

Check Point Survey Report

“Texas Neches Basin FY16 LiDAR”
USGS Contract: G16PC00020
Task Order Number: G16PD00324

Prepared for:
United States Geological Survey (USGS)



Prepared By:
Dewberry Consultants LLC
1003 Derekwood Lane, Suite 204
Lanham, Maryland, 20706
Phone (301)364-1855 Fax (301)731-0188

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	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

1.1 *Project Summary*

Dewberry Consultants LLC is under contract to the United States Geological Survey to provide 452 Check Points in the State of Texas. Under the above referenced USGS Task Order, Dewberry is tasked to complete the quality assurance of LiDAR products. As part of this work Dewberry staff will complete Check Point surveys that will be used to evaluate vertical and horizontal accuracy. The ground survey was conducted March 23, and April 4, 2016.

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 15, NAD83 (2011) in meters. Final Vertical elevations are referenced to NAVD88 in meters using Geoid model 2012B (Geoid12B).

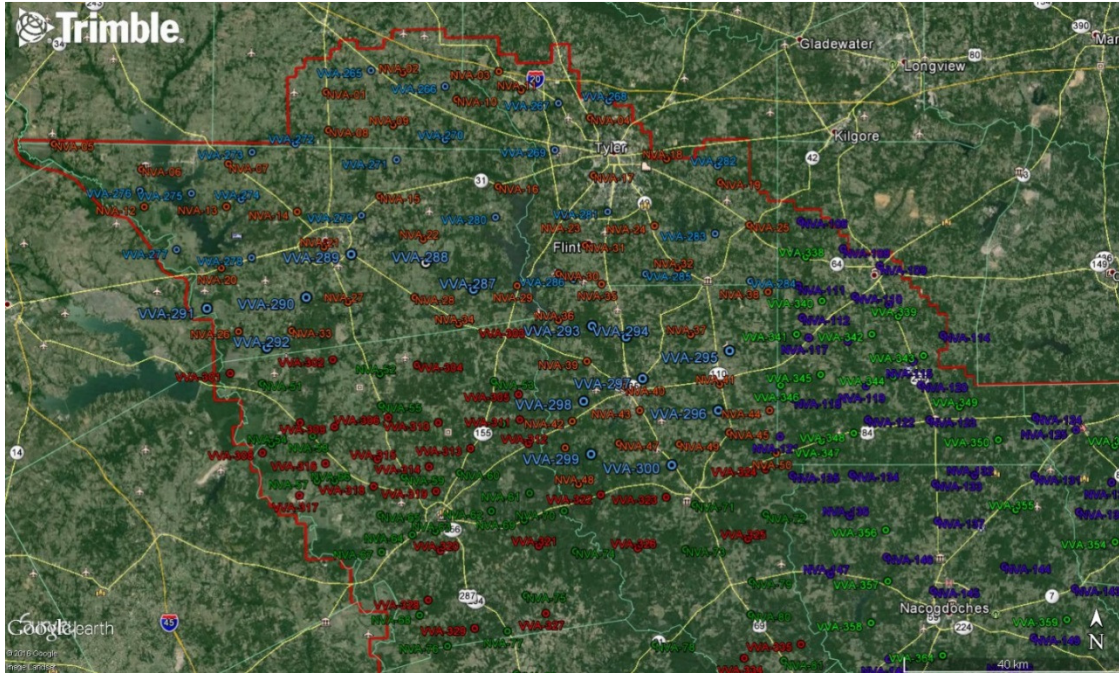
1.2 *Points of Contact*

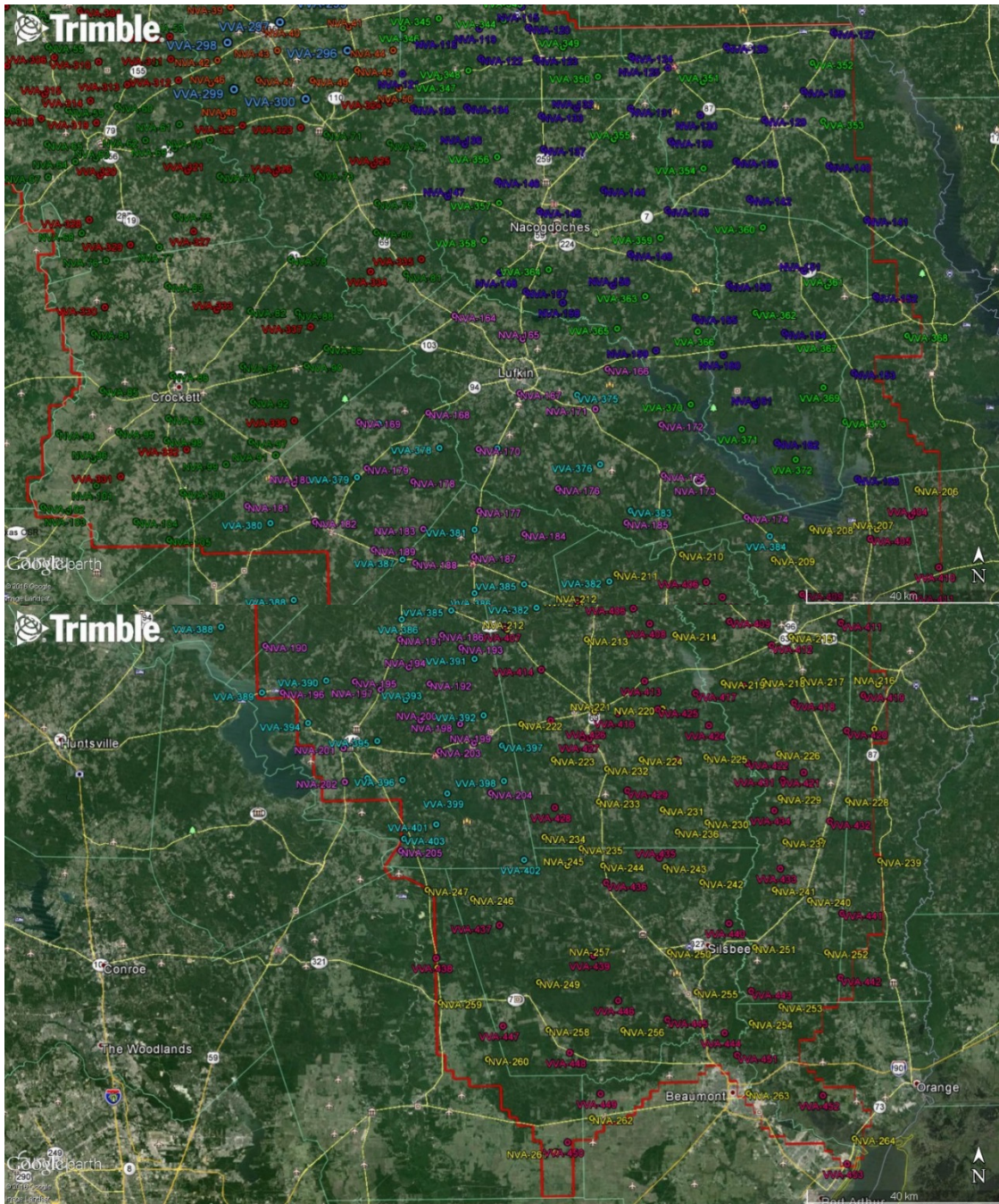
Questions regarding the technical aspects of this report should be addressed to:

Dewberry Consultants LLC

Gary D. Simpson, L.S.
Senior Associate
10003 Derekwood Lane
Suite 204
Lanham, Maryland 20706
(301) 364-1855 direct
(301) 731-0188 fax

1.3 Project Area





PROJECT DETAILS

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 452 LiDAR Check 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 Check 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 Consultants LLC office located in Lanham, MD was tied to a Real Time Network operated by TxDOT RTN. 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 ± 5 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.

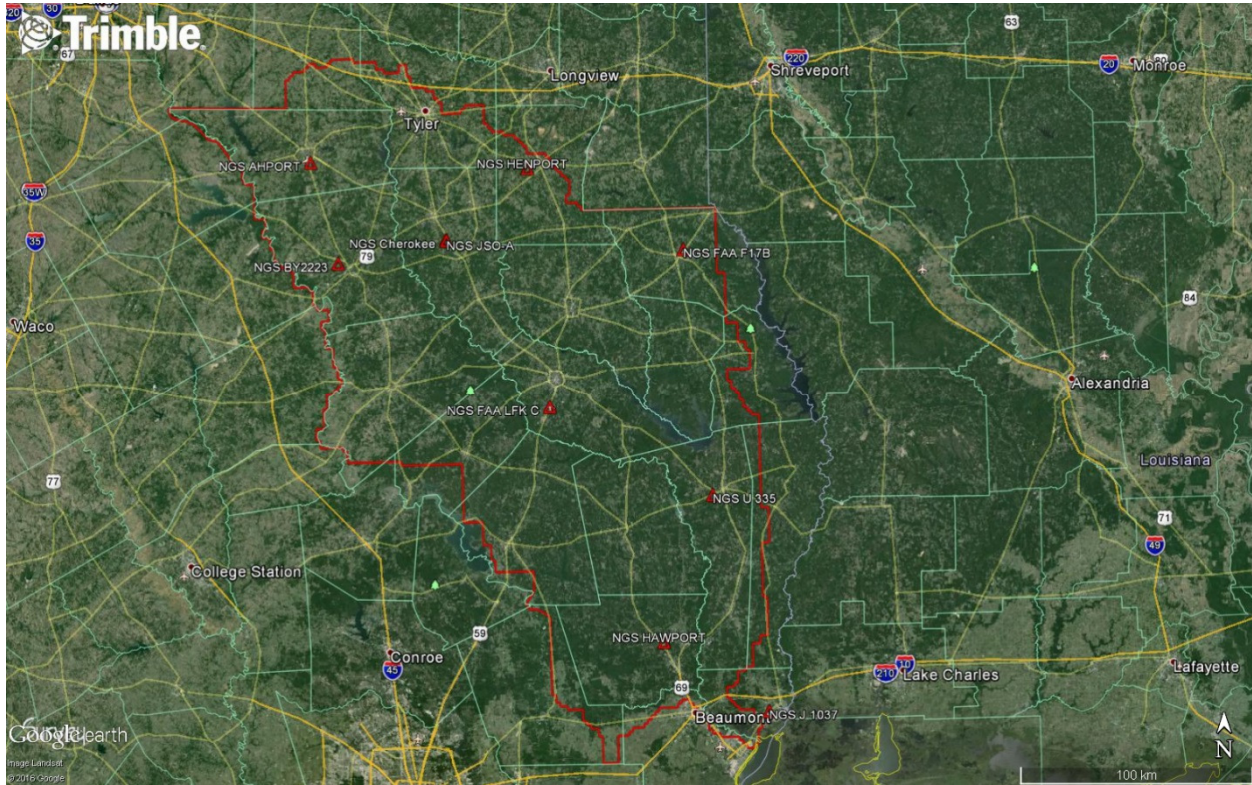
Field GPS observations are detailed on the “Check Point Documentation Reports” submitted as part of this report.

