

DPH-11 Report on Absolute Vertical Accuracy

The USGS Lidar Base Specification Version 1.3 states: "Absolute vertical accuracy of the lidar data and the derived DEM will be assessed and reported in accordance with the ASPRS (2014). Two broad land cover types shall be assessed: vegetated and nonvegetated. Three absolute accuracy values shall be assessed and reported: (1) NVA for the point data, (2) NVA for the DEM, and (3) VVA for the DEM. The minimum NVA and VVA requirements for all data, using the ASPRS methodology, are listed in Table 4. Both the NVA and VVA required values shall be met."

Table 4. Absolute vertical accuracy for light detection and ranging data and digital elevation models.

[QL, quality level, $RMSE_z$, root mean square error in the z direction; NVA, nonvegetated vertical accuracy; VVA, vegetated vertical accuracy; m, meter; \leq , less than or equal to]

Quality level	$RMSE_z$ (nonvegetated) (m)	NVA at the 95-percent confidence level (m)	VVA at the 95th percentile (m)
QL0	≤ 0.050	≤ 0.098	≤ 0.15
QL1	≤ 0.100	≤ 0.196	≤ 0.30
QL2	≤ 0.100	≤ 0.196	≤ 0.30
QL3	≤ 0.200	≤ 0.392	≤ 0.60

The purpose of this section is to report on the absolute vertical accuracy of the lidar data and DEMs generated from it by testing for NVA (Nonvegetated Vertical Accuracy) and VVA (Vegetated Vertical Accuracy) against surveyed ground check points.

DPH-11 Report on Absolute Vertical Accuracy - continued

[Data Source - Y:\Mapping\Projects\65220171_USGS-TX_West_Texas\Production\Final_Client_Deliverables\Lot6_utm14\metadata\shapefiles\TX_WestTexas_Lot6_73NVA_49VVA_pts_u14.shp](#)

Units: Meter (/Feet)

Vertical Accuracy Class tested: 10-cm

Check Points in defined project area (DPA):	122
Check Points with Lidar Coverage	122
Check Points with Lidar Coverage (NVA)	73
Check Points with Lidar Coverage (VVA)	49
Average Z Error (NVA)	0.006/0.019
Maximum Z Error (NVA)	0.157/0.514
Median Z Error (NVA)	0.006/0.019
Minimum Z Error (NVA)	-0.208/-0.682
Standard deviation of Vertical Error (NVA)	0.061/0.199
Skewness of Vertical Error (NVA)	-0.367
Kurtosis of Vertical Error (NVA)	1.283
Non-vegetated Vertical Accuracy (NVA) RMSE(z) ¹	0.061/0.199 PASS
Non-vegetated Vertical Accuracy (NVA) at the 95% Confidence Level +/- ¹	0.119/0.390 PASS
FGDC/NSSDA Vertical Accuracy at the 95% Confidence Level +/-	0.119/0.390
Non-vegetated Vertical Accuracy (NVA) RMSE(z) (DEM) ²	0.064/0.209 PASS
Non-vegetated Vertical Accuracy (NVA) at the 95% Confidence Level (DEM) +/- ²	0.125/0.410 PASS
Vegetated Vertical Accuracy (VVA) at the 95th Percentile (DEM) +/- ²	0.205/0.673 PASS

This data set was tested to meet ASPRS Positional Accuracy Standard for Digital Geospatial Data (2014) for a 10-cm RMSEz Vertical Accuracy Class. Actual NVA accuracy was found to be RMSEz = 6.1cm, equating to +/- 11.9cm at the 95% confidence level. Actual VVA accuracy was found to be +/- 20.5cm at the 95th percentile.

¹ This value is calculated from TIN-based testing of the lidar point cloud data.

² This value is calculated from RAM-based grid testing of the lidar data. The grid cells are sized according to the Quality Level selected, and are defined in the USGS NGP Lidar Base Specification Version 1.3 (page 24, Table 6).

