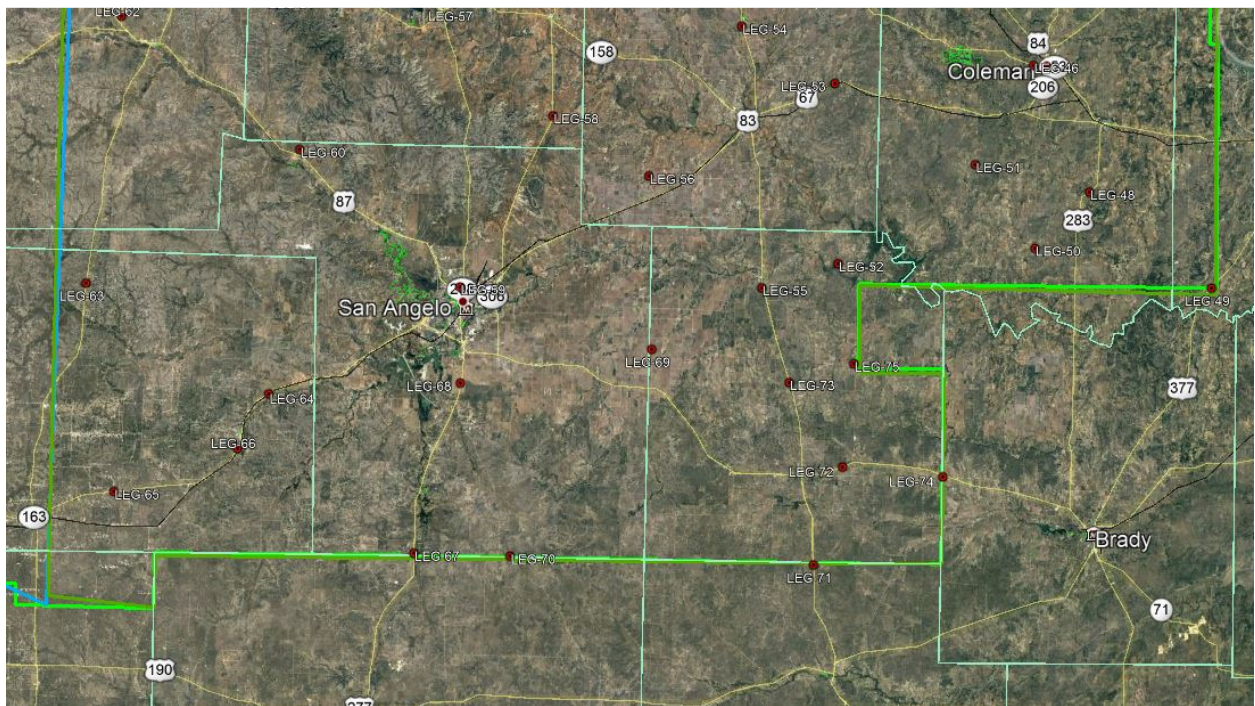
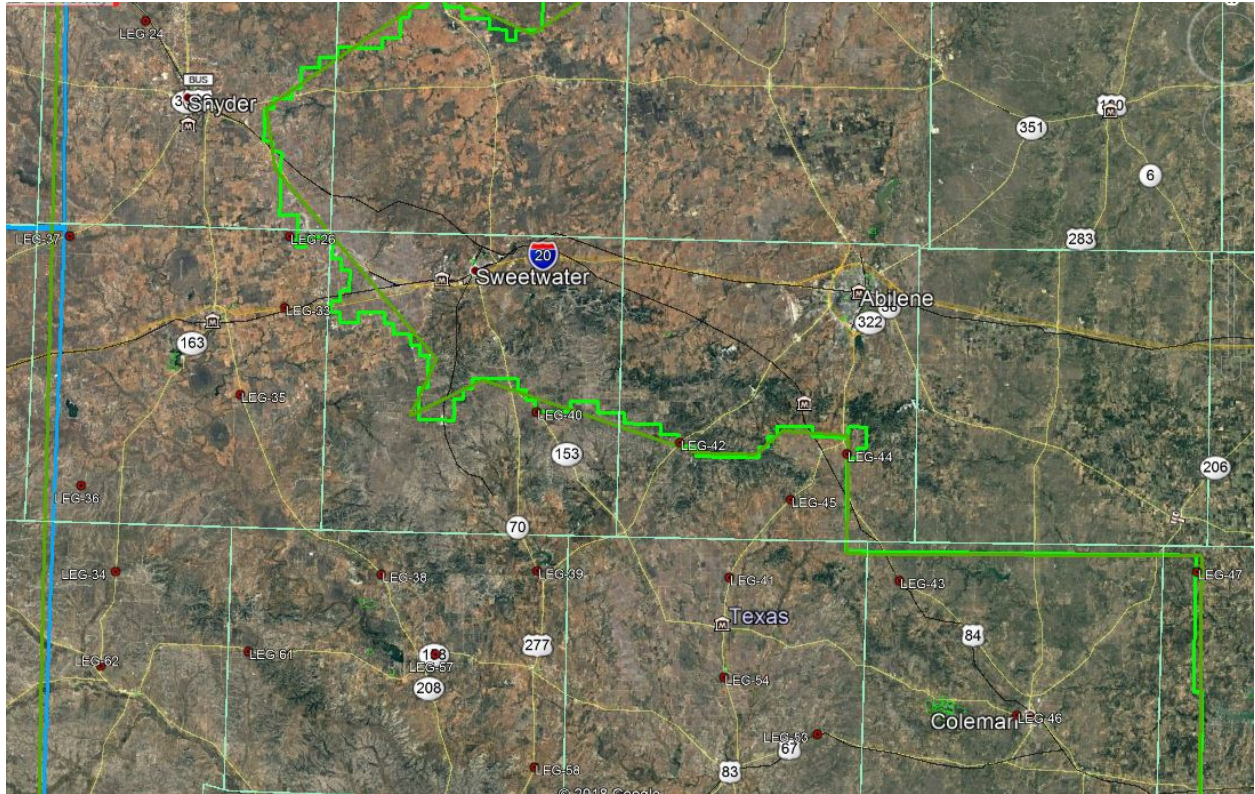
***Leading Edge Geomatics***





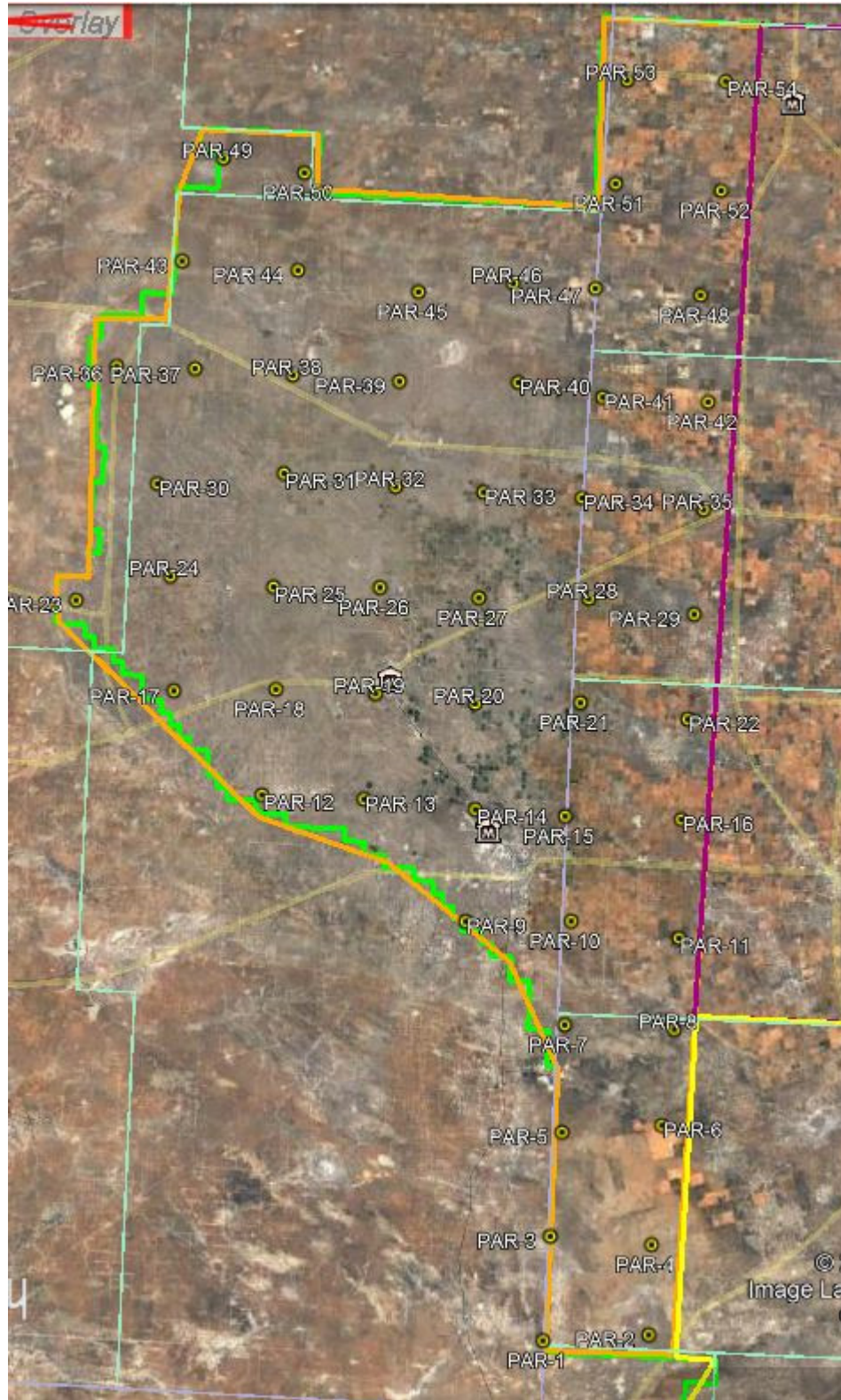
***Leading Edge Geomatics***





**Leading Edge Geomatics**





***Precision Aerial Reconnaissance***



## **PROJECT DETAILS**

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### **2.1 *Survey Equipment***

In performing the GPS observations Trimble R-10 GNSS receiver/antenna attached to a two meter fixed height pole with a Trimble TSC3 Data Collector to collect GPS raw data were used to perform the field surveys.

### **2.2 *Survey Point Detail***

The 371 Ground Control Points were well distributed throughout the project area.

A sketch was made for each location and a nail was set at the point where possible or at an identifiable point. The Ground Control Point locations are detailed on the “Check Point Documentation Report” sheets attached to this report.

### **2.3 *Network Design***

The GPS survey performed by Dewberry Engineers Inc. office located in Lanham, MD was tied to a Real Time Network operated by Texas DOT. The network is a series of “real-time” continuously operating, high precision GPS reference stations. All of the reference stations have been linked together using Trimble GPSNet software, creating a Virtual Reference Station System (VRS).

The Trimble NetR5 Reference Station is a multi-channel, multi-frequency GNSS (Global Navigation Satellite System) receiver designed for use as a stand-alone reference station or as part of a GNSS infrastructure solution. Trimble R-Track technology in the NetR5 receiver supports the modernized GPS L2C and L5 signals as well as GLONASS L1/L2 signals.

## 2.4 Field Survey Procedures and Analysis

Dewberry field surveyors used Trimble R-10 GNSS receivers, which is a geodetic quality dual frequency GPS receiver, to collect data at each surveyed location.

All locations were occupied once with approximately 50% of the locations being re-observed. All re-observations matched the initially derived station positions within the allowable tolerance of  $\pm 5\text{cm}$  or within the 95% confidence level. Each occupation which utilized the VRS network was occupied for approximately three (3) minutes in duration and measured to 180 epochs.

Each occupation which utilized OPUS (if used) was occupied between 20 and 30 minutes.

Field GPS observations are detailed on the “Check Point Documentation Reports” submitted as part of this report.

Twenty-nine (29) existing NGS monument listed in the NSRS database were located for the Texas areas as an additional QA/QC method to check the horizontal and vertical accuracy of the VRS network as well as being the primary project control monuments.