Nine (9) existing NGS monument listed in the NSRS database were located 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 designated as CR1348, BY2223, BY2779, AB6240, AB2805, BL2312, CR1373, BK1760 and BL0092. The results are as follows:

PT. #	Observed Values			Data Sheet Values			ΔX	ΔY	ΔZ
	NORTHING	EASTING	ELEVS.	NORTHING	EASTING	ELEVS.			
BY2223	3519381.542	244222.594	123.529	3,519,381.68	244,222.62	123.483	N/A	N/A	0.046
FAA F17B	3522031.154	390704.149	91.017	3,522,031.16	390,704.16	91.02	-0.003	-0.010	-0.003
NGS AHPORT	3562283.149	233251.708	134.616	3,562,283.14	233,251.70	134.66	0.014	0.011	-0.044
NGS CHEROKEE	3528207.331	290206.614	201.419	3,528,207.32	290,206.63	201.46	0.012	-0.012	-0.041
NGS FAA LFK C	3456692.345	332827.047	84.413	3,456,692.33	332,827.02	84.57	0.020	0.024	N/A
NGS HAWPORT	3356906.755	379048.505	19.952	3,356,906.74	379,048.47	20.16	0.019	0.038	N/A
NGS J 1037	3326688.367	423096.604	3.059	3,326,688.35	423,096.59	3.22	0.022	0.011	N/A
NGS JSO-A	3527864.401	290484.308	201.594	3,527,864.38	290,484.30	201.67	0.021	0.004	0.051
NGS U 335	3418269.822	400921.062	63.827	3,418,269.82	400,921.07	63.78	0.002	-0.006	0.047

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 the TxDOT RTN 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 2014) 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

NVA CHECK POINTS

Point ID	Northing	Easting	Elevation
NVA-01	3593631.333	231540.743	164.733
NVA-02	3596824.201	245513.202	161.746
NVA-03	3596782.206	262949.895	170.663
NVA-04	3588150.084	279353.545	152.477
NVA-05	3585256.862	181692.689	102.971
NVA-06	3580349.530	197646.483	116.572
NVA-07	3581046.269	213542.548	120.173
NVA-08	3586740.495	231843.903	137.782
NVA-09	3586373.846	243654.617	149.774
NVA-10	3591906.937	255211.193	156.108
NVA-11	3593334.963	266956.018	172.542
NVA-12	3573541.552	198061.267	101.562
NVA-13	3572250.924	216149.979	104.764
NVA-14	3572122.943	225926.850	130.058
NVA-15	3574693.499	240948.034	138.538
NVA-16	3576054.524	262491.305	115.237
NVA-17	3577753.905	279796.822	158.097
NVA-18	3580491.988	293116.980	135.999
NVA-19	3576141.856	302778.064	143.188
NVA-20	3562254.249	211934.395	87.614
NVA-21	3565691.944	230704.781	137.145
NVA-22	3566790.333	248733.399	139.920
NVA-23	3570490.388	274482.070	138.948
NVA-24	3568495.703	290706.636	143.713
NVA-25	3568362.371	307912.247	164.397
NVA-26	3550716.395	214877.705	81.684
NVA-27	3555698.564	234904.723	115.375
NVA-28	3555102.432	249360.847	146.289
NVA-29	3558112.574	265613.075	113.749
NVA-30	3560157.071	273192.960	125.071
NVA-31	3565205.874	278061.307	152.544
NVA-32	3560794.011	294770.905	105.005
NVA-33	3550712.124	224578.626	125.575
NVA-34	3551419.925	254877.188	132.834
NVA-35	3558147.708	280925.454	152.308
NVA-36	3551754.493	272993.769	124.242
NVA-37	3548796.117	296929.386	107.406

NVA-38	3556254.299	311064.685	122.804
NVA-39	3544290.202	278028.192	203.437
NVA-40	3539766.970	284809.557	178.946
NVA-41	3539776.712	302035.735	141.804
NVA-42	3533559.800	275191.767	136.837
NVA-43	3535300.974	287480.131	149.478
NVA-44	3563724.208	299614.990	137.276
NVA-45	3531046.952	303617.271	102.773
NVA-46	3528794.765	273812.330	169.548
NVA-47	3529459.968	283589.897	198.159
NVA-48	3522184.935	276147.355	102.008
NVA-49	3529134.493	294544.694	129.381
NVA-50	3527175.106	312061.347	96.108
NVA-51	3541297.765	219038.099	100.898
NVA-52	3542655.966	240484.304	120.036
NVA-53	3540997.534	261138.370	159.064
NVA-54	3530333.651	220506.145	90.155
NVA-55	3536926.966	239155.670	141.299
NVA-56	3533279.415	262484.845	120.873
NVA-57	3523562.063	228688.943	89.222
NVA-58	3532068.526	227708.726	93.150
NVA-59	3524069.608	244554.385	117.663
NVA-60	3524619.265	254647.785	134.958
NVA-61	3520032.099	266525.790	119.568
NVA-62	3517598.572	260259.297	146.019
NVA-63	3514168.178	250071.405	159.547
NVA-64	3513673.778	245905.147	116.835
NVA-65	3517241.447	240106.081	101.610
NVA-66	3522500.322	232507.522	100.948
NVA-67	3510548.505	240208.853	91.660
NVA-68	3499046.779	246997.554	104.211
NVA-69	3515865.068	266184.607	92.474
NVA-70	3518239.991	273756.124	109.207
NVA-71	3518188.357	297173.482	164.177
NVA-72	3516248.593	310013.202	98.605
NVA-73	3510140.335	295334.843	135.785
NVA-74	3510115.778	275339.603	116.980
NVA-75	3502337.741	266276.647	146.777
NVA-76	3493313.136	251839.381	124.763
NVA-77	3495913.129	262801.242	154.862
NVA-78	3493013.706	289422.365	133.374

NVA-79	3504113.069	307289.824	118.736
NVA-80	3498183.704	307037.486	98.142
NVA-81	3489696.636	312879.047	102.168
NVA-82	3482715.093	281154.343	131.696
NVA-83	3486994.946	264309.824	146.243
NVA-84	3478751.741	249088.403	107.097
NVA-85	3467203.818	250694.410	98.239
NVA-86	3469962.225	265100.620	96.313
NVA-87	3471605.856	279398.342	136.903
NVA-88	3482330.320	290762.483	87.080
NVA-89	3475003.819	296518.481	121.564
NVA-90	3471533.375	292424.696	110.837
NVA-91	3455195.796	282287.117	84.172
NVA-92	3464413.093	281340.947	93.456
NVA-93	3461318.819	264082.757	107.064
NVA-94	3458514.234	241543.062	62.682
NVA-95	3458678.920	253873.687	80.701
NVA-96	3453190.601	248549.692	77.131
NVA-97	3456279.742	280861.679	75.275
NVA-98	3456823.587	263603.839	113.418
NVA-99	3451786.029	275589.434	78.222
NVA-100	3446207.201	266716.969	88.677
NVA-101	3447890.090	249037.172	84.517
NVA-102	3446968.907	241900.832	52.366
NVA-103	3442705.219	243250.278	48.415
NVA-104	3440380.874	257004.480	90.361
NVA-105	3436668.220	263766.395	89.537
NVA-106	3568916.442	317235.764	170.894
NVA-107	3563155.646	316124.732	140.485
NVA-108	3563797.179	324828.861	146.418
NVA-109	3560635.044	331456.975	145.771
NVA-110	3555182.036	326858.254	139.401
NVA-111	3565912.685	300326.350	141.817
NVA-112	3551494.493	317239.084	127.514
NVA-113	3553599.420	332982.829	146.263
NVA-114	3547938.826	342775.129	144.019
NVA-115	3542775.146	337490.462	133.839
NVA-116	3547081.900	325413.403	145.448
NVA-117	3547881.527	318348.285	134.269
NVA-118	3536864.260	315473.529	132.074
NVA-119	3538985.386	328563.414	133.218

NVA-120	3539033.415	338598.801	150.474
NVA-121	3529934.799	312987.297	109.528
NVA-122	3532929.344	328830.799	154.544
NVA-123	3532780.000	340005.866	153.896
NVA-124	3532814.573	359407.349	113.366
NVA-125	3530439.580	366756.464	127.510
NVA-126	3534579.162	378743.549	104.817
NVA-127	3537174.377	400684.261	65.074
NVA-128	3525377.009	394346.374	89.083
NVA-129	3519651.716	386241.934	114.630
NVA-130	3520778.718	373185.902	125.517
NVA-131	3522332.605	359086.995	117.553
NVA-132	3522551.579	348059.165	152.702
NVA-133	3521157.328	340918.129	134.449
NVA-134	3523113.793	325838.332	145.507
NVA-135	3523117.343	314986.601	86.515
NVA-136	3515635.684	325257.196	146.885
NVA-137	3514420.089	341262.422	140.335
NVA-138	3515564.586	367153.955	84.406
NVA-139	3511350.687	380350.642	156.902
NVA-140	3510166.080	399290.041	98.171
NVA-141	3499132.598	406804.614	76.442
NVA-142	3503686.525	382940.217	125.087
NVA-143	3501697.893	366215.196	86.881
NVA-144	3505968.261	353343.921	142.188
NVA-145	3501885.291	340265.915	136.530
NVA-146	3507175.736	334063.185	99.557
NVA-147	3505196.686	321595.732	108.490
NVA-148	3489622.695	331954.897	86.651
NVA-149	3492941.090	358548.773	119.684
NVA-150	3486400.002	378495.524	104.588
NVA-151	3488947.617	393767.167	92.457
NVA-152	3483638.758	408306.243	100.661
NVA-153	3468244.553	403705.720	100.695
NVA-154	3476525.329	389597.356	83.448
NVA-155	3479878.250	371531.407	78.177
NVA-156	3494195.263	341259.034	91.956
NVA-157	3485731.004	337171.349	81.408
NVA-158	3483362.255	344621.239	103.461
NVA-159	3473390.777	363429.828	57.993
NVA-160	3471774.284	377117.232	77.534

NVA-161	3462047.625	383479.248	77.671
NVA-162	3454377.412	387768.527	58.251
NVA-163	3446755.395	404706.896	57.708
NVA-164	3446755.402	404706.898	57.695
NVA-164	3481112.868	322641.356	88.933
NVA-165	3476143.384	336315.570	110.470
NVA-166	3469864.883	353501.999	87.587
NVA-167	3465274.847	335611.451	78.375
NVA-168	3461627.709	316948.884	59.926
NVA-169	3459990.635	302900.308	105.931
NVA-170	3454105.766	327071.443	59.275
NVA-171	3461777.627	350903.309	96.956
NVA-172	3458428.709	364306.674	60.845
NVA-173	3447154.238	371639.199	100.971
NVA-174	3439431.541	381332.121	101.854
NVA-175	3449895.598	368067.854	69.970
NVA-176	3445619.068	348308.038	78.006
NVA-177	3441611.910	326963.597	79.864
NVA-178	3447785.153	313683.379	77.313
NVA-179	3450622.515	304306.197	102.906
NVA-180	3447630.151	289440.059	85.952
NVA-181	3443310.613	279851.726	74.179
NVA-182	3439919.351	293539.830	99.146
NVA-183	3438117.431	315560.672	87.648
NVA-184	3436772.956	336091.301	73.263
NVA-185	3438854.562	357787.627	58.545
NVA-186	3421669.095	333920.816	87.497
NVA-187	3432189.666	325811.257	68.509
NVA-188	3431292.458	313812.183	81.574
NVA-189	3433954.139	305670.422	100.829
NVA-190	3420135.471	297921.325	81.751
NVA-191	3415151.499	322783.878	82.092
NVA-192	3411832.605	331238.793	114.232
NVA-193	3419022.622	337772.205	91.528
NVA-194	3415153.924	327004.418	114.537
NVA-195	3412551.860	316007.241	83.903
NVA-196	3410605.563	301332.406	48.439
NVA-197	3410804.719	321338.714	73.158
NVA-198	3403570.237	337295.224	100.546
NVA-199	3399721.777	340073.992	112.151
NVA-200	3404462.073	329237.576	112.854

NVA-201	3399081.945	313535.771	48.853
NVA-202	3392290.703	313727.055	42.702
NVA-203	3398219.193	333029.628	104.842
NVA-204	3389599.189	343373.024	72.971
NVA-205	3378223.733	324876.552	45.393
NVA-206	3444330.450	416263.325	117.586
NVA-207	3436421.615	407856.169	145.870
NVA-208	3436928.022	394676.576	57.953
NVA-209	3430775.903	386732.443	44.974
NVA-210	3432102.140	368087.656	38.481
NVA-211	3426488.006	356975.010	96.722
NVA-212	3422580.351	347121.404	75.966
NVA-213	3420297.624	363314.159	94.557
NVA-214	3420971.653	381282.760	66.579
NVA-215	3420288.693	404944.004	74.680
NVA-216	3410324.909	422806.094	83.461
NVA-217	3410484.788	406800.519	104.770
NVA-218	3403654.933	401515.929	66.739
NVA-219	3411152.683	391001.527	29.180
NVA-220	3406050.056	378464.772	82.473
NVA-221	3405694.973	364474.571	83.982
NVA-222	3403360.979	349670.489	95.592
NVA-223	3396110.909	356184.294	83.339
NVA-224	3395879.426	374060.941	69.369
NVA-225	3396153.266	387198.404	50.077
NVA-226	3396661.115	402059.650	55.699
NVA-227	3401350.875	421579.184	43.904
NVA-228	3386998.510	415906.004	31.897
NVA-229	3387717.838	402165.992	40.586
NVA-230	3382763.074	387209.696	40.878
NVA-231	3385708.660	378157.010	37.089
NVA-232	3393708.960	367470.099	58.579
NVA-233	3387525.481	365328.490	47.152
NVA-234	3386260.056	359596.561	54.082
NVA-235	3381073.175	365714.639	40.804
NVA-236	3381142.574	381124.635	38.289
NVA-237	3378823.048	403012.791	32.533
NVA-238	3368432.439	406618.826	21.570
NVA-239	3374751.726	422400.498	15.909
NVA-240	3367000.725	407718.064	23.549
NVA-241	3369160.834	400685.025	17.346

NVA-242	3370717.857	385947.731	33.534
NVA-243	3374097.677	378560.622	19.591
NVA-244	3374574.949	365862.278	29.564
NVA-245	3374620.544	358613.025	36.056
NVA-246	3368297.691	339321.112	41.343
NVA-247	3373984.385	328963.731	38.867
NVA-248	3356503.736	331633.788	30.855
NVA-249	3351224.720	352477.590	21.331
NVA-250	3356896.846	379159.667	20.381
NVA-251	3357592.881	396471.505	10.220
NVA-252	3356327.494	411163.820	13.843
NVA-253	3345586.333	401687.638	8.936
NVA-254	3342315.458	395587.245	6.155
NVA-255	3348897.601	384157.543	16.118
NVA-256	3341474.413	369427.039	14.247
NVA-257	3356320.126	363609.166	24.165
NVA-258	3343640.329	353101.654	19.133
NVA-259	3347480.109	332463.281	29.379
NVA-260	3335785.961	341858.193	20.289
NVA-261	3319999.366	355024.652	15.197
NVA-262	3323593.886	362827.420	12.718
NVA-263	3328349.247	394468.747	5.652
NVA-264	3318833.245	416437.393	1.312

VVA CHECK POINTS

Point ID	Northing	Easting	Elevation
VVA-265	3597363.627	239714.517	161.903
VVA-266	3594067.490	252614.970	144.626
VVA-267	3590972.664	273547.591	128.839
VVA-268	3591238.773	282846.190	161.457
VVA-269	3582451.683	272860.523	158.834
VVA-270	3584647.799	252983.067	138.083
VVA-271	3581127.201	244139.680	140.925
VVA-272	3584422.301	225751.162	190.886
VVA-273	3582878.919	217858.172	122.929
VVA-274	3574541.925	215763.247	121.163
VVA-275	3575817.152	206699.253	104.825
VVA-276	3576456.853	197322.726	107.728
VVA-277	3565717.240	203830.897	87.324
VVA-278	3564105.081	217497.055	115.365
VVA-279	3571704.694	237404.004	147.579

VVA-280	3570409.585	262023.568	123.117
VVA-281	3571130.107	282235.455	164.119
VVA-282	3579142.078	302303.980	144.991
VVA-283	3566959.728	301677.650	142.925
VVA-284	3558330.108	307887.881	133.529
VVA-285	3559774.253	289019.949	114.838
VVA-286	3559090.611	275788.987	136.945
VVA-287	3557418.246	257029.590	149.494
VVA-288	3562588.915	249142.651	142.821
VVA-289	3564355.729	235624.091	152.565
VVA-290	3556767.065	227355.581	124.975
VVA-291	3555887.556	208776.734	89.131
VVA-292	3547791.221	220030.447	107.046
VVA-293	3550055.032	279572.264	148.471
VVA-294	3548631.521	284970.044	152.231
VVA-295	3546863.338	303987.183	141.927
VVA-296	3535567.906	301883.245	118.851
VVA-297	3541108.817	288127.486	137.282
VVA-298	3537433.951	277107.983	138.572
VVA-299	3525702.012	280722.192	206.149
VVA-300	3525402.300	293113.274	189.783
VVA-301	3543230.667	213177.815	83.809
VVA-302	3545567.018	231941.551	109.667
VVA-303	3550325.519	268460.220	131.521
VVA-304	3543937.369	247199.346	141.796
VVA-305	3538552.890	265590.681	103.200
VVA-306	3534800.722	241837.342	136.708
VVA-307	3534113.707	225800.070	108.722
VVA-308	3528422.208	218858.995	83.495
VVA-309	3533168.471	232013.802	113.889
VVA-310	3534118.592	250977.595	192.856
VVA-311	3533974.346	265649.787	135.592
VVA-312	3529556.302	267073.314	113.158
VVA-313	3528910.895	256658.259	121.805
VVA-314	3526187.817	248587.293	169.499
VVA-315	3526818.028	239870.386	109.893
VVA-316	3526700.646	230290.649	108.482
VVA-317	3517364.799	233824.389	95.639
VVA-318	3522562.862	238664.423	97.888
VVA-319	3521381.410	250278.035	145.749
VVA-320	3510673.420	250888.451	146.721

VVA-321	3511008.995	268267.867	139.949
VVA-322	3520230.134	280110.515	122.887
VVA-323	3519587.821	291908.868	121.206
VVA-324	3524325.620	310080.612	95.990
VVA-325	3511719.924	306642.839	135.307
VVA-326	3510235.174	286630.266	117.070
VVA-327	3499006.347	269809.046	120.576
VVA-328	3501670.618	248682.397	93.086
VVA-329	3496617.839	256884.171	121.394
VVA-330	3484314.888	250952.073	120.103
VVA-331	3449670.358	254042.755	84.986
VVA-332	3454914.180	267625.458	92.612
VVA-333	3483094.664	274226.992	115.391
VVA-334	3489397.844	305280.623	78.784
VVA-335	3492579.789	316090.213	102.384
VVA-336	3460445.671	289677.375	105.235
VVA-337	3479217.173	293216.071	109.283
VVA-338	3561912.888	318075.107	133.797
VVA-339	3551264.754	334716.534	116.725
VVA-340	3554339.130	321167.384	135.743
VVA-341	3548573.567	316511.595	117.059
VVA-342	3549490.531	329930.269	137.471
VVA-343	3544033.925	338965.097	130.779
VVA-344	3540619.405	333598.381	113.320
VVA-345	3541312.347	320406.580	113.777
VVA-346	3539334.626	313115.754	118.814
VVA-347	3529189.545	320354.750	98.290
VVA-348	3530543.590	326213.234	142.529
VVA-349	3534942.140	345484.272	173.936
VVA-350	3528844.038	352587.541	129.447
VVA-351	3527466.376	373886.728	116.874
VVA-352	3531049.178	396276.578	87.676
VVA-353	3519204.231	398189.597	76.662
VVA-354	3510140.529	373710.831	125.377
VVA-355	3516118.660	355497.213	152.985
VVA-356	3512983.464	331759.822	153.373
VVA-357	3502544.319	332747.632	149.597
VVA-358	3496207.786	328875.762	105.633
VVA-359	3496192.209	364621.510	155.838
VVA-360	3497869.229	385527.830	102.099
VVA-361	3485870.509	398421.570	128.750