The results are as follows:

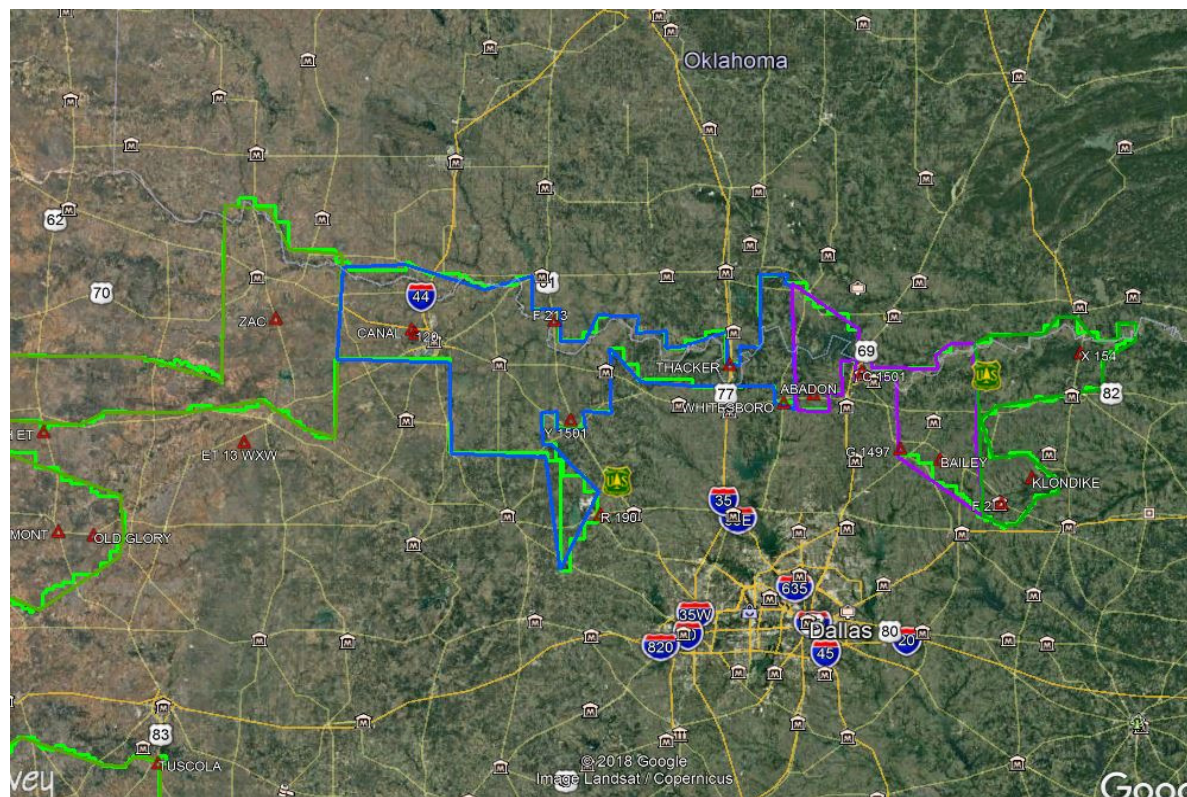
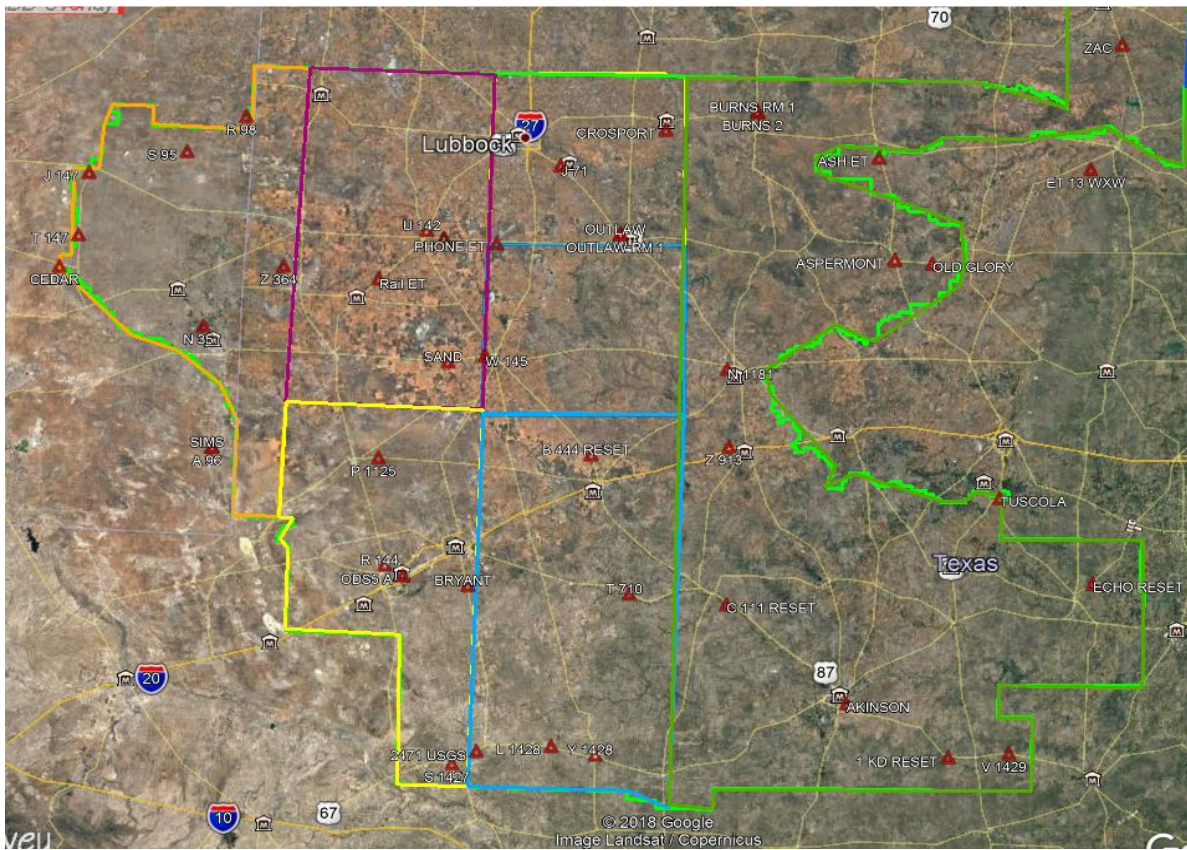
PT. #	Observed Values			Data Sheet Values			$\Delta X$	$\Delta Y$	$\Delta Z$
	NORTHING (m)	EASTING (m)	ELEV. (m)	NORTHING (m)	EASTING (m)	ELEV. (m)			
SAND	3622053.893	766797.500	927.649	3622053.881	766797.503	927.700	0.012	-0.003	-0.051
U142	3677753.362	754497.407	1013.943	3677753.394	754497.396	1013.943	-0.032	0.011	0.000
BAILY	3701343.430	762007.121	222.536	3701343.408	762007.074	N/A	0.022	0.047	N/A
C1501	3739672.385	728478.009	199.351	N/A	N/A	199.388	N/A	N/A	-0.037
G1497	3706007.577	744976.282	227.295	N/A	N/A	227.289	N/A	N/A	0.006
R144	3533680.039	746357.828	898.925	3533680.037	746357.819	898.922	0.002	0.009	0.003
ODS5A	3529400.423	753990.029	876.879	3529400.441	753990.034	876.912	-0.018	-0.005	-0.033
CROSPORT	3722715.202	292152.436	918.777	3722715.194	292152.415	918.750	0.008	0.021	0.027
J71	3707170.834	249469.622	958.555	3707170.861	249469.668	958.516	-0.027	-0.046	0.039
OUTLAW	3677779.536	273899.148	893.935	3677779.541	273899.187	893.895	-0.005	-0.039	0.040
CANAL	3757220.608	537089.373	314.396	3757220.589	537089.336	N/A	0.019	0.037	N/A
THACKER	3742479.263	672160.218	270.224	3742479.273	672160.204	N/A	-0.010	0.014	N/A
WHITESBORO	3725882.469	695223.106	240.838	3725882.451	695223.134	240.890	0.018	-0.028	-0.052
L1428	3458265.338	246930.333	822.058	N/A	N/A	822.025	N/A	N/A	0.033
Y1428	3454761.373	264942.044	821.716	3454761.363	264942.040	821.739	0.010	0.004	-0.023
2471USGS	3455865.115	216531.742	753.355	N/A	N/A	753.403	N/A	N/A	-0.048
DM1429	3727646.385	257459.07	174.787	3727646.387	257459.091	N/A	-0.002	-0.023	N/A
PRXE	3724087.783	272219.29	159.814	3724087.753	272219.309	159.840	0.030	-0.016	-0.026
AKINSON	3477092.323	366675.924	574.118	3477092.328	366675.912	574.152	-0.005	0.012	-0.034
C111RESET	3519550.030	317672.597	687.920	N/A	N/A	687.93	N/A	N/A	-0.010
ET13WXW	3707338.067	465714.632	431.912	3707338.012	465714.626	431.87	0.055	0.006	0.042
TUSCOLA	3565493.125	428629.948	613.822	3565493.125	428629.952	613.862	0.000	-0.004	-0.040



V1429	3455756.274	433361.34	596.922	N/A	N/A	596.93	N/A	N/A	-0.008
VERNPORT	3787268.059	473961.59	382.651	3787268.018	473961.573	382.61	0.041	0.013	0.041
Z913	3587090.48	318419.79	672.539	3587090.508	318419.731	672.526	-0.028	0.058	0.013
S95	3706100.398	654282.643	1249.910	N/A	N/A	1249.867	N/A	N/A	0.043
J147	3694916.564	614341.163	1366.439	3694916.601	614341.374	1366.380	-0.037	-0.211	0.059
N35	3631441.335	665979.254	1134.418	N/A	N/A	1134.368	N/A	N/A	0.050
A96	3579717.518	672798.964	1017.996	3579717.508	672798.968	1018.057	0.010	-0.004	-0.061

The above results indicate that the VRS network is providing positional values within the 5cm parameters for this survey.

# NGS Monuments





## **2.5 Adjustment**

The survey data was collected using Virtual Reference Stations (VRS) methodology within a Virtual Reference System (VRS).

The system is designed to provide a true Network RTK performance, the RTKNet software enables high-accuracy positioning in real time across a geographic region. The RTKNet software package uses real-time data streams from Texas DOT system user and generates correction models for high-accuracy RTK GPS corrections throughout the network. Therefore, corrections were applied to the points as they were being collected, thus negating the need for a post process adjustment.

## **2.6 Data Processing Procedures**

After field data is collected the information is downloaded from the data collectors into the office software. The Software program used is called TBC or Trimble Business Center.

Downloaded data is run through the TBC program to obtain the following reports; points report, point comparison report and a point detail report. The reports are reviewed for point accuracy and precision.

After review of the point data an “ASCII” or “txt” file which is the industry standard is created. Point files are loaded into our CADD program (Carlson Survey 2017) to make a visual check of the point data (Pt. #, Coordinates, Elev. and Description). The data can now be imported into the final product.

### 3. FINAL COORDINATES

<b>TEXAS WEST &amp; CENTRAL LIDAR 2018</b>			
<b>Ground Control Points</b>			
<b>Airborne Imaging</b>			
<b>UTM Zone 13 North NAD83 (2011), Meters</b>			
<b>POINT ID</b>	<b>NORTHING (m)</b>	<b>EASTING (m)</b>	<b>ELEVS. (m)</b>
ABI-1	3722160.415	713200.280	1141.121
ABI-2	3720853.161	727014.203	1108.256
ABI-3	3720991.850	740333.001	1079.920
ABI-4	3720419.841	755510.323	1047.569
ABI-5	3719682.575	770067.857	1014.703
ABI-6	3694478.709	702968.344	1137.908
ABI-7	3699223.936	722037.830	1103.818
ABI-8	3699278.935	733859.415	1074.939
ABI-9	3695499.905	748700.200	1047.024
ABI-10	3700471.171	763554.578	1024.735
ABI-11	3673794.223	711417.932	1104.418
ABI-12	3674039.524	724293.405	1071.544
ABI-13	3674467.715	741249.346	1030.554
ABI-14	3674759.105	757367.237	1005.711
ABI-15	3675143.113	770257.008	972.716
ABI-16	3647405.404	712540.356	1056.803
ABI-17	3647668.730	723832.669	1033.550
ABI-18	3645517.025	738376.183	995.530
ABI-19	3645204.857	756122.833	960.989
ABI-20	3642805.742	772279.071	943.217
ABI-21	3623053.314	709877.605	1028.059
ABI-22	3621820.418	724426.955	995.230
ABI-23	3622144.727	738949.741	969.141
ABI-24	3621509.975	758523.355	926.520
ABI-25	3622760.320	772540.177	913.476
ABI-CONTROL	3674833.115	761746.989	996.375
<b>UTM Zone 14 North NAD83 (2011), Meters</b>			
<b>POINT ID</b>	<b>NORTHING (m)</b>	<b>EASTING (m)</b>	<b>ELEVS. (m)</b>
ABI-1	3725940.596	156529.373	1141.121
ABI-2	3723832.969	170255.237	1108.256



ABI-3	3723199.045	183567.847	1079.920
ABI-4	3721747.819	198692.835	1047.569
ABI-5	3720168.022	213186.311	1014.703
ABI-6	3698870.329	144703.010	1137.908
ABI-7	3702511.786	164032.009	1103.818
ABI-8	3701884.526	175845.386	1074.939
ABI-9	3697254.002	190451.282	1047.024
ABI-10	3701362.122	205572.269	1024.735
ABI-11	3677713.385	151957.101	1104.418
ABI-12	3677219.778	164836.448	1071.544
ABI-13	3676674.959	181800.035	1030.554
ABI-14	3676041.730	197914.888	1005.711
ABI-15	3675686.210	210808.307	972.716
ABI-16	3651278.687	151569.359	1056.803
ABI-17	3650898.036	162868.068	1033.549
ABI-18	3647919.651	177275.305	995.530
ABI-19	3646597.284	194983.576	960.989
ABI-20	3643282.147	210980.788	943.217
ABI-21	3627093.829	147523.944	1028.059
ABI-22	3625037.379	161993.001	995.230
ABI-23	3624538.813	176520.835	969.141
ABI-24	3622796.588	196035.950	926.520
ABI-25	3623251.833	210104.128	913.476
ABI-CONTROL	3675864.531	202292.899	996.375

**Aerial Services, Inc.**

UTM Zone 14 North NAD83 (2011), Meters

POINT ID	NORTHING (m)	EASTING (m)	ELEVS. (m)
ASI-01	3722442.031	713750.142	261.740
ASI-02	3724045.507	700945.721	230.877
ASI-03	3727959.062	708275.869	221.388
ASI-04	3729233.929	720494.556	248.286
ASI-05	3738317.459	715934.698	228.102
ASI-06	3736146.265	704670.691	196.347
ASI-07	3743701.658	722600.326	219.421
ASI-08	3752623.272	717421.436	209.719
ASI-09	3743597.810	710425.349	235.533
ASI-10	3747829.892	701788.705	216.613
ASI-11	3750338.671	711295.109	200.247