VVA-362	3480558.719	383578.127	110.781
VVA-363	3482158.797	360887.155	80.266
VVA-364	3490092.200	341857.032	92.026
VVA-365	3477941.940	355552.582	62.232
VVA-366	3477035.249	371996.836	58.208
VVA-367	3475357.602	396932.514	95.237
VVA-368	3475616.783	414635.572	90.754
VVA-369	3465347.831	397360.363	82.717
VVA-370	3463511.625	370480.344	75.921
VVA-371	3457569.065	380600.028	63.267
VVA-372	3450851.910	391467.749	63.196
VVA-373	3458066.385	401890.696	74.082
VVA-374	3460133.183	305800.376	98.792
VVA-375	3464848.590	347169.997	84.878
VVA-376	3450370.607	348697.819	57.765
VVA-377	3454169.217	330802.389	72.171
VVA-378	3454393.450	319133.026	65.059
VVA-379	3449112.558	302073.283	90.095
VVA-380	3439649.072	284159.659	81.605
VVA-381	3437983.214	325971.688	69.123
VVA-382	3426871.981	352617.380	83.019
VVA-383	3441108.841	357744.675	57.015
VVA-384	3441513.711	378786.040	65.867
VVA-385	3426182.373	336708.260	88.067
VVA-386	3425089.114	325665.194	96.347
VVA-387	3435128.587	303008.275	95.877
VVA-388	3435107.079	296672.600	101.540
VVA-389	3412411.197	297088.429	49.747
VVA-390	3411776.313	310432.609	100.362
VVA-391	3419723.225	342559.525	92.238
VVA-392	3405240.609	342085.426	120.800
VVA-393	3407039.370	327486.117	130.758
VVA-394	3404307.385	306386.660	64.035
VVA-395	3400380.705	320407.202	87.554
VVA-396	3392391.811	325450.111	64.193
VVA-397	3399089.750	345748.872	84.018
VVA-398	3391922.743	345985.343	81.414
VVA-399	3404083.400	355823.778	103.143
VVA-400	3393936.384	318628.341	95.469
VVA-401	3383405.176	332122.004	67.671
VVA-402	3379571.268	348148.366	47.411

VVA-403	3380618.496	325473.079	61.121
VVA-404	3438955.112	414875.909	167.629
VVA-405	3434539.325	406484.350	112.508
VVA-406	3426248.831	372803.043	115.017
VVA-407	3423508.636	342569.446	72.362
VVA-408	3425026.146	374315.666	118.039
VVA-409	3423984.982	392449.582	40.494
VVA-410	3428802.634	421292.470	90.481
VVA-411	3422660.461	414756.395	83.286
VVA-412	3418525.493	400879.531	65.861
VVA-413	3411544.976	374531.978	64.869
VVA-414	3414338.290	353850.596	107.889
VVA-415	3399869.590	361752.886	89.288
VVA-416	3405332.829	369394.603	78.605
VVA-417	3409580.070	384686.461	63.169
VVA-418	3406899.446	405283.485	83.223
VVA-419	3408173.461	419456.420	64.882
VVA-420	3400532.340	416004.828	49.539
VVA-421	3390394.361	405725.780	39.973
VVA-422	3394881.714	396374.510	21.271
VVA-423	3409506.921	396843.045	49.560
VVA-424	3402520.550	387858.065	60.674
VVA-425	3405743.753	374058.143	77.894
VVA-426	3400163.144	363436.366	98.828
VVA-427	3388709.464	334890.910	70.623
VVA-428	3386416.483	356222.852	55.171
VVA-429	3391106.596	370955.949	46.860
VVA-430	3395610.828	381177.614	61.720
VVA-431	3391321.659	402854.382	42.313
VVA-432	3382593.451	411920.675	31.507
VVA-433	3373243.454	401897.526	24.149
VVA-434	3384919.085	401163.653	20.069
VVA-435	3376270.117	377109.662	29.594
VVA-436	3371139.777	366496.366	31.010
VVA-437	3362728.533	344663.011	36.043
VVA-438	3383842.266	337825.267	65.784
VVA-439	3353143.573	360175.818	22.215
VVA-440	3358155.459	390582.183	9.224
VVA-441	3365000.721	414158.258	18.470
VVA-442	3351139.153	413844.324	12.635
VVA-443	3348719.374	395581.844	11.047

VVA-444	3340245.343	389113.497	6.705
VVA-445	3343351.875	378430.618	11.415
VVA-446	3347098.254	368467.741	16.593
VVA-447	3342483.936	345150.842	22.551
VVA-448	3336061.330	360258.623	12.957
VVA-449	3327815.539	364257.662	11.221
VVA-450	3320129.843	358955.128	13.336
VVA-451	3340274.439	386637.798	3.523
VVA-452	3329437.956	408982.267	4.853
VVA-453	3313458.447	414707.063	0.865

4. GPS OBSERVATIONS

NVA CHECK POINTS

POINT ID	OBSERV. DATE	JULIAN DATE	TIME OF DAY (AST)	RE-OBSERV. DATE	RE-OBSERV. TIME
NVA-01	3/27/2016	87	11:24	4/1/2016	8:29
NVA-02	3/26/2016	86	19:45	4/1/2016	7:21
NVA-03	3/23/2016	83	9:34	3/27/2016	6:47
NVA-04	3/23/2016	83	7:33	3/27/2016	6:10
NVA-05	3/29/2016	89	12:45	N/A	N/A
NVA-06	3/29/2016	89	10:59	N/A	N/A
NVA-07	3/28/2016	88	14:16	3/28/2016	20:01
NVA-08	3/27/2016	87	12:28	4/1/2016	8:50
NVA-09	3/27/2016	87	8:53	N/A	N/A
NVA-10	3/26/2016	86	18:13	3/27/2016	7:11
NVA-11	3/26/2016	86	17:08	3/27/2016	6:39
NVA-12	3/28/2016	88	18:56	N/A	N/A
NVA-13	3/28/2016	88	15:28	N/A	N/A
NVA-14	3/28/2016	88	12:29	3/28/2016	20:51
NVA-15	3/27/2016	87	13:53	N/A	N/A
NVA-16	3/26/2015	86	12:58	N/A	N/A
NVA-17	3/24/2016	84	10:21	3/24/2016	21:47
NVA-18	3/24/2016	84	11:29	N/A	N/A
NVA-19	3/24/2016	84	12:17	N/A	N/A
NVA-20	3/28/2016	88	16:35	N/A	N/A
NVA-21	3/28/2016	88	11:46	3/28/2016	21:11
NVA-22	3/26/2016	86	11:01	N/A	N/A
NVA-23	3/26/2016	86	7:39	N/A	N/A
NVA-24	3/24/2016	84	8:23	3/24/2016	20:49
NVA-25	3/24/2016	84	14:22	3/25/2016	5:15
NVA-26	3/27/2016	87	19:00	N/A	N/A
NVA-27	3/27/2016	87	16:36	N/A	N/A
NVA-28	3/26/2016	86	10:01	4/1/2016	9:37
NVA-29	3/26/2016	86	8:23	N/A	N/A
NVA-30	3/23/2016	83	14:02	3/23/2016	19:37
NVA-31	3/23/2016	83	13:14	3/23/2016	19:49
NVA-32	3/28/2016	88	7:53	N/A	N/A
NVA-33	3/27/2016	87	17:41	N/A	N/A
NVA-34	3/26/2016	86	9:44	4/1/2016	9:53

NVA-35	3/23/2016	83	15:06	3/23/2016	19:10
NVA-36	3/29/2016	89	18:06	N/A	N/A
NVA-37	3/25/2016	85	9:18	N/A	N/A
NVA-38	3/24/2016	84	20:06	3/25/2016	6:15
NVA-39	3/23/2016	83	17:37	3/25/2016	6:53
NVA-40	3/23/2016	83	16:53	3/25/2016	6:39
NVA-41	3/25/2016	85	11:04	4/1/2016	14:13
NVA-42	3/25/2016	85	17:34	4/1/2016	11:13
NVA-43	3/25/2016	85	19:24	N/A	N/A
NVA-44	3/28/2016	88	10:13	N/A	N/A
NVA-45	3/25/2016	85	12:26	N/A	N/A
NVA-46	3/25/2016	85	17:13	4/1/2016	11:28
NVA-47	3/25/2016	85	15:33	4/1/2016	11:51
NVA-48	3/25/2016	85	16:52	4/1/2016	12:33
NVA-49	3/25/2016	85	14:06	4/1/2016	13:51
NVA-50	3/30/2016	90	18:29	N/A	N/A
NVA-51	3/24/2016	84	10:40	3/24/2016	20:33
NVA-52	3/24/2016	84	8:05	N/A	N/A
NVA-53	3/23/2016	83	7:35	3/23/2016	21:03
NVA-54	3/24/2016	84	11:49	3/24/2016	20:11
NVA-55	3/24/2016	84	15:10	N/A	N/A
NVA-56	3/23/2016	83	7:55	3/23/2016	18:52
NVA-57	3/24/2016	84	12:18	3/24/2016	19:06
NVA-58	3/24/2016	84	13:47	3/24/2016	21:41
NVA-59	3/24/2016	84	16:40	N/A	N/A
NVA-60	3/24/2016	84	5:55	N/A	N/A
NVA-61	3/23/2016	83	17:40	3/23/2016	19:47
NVA-62	3/23/2016	83	17:55	N/A	N/A
NVA-63	3/24/2016	84	18:15	N/A	N/A
NVA-64	3/25/2016	85	7:50	N/A	N/A
NVA-65	3/25/2016	85	8:10	N/A	N/A
NVA-66	3/24/2016	84	12:50	3/24/2016	18:47
NVA-67	3/25/2016	85	9:01	3/25/2016	20:36
NVA-68	3/25/2016	85	10:55	3/25/2016	19:59
NVA-69	3/23/2016	83	17:25	3/23/2016	20:03
NVA-70	3/23/2016	83	16:20	4/2/2016	17:21
NVA-71	3/23/2016	83	13:10	4/2/2016	18:33
NVA-72	3/23/2016	83	12:50	N/A	N/A
NVA-73	3/23/2016	83	14:35	4/2/2016	18:51