ASI-12	3752926.847	705422.185	216.990
ASI-13	3762917.137	703303.698	249.274
ASI-14	3756497.773	713889.679	200.896
ASI-15	3764194.360	711065.198	245.028
ASI-16	3772387.886	703839.252	254.792
ASI-17	3778207.900	700511.447	280.597
ASI-18	3764628.868	722942.448	196.140
ASI-19	3758256.383	726733.155	194.560
ASI-20	3738261.896	725453.261	236.393
ASI-21	3746116.833	728641.794	176.743
ASI-22	3738453.524	735785.000	189.109
ASI-23	3738466.732	742737.506	176.613
ASI-24	3737974.100	759855.932	161.206
ASI-25	3729280.697	755694.819	183.379
ASI-26	3729599.335	748968.723	167.257
ASI-27	3747788.267	761299.415	155.283
ASI-28	3751883.694	765521.138	158.842
ASI-29	3738341.653	776131.585	155.905
ASI-30	3752803.366	776676.151	139.848
ASI-31	3740411.482	769168.130	181.850
ASI-32	3720933.722	744329.184	205.659
ASI-33	3721942.682	760216.395	193.039
ASI-34	3729944.625	768592.204	178.652
ASI-35	3722304.139	772986.665	190.108
ASI-36	3713625.374	752812.383	222.192
ASI-37	3716652.159	770853.830	199.413
ASI-38	3711165.381	742890.361	230.569
ASI-39	3711416.544	763170.751	195.587
ASI-40	3705090.664	751376.020	207.289
ASI-41	3702095.654	746324.156	230.258
ASI-42	3698988.659	758441.626	217.210
ASI-43	3701426.755	766871.683	205.289
ASI-44	3696235.942	772995.755	206.591
ASI-45	3683970.446	777779.318	168.760
ASI-46	3675290.844	779633.762	169.073
ASI-47	3687307.166	770727.848	191.524
ASI-48	3689427.607	763944.011	205.389
ASI-49	3741890.144	751232.458	188.603



UTM Zone 15 North NAD83 (2011), Meters			
POINT ID	NORTHING (m)	EASTING (m)	ELEVS. (m)
ASI-01	3726190.072	157095.144	261.740
ASI-02	3728535.875	144392.937	230.877
ASI-03	3732020.863	151945.514	221.388
ASI-04	3732584.450	164228.352	248.286
ASI-05	3741925.397	160201.078	228.102
ASI-06	3740412.011	148819.270	196.347
ASI-07	3746916.221	167174.573	219.421
ASI-08	3756132.039	162521.339	209.719
ASI-09	3747522.632	155004.046	235.533
ASI-10	3752255.788	146620.688	216.613
ASI-11	3754207.388	156266.670	200.247
ASI-12	3757136.861	150549.500	216.990
ASI-13	3767244.016	149017.366	249.274
ASI-14	3760209.725	159219.220	200.896
ASI-15	3768065.337	156847.818	245.028
ASI-16	3776676.543	150108.224	254.792
ASI-17	3782688.039	147124.878	280.597
ASI-18	3767803.300	168739.887	196.140
ASI-19	3761215.191	172153.621	194.560
ASI-20	3741315.412	169707.711	236.393
ASI-21	3748976.574	173350.958	176.743
ASI-22	3740905.118	180039.774	189.109
ASI-23	3740513.462	186984.937	176.613
ASI-24	3739024.982	204051.905	161.206
ASI-25	3730585.802	199391.225	183.379
ASI-26	3731294.742	192692.612	167.257
ASI-27	3748740.686	206065.094	155.283
ASI-28	3752583.566	210519.433	158.842
ASI-29	3738444.864	220323.579	155.905
ASI-30	3752850.512	221710.089	139.848
ASI-31	3740916.620	213491.899	181.850
ASI-32	3722909.256	187555.916	205.659
ASI-33	3722995.709	203480.603	193.039
ASI-34	3730499.655	212308.234	178.652
ASI-35	3722616.276	216252.415	190.108
ASI-36	3715118.745	195604.991	222.192
ASI-37	3717096.838	213795.545	199.413

ASI-38	3713235.956	185553.045	230.569
ASI-39	3712313.724	205821.166	195.587
ASI-40	3706678.228	193677.054	207.289
ASI-41	3703978.680	188458.590	230.258
ASI-42	3700176.595	200381.056	217.210
ASI-43	3702124.947	208939.603	205.289
ASI-44	3696589.056	214755.002	206.591
ASI-45	3684068.035	218825.331	168.760
ASI-46	3675296.222	220178.732	169.073
ASI-47	3687804.693	211976.754	191.524
ASI-48	3690312.119	205324.970	205.389
ASI-49	3743437.729	195668.458	188.603

### Axis Geospatial

UTM Zone 13 North NAD83 (2011), Meters

POINT ID	NORTHING (m)	EASTING (m)	ELEVS. (m)
AXG-1	3441396.799	785429.823	711.624
AXG-2	3447019.832	765181.588	742.686
AXG-3	3473099.227	781415.592	825.207
AXG-4	3487023.014	757953.554	809.163
AXG-5	3512569.571	783351.954	831.555
AXG-6	3510424.843	748221.385	902.972
AXG-7	3506247.200	716983.479	877.593
AXG-8	3532064.987	707816.305	974.587
AXG-9	3527940.104	744778.700	891.989
AXG-10	3534165.038	781959.929	828.094
AXG-11	3540313.901	712602.779	1010.840
AXG-12	3544101.849	736504.546	934.587
AXG-13	3544035.273	772572.614	861.881
AXG-14	3556741.449	704251.355	1008.250
AXG-15	3561817.166	750402.601	911.802
AXG-16	3552826.924	774674.288	857.942
AXG-17	3571532.104	709492.840	1002.038
AXG-18	3575358.694	731975.104	967.802
AXG-19	3573391.000	759402.374	901.449
AXG-20	3575733.808	779549.438	854.589
AXG-21	3584879.666	708812.849	1004.299
AXG-22	3586326.699	728649.539	973.651
AXG-23	3579554.118	766283.694	894.965



AXG-24	3595115.707	702280.105	1023.976
AXG-25	3598713.253	735043.699	954.517
AXG-26	3596250.155	774765.369	889.957
AXG-27	3498148.413	780836.598	857.418
AXG-28	3468798.377	755476.253	859.636
AXG-29	3539048.392	759581.122	888.672
AXG-30	3558435.214	738972.626	929.198
AXG-31	3455812.098	773046.502	810.387
AXG-32	3499752.643	766943.657	881.478
AXG-33	3440103.379	758201.136	701.622
UTM Zone 14 North NAD83 (2011), Meters			
UTM Zone 14 North NAD83 (2011), Meters			
POINT ID	NORTHING (m)	EASTING (m)	ELEVS. (m)
AXG-1	3441440.909	212939.398	711.624
AXG-2	3448152.184	193021.978	742.686
AXG-3	3473315.569	210651.856	825.207
AXG-4	3488503.089	187980.225	809.163
AXG-5	3512621.925	214747.689	831.555
AXG-6	3512414.314	179543.177	902.973
AXG-7	3509959.914	148099.905	877.593
AXG-8	3536270.623	140363.569	974.587
AXG-9	3530102.133	177070.662	891.989
AXG-10	3534261.715	214550.039	828.094
AXG-11	3544249.782	145605.215	1010.840
AXG-12	3546707.448	169700.193	934.587
AXG-13	3544638.032	205723.490	861.881
AXG-14	3561133.844	138172.187	1008.250
AXG-15	3563631.448	184570.605	911.802
AXG-16	3553300.500	208310.749	857.942
AXG-17	3575624.258	144237.402	1002.038
AXG-18	3578189.557	166918.041	967.802
AXG-19	3574689.002	194206.325	901.449
AXG-20	3575901.590	214456.578	854.589
AXG-21	3589002.603	144306.081	1004.299
AXG-22	3589334.745	164210.295	973.651
AXG-23	3580458.989	201423.709	894.965
AXG-24	3599600.714	138352.280	1023.976
AXG-25	3601350.805	171295.336	954.517
AXG-26	3596655.425	210830.402	889.956

AXG-27	3498360.316	211443.480	857.418
AXG-28	3470433.588	184510.480	859.636
AXG-29	3540378.417	192472.157	888.672
AXG-30	3560890.364	172963.701	929.198
AXG-31	3456507.193	201353.893	810.387
AXG-32	3500724.800	197657.407	881.478
AXG-33	3441621.227	185675.048	701.622

**UTM Zone 14 North NAD83 (2011), Meters**

POINT ID	NORTHING (m)	EASTING (m)	ELEVS. (m)
GCP-1	3736900.108	227621.642	1018.197
GCP-2	3737303.218	245231.501	999.310
GCP-3	3737174.887	259516.260	976.094
GCP-4	3735898.745	278800.386	955.413
GCP-5	3741559.789	292376.207	871.471
GCP-6	3719277.881	229164.411	988.800
GCP-7	3720367.287	246479.966	962.744
GCP-8	3720239.121	260251.307	952.396
GCP-9	3719599.564	277878.484	935.945
GCP-10	3719646.411	292338.856	915.859
GCP-11	3704670.593	228296.447	992.925
GCP-12	3704316.310	243274.362	959.607
GCP-13	3708951.683	259963.849	932.291
GCP-14	3705096.694	278021.847	847.641
GCP-15	3706613.436	295396.518	809.640
GCP-16	3691311.673	228953.740	986.872
GCP-17	3690291.927	245955.458	952.579
GCP-18	3687750.599	258752.700	916.101
GCP-19	3688730.113	277241.879	768.868
GCP-20	3689812.911	290567.328	738.188
GCP-21	3673564.528	228505.266	962.303
GCP-22	3673018.120	244772.878	935.099
GCP-23	3672742.729	257952.802	903.686
GCP-24	3674385.097	278041.981	793.940
GCP-25	3676448.133	291388.849	721.606

**Digital Aerial Solutions**

**UTM Zone 14 North NAD83 (2011), Meters**

POINT ID	NORTHING (m)	EASTING (m)	ELEVS. (m)
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DAS-1	3655501.727	604378.514	325.900
DAS-2	3658085.694	600455.917	309.147
DAS-3	3671032.926	601472.839	264.794
DAS-4	3670901.306	606065.164	255.952
DAS-5	3676151.781	613718.113	244.731
DAS-6	3683637.950	611983.872	286.674
DAS-7	3686264.559	607066.893	274.513
DAS-8	3688340.379	603848.847	293.066
DAS-9	3692777.548	601942.622	328.079
DAS-10	3736731.777	650412.572	310.588
DAS-11	3699762.396	599412.334	353.454
DAS-12	3745442.329	639811.317	271.049
DAS-13	3740770.096	648137.917	251.589
DAS-14	3736558.861	672943.630	236.055
DAS-15	3741142.185	638068.756	294.410
DAS-16	3742124.141	598377.475	278.520
DAS-17	3739453.983	619573.616	294.957
DAS-18	3726552.553	601586.187	289.094
DAS-19	3721866.863	574169.683	297.495
DAS-20	3726902.832	693435.722	238.006
DAS-21	3765682.738	597372.077	285.311
DAS-22	3765090.356	570075.503	294.800
DAS-23	3741741.831	574338.834	281.130
DAS-24	3772290.606	507760.253	344.551
DAS-25	3772363.374	540727.546	313.042
DAS-26	3746400.256	514940.549	311.172
DAS-27	3759021.396	521348.787	315.858
DAS-28	3749701.835	549242.188	299.092
DAS-29	3728006.744	501756.645	374.838
DAS-30	3721678.471	590887.362	314.134
DAS-31	3733880.209	582186.254	290.522
DAS-32	3711006.090	574431.217	341.439
DAS-33	3713068.670	563280.004	316.447
DAS-34	3732514.583	563037.928	285.140
DAS-35	3757265.742	536693.631	306.916
DAS-36	3765091.083	557424.780	281.057
DAS-37	3763878.863	695702.890	229.202
DAS-38	3762119.086	686091.349	214.028
DAS-39	3741002.440	671880.505	263.500

DAS-40	3754598.587	637744.863	234.378
DAS-41	3775173.586	688454.449	256.021
DAS-42	3772083.619	523013.259	334.953
DAS-43	3767016.498	507597.809	364.221
DAS-44	3704203.139	591328.287	309.205
DAS-45	3741854.115	696886.918	229.242

## Eagle Mapping

UTM Zone 14 North NAD83 (2011), Meters

POINT ID	NORTHING (m)	EASTING (m)	ELEVS. (m)
EGM-1	3598289.816	299019.290	685.849
EGM-2	3583143.209	262838.153	812.737
EGM-3	3599436.977	228844.084	846.335
EGM-4	3577734.598	228873.357	865.573
EGM-5	3575452.014	282871.619	732.985
EGM-6	3556245.303	271083.994	840.400
EGM-7	3560208.172	241731.773	785.437
EGM-8	3563950.892	220070.329	843.323
EGM-9	3540671.736	218055.061	836.863
EGM-10	3531303.751	243721.407	787.859
EGM-11	3528313.174	265057.055	813.284
EGM-12	3531709.963	299934.959	732.138
EGM-13	3502154.274	292332.706	804.091
EGM-14	3498089.875	264493.301	814.586
EGM-15	3492923.921	243169.655	815.253
EGM-16	3511238.614	215591.981	839.906
EGM-17	3486271.427	221038.537	836.926
EGM-18	3472128.750	262578.501	797.483
EGM-19	3465977.245	276790.718	757.638
EGM-20	3471506.961	298857.212	769.571
EGM-21	3449517.284	299918.266	797.747
EGM-22	3440248.112	264695.330	795.491
EGM-23	3458323.634	242528.397	821.625
EGM-24	3442958.570	229605.401	815.055
EGM-25	3454531.581	214360.044	742.452
POINT ID	NORTHING (m)	EASTING (m)	ELEVS. (m)
GCP-21	3673564.528	228505.266	962.303
GCP-22	3673018.120	244772.878	935.099