NVA-74	3/27/2016	87	14:30	N/A	N/A
NVA-75	3/27/2016	87	13:30	3/27/2016	20:39
NVA-76	3/25/2016	85	11:50	3/25/2016	20:16
NVA-77	3/25/2016	85	12:20	3/25/2016	19:06
NVA-78	3/28/2016	88	8:15	N/A	N/A
NVA-79	3/28/2016	88	6:45	3/28/2016	22:02
NVA-80	3/28/2016	88	11:50	N/A	N/A
NVA-81	3/28/2016	88	11:15	N/A	N/A
NVA-82	3/27/2016	87	12:01	3/27/2016	19:33
NVA-83	3/25/2016	85	12:58	3/25/2016	18:33
NVA-84	3/25/2016	85	15:15	3/25/2016	17:37
NVA-85	3/25/2016	85	16:20	N/A	N/A
NVA-86	3/25/2016	85	15:58	N/A	N/A
NVA-87	3/27/2016	87	11:20	3/27/2016	19:06
NVA-88	3/28/2016	88	8:56	N/A	N/A
NVA-89	3/27/2016	87	9:10	3/27/2016	17:38
NVA-90	3/27/2016	87	9:28	3/27/2016	17:48
NVA-91	3/26/2016	86	15:15	4/2/2016	13:48
NVA-92	3/27/2016	87	10:45	3/27/2016	18:30
NVA-93	3/26/2016	86	17:49	3/26/2016	21:53
NVA-94	3/25/2016	85	16:40	N/A	N/A
NVA-95	3/26/2016	86	6:40	N/A	N/A
NVA-96	3/26/2016	86	7:05	N/A	N/A
NVA-97	3/26/2016	86	15:26	4/2/2016	15:16
NVA-98	3/26/2016	86	17:12	3/26/2016	21:19
NVA-99	3/26/2016	86	16:09	4/2/2016	14:56
NVA-100	3/26/2016	86	10:05	3/26/2016	20:27
NVA-101	3/26/2016	86	7:40	4/2/2016	16:20
NVA-102	3/26/2016	86	8:15	4/2/2016	15:39
NVA-103	3/23/2016	83	8:25	4/2/2016	15:56
NVA-104	3/26/2016	86	8:54	4/2/2016	16:10
NVA-105	3/26/2016	86	11:04	3/26/2016	18:36
NVA-106	3/22/2016	82	20:05	3/23/2016	20:59
NVA-107	3/24/2016	84	15:32	3/30/2016	5:50
NVA-108	3/22/2016	82	19:33	3/23/2016	21:21
NVA-109	3/30/2016	90	15:31	N/A	N/A
NVA-110	3/24/2016	84	18:06	3/30/2016	7:46
NVA-111	3/28/2016	88	9:55	3/30/2016	6:27
NVA-112	3/24/2016	84	19:00	3/30/2016	6:51

NVA-113	3/30/2016	90	14:18	N/A	N/A
NVA-114	3/30/2016	90	12:59	N/A	N/A
NVA-115	3/30/2016	90	12:03	4/1/2016	16:03
NVA-116	3/31/2016	91	14:15	4/1/2016	15:20
NVA-117	3/30/2016	90	16:25	4/1/2016	15:03
NVA-118	3/30/2016	90	17:37	N/A	N/A
NVA-119	3/31/2016	91	16:09	N/A	N/A
NVA-120	3/30/2016	90	11:46	4/1/2016	16:23
NVA-121	3/30/2016	90	18:13	N/A	N/A
NVA-122	3/31/2016	91	12:44	N/A	N/A
NVA-123	3/30/2016	90	11:27	4/1/2016	16:39
NVA-124	4/1/2016	92	14:46	4/4/2016	7:28
NVA-125	4/1/2016	92	13:57	4/4/2016	7:15
NVA-126	3/31/2016	91	14:49	N/A	N/A
NVA-127	3/31/2016	91	10:50	N/A	N/A
NVA-128	3/31/2016	91	12:20	4/1/2016	20:31
NVA-129	3/31/2016	91	13:50	4/1/2016	20:16
NVA-130	4/1/2016	92	12:11	N/A	N/A
NVA-131	4/1/2016	92	15:25	N/A	N/A
NVA-132	3/31/2016	91	19:28	N/A	N/A
NVA-133	3/30/2016	90	10:50	4/1/2016	17:13
NVA-134	3/31/2016	91	11:18	N/A	N/A
NVA-135	3/31/2016	91	11:42	N/A	N/A
NVA-136	3/31/2016	91	10:09	N/A	N/A
NVA-137	3/30/2016	90	10:11	4/1/2016	17:58
NVA-138	4/1/2016	92	11:03	N/A	N/A
NVA-139	3/31/2016	91	7:37	4/1/2016	19:56
NVA-140	3/31/2016	91	8:30	N/A	N/A
NVA-141	3/30/2016	90	17:30	N/A	N/A
NVA-142	3/30/2016	90	10:35	N/A	N/A
NVA-143	3/30/2016	90	9:30	4/1/2016	19:29
NVA-144	4/1/2016	92	9:19	4/1/2016	18:30
NVA-145	3/31/2016	91	8:07	4/4/2016	5:21
NVA-146	3/28/2016	88	13:35	3/28/2016	20:49
NVA-147	3/28/2016	88	12:35	3/28/2016	21:37
NVA-148	3/28/2016	88	14:44	3/28/2016	20:06
NVA-149	3/28/2016	88	18:23	4/2/2016	5:37
NVA-150	3/29/2016	89	7:15	4/2/2016	7:13
NVA-151	3/30/2016	90	16:17	N/A	N/A

NVA-152	3/29/2016	89	17:52	N/A	N/A
NVA-153	3/29/2016	89	18:25	4/2/2016	12:10
NVA-154	3/30/2016	90	13:58	4/2/2016	9:36
NVA-155	3/29/2016	89	7:30	4/2/2016	7:33
NVA-156	3/31/2016	91	6:39	4/2/2016	5:56
NVA-157	3/28/2016	88	14:55	3/28/2016	19:31
NVA-158	3/28/2016	88	15:40	3/28/2016	18:59
NVA-159	3/29/2016	89	8:50	4/2/2016	8:21
NVA-160	3/29/2016	89	8:15	4/2/2016	8:46
NVA-161	3/29/2016	89	10:10	N/A	N/A
NVA-162	3/29/2016	89	12:03	N/A	N/A
NVA-163	3/29/2016	89	14:15	N/A	N/A
NVA-164	3/30/2016	90	7:45	4/2/2016	5:21
NVA-165	3/29/2016	89	18:26	4/2/2016	6:31
NVA-166	3/29/2016	89	17:35	4/2/2016	6:59
NVA-167	3/31/2016	91	11:49	4/2/2016	21:37
NVA-168	3/30/2016	90	9:04	N/A	N/A
NVA-169	3/30/2016	90	11:07	N/A	N/A
NVA-170	3/31/2016	91	12:49	N/A	N/A
NVA-171	3/29/2016	89	16:02	4/2/2016	7:50
NVA-172	3/29/2016	89	15:33	N/A	N/A
NVA-173	3/29/2016	89	14:12	4/2/2016	9:41
NVA-174	3/29/2016	89	13:11	4/2/2016	9:57
NVA-175	3/29/2016	89	14:49	4/2/2016	9:31
NVA-176	3/31/2016	91	10:34	N/A	N/A
NVA-177	3/31/2016	91	13:48	4/2/2016	20:16
NVA-178	3/30/2016	90	9:56	N/A	N/A
NVA-179	3/30/2016	90	11:34	N/A	N/A
NVA-180	3/26/2016	86	14:50	4/2/2016	14:08
NVA-181	3/26/2016	86	14:00	4/2/2016	14:31
NVA-182	3/26/2016	86	12:15	N/A	N/A
NVA-183	3/30/2016	90	14:24	N/A	N/A
NVA-184	3/31/2016	91	14:33	N/A	N/A
NVA-185	3/30/2016	90	19:50	N/A	N/A
NVA-186	4/1/2016	92	17:02	N/A	N/A
NVA-187	3/31/2016	91	16:38	4/2/2016	13:21
NVA-188	3/30/2016	90	14:53	4/2/2016	19:59
NVA-189	3/30/2016	90	13:28	4/2/2016	19:41
NVA-190	4/1/2016	92	10:51	4/2/2016	18:37

NVA-191	3/31/2016	91	17:42	4/2/2016	14:13
NVA-192	4/1/2016	92	15:56	4/2/2016	14:43
NVA-193	4/1/2016	92	17:15	N/A	N/A
NVA-194	4/1/2016	92	16:16	4/2/2016	14:29
NVA-195	4/1/2016	92	13:49	4/2/2016	15:33
NVA-196	4/1/2016	92	9:20	4/2/2016	17:31
NVA-197	3/31/2016	91	18:07	4/2/2016	15:19
NVA-198	4/3/2016	94	10:25	N/A	N/A
NVA-199	4/1/2016	92	18:35	N/A	N/A
NVA-200	4/1/2016	92	15:21	N/A	N/A
NVA-201	3/31/2016	91	18:46	4/2/2016	16:13
NVA-202	3/31/2016	91	19:20	4/2/2016	16:34
NVA-203	4/3/2016	94	9:42	N/A	N/A
NVA-204	4/3/2016	94	15:57	N/A	N/A
NVA-205	4/2/2016	93	18:50	4/2/2016	10:51
NVA-206	3/28/2016	88	9:43	4/4/2016	6:33
NVA-207	3/28/2016	88	8:26	4/4/2016	5:39
NVA-208	3/28/2016	88	15:42	4/4/2016	17:56
NVA-209	3/28/2016	88	14:54	4/4/2016	16:56
NVA-210	3/28/2016	88	16:38	4/4/2016	13:59
NVA-211	3/30/2016	90	18:04	4/2/2016	11:26
NVA-212	3/30/2016	90	16:56	4/2/2016	12:10
NVA-213	3/28/2016	88	18:34	4/4/2016	13:31
NVA-214	3/28/2016	88	18:37	4/4/2016	15:43
NVA-215	3/28/2016	88	6:58	3/28/2016	21:13
NVA-216	3/31/2016	91	10:42	N/A	N/A
NVA-217	3/29/2016	89	16:52	4/4/2016	9:10
NVA-218	3/29/2016	89	14:56	4/4/2016	10:07
NVA-219	3/29/2016	89	15:38	4/4/2016	9:51
NVA-220	3/29/2016	89	9:18	4/4/2016	11:49
NVA-221	3/28/2016	88	19:37	4/4/2016	12:41
NVA-222	4/3/2016	94	13:23	N/A	N/A
NVA-223	4/3/2016	94	14:28	N/A	N/A
NVA-224	3/29/2016	89	12:37	N/A	N/A
NVA-225	3/29/2016	89	10:25	N/A	N/A
NVA-226	3/29/2016	89	13:34	3/29/2016	19:53
NVA-227	3/31/2016	91	10:17	N/A	N/A
NVA-228	3/29/2016	89	19:00	4/4/2016	13:53
NVA-229	3/30/2016	90	17:40	4/4/2016	14:21

NVA-230	3/30/2016	90	15:44	N/A	N/A
NVA-231	3/30/2016	90	15:14	N/A	N/A
NVA-232	3/30/2016	90	12:20	N/A	N/A
NVA-233	3/30/2016	90	11:33	N/A	N/A
NVA-234	4/3/2016	94	16:47	N/A	N/A
NVA-235	3/30/2016	90	10:55	N/A	N/A
NVA-236	3/30/2016	90	15:28	N/A	N/A
NVA-237	3/30/2016	90	18:45	N/A	N/A
NVA-238	3/30/2016	90	19:33	4/4/2016	12:53
NVA-239	3/31/2016	91	8:58	4/4/2016	12:21
NVA-240	3/31/2016	91	12:58	4/4/2016	11:21
NVA-241	3/31/2016	91	12:38	4/4/2016	11:51
NVA-242	3/31/2016	91	14:58	N/A	N/A
NVA-243	3/31/2016	91	16:00	N/A	N/A
NVA-244	3/30/2016	90	10:08	N/A	N/A
NVA-245	4/3/2016	94	17:35	N/A	N/A
NVA-246	4/2/2016	93	7:55	4/3/2016	11:53
NVA-247	4/2/2016	93	18:34	4/3/2016	10:39
NVA-248	4/2/2016	93	16:53	4/3/2016	10:11
NVA-249	4/2/2016	93	9:37	4/3/2016	8:16
NVA-250	3/30/2016	90	9:25	N/A	N/A
NVA-251	3/31/2016	91	13:53	N/A	N/A
NVA-252	4/1/2016	92	14:34	4/4/2016	10:37
NVA-253	4/1/2016	92	15:45	4/4/2016	9:13
NVA-254	4/1/2016	92	16:34	N/A	N/A
NVA-255	3/31/2016	91	18:23	N/A	N/A
NVA-256	3/31/2016	91	19:18	N/A	N/A
NVA-257	4/2/2016	93	10:32	4/3/2016	13:03
NVA-258	4/2/2016	93	12:09	4/3/2016	8:56
NVA-259	4/2/2016	93	16:30	4/3/2016	7:18
NVA-260	4/2/2016	93	13:58	4/3/2016	6:13
NVA-261	4/1/2016	92	20:48	N/A	N/A
NVA-262	3/31/2016	91	20:23	N/A	N/A
NVA-263	4/1/2016	92	7:51	N/A	N/A
NVA-264	4/1/2016	92	9:55	4/4/2016	6:13

VVA

POINT ID	OBSERV. DATE	JULIAN DATE	TIME OF DAY (AST)	RE-OBSERV. DATE	RE-OBSERV. TIME
VVA-265	3/27/2016	87	10:12	N/A	N/A
VVA-266	3/26/2016	86	18:42	4/1/2016	6:21
VVA-267	3/26/2016	86	15:27	3/26/2016	21:02
VVA-268	3/26/2016	86	15:53	3/26/2016	21:19
VVA-269	3/26/2016	86	14:26	3/26/2016	20:21
VVA-270	3/27/2016	87	20:07	N/A	N/A
VVA-271	3/27/2016	87	13:18	N/A	N/A
VVA-272	3/28/2016	88	13:16	N/A	N/A
VVA-273	3/28/2016	88	13:38	N/A	N/A
VVA-274	3/28/2016	88	15:02	N/A	N/A
VVA-275	3/29/2016	89	10:14	N/A	N/A
VVA-276	3/29/2016	89	11:22	N/A	N/A
VVA-277	3/28/2016	88	18:04	N/A	N/A
VVA-278	3/28/2016	88	16:17	N/A	N/A
VVA-279	3/27/2016	87	14:14	3/27/2016	20:49
VVA-280	3/26/2016	86	11:56	N/A	N/A
VVA-281	3/23/2016	83	11:57	3/23/2016	20:19
VVA-282	3/24/2016	84	13:10	3/28/2016	7:15
VVA-283	3/29/2016	89	19:53	N/A	N/A
VVA-284	3/25/2016	85	20:28	N/A	N/A
VVA-285	3/28/2016	88	8:46	N/A	N/A
VVA-286	3/23/2016	83	14:32	3/23/2016	19:23
VVA-287	3/26/2016	86	9:20	N/A	N/A
VVA-288	3/26/2016	86	10:37	N/A	N/A
VVA-289	3/27/2016	87	15:23	3/27/2016	21:19
VVA-290	3/27/2016	87	17:22	N/A	N/A
VVA-291	3/28/2016	88	17:19	N/A	N/A
VVA-292	3/27/2016	87	18:35	N/A	N/A
VVA-293	3/23/2016	83	18:38	3/25/2016	7:18
VVA-294	3/23/2016	83	16:23	3/25/2016	7:36
VVA-295	3/25/2016	85	9:57	N/A	N/A
VVA-296	3/25/2016	85	12:03	N/A	N/A
VVA-297	3/25/2016	85	18:29	N/A	N/A
VVA-298	3/25/2016	85	17:58	4/1/2016	10:36
VVA-299	3/25/2016	85	16:21	N/A	N/A
VVA-300	3/25/2016	85	13:44	4/1/2016	13:10

VVA-301	3/24/2016	84	10:15	3/24/2016	21:01
VVA-302	3/24/2016	84	9:20	N/A	N/A
VVA-303	3/23/2016	83	6:40	3/23/2016	21:23
VVA-304	3/24/2016	84	7:50	N/A	N/A
VVA-305	3/23/2016	83	8:45	3/23/2016	20:46
VVA-306	3/24/2016	84	15:35	N/A	N/A
VVA-307	3/24/2016	84	14:05	3/24/2016	21:29
VVA-308	3/24/2016	84	12:01	3/24/2016	19:58
VVA-309	3/24/2016	84	14:30	3/24/2016	21:53
VVA-310	3/24/2016	84	6:49	N/A	N/A
VVA-311	3/23/2016	83	8:10	3/23/2016	19:06
VVA-312	3/23/2016	83	9:10	3/23/2016	19:16
VVA-313	3/23/2016	83	9:40	3/23/2016	18:21
VVA-314	3/24/2016	84	6:15	N/A	N/A
VVA-315	3/24/2016	84	16:15	N/A	N/A
VVA-316	3/24/2016	84	13:10	3/24/2016	22:23
VVA-317	3/24/2016	84	8:38	3/24/2016	19:23
VVA-318	3/24/2016	84	17:09	3/24/2016	22:38
VVA-319	3/24/2016	84	5:40	N/A	N/A
VVA-320	3/26/2016	86	5:50	N/A	N/A
VVA-321	3/27/2016	87	14:05	N/A	N/A
VVA-322	3/23/2016	83	11:10	4/2/2016	17:56
VVA-323	3/23/2016	83	11:30	4/2/2016	18:13
VVA-324	3/23/2016	83	12:02	N/A	N/A
VVA-325	3/27/2016	87	16:50	4/2/2016	19:01
VVA-326	3/23/2016	83	15:10	N/A	N/A
VVA-327	3/27/2016	87	13:01	3/27/2016	20:23
VVA-328	3/25/2016	85	18:50	N/A	N/A
VVA-329	3/25/2016	85	18:29	N/A	N/A
VVA-330	3/25/2016	85	13:40	3/25/2016	17:58
VVA-331	3/26/2016	86	7:20	N/A	N/A
VVA-332	3/26/2016	86	16:50	3/26/2016	21:06
VVA-333	3/25/2016	85	17:50	N/A	N/A
VVA-334	3/28/2016	88	10:45	N/A	N/A
VVA-335	3/28/2016	88	11:30	N/A	N/A
VVA-336	3/27/2016	87	10:05	3/27/2016	18:16
VVA-337	3/28/2016	88	9:18	N/A	N/A
VVA-338	3/24/2016	84	16:20	3/30/2016	6:08
VVA-339	3/30/2016	90	13:59	N/A	N/A

VVA-340	3/24/2016	84	18:31	3/30/2016	7:27
VVA-341	3/24/2016	84	19:25	3/30/2016	7:11
VVA-342	3/31/2016	91	15:05	4/1/2016	15:39
VVA-343	3/30/2016	90	12:31	N/A	N/A
VVA-344	3/31/2016	91	15:29	N/A	N/A
VVA-345	3/31/2016	91	13:31	N/A	N/A
VVA-346	3/30/2016	90	17:18	N/A	N/A
VVA-347	3/31/2016	91	12:02	N/A	N/A
VVA-348	3/31/2016	91	12:28	N/A	N/A
VVA-349	3/31/2016	91	18:10	N/A	N/A
VVA-350	3/31/2016	91	18:59	N/A	N/A
VVA-351	4/1/2016	92	12:47	N/A	N/A
VVA-352	3/31/2016	91	12:07	4/1/2016	21:18
VVA-353	3/31/2016	91	9:25	N/A	N/A
VVA-354	4/1/2016	92	11:33	N/A	N/A
VVA-355	4/1/2016	92	8:26	N/A	N/A
VVA-356	3/31/2016	91	9:42	N/A	N/A
VVA-357	3/28/2016	88	13:45	3/28/2016	20:36
VVA-358	3/28/2016	88	14:25	3/28/2016	20:19
VVA-359	3/28/2016	88	18:04	N/A	N/A
VVA-360	3/30/2016	90	11:00	N/A	N/A
VVA-361	3/30/2016	90	16:01	N/A	N/A
VVA-362	3/30/2016	90	13:30	N/A	N/A
VVA-363	3/28/2016	88	17:30	4/2/2016	6:31
VVA-364	3/28/2016	88	16:05	3/28/2016	19:50
VVA-365	3/28/2016	88	17:00	4/1/2016	7:43
VVA-366	3/29/2016	89	19:45	4/2/2016	7:51
VVA-367	3/29/2016	89	18:40	4/2/2016	9:56
VVA-368	3/29/2016	89	17:10	4/2/2016	13:13
VVA-369	3/29/2016	89	19:10	4/2/2016	10:33
VVA-370	3/29/2016	89	9:20	N/A	N/A
VVA-371	3/29/2016	89	11:00	N/A	N/A
VVA-372	3/29/2016	89	12:18	N/A	N/A
VVA-373	3/29/2016	89	13:05	4/2/2016	10:49
VVA-374	3/30/2016	90	10:27	N/A	N/A
VVA-375	3/29/2016	89	17:14	4/2/2016	7:16
VVA-376	3/31/2016	91	9:45	4/2/2016	8:46
VVA-377	3/31/2016	91	12:35	4/2/2016	21:06
VVA-378	3/30/2016	90	9:21	N/A	N/A