GCP-23	3672742.729	257952.802	903.686
GCP-24	3674385.097	278041.981	793.940
GCP-25	3676448.133	291388.849	721.606
GCP-26	3657484.527	228001.548	942.753
GCP-27	3656852.959	244316.163	916.523
GCP-28	3657466.703	275671.003	745.664
GCP-29	3659315.092	293561.741	692.967
GCP-30	3657882.574	258142.259	879.664
GCP-31	3641106.906	230342.624	916.065
GCP-32	3644392.646	244575.171	912.528
GCP-33	3640324.969	255323.976	901.863
GCP-34	3638491.162	274206.893	758.477
GCP-35	3639805.344	290739.114	812.575
GCP-36	3625918.889	229014.983	905.778
GCP-37	3626101.775	243983.907	890.061
GCP-38	3628562.611	260121.407	793.477
GCP-39	3628545.606	275015.449	756.268
GCP-40	3625590.191	292709.454	734.155
GCP-41	3608873.434	226713.245	871.399
GCP-42	3611029.835	241052.920	872.986
GCP-43	3609606.551	256847.161	775.726
GCP-44	3612345.980	291881.796	716.507
GCP-45	3604645.656	278456.438	749.731

## Intermap

### UTM Zone 15 North NAD83 (2011), Meters

POINT ID	NORTHING (m)	EASTING (m)	ELEVS. (m)
ITM-01	3754508.417	233157.423	157.888
ITM-02	3747780.663	245533.947	150.514
ITM-03	3734550.333	272923.532	150.593
ITM-04	3750863.413	268425.903	127.426
ITM-05	3754592.990	287756.704	121.575
ITM-06	3726445.811	225351.819	190.796
ITM-07	3729834.224	238801.849	167.011
ITM-08	3714120.222	222567.116	202.167
ITM-09	3747691.498	274700.545	149.501
ITM-10	3738773.253	254377.134	175.324
ITM-11	3759906.578	265389.613	150.594
ITM-12	3737286.118	224585.186	157.197

ITM-13	3703357.747	235642.646	171.406
ITM-14	3704845.387	224773.241	161.187
ITM-15	3694136.845	222780.490	182.053
ITM-16	3696637.583	241885.912	148.863
ITM-17	3685606.561	252678.569	150.966
ITM-18	3675049.093	223628.227	185.222
ITM-19	3678667.694	235935.098	154.188
ITM-20	3691879.625	233766.625	154.919

**UTM Zone 14 North NAD83 (2011), Meters**

POINT ID	NORTHING (m)	EASTING (m)	ELEVS. (m)
ITM-01	3755127.045	788007.899	157.888
ITM-02	3749131.714	800758.924	150.514
ITM-03	3737513.011	828886.767	150.593
ITM-04	3753546.963	823442.731	127.426
ITM-05	3758402.834	842537.218	121.575
ITM-06	3726654.871	781848.563	190.796
ITM-07	3730818.882	795081.094	167.011
ITM-08	3714188.243	779782.557	202.167
ITM-09	3750744.712	829896.106	149.501
ITM-10	3740651.600	810115.416	175.324
ITM-11	3762402.615	819881.048	150.594
ITM-12	3737432.786	780453.406	157.197
ITM-13	3704198.164	793459.570	171.406
ITM-14	3705056.091	782521.055	161.187
ITM-15	3694250.059	781148.916	182.053
ITM-16	3697847.638	800081.574	148.863
ITM-17	3687452.165	811495.298	150.966
ITM-18	3675241.829	783091.829	185.222
ITM-19	3679560.738	795172.529	154.188
ITM-20	3692628.812	792247.910	154.919

**Leading Edge Geomatics**

**UTM Zone 14 North NAD83 (2011), Meters**

POINT ID	NORTHING (m)	EASTING (m)	ELEVS. (m)
LEG-1	3750790.860	482725.053	366.346
LEG-2	3780836.167	473888.324	362.612
LEG-3	3814472.579	469385.987	407.484
LEG-4	3765927.006	455836.646	408.709



LEG-5	3770898.526	499096.714	367.481
LEG-6	3741802.040	426854.553	420.292
LEG-7	3735756.299	421875.369	478.494
LEG-8	3729634.272	462700.431	369.142
LEG-9	3731720.106	438268.586	456.797
LEG-10	3711893.439	378772.402	543.386
LEG-11	3717196.569	381866.002	530.773
LEG-12	3744916.561	376931.438	553.939
LEG-13	3735707.916	341728.608	754.337
LEG-14	3719519.488	362474.465	580.578
LEG-15	3694283.330	344398.971	644.016
LEG-16	3694411.822	383621.420	534.387
LEG-17	3710977.146	328655.710	707.442
LEG-18	3729051.285	305493.155	912.822
LEG-19	3745719.819	329048.036	793.388
LEG-20	3720314.618	328883.204	759.482
LEG-21	3672380.085	336556.773	637.811
LEG-22	3676062.853	300575.824	745.477
LEG-23	3705766.829	304253.154	736.838
LEG-24	3634343.609	313340.782	766.476
LEG-25	3670060.457	342734.456	612.818
LEG-26	3599060.232	337422.163	730.392
LEG-27	3644821.119	360872.503	554.791
LEG-28	3675021.326	369564.410	578.035
LEG-29	3658357.934	373295.404	563.327
LEG-30	3649545.716	391415.845	538.937
LEG-31	3667511.031	401502.317	501.786
LEG-32	3672512.707	414949.543	515.821
LEG-33	3587360.195	336693.223	682.568
LEG-34	3544519.249	309090.271	756.526
LEG-35	3573146.281	329457.133	653.927
LEG-36	3558083.732	303262.814	691.199
LEG-37	3598922.313	300994.492	670.005
LEG-38	3543925.302	352896.107	632.231
LEG-39	3544294.830	378643.897	617.036
LEG-40	3570618.945	378202.076	769.331
LEG-41	3543778.719	410052.322	588.151
LEG-42	3565819.303	401840.713	744.291
LEG-43	3543379.615	438032.594	604.445

LEG-44	3564037.252	429205.471	603.107
LEG-45	3556537.190	420015.970	625.701
LEG-46	3521475.627	457545.253	559.508
LEG-47	3545137.140	487216.179	482.945
LEG-48	3500709.075	466971.627	463.064
LEG-49	3485110.417	487345.558	426.141
LEG-50	3491401.838	457966.740	474.653
LEG-51	3505000.943	447977.118	548.915
LEG-52	3488602.187	425406.793	490.850
LEG-53	3517971.640	424134.424	541.854
LEG-54	3528346.468	409257.358	545.144
LEG-55	3484572.983	412839.695	501.086
LEG-56	3502774.549	393946.175	528.337
LEG-57	3530941.392	361947.285	581.033
LEG-58	3512542.590	378226.732	571.760
LEG-59	3484377.766	363074.483	576.307
LEG-60	3506756.363	336466.313	657.647
LEG-61	3531182.939	331039.100	785.836
LEG-62	3528614.593	306701.218	729.277
LEG-63	3484596.311	301190.750	775.397
LEG-64	3466689.691	331647.670	642.851
LEG-65	3450554.960	306535.248	765.773
LEG-66	3457470.028	326460.907	678.975
LEG-67	3440764.412	355776.503	653.135
LEG-68	3468635.433	363283.628	586.140
LEG-69	3474358.572	394767.811	551.975
LEG-70	3440376.233	371652.440	712.134
LEG-71	3439260.472	421657.409	661.790
LEG-72	3455313.243	426344.763	609.203
LEG-73	3469116.557	417442.459	576.035
LEG-74	3453852.398	442881.166	572.785
LEG-75	3472239.996	428102.549	502.750

**Precision Aerial Reconnaissance**

UTM Zone 14 North NAD83 (2011), Meters

POINT ID	NORTHING (m)	EASTING (m)	ELEVS. (m)
PAR-1	3558092.532	116336.395	940.145
PAR-2	3562640.654	131972.299	974.051
PAR-3	3573300.058	117400.292	989.089

PAR-4	3572251.694	132131.680	996.976
PAR-5	3590304.818	118530.567	1031.352
PAR-6	3589609.380	133640.386	1025.520
PAR-7	3604126.875	119325.108	1077.000
PAR-8	3603565.236	135291.514	1034.185
PAR-9	3619021.120	104806.068	1103.977
PAR-10	3619180.910	120190.391	1082.856
PAR-11	3616811.101	135884.355	1041.215
PAR-12	3637171.914	74967.711	1225.688
PAR-13	3636695.272	89862.089	1177.336
PAR-14	3635262.360	106127.249	1127.953
PAR-15	3634373.281	119240.085	1108.466
PAR-16	3634003.248	136240.607	1064.295
PAR-17	3652593.558	63042.830	1291.098
PAR-18	3652518.491	76926.141	1242.739
PAR-19	3651983.180	91486.167	1195.571
PAR-20	3650621.012	106036.541	1151.044
PAR-21	3650827.952	121347.721	1119.009
PAR-22	3648597.657	136941.366	1083.808
PAR-23	3665185.915	47440.958	1352.710
PAR-24	3668849.064	61361.984	1309.728
PAR-25	3667364.470	76485.219	1261.979
PAR-26	3667378.435	91614.526	1213.939
PAR-27	3665945.025	106468.176	1171.052
PAR-28	3665907.306	122481.786	1135.874
PAR-29	3663727.317	137829.123	1103.355
PAR-30	3685055.951	52430.698	1350.181
PAR-31	3683843.831	77910.876	1273.286
PAR-32	3682061.089	94212.341	1223.660
PAR-33	3681254.045	107056.844	1189.760
PAR-34	3680490.674	121404.677	1158.652
PAR-35	3678897.399	139124.126	1118.731
PAR-36	3699349.549	53224.370	1357.572
PAR-37	3699027.264	64747.993	1318.340
PAR-38	3698122.745	79127.455	1275.264
PAR-39	3696307.844	94827.868	1241.237
PAR-40	3692469.478	110730.298	1193.312
PAR-41	3695080.047	124362.419	1172.106
PAR-42	3694480.454	139691.339	1142.724



PAR-43	3712223.427	67400.089	1319.802
PAR-44	3713368.246	79693.718	1297.271
PAR-45	3710310.193	97365.787	1244.669
PAR-46	3714325.357	111253.884	1215.995
PAR-47	3711605.092	123177.985	1187.987
PAR-48	3709967.939	138464.943	1160.010
PAR-49	3729730.566	68625.607	1358.222
PAR-50	3727562.385	80526.326	1320.843
PAR-51	3726343.702	126104.784	1206.831
PAR-52	3724014.002	141284.817	1164.799
PAR-53	3741208.261	127548.955	1203.371
PAR-54	3741067.897	141885.285	1173.509
<b>UTM Zone 13 North NAD83 (2011), Meters</b>			
<b>POINT ID</b>	<b>NORTHING (m)</b>	<b>EASTING (m)</b>	<b>ELEVS. (m)</b>
PAR-1	3552494.250	682645.854	940.145
PAR-2	3557899.145	697984.308	974.051
PAR-3	3567716.148	682859.720	989.089
PAR-4	3567492.714	697607.639	996.976
PAR-5	3584733.906	683035.863	1031.352
PAR-6	3584887.125	698141.617	1025.520
PAR-7	3598559.719	683052.252	1077.000
PAR-8	3598897.442	699004.805	1034.185
PAR-9	3612590.620	667738.867	1103.977
PAR-10	3613617.962	683067.006	1082.856
PAR-11	3612140.435	698849.953	1041.215
PAR-12	3628993.318	636975.595	1225.688
PAR-13	3629361.957	651844.858	1177.336
PAR-14	3628855.039	668137.780	1127.953
PAR-15	3628711.420	681260.593	1108.466
PAR-16	3629305.489	698233.262	1064.295
PAR-17	3643681.470	624219.766	1291.098
PAR-18	3644395.843	638056.184	1242.739
PAR-19	3644690.162	652595.847	1195.530
PAR-20	3644159.722	667175.819	1151.044
PAR-21	3645236.631	682428.044	1119.009
PAR-22	3643899.435	698103.783	1083.808
PAR-23	3655336.805	607961.944	1352.710
PAR-24	3659779.487	621619.600	1309.728

PAR-25	3659163.268	636771.362	1261.979
PAR-26	3660040.461	651846.826	1213.939
PAR-27	3659459.405	666733.263	1171.052
PAR-28	3660335.711	682699.595	1135.874
PAR-29	3659037.879	698127.297	1103.355
PAR-30	3675412.801	611796.571	1350.181
PAR-31	3675664.665	637249.813	1273.286
PAR-32	3674821.830	653596.429	1223.660
PAR-33	3674753.081	666444.859	1189.760
PAR-34	3674813.861	680791.856	1158.652
PAR-35	3674240.084	698551.452	1118.731
PAR-36	3689695.354	611767.073	1357.572
PAR-37	3690036.603	623264.500	1318.340
PAR-38	3689961.906	637642.706	1275.264
PAR-39	3689055.683	653392.543	1241.237
PAR-40	3686143.474	669463.382	1193.312
PAR-41	3689529.266	682903.613	1172.106
PAR-42	3689812.578	698222.912	1142.724
PAR-43	3703335.428	625146.886	1319.802
PAR-44	3705185.014	637329.071	1297.271
PAR-45	3703156.842	655115.854	1244.669
PAR-46	3707960.150	668726.827	1215.995
PAR-47	3705936.550	680770.997	1187.987
PAR-48	3705186.258	696107.945	1160.010
PAR-49	3720847.231	625356.241	1358.222
PAR-50	3719375.989	637338.490	1320.843
PAR-51	3720800.097	682836.999	1206.831
PAR-52	3719356.079	698108.123	1164.799
PAR-53	3735704.014	683414.526	1203.371
PAR-54	3736397.299	697717.603	1173.509