VVA-379	3/30/2016	90	11:47	N/A	N/A
VVA-380	3/26/2016	86	13:30	N/A	N/A
VVA-381	3/31/2016	91	16:15	N/A	N/A
VVA-382	3/30/2016	90	17:12	4/2/2016	10:56
VVA-383	3/30/2016	90	20:10	N/A	N/A
VVA-384	3/29/2016	89	13:33	4/2/2016	10:18
VVA-385	3/30/2016	90	15:42	4/2/2016	13:06
VVA-386	3/31/2016	91	17:05	4/2/2016	13:49
VVA-387	3/30/2016	90	13:45	N/A	N/A
VVA-388	4/1/2016	92	11:47	4/2/2016	19:26
VVA-389	4/1/2016	92	9:57	4/2/2016	17:50
VVA-390	4/1/2016	92	13:27	N/A	N/A
VVA-391	4/1/2016	92	17:36	N/A	N/A
VVA-392	4/1/2016	92	18:54	N/A	N/A
VVA-393	4/1/2016	92	15:38	4/2/2016	15:09
VVA-394	4/1/2016	92	8:41	4/2/2016	17:13
VVA-395	4/1/2016	92	14:47	N/A	N/A
VVA-396	4/3/2016	94	21:26	N/A	N/A
VVA-397	4/3/2016	94	13:38	N/A	N/A
VVA-398	4/3/2016	94	15:36	N/A	N/A
VVA-399	4/3/2016	94	13:00	N/A	N/A
VVA-400	4/3/2016	94	22:09	N/A	N/A
VVA-401	4/3/2016	94	20:24	N/A	N/A
VVA-402	4/3/2016	94	18:51	N/A	N/A
VVA-403	4/2/2016	93	19:03	4/3/2016	11:11
VVA-404	3/28/2016	88	9:17	4/4/2016	7:11
VVA-405	3/28/2016	88	8:10	4/4/2016	6:10
VVA-406	3/28/2016	88	17:08	4/4/2016	14:29
VVA-407	3/30/2016	90	16:07	4/2/2016	12:23
VVA-408	3/28/2016	88	17:25	4/4/2016	15:23
VVA-409	3/28/2016	88	14:08	4/4/2016	16:31
VVA-410	3/28/2016	88	11:28	4/4/2016	7:54
VVA-411	3/28/2016	88	11:53	4/4/2016	8:10
VVA-412	3/28/2016	88	13:26	3/28/2016	20:57
VVA-413	3/28/2016	88	20:20	4/4/2016	11:11
VVA-414	4/3/2016	94	11:07	N/A	N/A
VVA-415	4/3/2016	94	12:19	N/A	N/A
VVA-416	3/28/2016	88	19:54	4/4/2016	12:19
VVA-417	3/29/2016	89	8:54	N/A	N/A

VVA-418	3/29/2016	89	14:39	3/29/2016	21:30
VVA-419	3/31/2016	91	10:55	N/A	N/A
VVA-420	3/29/2016	89	17:49	N/A	N/A
VVA-421	3/30/2016	90	17:24	4/4/2016	15:21
VVA-422	3/29/2016	89	10:44	3/29/2016	20:16
VVA-423	3/29/2016	89	15:16	4/4/2016	10:21
VVA-424	3/29/2016	89	10:10	N/A	N/A
VVA-425	3/29/2016	89	9:39	4/4/2016	12:03
VVA-426	3/30/2016	90	13:23	N/A	N/A
VVA-427	4/3/2016	94	20:50	N/A	N/A
VVA-428	4/3/2016	94	16:27	N/A	N/A
VVA-429	3/30/2016	90	13:48	N/A	N/A
VVA-430	3/29/2016	89	11:09	N/A	N/A
VVA-431	3/30/2016	90	17:05	4/4/2016	14:59
VVA-432	3/29/2016	89	19:19	4/4/2016	13:21
VVA-433	3/31/2016	91	12:15	N/A	N/A
VVA-434	3/30/2016	90	18:02	N/A	N/A
VVA-435	3/31/2016	91	15:48	N/A	N/A
VVA-436	4/3/2016	94	17:20	N/A	N/A
VVA-437	4/2/2016	93	8:51	4/3/2016	12:13
VVA-438	4/3/2016	94	19:39	N/A	N/A
VVA-439	4/2/2016	93	10:12	4/3/2016	13:18
VVA-440	3/31/2016	91	14:20	N/A	N/A
VVA-441	3/31/2016	91	8:36	N/A	N/A
VVA-442	4/1/2016	92	14:18	4/4/2016	10:15
VVA-443	4/1/2016	92	15:13	4/4/2016	9:49
VVA-444	4/1/2016	92	18:45	N/A	N/A
VVA-445	3/31/2016	91	18:54	N/A	N/A
VVA-446	4/2/2016	93	11:00	N/A	N/A
VVA-447	4/2/2016	93	16:08	N/A	N/A
VVA-448	4/2/2016	93	11:28	4/3/2016	9:38
VVA-449	3/31/2016	91	20:07	N/A	N/A
VVA-450	4/1/2016	92	20:31	N/A	N/A
VVA-451	4/1/2016	92	18:58	N/A	N/A
VVA-452	4/1/2016	92	11:43	4/4/2016	7:11
VVA-453	4/1/2016	92	9:22	4/4/2016	5:51

5. POINT COMPARISON

NVA

POINT ID	POINT CK	DELTA NORTH (M)	DELTA EAST (M)	VERT. DIFF (M)
NVA-01	NVA-01CK	0.003	-0.002	-0.008
NVA-02	NVA-02CK	0.001	0.009	0.011
NVA-03	NVA-03CK	0.011	0.004	-0.001
NVA-04	NVA-04CK	0.001	0.000	0.004
NVA-07	NVA-07CK	0.000	-0.006	0.000
NVA-08	NVA-08CK	0.002	-0.003	0.008
NVA-10	NVA-10CK	0.002	0.000	-0.004
NVA-11	NVA-11CK	0.002	-0.003	0.007
NVA-14	NVA-14CK	-0.015	-0.001	-0.010
NVA-17	NVA-17CK	0.002	0.003	0.002
NVA-21	NVA-21CK	0.002	-0.001	0.000
NVA-24	NVA-24CK	0.003	0.000	0.020
NVA-25	NVA-25CK	-0.007	-0.007	-0.009
NVA-28	NVA-28CK	-0.004	-0.008	0.040
NVA-30	NVA-30CK	-0.004	-0.002	0.000
NVA-31	NVA-31CK	0.002	0.002	0.000
NVA-34	NVA-34CK	-0.003	0.004	-0.003
NVA-35	NVA-35CK	0.004	-0.003	-0.007
NVA-38	NVA-38CK	0.000	0.004	0.007
NVA-39	NVA-39CK	0.002	-0.001	0.010
NVA-40	NVA-40CK	0.001	-0.001	0.013
NVA-41	NVA-41CK	0.001	-0.001	0.002
NVA-42	NVA-42CK	0.007	0.005	-0.002
NVA-46	NVA-46CK	0.000	0.002	0.005
NVA-47	NVA-47CK	-0.002	-0.001	0.001
NVA-48	NVA-48CK	-0.003	0.006	0.002
NVA-49	NVA-49CK	-0.003	-0.007	-0.001
NVA-51	NVA-51CK	-0.007	0.000	-0.003
NVA-53	NVA-53CK	0.007	-0.006	0.011
NVA-54	NVA-54CK	-0.001	0.006	0.002
NVA-56	NVA-56CK	0.003	0.004	0.006
NVA-57	NVA-57CK	0.003	0.015	0.009
NVA-58	NVA-58CK	-0.007	0.007	-0.015
NVA-61	NVA-61CK	-0.004	0.006	-0.001
NVA-66	NVA-66CK	-0.004	-0.003	-0.006
NVA-67	NVA-67CK	-0.004	0.005	-0.014

NVA-68	NVA-68CK	-0.004	0.003	0.016
NVA-69	NVA-69CK	-0.003	-0.005	-0.024
NVA-70	NVA-70CK	0.003	-0.004	0.012
NVA-71	NVA-71CK	-0.005	-0.010	0.009
NVA-73	NVA-73CK	0.003	-0.008	-0.002
NVA-75	NVA-75CK	-0.001	-0.001	0.008
NVA-76	NVA-76CK	-0.003	-0.004	0.006
NVA-77	NVA-77CK	-0.003	-0.002	0.006
NVA-79	NVA-79CK	-0.002	-0.002	0.003
NVA-82	NVA-82CK	0.000	0.000	-0.023
NVA-83	NVA-83CK	0.000	0.001	-0.004
NVA-84	NVA-84CK	0.000	-0.002	-0.012
NVA-87	NVA-87CK	-0.007	0.004	0.000
NVA-89	NVA-89CK	-0.002	-0.001	0.026
NVA-90	NVA-90CK	0.001	-0.005	-0.011
NVA-91	NVA-91CK	-0.004	-0.003	0.000
NVA-92	NVA-92CK	0.013	-0.001	-0.001
NVA-93	NVA-93CK	-0.011	-0.006	-0.005
NVA-97	NVA-97CK	0.010	0.003	0.003
NVA-98	NVA-98CK	-0.005	0.004	-0.002
NVA-99	NVA-99CK	-0.002	-0.003	0.003
NVA-100	NVA-100CK	0.007	-0.003	-0.007
NVA-101	NVA-101CK	0.000	0.001	-0.005
NVA-103	NVA-103CK	-0.001	-0.004	-0.001
NVA-104	NVA-104CK	0.027	0.013	0.047
NVA-105	NVA-105CK	0.003	-0.011	-0.020
NVA-106	NVA-106CK	-0.002	0.010	-0.012
NVA-107	NVA-107CK	-0.004	0.003	0.000
NVA-108	NVA-108CK	0.000	0.004	0.010
NVA-110	NVA-110CK	-0.001	-0.002	0.001
NVA-111	NVA-111CK	0.001	0.002	0.008
NVA-112	NVA-112CK	-0.004	0.001	0.005
NVA-115	NVA-115CK	-0.005	-0.003	-0.008
NVA-116	NVA-116CK	-0.002	0.004	0.012
NVA-117	NVA-117CK	-0.004	0.006	0.002
NVA-120	NVA-120CK	0.003	0.004	0.020
NVA-123	NVA-123CK	0.010	-0.007	-0.004
NVA-124	NVA-124CK	0.000	-0.009	-0.017
NVA-125	NVA-125CK	-0.008	-0.001	0.010
NVA-128	NVA-128CK	-0.003	-0.010	0.014
NVA-133	NVA-133CK	-0.005	-0.004	0.009