#### 4. GPS OBSERVATIONS

POINT ID	OBSERV. DATE	JULIAN DATE	TIME OF DAY	RE-OBSERV. DATE	RE-OBSERV. TIME
<b>Airborne Imaging</b>					
ABI-1	3/5/2018	64	18:45	3/5/2018	18:48
ABI-2	3/5/2018	64	18:25	3/5/2018	18:28
ABI-3	3/5/2018	64	18:07	3/5/2018	18:10
ABI-4	3/5/2018	64	17:42	3/5/2018	17:45
ABI-5	3/5/2018	64	17:25	3/5/2018	17:28
ABI-6	3/5/2018	64	15:06	3/5/2018	15:09
ABI-7	3/5/2018	64	15:43	3/5/2018	15:46
ABI-8	3/5/2018	64	16:06	3/5/2018	16:09
ABI-9	3/5/2018	64	16:28	3/5/2018	16:31
ABI-10	3/5/2018	64	16:54	3/6/2018	10:49
ABI-11	3/5/2018	64	14:25	3/5/2018	14:28
ABI-12	3/5/2018	64	13:57	3/5/2018	14:00
ABI-13	3/5/2018	64	13:34	3/5/2018	13:37
ABI-14	3/5/2018	64	12:03	3/6/2018	11:34
ABI-15	3/5/2018	64	12:58	3/6/2018	11:55
ABI-16	3/6/2018	65	13:22	3/6/2018	13:25
ABI-17	3/6/2018	65	13:04	3/6/2018	13:07
ABI-18	3/6/2018	65	13:54	3/6/2018	13:57
ABI-19	3/6/2018	65	14:15	3/6/2018	14:18
ABI-20	3/6/2018	65	14:37	3/6/2018	14:40
ABI-21	3/6/2018	65	17:46	3/6/2018	17:49
ABI-22	3/6/2018	65	17:24	3/6/2018	17:27
ABI-23	3/6/2018	65	17:05	3/6/2018	17:08
ABI-24	3/6/2018	65	16:42	3/6/2018	16:45
ABI-25	3/6/2018	65	15:33	3/6/2018	15:36
<b>Aerial Services, Inc.</b>					
ASI-1	3/4/2018	63	9:03	3/14/2018	9:07
ASI-2	3/14/2018	73	9:24	3/15/2018	15:10
ASI-3	3/14/2018	73	9:49	3/14/2018	9:53
ASI-4	3/13/2018	72	9:07	3/13/2008	19:05
ASI-5	3/14/2018	73	10:38	3/14/2018	10:42
ASI-6	3/14/2018	73	12:33	3/14/2018	12:37
ASI-7	3/13/2018	72	10:05	3/13/2018	10:09



ASI-8	3/14/2018	73	11:09	3/14/2018	11:13
ASI-9	3/14/2018	73	11:53	3/14/2018	11:57
ASI-10	3/14/2018	73	13:08	3/14/2018	13:14
ASI-11	3/14/2018	73	14:02	3/14/2018	14:06
ASI-12	3/14/2018	73	13:39	3/14/2018	13:43
ASI-13	3/14/2018	73	14:51	3/14/2018	14:55
ASI-14	3/14/2018	73	16:47	3/14/2018	16:51
ASI-15	3/14/2018	73	16:24	3/14/2018	16:28
ASI-16	3/14/2018	73	15:18	3/14/2018	15:22
ASI-17	3/14/2018	73	15:49	3/14/2018	15:53
ASI-18	3/14/2018	73	17:19	3/14/2018	17:23
ASI-19	3/14/2018	73	17:39	3/14/2018	17:43
ASI-20	3/13/2018	72	9:36	3/14/2018	19:00
ASI-21	3/14/2018	73	18:30	3/14/2018	18:34
ASI-22	3/13/2018	72	11:17	3/13/2018	11:21
ASI-23	3/13/2018	72	11:39	3/13/2018	11:43
ASI-24	3/13/2018	72	14:08	3/13/2018	14:12
ASI-25	3/13/2018	72	16:07	3/13/2018	16:11
ASI-26	3/13/2018	72	16:27	3/13/2018	16:31
ASI-27	3/13/2018	72	12:37	3/13/2018	12:41
ASI-28	3/13/2018	72	12:59	3/13/2018	13:03
ASI-29	3/13/2018	72	15:05	3/13/2018	15:09
ASI-30	3/13/2018	72	13:22	3/13/2018	13:28
ASI-31	3/13/2018	72	14:43	3/13/2018	14:47
ASI-32	3/12/2018	71	18:19	3/13/2018	16:59
ASI-33	3/12/2018	71	17:58	3/13/2018	18:32
ASI-34	3/13/2018	72	15:38	3/13/2018	15:42
ASI-35	3/12/2018	71	14:12	3/12/2018	14:16
ASI-36	3/12/2018	71	17:26	3/12/2018	17:32
ASI-37	3/12/2018	71	14:41	3/12/2018	14:45
ASI-38	3/13/2018	72	17:29	3/14/2018	10:55
ASI-39	3/12/2018	71	15:07	3/15/2018	14:16
ASI-40	3/12/2018	71	17:02	3/13/2018	18:08
ASI-41	3/12/2018	71	16:44	3/12/2018	16:48
ASI-42	3/12/2018	71	16:23	3/15/2018	11:31
ASI-43	3/12/2018	71	15:31	3/15/2018	13:59
ASI-44	3/15/2018	74	13:43	3/15/2018	13:47
ASI-45	3/15/2018	74	12:40	3/15/2018	12:44
ASI-46	3/15/2018	74	13:07	3/15/2018	13:11

ASI-47	3/15/2018	74	12:15	3/15/2018	12:19
ASI-48	3/15/2018	74	11:55	3/15/2018	11:59
ASI-49	3/13/2018	72	12:06	3/13/2018	12:10
<b>Axis Geospatial</b>					
AXG-1	3/8/2018	67	11:02	3/8/2018	11:05
AXG-2	3/8/2018	67	11:57	3/8/2018	12:00
AXG-3	3/7/2018	66	17:02	3/7/2018	17:05
AXG-4	3/8/2018	67	14:47	3/8/2018	14:30
AXG-5	3/7/2018	66	14:25	3/5/2018	14:28
AXG-6	3/8/2018	67	16:49	3/8/2018	16:52
AXG-7	3/8/2018	67	17:32	3/8/2018	17:35
AXG-8	3/8/2018	67	18:19	3/8/2018	18:22
AXG-9	3/9/2018	68	10:19	3/9/2018	10:22
AXG-10	3/7/2018	66	13:40	3/7/2018	13:43
AXG-11	3/8/2018	67	18:55	3/8/2018	18:58
AXG-12	3/9/2018	68	12:13	3/9/2018	12:16
AXG-13	3/7/2018	66	13:08	3/7/2018	13:11
AXG-14	3/9/2018	68	19:01	3/10/2018	12:55
AXG-15	3/9/2018	68	12:53	3/10/2018	11:08
AXG-16	3/7/2018	66	12:37	3/7/2018	12:40
AXG-17	3/9/2018	68	18:41	3/10/2018	12:35
AXG-18	3/9/2018	68	16:22	3/10/2018	11:48
AXG-19	3/9/2018	68	14:49	3/9/2018	14:52
AXG-20	3/9/2018	68	15:27	3/9/2018	15:30
AXG-21	3/9/2018	68	18:22	3/10/2018	12:16
AXG-22	3/9/2018	68	16:57	3/9/2018	17:00
AXG-23	3/9/2018	68	14:16	3/9/2018	14:19
AXG-24	3/9/2018	68	18:05	3/9/2018	18:08
AXG-25	3/9/2018	68	17:20	3/9/2018	17:23
AXG-26	3/9/2018	68	13:56	3/9/2018	13:59
AXG-27	3/7/2018	66	15:22	3/7/2018	15:25
AXG-28	3/8/2018	67	13:30	3/8/2018	13:33
AXG-29	3/9/2018	68	11:16	3/10/2018	10:43
AXG-30	3/9/2018	67	12:34	3/10/2018	11:24
AXG-31	3/8/2017	67	11:33	3/8/2018	11:36
AXG-32	3/8/2018	67	16:21	3/8/2018	16:24
AXG-33	3/8/2018	67	12:26	3/8/2018	12:29
GCP-1	3/5/2018	64	12:30	3/5/2018	12:36

GCP-2	3/5/2018	64	12:54	3/5/2018	12:57
GCP-3	3/5/2018	64	13:25	3/5/2018	13:28
GCP-4	3/5/2018	64	13:54	3/5/2018	13:57
GCP-5	3/5/2018	64	14:39	3/5/2018	14:42
GCP-6	3/5/2018	64	11:51	3/5/2018	19:37
GCP-7	3/5/2018	64	11:26	3/5/2018	19:12
GCP-8	3/5/2018	64	11:01	3/5/2018	18:55
GCP-9	3/5/2018	64	18:34	3/5/2018	18:37
GCP-10	3/5/2018	64	15:45	3/5/2018	15:48
GCP-11	3/5/2018	64	9:42	3/5/2018	6:24
GCP-12	3/5/2018	64	10:04	3/5/2018	10:07
GCP-13	3/5/2018	64	10:41	3/5/2018	10:44
GCP-14	3/5/2018	64	18:15	3/5/2018	18:18
GCP-15	3/5/2018	64	16:09	3/5/2018	16:12
GCP-16	3/5/2018	64	9:09	3/5/2018	6:43
GCP-17	3/5/2018	64	8:43	3/5/2018	8:46
GCP-18	3/5/2018	64	8:21	3/5/2018	8:24
GCP-19	3/5/2018	64	17:56	3/5/2018	17:59
GCP-20	3/5/2018	64	16:44	3/5/2018	16:47
GCP-21	3/5/2018	64	7:40	3/6/2018	7:43
GCP-22	3/6/2018	65	8:03	3/6/2018	8:06
GCP-23	3/6/2018	65	8:19	3/6/2018	8:22
GCP-24	3/5/2018	64	17:18	3/5/2018	9:22
GCP-25	3/6/2018	65	9:53	3/6/2018	9:57
<b>Digital Aerial Solutions</b>					
DAS-1	3/10/2018	69	18:53	3/10/2018	18:56
DAS-2	3/10/2018	69	18:33	3/10/2018	18:36
DAS-3	3/10/2018	69	18:11	3/10/2018	18:14
DAS-4	3/10/2018	69	17:58	3/10/2018	18:01
DAS-5	3/10/2018	69	17:39	3/10/2018	17:42
DAS-6	3/10/2018	69	17:22	3/10/2018	17:25
DAS-7	3/10/2018	69	17:07	3/10/2018	17:10
DAS-8	3/10/2018	69	16:51	3/10/2018	16:54
DAS-9	3/10/2018	69	16:33	3/10/2018	16:36
DAS-10	3/11/2018	70	14:29	3/11/2018	14:32
DAS-11	3/10/2018	69	16:13	3/10/2018	16:16
DAS-12	3/11/2018	70	13:32	3/11/2018	13:35
DAS-13	3/11/2018	70	14:13	3/11/2018	14:16



DAS-14	3/11/2018	70	15:13	3/11/2018	15:16
DAS-15	3/11/2018	70	13:14	3/11/2018	13:17
DAS-16	3/11/2018	70	10:49	3/11/2018	10:52
DAS-17	3/11/2018	70	12:46	3/11/2018	12:49
DAS-18	3/11/2018	70	11:59	3/11/2018	12:02
DAS-19	3/10/2018	69	13:40	3/10/2018	13:43
DAS-20	3/11/2018	70	18:14	3/11/2018	18:17
DAS-21	3/11/2018	70	11:22	3/11/2018	11:25
DAS-22	3/10/2018	69	12:09	3/10/2018	12:12
DAS-23	3/10/2018	69	12:35	3/11/2018	10:40
DAS-24	3/10/2018	69	10:15	3/10/2018	10:18
DAS-25	3/10/2018	69	11:09	3/10/2018	11:12
DAS-26	3/10/2018	69	9:07	3/10/2018	9:10
DAS-27	3/9/2018	68	12:25	3/10/2018	9:53
DAS-28	3/10/2018	69	7:50	3/10/2018	7:53
DAS-29	3/10/2018	69	8:38	3/10/2018	8:41
DAS-30	3/11/2018	70	9:20	3/11/2018	9:23
DAS-31	3/11/2018	70	9:53	3/11/2018	9:56
DAS-32	3/10/2018	69	14:26	3/11/2018	8:48
DAS-33	3/10/2018	69	14:04	3/10/2018	14:07
DAS-34	3/10/2018	69	13:07	3/10/2018	13:10
DAS-35	3/9/2018	68	11:47	3/9/2018	11:50
DAS-36	3/10/2018	69	11:47	3/10/2018	11:50
DAS-37	3/11/2018	70	17:25	3/11/2018	17:28
DAS-38	3/11/2018	70	17:06	3/11/2018	17:09
DAS-39	3/11/2018	70	15:35	3/11/2018	15:38
DAS-40	3/11/2018	70	13:50	3/11/2018	13:53
DAS-41	3/11/2018	70	16:42	3/11/2018	16:45
DAS-42	3/10/2018	69	10:41	3/10/2018	10:44
DAS-43	3/9/2018	68	12:50	3/10/2018	9:35
DAS-44	3/10/2018	69	15:03	3/11/2018	8:11
DAS-45	3/11/2018	70	17:55	3/11/2018	17:58
<b>Eagle Mapping</b>					
EGM-1	3/5/2018	64	13:14	3/5/2018	13:18
EGM-2	3/5/2018	64	12:30	3/5/2018	12:34
EGM-3	3/5/2018	64	9:30	3/5/2018	9:34
EGM-4	3/5/2018	64	10:07	3/5/2018	10:11
EGM-5	3/5/2018	64	1:53	3/5/2018	1:57

EGM-6	3/5/2018	64	14:32	3/5/2018	14:36
EGM-7	3/5/2018	64	11:19	3/6/2018	19:08
EGM-8	3/5/2018	64	10:41	3/5/2018	10:48
EGM-9	3/6/2018	65	7:45	3/6/2018	7:49
EGM-10	3/6/2018	65	13:25	3/6/2018	18:39
EGM-11	3/5/2018	64	16:02	3/6/2018	13:58
EGM-12	3/5/2018	64	15:07	3/5/2018	15:16
EGM-13	3/6/2018	65	15:00	3/6/2018	15:04
EGM-14	3/5/2018	64	16:36	3/6/2018	14:27
EGM-15	3/6/2018	65	12:44	3/6/2018	12:48
EGM-16	3/6/2018	65	8:28	3/6/2018	8:32
EGM-17	3/6/2018	65	8:59	3/6/2018	9:05
EGM-18	3/5/2018	64	17:03	3/6/2018	12:11
EGM-19	3/6/2018	65	17:23	3/6/2018	17:27
EGM-20	3/6/2018	65	15:53	3/6/2018	15:57
EGM-21	3/6/2018	65	16:21	3/6/2018	16:38
EGM-22	3/6/2018	65	11:33	3/6/2018	11:38
EGM-23	3/5/2018	64	18:17	3/5/2018	18:21
EGM-24	3/6/2018	65	10:23	3/6/2018	10:27
EGM-25	3/6/2018	65	9:34	3/6/2018	9:38
GCP-21	3/5/2018	64	7:40	3/6/2018	7:43
GCP-22	3/6/2018	65	8:03	3/6/2018	8:06
GCP-23	3/6/2018	65	8:19	3/6/2018	8:22
GCP-24	3/5/2018	64	17:18	3/5/2018	9:22
GCP-25	3/6/2018	65	9:53	3/6/2018	9:57
GCP-26	3/6/2018	65	13:12	3/6/2018	13:15
GCP-27	3/6/2018	65	12:51	3/6/2018	12:54
GCP-28	3/6/2018	65	11:36	3/6/2018	11:39
GCP-29	3/6/2018	65	10:23	3/6/2018	10:26
GCP-30	3/6/2018	65	12:24	3/6/2018	12:27
GCP-31	3/6/2018	65	13:42	3/6/2018	13:45
GCP-32	3/6/2018	65	14:01	3/6/2018	14:04
GCP-33	3/6/2018	65	14:21	3/6/2018	14:24
GCP-34	3/6/2018	65	11:12	3/6/2018	11:15
GCP-35	3/6/2018	65	10:54	3/6/2018	10:57
GCP-36	3/6/2018	65	15:22	3/6/2018	15:25
GCP-37	3/6/2018	65	15:01	3/6/2018	15:04
GCP-38	3/6/2018	65	14:42	3/6/2018	14:45
GCP-39	3/6/2018	65	18:11	3/6/2018	18:14

GCP-40	3/6/2018	65	17:52	3/6/2018	17:55
GCP-41	3/6/2018	65	15:49	3/6/2018	15:52
GCP-42	3/6/2018	65	16:11	3/6/2018	16:14
GCP-43	3/6/2018	65	16:37	3/6/2018	16:40
GCP-44	3/6/2018	65	17:30	3/6/2018	17:33
GCP-45	3/6/2018	65	17:04	3/6/2018	17:07
<b>Intermap</b>					
ITM-1	3/11/2018	70	15:02	3/11/2018	15:06
ITM-2	3/11/2018	70	12:40	3/11/2018	12:44
ITM-3	3/11/2018	70	8:35	3/11/2018	18:34
ITM-4	3/11/2018	70	10:29	3/11/2018	10:33
ITM-5	3/11/2018	70	11:47	3/11/2018	11:51
ITM-6	3/10/2018	69	15:34	3/11/2018	16:40
ITM-7	3/10/2018	69	18:18	3/11/2018	17:08
ITM-8	3/10/2018	69	11:13	3/10/2018	17:03
ITM-9	3/11/2018	70	10:01	3/11/2018	10:05
ITM-10	3/11/2018	70	9:07	3/11/2018	9:11
ITM-11	3/11/2018	70	10:52	3/11/2018	10:56
ITM-12	3/11/2018	70	13:20	3/11/2018	13:24
ITM-13	3/10/2018	69	16:20	3/10/2018	16:24
ITM-14	3/10/2018	69	11:47	3/10/2018	16:41
ITM-15	3/10/2018	69	12:18	3/10/2018	12:24
ITM-16	3/10/2018	69	16:02	3/10/2018	16:06
ITM-17	3/10/2018	69	14:13	3/10/2018	14:17
ITM-18	3/10/2018	69	13:10	3/10/2018	13:14
ITM-19	3/10/2018	69	13:44	3/10/2018	13:48
ITM-20	3/10/2018	69	14:58	3/10/2018	15:02
<b>Leading Edge Geomatics</b>					
LEG-1	3/8/2018	67	14:42	3/8/2018	14:45
LEG-2	3/8/2018	67	15:41	3/8/2018	15:44
LEG-3	3/8/2018	67	16:26	3/8/2018	16:29
LEG-4	3/8/2018	67	17:26	3/9/2018	14:14
LEG-5	3/8/2018	67	18:08	3/9/2018	13:08
LEG-6	3/8/2018	67	11:38	3/8/2018	11:41
LEG-7	3/8/2018	67	11:12	3/8/2018	11:15
LEG-8	3/8/2018	67	12:49	3/8/2018	12:52
LEG-9	3/8/2012	67	12:06	3/8/2018	12:09



LEG-10	3/7/2018	66	15:26	3/7/2018	15:29
LEG-11	3/8/2018	67	10:23	3/8/2018	10:26
LEG-12	3/8/2018	67	4:27	3/8/2018	16:30
LEG-13	3/8/2018	67	8:47	3/8/2018	8:50
LEG-14	3/7/2018	66	15:57	3/8/2018	9:58
LEG-15	3/7/2018	66	17:17	3/7/2018	17:20
LEG-16	3/7/2018	66	14:43	3/7/2018	14:46
LEG-17	3/7/2018	66	16:45	3/7/2018	16:48
LEG-18	3/7/2018	66	18:47	3/8/2018	6:55
LEG-19	3/8/2018	67	8:17	3/8/2018	8:14
LEG-20	3/7/2018	66	16:28	3/7/2018	16:31
LEG-21	3/7/2018	66	9:39	3/7/2018	9:42
LEG-22	3/7/2018	66	8:55	3/7/2018	8:58
LEG-23	3/7/2018	66	18:03	3/7/2018	18:06
LEG-24	3/7/2018	66	8:00	3/7/2018	8:03
LEG-25	3/7/2018	66	9:55	3/7/2018	9:58
LEG-26	3/7/2018	66	10:23	3/7/2018	10:28
LEG-27	3/7/2018	66	10:43	3/7/2018	10:46
LEG-28	3/7/2018	66	14:12	3/7/2018	14:15
LEG-29	3/7/2018	66	11:09	3/7/2018	11:12
LEG-30	3/7/2018	66	12:15	3/7/2018	12:18
LEG-31	3/7/2018	66	12:58	3/7/2018	13:01
LEG-32	3/7/2018	66	13:20	3/7/2018	13:23
LEG-33	3/7/2018	66	9:49	3/8/2018	14:40
LEG-34	3/8/2018	67	13:06	3/8/2018	13:10
LEG-35	3/7/2018	66	11:05	3/7/2018	11:09
LEG-36	3/8/2018	67	13:32	3/8/2018	13:36
LEG-37	3/7/2018	66	8:40	3/7/2018	8:44
LEG-38	3/7/2018	66	11:37	3/7/2018	11:41
LEG-39	3/8/2018	67	18:21	3/8/2018	18:25
LEG-40	3/8/2018	67	15:22	3/8/2018	15:26
LEG-41	3/8/2018	67	17:33	3/8/2018	17:37
LEG-42	3/8/2017	67	16:04	3/8/2018	16:08
LEG-43	3/9/2018	68	16:09	3/9/2018	16:13
LEG-44	3/8/2018	67	16:52	3/8/2018	16:55
LEG-45	3/8/2018	67	17:16	3/8/2018	17:20
LEG-46	3/9/2018	68	15:36	3/9/2018	15:42
LEG-47	3/9/2018	68	17:12	3/9/2018	17:16
LEG-48	3/9/2018	68	15:02	3/9/2018	15:06

LEG-49	3/9/2018	68	14:17	3/9/2018	14:21
LEG-50	3/9/2018	68	13:33	3/9/2018	13:37
LEG-51	3/9/2018	68	12:57	3/9/2018	13:02
LEG-52	3/7/2018	66	16:41	3/7/2018	16:45
LEG-53	3/9/2018	68	12:24	3/9/2018	12:28
LEG-54	3/9/2018	68	11:51	3/9/2018	11:55
LEG-55	3/7/2018	66	16:09	3/9/2018	10:37
LEG-56	3/9/2018	68	11:10	3/9/2018	11:14
LEG-57	3/7/2018	66	12:05	3/7/2018	12:09
LEG-58	3/8/2018	67	18:48	3/8/2018	18:52
LEG-59	3/7/2018	66	14:19	3/7/2018	14:22
LEG-60	3/7/2018	66	13:39	3/7/2018	13:43
LEG-61	3/7/2018	66	12:42	3/7/2018	12:45
LEG-62	3/8/2018	67	12:41	3/8/2018	12:45
LEG-63	3/8/2018	67	12:05	3/8/2018	12:08
LEG-64	3/8/2018	67	10:18	3/8/2018	10:22
LEG-65	3/8/2018	67	11:13	3/8/2018	11:17
LEG-66	3/8/2018	67	10:38	3/8/2018	10:42
LEG-67	3/8/2018	67	8:56	3/8/2018	9:00
LEG-68	3/8/2018	67	8:27	3/9/2018	8:15
LEG-69	3/7/2018	66	15:21	3/7/2018	15:29
LEG-70	3/8/2018	67	9:28	3/8/2018	9:32
LEG-71	3/7/2018	66	18:03	3/7/2018	18:07
LEG-72	3/9/2018	68	9:04	3/9/2018	9:08
LEG-73	3/7/2018	66	17:34	3/9/2018	10:19
LEG-74	3/9/2018	68	9:41	3/9/2018	9:45
LEG-75	3/7/2018	66	17:08	3/7/2018	17:12
<b>Precision Aerial Reconnaissance</b>					
PAR-1	3/10/2018	69	13:46	3/10/2018	13:49
PAR-2	3/10/2018	69	13:23	3/10/2018	13:26
PAR-3	3/10/2018	69	14:23	3/10/2018	14:26
PAR-4	3/10/2018	69	16:02	3/10/2018	16:05
PAR-5	3/10/2018	69	18:04	3/10/2018	18:07
PAR-6	3/10/2018	69	16:52	3/10/2018	16:55
PAR-7	3/11/2018	70	14:33	3/11/2018	14:36
PAR-8	3/11/2018	70	12:47	3/11/2018	12:50
PAR-9	3/11/2018	70	11:16	3/11/2018	11:19
PAR-10	3/11/2018	70	11:42	3/11/2018	11:45

PAR-11	3/11/2018	70	12:08	3/11/2018	12:11
PAR-12	3/11/2018	70	18:16	3/11/2018	18:19
PAR-13	3/11/2018	70	17:42	3/13/2018	11:26
PAR-14	3/11/2018	70	16:54	3/13/2018	10:44
PAR-15	3/11/2018	70	16:24	3/13/2018	10:21
PAR-16	3/11/2018	70	15:47	3/11/2018	15:50
PAR-17	3/13/2018	72	12:24	3/14/2018	11:10
PAR-18	3/13/2018	72	12:54	3/14/2018	10:42
PAR-19	3/13/2018	72	13:25	3/13/2018	19:56
PAR-20	3/13/2018	72	14:15	3/13/2018	19:30
PAR-21	3/13/2018	72	14:46	3/13/2018	14:49
PAR-22	3/13/2018	72	15:11	3/13/2018	15:14
PAR-23	3/14/2018	73	12:02	3/14/2018	12:05
PAR-24	3/14/2018	73	12:53	3/14/2018	12:56
PAR-25	3/13/2018	72	18:11	3/13/2018	18:14
PAR-26	3/13/2018	72	17:26	3/13/2018	17:29
PAR-27	3/13/2018	72	16:58	3/13/2018	17:01
PAR-28	3/13/2018	72	16:33	3/13/2018	16:36
PAR-29	3/13/2018	72	15:52	3/13/2018	15:55
PAR-30	3/14/2018	73	14:46	3/14/2018	14:49
PAR-31	3/14/2018	73	18:31	3/14/2018	18:34
PAR-32	3/14/2018	73	19:10	3/14/2018	19:13
PAR-33	3/15/2018	74	15:45	3/15/2018	15:48
PAR-34	3/15/2018	74	16:37	3/15/2018	16:40
PAR-35	3/15/2018	74	17:11	3/15/2018	17:14
PAR-36	3/14/2018	73	15:20	3/14/2018	15:23
PAR-37	3/14/2018	73	17:09	3/14/2018	17:12
PAR-38	3/14/2018	73	17:53	3/14/2018	17:56
PAR-39	3/15/2018	74	14:55	3/15/2018	14:58
PAR-40	3/15/2018	74	18:41	3/15/2018	18:44
PAR-41	3/15/2018	74	18:05	3/15/2018	18:08
PAR-42	3/15/2018	74	17:40	3/15/2018	17:43
PAR-43	3/14/2018	73	16:40	3/14/2018	16:43
PAR-43	3/15/2018	74	13:20	3/15/2018	13:23
PAR-44	3/15/2018	74	12:46	3/15/2018	12:49
PAR-45	3/15/2018	74	14:28	3/15/2018	14:31
PAR-46	3/16/2018	75	12:50	3/16/2018	12:53
PAR-47	3/16/2018	75	12:01	3/16/2018	12:04
PAR-48	3/16/2018	75	12:28	3/16/2018	12:32