NVA-137	NVA-137CK	0.006	-0.001	-0.001
NVA-139	NVA-139CK	0.006	-0.006	0.002
NVA-143	NVA-143CK	-0.002	-0.008	0.002
NVA-144	NVA-144CK	0.005	0.002	0.009
NVA-145	NVA-145CK	0.005	0.001	-0.002
NVA-146	NVA-146CK	-0.004	0.004	-0.017
NVA-147	NVA-147CK	-0.004	0.000	0.000
NVA-148	NVA-148CK	0.003	-0.010	-0.038
NVA-149	NVA-149CK	0.000	-0.006	-0.004
NVA-150	NVA-150CK	0.001	0.001	0.010
NVA-153	NVA-153CK	-0.006	0.002	0.002
NVA-154	NVA-154CK	-0.008	-0.001	0.014
NVA-155	NVA-155CK	0.001	-0.001	-0.011
NVA-156	NVA-156CK	0.005	-0.002	-0.013
NVA-157	NVA-157CK	-0.003	-0.003	-0.005
NVA-158	NVA-158CK	0.002	0.010	0.026
NVA-159	NVA-159CK	-0.020	-0.008	0.031
NVA-160	NVA-160CK	0.001	-0.003	0.002
NVA-164	NVA-164CK	0.002	0.001	0.007
NVA-165	NVA-165CK	0.001	0.003	0.000
NVA-166	NVA-166CK	-0.002	0.002	0.015
NVA-167	NVA-167CK	-0.001	-0.012	-0.001
NVA-171	NVA-171CK	-0.005	0.016	-0.035
NVA-173	NVA-173CK	0.023	-0.005	0.016
NVA-174	NVA-174CK	0.011	0.003	-0.024
NVA-175	NVA-175CK	0.000	0.003	-0.021
NVA-177	NVA-177CK	0.000	0.010	0.000
NVA-180	NVA-180CK	-0.001	0.006	0.001
NVA-181	NVA-181CK	-0.003	0.001	-0.003
NVA-187	NVA-187CK	-0.009	-0.001	0.023
NVA-188	NVA-188CK	-0.002	0.007	0.020
NVA-189	NVA-189CK	0.005	0.014	-0.022
NVA-190	NVA-190CK	0.000	0.005	-0.003
NVA-191	NVA-191CK	-0.007	0.009	-0.007
NVA-192	NVA-192CK	0.005	-0.001	0.001
NVA-194	NVA-194CK	0.001	-0.005	0.024
NVA-195	NVA-195CK	-0.002	0.001	0.011
NVA-196	NVA-196CK	-0.002	-0.004	0.020
NVA-197	NVA-197CK	-0.001	-0.005	-0.005
NVA-201	NVA-201CK	-0.005	-0.003	0.003
NVA-202	NVA-202CK	0.001	0.000	0.005

NVA-205	NVA-205CK	-0.004	-0.006	0.015
NVA-206	NVA-206CK	-0.003	-0.003	0.007
NVA-207	NVA-207CK	-0.002	0.004	-0.004
NVA-208	NVA-208CK	0.011	0.006	0.025
NVA-209	NVA-209CK	-0.002	-0.005	0.000
NVA-210	NVA-210CK	0.004	-0.004	0.013
NVA-211	NVA-211CK	0.010	-0.012	0.021
NVA-212	NVA-212CK	0.001	0.005	-0.010
NVA-213	NVA-213CK	0.003	0.003	0.010
NVA-214	NVA-214CK	0.024	-0.032	-0.039
NVA-215	NVA-215CK	-0.004	0.000	-0.010
NVA-217	NVA-217CK	0.004	0.000	-0.004
NVA-218	NVA-218CK	0.006	0.003	0.012
NVA-219	NVA-219CK	-0.011	0.000	-0.013
NVA-220	NVA-220CK	0.002	-0.016	-0.024
NVA-221	NVA-221CK	0.001	-0.001	0.001
NVA-226	NVA-226CK	0.006	-0.004	0.005
NVA-228	NVA-228CK	0.001	-0.001	-0.002
NVA-229	NVA-229CK	-0.001	-0.008	0.016
NVA-238	NVA-238CK	0.001	-0.001	0.011
NVA-239	NVA-239CK	-0.010	0.005	0.001
NVA-240	NVA-240CK	-0.008	-0.006	0.014
NVA-241	NVA-241CK	0.000	-0.001	-0.033
NVA-246	NVA-246CK	0.004	-0.001	-0.017
NVA-247	NVA-247CK	0.002	-0.002	-0.008
NVA-248	NVA-248CK	-0.005	-0.006	0.010
NVA-249	NVA-249CK	0.000	0.004	0.009
NVA-252	NVA-252CK	-0.003	-0.003	0.004
NVA-253	NVA-253CK	0.017	0.010	0.041
NVA-257	NVA-257CK	0.011	0.002	-0.005
NVA-258	NVA-258CK	0.001	0.005	0.021
NVA-259	NVA-259CK	-0.001	0.003	-0.002
NVA-260	NVA-260CK	-0.001	-0.008	0.002
NVA-264	NVA-264CK	-0.004	0.006	0.010

VVA

VVA-266	VVA-266CK	-0.005	0.010	0.020
VVA-267	VVA-267CK	-0.005	0.006	0.010
VVA-268	VVA-268CK	0.000	0.000	-0.016
VVA-269	VVA-269CK	-0.007	-0.002	-0.018
VVA-279	VVA-279CK	0.001	0.009	-0.002

VVA-281	VVA-281CK	-0.010	0.008	-0.004
VVA-282	VVA-282CK	0.009	0.009	-0.031
VVA-286	VVA-286CK	0.000	0.006	0.021
VVA-289	VVA-289CK	-0.002	-0.002	-0.002
VVA-293	VVA-293CK	0.002	-0.004	-0.003
VVA-294	VVA-294CK	0.005	0.009	0.015
VVA-298	VVA-298CK	-0.012	0.002	0.011
VVA-300	VVA-300CK	-0.001	0.004	0.002
VVA-301	VVA-301CK	-0.002	-0.005	-0.006
VVA-303	VVA-303CK	0.004	-0.001	-0.006
VVA-305	VVA-305CK	-0.012	0.020	-0.020
VVA-307	VVA-307CK	-0.008	-0.020	-0.007
VVA-308	VVA-308CK	0.002	0.001	0.005
VVA-309	VVA-309CK	-0.004	0.002	0.001
VVA-311	VVA-311CK	-0.010	-0.001	-0.005
VVA-312	VVA-312CK	-0.003	-0.001	0.011
VVA-313	VVA-313CK	-0.007	0.000	-0.009
VVA-316	VVA-316CK	0.019	-0.017	-0.019
VVA-318	VVA-318CK	-0.005	-0.011	0.023
VVA-322	VVA-322CK	0.000	-0.003	-0.003
VVA-323	VVA-323CK	-0.020	0.002	0.005
VVA-325	VVA-325CK	0.000	-0.002	-0.012
VVA-327	VVA-327CK	0.012	-0.046	-0.004
VVA-330	VVA-330CK	-0.001	0.023	-0.026
VVA-332	VVA-332CK	0.001	0.001	0.004
VVA-336	VVA-336CK	-0.008	0.000	-0.012
VVA-340	VVA-340CK	0.002	0.002	-0.014
VVA-341	VVA-341CK	-0.001	0.001	0.002
VVA-342	VVA-342CK	0.011	0.000	-0.003
VVA-357	VVA-357CK	0.002	0.002	0.005
VVA-358	VVA-358CK	-0.003	0.007	0.014
VVA-363	VVA-363CK	0.017	0.007	-0.003
VVA-365	VVA-365CK	0.000	0.008	0.003
VVA-366	VVA-366CK	-0.007	-0.001	-0.012
VVA-367	VVA-367CK	0.005	0.000	0.004
VVA-368	VVA-368CK	-0.010	-0.005	0.003
VVA-369	VVA-369CK	0.004	-0.003	0.001
VVA-373	VVA-373CK	-0.004	0.002	-0.011
VVA-375	VVA-375CK	0.000	0.001	-0.013
VVA-376	VVA-376CK	0.006	0.009	-0.003
VVA-377	VVA-377CK	-0.002	-0.001	0.003

VVA-382	VVA-382CK	0.009	-0.003	-0.007
VVA-384	VVA-384CK	-0.001	0.011	-0.007
VVA-385	VVA-385CK	0.003	-0.007	-0.009
VVA-386	VVA-386CK	-0.015	0.014	0.006
VVA-388	VVA-388CK	0.000	0.003	0.005
VVA-389	VVA-389CK	-0.006	-0.003	-0.019
VVA-393	VVA-393CK	-0.006	-0.003	-0.016
VVA-394	VVA-394CK	0.004	-0.003	-0.011
VVA-403	VVA-403CK	0.000	0.004	0.008
VVA-404	VVA-404CK	0.003	0.002	-0.011
VVA-405	VVA-405CK	0.002	0.011	0.009
VVA-406	VVA-406CK	0.005	0.001	0.009
VVA-407	VVA-407CK	-0.014	0.006	0.002
VVA-408	VVA-408CK	-0.005	-0.001	-0.013
VVA-409	VVA-409CK	-0.008	0.007	-0.027
VVA-410	VVA-410CK	0.006	0.012	0.012
VVA-411	VVA-411CK	0.001	0.005	-0.024
VVA-412	VVA-412CK	0.010	0.006	-0.002
VVA-413	VVA-413CK	-0.002	-0.003	-0.002
VVA-416	VVA-416CK	0.002	0.001	-0.003
VVA-418	VVA-418CK	-0.003	0.001	0.023
VVA-421	VVA-421CK	0.005	-0.006	0.040
VVA-422	VVA-422CK	0.005	-0.004	0.038
VVA-423	VVA-423CK	0.004	-0.003	-0.002
VVA-425	VVA-425CK	-0.007	0.009	0.011
VVA-431	VVA-431CK	0.009	0.011	0.022
VVA-432	VVA-432CK	0.014	0.017	-0.002
VVA-437	VVA-437CK	-0.002	-0.003	-0.004
VVA-439	VVA-439CK	0.001	-0.005	0.014
VVA-442	VVA-442CK	-0.015	0.007	0.022
VVA-443	VVA-443CK	0.004	-0.001	-0.003
VVA-448	VVA-448CK	0.002	0.003	0.001
VVA-452	VVA-452CK	0.002	-0.004	-0.004
VVA_453	VVA-453CK	-0.002	0.007	0.011