<b>PAR-49</b>	<b>3/15/2018</b>	<b>74</b>	<b>11:16</b>	<b>3/15/2018</b>	<b>11:19</b>
<b>PAR-50</b>	<b>3/15/2018</b>	<b>74</b>	<b>11:46</b>	<b>3/15/2018</b>	<b>11:49</b>
<b>PAR-51</b>	<b>3/16/2018</b>	<b>75</b>	<b>23:41</b>	<b>3/16/2018</b>	<b>23:44</b>
<b>PAR-52</b>	<b>3/16/2018</b>	<b>75</b>	<b>11:59</b>	<b>3/16/2018</b>	<b>12:03</b>
<b>PAR-53</b>	<b>3/16/2018</b>	<b>75</b>	<b>11:20</b>	<b>3/16/2018</b>	<b>11:24</b>
<b>PAR-54</b>	<b>3/16/2018</b>	<b>75</b>	<b>10:59</b>	<b>3/16/2018</b>	<b>11:03</b>

## 5. POINT COMPARISON

Point ID	Point CK	Delta North (M)	Delta East (M)	Vertical Difference (M)
<b>Airborne Imaging</b>				
ABI-1	ABI-1CK	-0.002	0.000	-0.001
ABI-2	ABI-2CK	0.000	0.002	-0.006
ABI-3	ABI-3CK	-0.001	-0.001	0.002
ABI-4	ABI-4CK	0.002	-0.001	-0.003
ABI-5	ABI-5CK	-0.003	-0.001	-0.003
ABI-6	ABI-6CK	0.001	0.002	-0.002
ABI-7	ABI-7CK	-0.005	0.000	-0.002
ABI-8	ABI-8CK	0.000	-0.001	0.017
ABI-9	ABI-9CK	0.004	0.003	-0.022
ABI-10	ABI-10CK	0.006	0.002	0.007
ABI-11	ABI-11CK	-0.001	-0.001	-0.003
ABI-12	ABI-12CK	0.005	0.001	-0.007
ABI-13	ABI-13CK	-0.005	-0.003	-0.008
ABI-14	ABI-14CK	0.000	-0.001	0.007
ABI-15	ABI-15CK	-0.004	0.001	-0.001
ABI-16	ABI-16CK	-0.003	0.000	0.009
ABI-17	ABI-17CK	-0.001	-0.005	0.001
ABI-18	ABI-18CK	-0.006	-0.001	0.009
ABI-19	ABI-19CK	-0.005	-0.002	0.026
ABI-20	ABI-20CK	0.000	0.000	-0.004
ABI-21	ABI-21CK	0.000	-0.002	0.002
ABI-22	ABI-22CK	0.001	-0.001	-0.002
ABI-23	ABI-23CK	-0.001	-0.001	-0.006
ABI-24	ABI-24CK	0.004	-0.005	0.007
ABI-25	ABI-25CK	0.000	-0.003	-0.002
<b>Aerial Services, Inc.</b>				
ASI-01	ASI-01	-0.001	0.002	-0.007
ASI-02	ASI-02	0.000	0.002	0.001
ASI-03	ASI-03	-0.005	-0.001	-0.004
ASI-04	ASI-04	-0.002	0.002	-0.006
ASI-05	ASI-05	0.005	0.001	-0.003
ASI-06	ASI-06	0.003	0.002	-0.014
ASI-07	ASI-07	-0.007	-0.003	-0.001

ASI-08	ASI-08	0.005	0.004	-0.029
ASI-09	ASI-09	0.007	0.002	0.038
ASI-10	ASI-10	-0.009	-0.004	0.021
ASI-11	ASI-11	0.004	-0.004	-0.023
ASI-12	ASI-12	0.005	-0.002	-0.013
ASI-13	ASI-13	0.001	0.007	0.000
ASI-14	ASI-14	0.008	-0.002	-0.016
ASI-15	ASI-15	-0.001	-0.004	-0.005
ASI-16	ASI-16	0.000	0.001	0.026
ASI-17	ASI-17	0.004	0.005	0.005
ASI-18	ASI-18	-0.005	-0.002	0.000
ASI-19	ASI-19	0.002	0.006	0.001
ASI-20	ASI-20	-0.004	0.003	-0.003
ASI-21	ASI-21	-0.003	0.005	-0.011
ASI-22	ASI-22	0.006	-0.001	-0.009
ASI-23	ASI-23	-0.001	0.006	-0.021
ASI-24	ASI-24	-0.003	0.004	0.015
ASI-25	ASI-25	0.001	-0.003	0.010
ASI-26	ASI-26	0.003	0.001	0.003
ASI-27	ASI-27	0.000	-0.002	-0.012
ASI-28	ASI-28	0.004	-0.009	0.027
ASI-29	ASI-29	0.003	-0.003	0.001
ASI-30	ASI-30	0.005	-0.009	0.019
ASI-31	ASI-31	0.007	0.003	0.011
ASI-32	ASI-32	0.002	-0.001	0.004
ASI-33	ASI-33	-0.002	-0.001	0.006
ASI-34	ASI-34	0.001	0.002	-0.012
ASI-35	ASI-35	0.001	0.003	-0.002
ASI-36	ASI-36	0.004	0.000	0.000
ASI-37	ASI-37	0.003	-0.004	-0.001
ASI-38	ASI-38	0.007	0.002	0.000
ASI-39	ASI-39	0.000	-0.001	-0.005
ASI-40	ASI-40	0.000	0.009	0.000
ASI-41	ASI-41	0.005	0.010	-0.030
ASI-42	ASI-42	0.002	0.001	0.017
ASI-43	ASI-43	-0.005	-0.001	-0.001
ASI-44	ASI-44	0.001	-0.004	-0.026
ASI-45	ASI-45	0.001	-0.004	-0.002
ASI-46	ASI-46	0.003	0.000	-0.005



ASI-47	ASI-47	0.000	0.006	0.022
ASI-48	ASI-48	0.002	0.000	-0.006
ASI-49	ASI-49	0.000	-0.004	0.000
<b>Axis Geospatial</b>				
AXG-1	AXG-1CK	0.004	0.003	0.001
AXG-2	AXG-2CK	0.000	-0.002	-0.005
AXG-3	AXG-3CK	0.001	0.001	-0.006
AXG-4	AXG-4CK	0.001	-0.002	0.000
AXG-5	AXG-5CK	0.002	0.003	0.007
AXG-6	AXG-6CK	-0.003	0.004	-0.001
AXG-7	AXG-7CK	-0.002	0.002	0.002
AXG-8	AXG-8CK	0.001	0.002	0.004
AXG-9	AXG-9CK	-0.003	-0.001	0.000
AXG-10	AXG-10CK	0.000	-0.005	-0.004
AXG-11	AXG-11CK	-0.003	0.001	0.004
AXG-12	AXG-12CK	0.001	0.004	-0.002
AXG-13	AXG-13CK	-0.003	0.009	-0.001
AXG-14	AXG-14CK	0.000	-0.003	0.011
AXG-15	AXG-15CK	-0.006	0.003	0.003
AXG-16	AXG-16CK	-0.004	0.000	-0.011
AXG-17	AXG-17CK	0.000	0.001	-0.004
AXG-18	AXG-18CK	-0.002	0.000	-0.001
AXG-19	AXG-19CK	0.000	-0.001	-0.004
AXG-20	AXG-20CK	-0.003	0.001	0.011
AXG-21	AXG-21CK	0.004	-0.004	0.027
AXG-22	AXG-22CK	-0.001	-0.002	0.002
AXG-23	AXG-23CK	-0.002	0.000	0.000
AXG-24	AXG-24CK	0.001	0.004	-0.024
AXG-25	AXG-25CK	0.001	0.002	-0.009
AXG-26	AXG-26CK	0.003	-0.006	0.000
AXG-27	AXG-27CK	0.001	-0.002	-0.004
AXG-28	AXG-28CK	0.001	-0.001	0.006
AXG-29	AXG-29CK	0.001	0.002	0.001
AXG-30	AXG-30CK	0.002	0.004	-0.001
AXG-31	AXG-31CK	-0.003	-0.002	-0.005
AXG-32	AXG-32CK	-0.006	0.003	0.006
AXG-33	AXG-33CK	0.000	0.000	0.002
GCP-1	GCP-1CK	0.003	-0.001	-0.002

GCP-2	GCP-2CK	0.002	-0.002	0.005
GCP-3	GCP-3CK	-0.001	0.000	0.001
GCP-4	GCP-4CK	0.001	-0.002	-0.004
GCP-5	GCP-5CK	0.002	0.002	0.005
GCP-6	GCP-6CK	-0.006	0.006	0.004
GCP-7	GCP-7CK	-0.003	0.001	-0.004
GCP-8	GCP-8CK	0.002	-0.004	-0.009
GCP-9	GCP-9CK	0.001	0.002	0.001
GCP-10	GCP-10CK	0.002	-0.001	-0.006
GCP-11	GCP-11CK	0.004	0.005	-0.003
GCP-12	GCP-12CK	0.000	0.000	0.002
GCP-13	GCP-13CK	0.000	-0.002	-0.010
GCP-14	GCP-14CK	0.000	0.006	-0.015
GCP-15	GCP-15CK	-0.001	-0.001	-0.010
GCP-16	GCP-16CK	-0.001	-0.004	0.004
GCP-17	GCP-17CK	-0.002	-0.005	-0.006
GCP-18	GCP-18CK	0.002	-0.005	-0.006
GCP-19	GCP-19CK	-0.004	-0.002	0.004
GCP-20	GCP-20CK	0.000	-0.003	0.010
GCP-21	GCP-21CK	0.000	-0.004	0.000
GCP-22	GCP-22CK	0.003	0.002	-0.004
GCP-23	GCP-23CK	-0.003	-0.001	-0.013
GCP-24	GCP-24CK	0.001	-0.002	-0.001
GCP-25	GCP-25CK	0.002	0.002	-0.011
<b>Digital Aerial Solutions</b>				
DAS-1	DAS-1CK	0.000	-0.003	0.007
DAS-2	DAS-2CK	-0.002	-0.001	0.007
DAS-3	DAS-3CK	0.002	0.002	-0.008
DAS-4	DAS-4CK	-0.002	-0.001	0.022
DAS-5	DAS-5CK	-0.007	0.002	-0.012
DAS-6	DAS-6CK	0.007	-0.007	0.006
DAS-7	DAS-7CK	0.001	-0.004	-0.004
DAS-8	DAS-8CK	0.008	-0.004	-0.006
DAS-9	DAS-9CK	0.005	0.004	0.000
DAS-10	DAS-10CK	-0.001	-0.002	0.001
DAS-11	DAS-11CK	0.002	-0.004	-0.005
DAS-12	DAS-12CK	0.003	0.006	0.005
DAS-13	DAS-13CK	0.003	0.006	0.001

DAS-14	DAS-14CK	0.000	-0.002	-0.002
DAS-15	DAS-15CK	0.004	0.001	-0.008
DAS-16	DAS-16CK	0.002	0.003	0.006
DAS-17	DAS-17CK	-0.002	-0.002	-0.002
DAS-18	DAS-18CK	0.004	-0.001	-0.001
DAS-19	DAS-19CK	0.002	-0.001	-0.009
DAS-20	DAS-20CK	-0.002	0.002	-0.006
DAS-21	DAS-21CK	-0.011	-0.006	-0.001
DAS-22	DAS-22CK	-0.003	-0.001	0.011
DAS-23	DAS-23CK	-0.003	0.004	0.009
DAS-24	DAS-24CK	0.000	0.001	0.003
DAS-25	DAS-25CK	0.000	0.003	-0.013
DAS-26	DAS-26CK	0.007	0.005	0.002
DAS-27	DAS-27CK	-0.003	-0.004	0.000
DAS-28	DAS-28CK	0.002	-0.001	0.003
DAS-29	DAS-29CK	0.006	-0.002	-0.007
DAS-30	DAS-30CK	0.003	0.009	-0.015
DAS-31	DAS-31CK	-0.004	-0.003	0.001
DAS-32	DAS-32CK	-0.014	-0.002	-0.027
DAS-33	DAS-33CK	-0.006	0.000	-0.011
DAS-34	DAS-34CK	-0.002	-0.002	0.005
DAS-35	DAS-35CK	-0.006	0.004	-0.002
DAS-36	DAS-36CK	0.004	-0.004	0.010
DAS-37	DAS-37CK	0.002	-0.001	-0.007
DAS-38	DAS-38CK	-0.005	0.007	-0.022
DAS-39	DAS-39CK	0.003	-0.002	-0.005
DAS-40	DAS-40CK	-0.006	0.001	0.015
DAS-41	DAS-41CK	-0.006	-0.006	0.005
DAS-42	DAS-42CK	0.005	-0.003	-0.008
DAS-43	DAS-43CK	0.005	-0.003	-0.008
DAS-44	DAS-44CK	-0.001	0.002	-0.010
DAS-45	DAS-45CK	0.002	-0.001	0.010
<b>Eagle Mapping</b>				
EGM-1	EGM-1	-0.003	0.001	0.012
EGM-2	EGM-2	0.010	-0.001	0.009
EGM-3	EGM-3	-0.001	0.020	0.007
EGM-4	EGM-4	-0.005	-0.002	-0.003
EGM-5	EGM-5	-0.002	-0.010	0.018

EGM-6	EGM-6	-0.002	-0.003	-0.003
EGM-7	EGM-7	-0.002	0.003	0.001
EGM-8	EGM-8	0.000	-0.003	-0.004
EGM-9	EGM-9	-0.001	-0.006	0.007
EGM-10	EGM-10	0.003	0.000	0.014
EGM-11	EGM-11	-0.004	0.004	0.031
EGM-12	EGM-12	-0.007	0.002	0.006
EGM-13	EGM-13	0.000	-0.002	0.016
EGM-14	EGM-14	-0.007	-0.016	0.010
EGM-15	EGM-15	0.008	0.000	-0.016
EGM-16	EGM-16	-0.001	0.004	-0.007
EGM-17	EGM-17	0.000	0.003	0.005
EGM-18	EGM-18	-0.001	0.003	0.009
EGM-19	EGM-19	-0.012	-0.002	0.007
EGM-20	EGM-20	0.005	0.005	0.004
EGM-21	EGM-21	0.000	0.000	-0.013
EGM-22	EGM-22	0.001	0.008	0.034
EGM-23	EGM-23	-0.006	0.000	-0.001
EGM-24	EGM-24	0.003	-0.002	-0.002
EGM-25	EGM-25	0.000	-0.004	0.019
GCP-21	GCP-21	0.000	-0.004	0.000
GCP-22	GCP-22	0.003	0.002	-0.004
GCP-23	GCP-23	-0.003	-0.001	-0.013
GCP-24	GCP-24	0.001	-0.002	-0.001
GCP-25	GCP-25	0.002	0.002	-0.011
GCP-26	GCP-26	-0.004	-0.002	0.002
GCP-27	GCP-27	0.002	-0.001	-0.005
GCP-28	GCP-28	-0.001	0.000	-0.005
GCP-29	GCP-29	-0.003	0.000	-0.002
GCP-30	GCP-30	0.000	-0.003	-0.005
GCP-31	GCP-31	-0.001	0.001	0.002
GCP-32	GCP-32	-0.005	0.000	0.002
GCP-33	GCP-33	0.007	0.001	-0.013
GCP-34	GCP-34	-0.009	-0.003	-0.009
GCP-35	GCP-35	0.001	0.003	0.014
GCP-36	GCP-36	0.002	-0.002	0.003
GCP-37	GCP-37	0.000	-0.001	-0.002
GCP-38	GCP-38	-0.005	-0.002	-0.012
GCP-39	GCP-39	0.002	0.002	0.003



GCP-40	GCP-40	-0.003	0.004	0.006
GCP-41	GCP-41	-0.001	0.000	-0.010
GCP-42	GCP-42	-0.004	0.000	0.013
GCP-43	GCP-43	0.003	-0.002	-0.013
GCP-44	GCP-44	0.001	-0.001	0.008
GCP-45	GCP-45	0.001	0.002	-0.012
<b>Intermap</b>				
ITM-01	ITM-01CK	0.004	-0.004	-0.010
ITM-02	ITM-02CK	0.004	-0.008	0.008
ITM-03	ITM-03CK	-0.005	0.003	-0.021
ITM-04	ITM-04CK	0.000	-0.009	-0.017
ITM-05	ITM-05CK	-0.003	-0.008	-0.038
ITM-06	ITM-06CK	0.009	0.006	-0.012
ITM-07	ITM-07CK	0.001	0.005	-0.010
ITM-08	ITM-08CK	0.008	0.000	0.004
ITM-09	ITM-09CK	0.002	0.001	-0.003
ITM-10	ITM-10CK	0.003	-0.005	-0.020
ITM-11	ITM-11CK	-0.002	-0.012	-0.031
ITM-12	ITM-12CK	-0.005	0.012	-0.018
ITM-13	ITM-13CK	-0.011	-0.001	-0.020
ITM-14	ITM-14CK	-0.005	-0.008	-0.002
ITM-15	ITM-15CK	-0.002	0.013	0.011
ITM-16	ITM-16CK	-0.003	0.003	0.009
ITM-17	ITM-17CK	-0.007	0.017	-0.030
ITM-18	ITM-18CK	0.004	0.003	-0.003
ITM-19	ITM-19CK	0.009	-0.001	0.008
ITM-20	ITM-20CK	-0.004	-0.007	0.016
<b>Leading Egde Geomatics</b>				
LEG-1	LEG-1CK	-0.005	-0.003	-0.008
LEG-2	LEG-2CK	-0.001	0.000	0.005
LEG-3	LEG-3CK	-0.004	0.005	0.003
LEG-4	LEG-4CK	-0.001	0.000	-0.002
LEG-5	LEG-5CK	0.000	0.001	-0.008
LEG-6	LEG-6CK	0.000	0.001	0.004
LEG-7	LEG-7CK	-0.008	0.000	0.003
LEG-8	LEG-8CK	0.000	-0.001	-0.010
LEG-9	LEG-9CK	-0.003	-0.001	0.002

LEG-10	LEG-10CK	-0.002	-0.001	-0.003
LEG-11	LEG-11CK	-0.001	0.000	0.003
LEG-12	LEG-12CK	0.006	-0.001	0.002
LEG-13	LEG-13CK	0.001	0.001	0.004
LEG-14	LEG-14CK	-0.002	0.000	0.012
LEG-15	LEG-15CK	0.000	0.000	-0.002
LEG-16	LEG-16CK	0.007	0.002	0.003
LEG-17	LEG-17CK	-0.003	-0.001	0.002
LEG-18	LEG-18CK	-0.004	-0.001	0.000
LEG-19	LEG-19CK	0.000	-0.004	0.003
LEG-20	LEG-20CK	-0.001	0.002	-0.003
LEG-21	LEG-21CK	-0.002	-0.005	-0.003
LEG-22	LEG-22CK	0.002	0.001	-0.005
LEG-23	LEG-23CK	0.001	0.001	0.003
LEG-24	LEG-24CK	-0.003	-0.001	0.023
LEG-25	LEG-25CK	0.004	0.004	-0.008
LEG-26	LEG-26CK	0.002	0.004	0.003
LEG-27	LEG-27CK	-0.004	-0.003	0.009
LEG-28	LEG-28CK	-0.004	-0.002	-0.002
LEG-29	LEG-29CK	-0.003	0.007	0.010
LEG-30	LEG-30CK	-0.002	0.003	-0.037
LEG-31	LEG-31CK	-0.002	0.004	0.012
LEG-32	LEG-32CK	0.003	-0.002	-0.011
LEG-33	LEG-33CK	-0.009	-0.007	0.026
LEG-34	LEG-34CK	0.002	-0.002	0.001
LEG-35	LEG-35CK	0.015	-0.007	-0.011
LEG-36	LEG-36CK	-0.007	-0.006	0.017
LEG-37	LEG-37CK	0.008	0.001	-0.005
LEG-38	LEG-38CK	-0.008	-0.006	0.004
LEG-39	LEG-39CK	-0.040	0.009	0.000
LEG-40	LEG-40CK	-0.014	0.009	-0.032
LEG-41	LEG-41CK	0.010	0.001	-0.017
LEG-42	LEG-42CK	-0.010	-0.014	0.038
LEG-43	LEG-43CK	0.007	0.007	0.017
LEG-44	LEG-44CK	0.002	0.001	-0.013
LEG-45	LEG-45CK	0.014	0.002	-0.037
LEG-46	LEG-46CK	0.002	-0.002	0.025
LEG-47	LEG-47CK	0.006	-0.005	-0.031
LEG-48	LEG-48CK	-0.004	-0.003	-0.007

LEG-49	LEG-49CK	0.000	0.000	-0.014
LEG-50	LEG-50CK	-0.009	-0.011	0.006
LEG-51	LEG-51CK	-0.001	0.000	0.012
LEG-52	LEG-52CK	0.004	-0.004	-0.001
LEG-53	LEG-53CK	0.001	0.001	-0.025
LEG-54	LEG-54CK	0.002	-0.002	0.004
LEG-55	LEG-55CK	0.000	-0.001	-0.023
LEG-56	LEG-56CK	0.001	0.002	-0.002
LEG-57	LEG-57CK	0.005	0.000	0.006
LEG-58	LEG-58CK	-0.002	0.014	0.003
LEG-59	LEG-59CK	0.010	-0.001	-0.001
LEG-60	LEG-60CK	0.000	0.002	0.017
LEG-61	LEG-61CK	0.000	0.001	-0.010
LEG-62	LEG-62CK	0.000	0.000	0.006
LEG-63	LEG-63CK	-0.004	0.010	0.002
LEG-64	LEG-64CK	0.001	0.001	-0.020
LEG-65	LEG-65CK	-0.012	0.007	0.012
LEG-66	LEG-66CK	-0.004	-0.011	0.014
LEG-67	LEG-67CK	-0.009	-0.008	-0.025
LEG-68	LEG-68CK	-0.003	-0.002	-0.013
LEG-69	LEG-69CK	-0.009	0.010	-0.023
LEG-70	LEG-70CK	0.001	-0.001	0.005
LEG-71	LEG-71CK	0.004	-0.005	0.004
LEG-72	LEG-72CK	0.010	0.001	-0.008
LEG-73	LEG-73CK	-0.008	-0.002	-0.007
LEG-74	LEG-74CK	0.003	-0.002	0.005
LEG-75	LEG-75CK	-0.013	0.009	0.026
<b>Precision Aerial Reconnaissance</b>				
PAR-1	PAR-1CK	-0.003	-0.002	0.001
PAR-2	PAR-2CK	0.010	0.007	-0.010
PAR-3	PAR-3CK	0.000	0.002	0.000
PAR-4	PAR-4CK	-0.008	-0.008	0.007
PAR-5	PAR-5CK	-0.001	0.007	0.004
PAR-6	PAR-6CK	0.001	0.000	-0.005
PAR-7	PAR-7CK	-0.004	-0.002	-0.015
PAR-8	PAR-8CK	0.003	0.003	-0.008
PAR-9	PAR-9CK	-0.007	-0.003	-0.020
PAR-10	PAR-10CK	0.006	-0.009	0.025

PAR-11	PAR-11CK	-0.001	0.000	0.009
PAR-12	PAR-12CK	-0.007	0.002	0.009
PAR-13	PAR-13CK	0.008	-0.004	0.007
PAR-14	PAR-14CK	-0.009	0.003	-0.012
PAR-15	PAR-15CK	-0.005	-0.007	0.016
PAR-16	PAR-16CK	-0.009	0.000	0.005
PAR-17	PAR-17CK	-0.007	0.022	-0.011
PAR-18	PAR-18CK	0.000	0.014	-0.016
PAR-19	PAR-19CK	-0.009	-0.019	-0.008
PAR-20	PAR-20CK	-0.006	-0.002	0.005
PAR-21	PAR-21CK	0.001	0.000	-0.015
PAR-22	PAR-22CK	-0.002	0.006	-0.023
PAR-23	PAR-23CK	-0.013	0.000	0.016
PAR-24	PAR-24CK	0.001	0.004	-0.010
PAR-25	PAR-25CK	0.002	0.005	-0.002
PAR-26	PAR-26CK	0.001	-0.004	-0.009
PAR-27	PAR-27CK	0.001	-0.003	-0.019
PAR-28	PAR-28CK	-0.005	-0.006	-0.018
PAR-29	PAR-29CK	0.003	-0.008	0.019
PAR-30	PAR-30CK	-0.002	0.002	-0.002
PAR-31	PAR-31CK	-0.014	0.007	-0.009
PAR-32	PAR-32CK	-0.002	-0.005	-0.014
PAR-33	PAR-33CK	0.003	0.000	0.004
PAR-34	PAR-34CK	-0.018	-0.010	0.013
PAR-35	PAR-35CK	0.001	-0.003	0.007
PAR-36	PAR-36CK	0.023	-0.002	-0.014
PAR-37	PAR-37CK	0.024	0.000	0.033
PAR-38	PAR-38CK	-0.012	0.020	0.013
PAR-39	PAR-39CK	-0.013	-0.019	0.010
PAR-40	PAR-40CK	-0.011	-0.018	-0.001
PAR-41	PAR-41	-0.001	0.002	-0.012
PAR-42	PAR-42	0.001	0.002	-0.016
PAR-43	PAR-43	-0.013	0.005	-0.011
PAR-44	PAR-44	0.015	0.028	-0.038
PAR-45	PAR-45	-0.001	-0.002	0.015
PAR-46	PAR-46	0.000	-0.001	-0.009
PAR-47	PAR-47	0.002	0.003	0.001
PAR-48	PAR-48	-0.004	0.007	-0.002
PAR-49	PAR-49	-0.003	0.006	-0.001



<b>PAR-50</b>	<b>PAR-50</b>	<b>0.003</b>	<b>0.008</b>	<b>-0.007</b>
<b>PAR-51</b>	<b>PAR-51</b>	<b>-0.006</b>	<b>0.002</b>	<b>-0.012</b>
<b>PAR-52</b>	<b>PAR-52</b>	<b>0.000</b>	<b>-0.003</b>	<b>-0.007</b>
<b>PAR-53</b>	<b>PAR-53</b>	<b>0.003</b>	<b>-0.002</b>	<b>-0.009</b>
<b>PAR-54</b>	<b>PAR-54</b>	<b>-0.001</b>	<b>-0.001</b>	<b>0.002</b>