DPH-11 Report on Absolute Vertical Accuracy - continued

The purpose of this section is to report the results of measuring the lidar point cloud data against surveyed ground NVA (nonvegetated vertical accuracy) check points. All XY coordinates and Z values reported are in the selected data units.

NVA (lidar data)

ID	X	Y	Coverage	Z	Z From Lidar	Z Error	Minimum Z	Median Z	Maximum Z	Intensity	Scan Angle Rank	Returns	Description	Comments
1353	466579.294	3018998.412	Yes	127.532	127.566	0.034	127.557	127.559	127.568	19022	2365	1,1,1		
1362	467735.387	3036848.749	Yes	161.001	160.978	-0.023	160.978	160.978	160.981	22383	-1925	1,1,1		
1363	371711.38	3154094.052	Yes	223.805	223.834	0.029	223.813	223.833	223.837	17502	615	1,1,1		
1369	497680.275	3013255.79	Yes	189.592	189.71	0.118	189.701	189.708	189.714	18744	-353	1,1,1		
1372	469163.923	2999407.504	Yes	143.29	143.371	0.081	143.364	143.366	143.382	6094	-3509	1,1,1		
1373	457878.039	2991567.479	Yes	106.501	106.625	0.124	106.615	106.616	106.631	17211	1327	1,1,1		
1377	488945.122	2954507.27	Yes	117.327	117.314	-0.013	117.306	117.309	117.347	6968	-2051	1,1,1		
1378	494079.236	2983324.956	Yes	132.43	132.427	-0.003	132.426	132.428	132.429	15356	511	1,1,1		
1379	325052.8519999999	294254.293	Yes	306.028	306.058	0.030	306.054	306.057	306.06	16577	-1964	1,1,1		
1380	479488.459	3005953.318	Yes	148.587	148.638	0.051	148.635	148.641	148.652	23666	-454	1,1,1		
1383	483451.933	2966960.011	Yes	124.427	124.479	0.052	124.477	124.479	124.48	11003	-1087	1,1,1		
1384	426653.4580000000	288010.012	Yes	149.157	149.18	0.023	149.164	149.185	149.202	7779	-2915	1,1,1		
1390	502614.4560000000	289980.458	Yes	185.502	185.439	-0.063	185.433	185.443	185.444	12378	568	1,1,1		
1395	506493.551	3009210.002	Yes	203.643	203.6	-0.043	203.597	203.598	203.641	15190	2530	1,1,1		
1403	475316.3539999999	2998017.009	Yes	114.58	114.479	-0.101	114.449	114.481	114.486	13628	3137	1,1,1		
1406	483894.5290000000	2983556.53	Yes	102.406	102.37	-0.036	102.366	102.38	102.409	8172	-3510	1,1,1		
1408	330444.0139999999	296126.119	Yes	298.196	298.24	0.044	298.236	298.239	298.263	14609	-801	1,1,1		
1411	485059.091	3021924.111	Yes	156.152	156.198	0.046	156.192	156.202	156.207	11961	3173	1,1,1		
1414	349188.7710000000	293903.467	Yes	260.314	260.284	-0.030	260.28	260.286	260.302	11230	773	1,1,1		
1414A	349197.449	3193895.596	Yes	260.675	260.649	-0.026	260.633	260.644	260.655	6794	749	1,1,1		
1424	511663.8009999999	292717.215	Yes	252.772	252.764	-0.008	252.76	252.764	252.764	20024	-2228	1,1,1		
1428	380699.01	3130951.523	Yes	231.996	231.936	-0.060	231.929	231.94	231.94	14905	-375	1,1,1		
1428A	379427.2100000000	293377.747	Yes	235.538	235.487	-0.051	235.475	235.489	235.505	11419	719	1,1,1		
1429	495114.017	2967243.609	Yes	128.596	128.568	-0.028	128.559	128.575	128.581	13795	-1747	1,1,1		
1430	461362.54	3040214.593	Yes	167.211	167.241	0.030	167.234	167.236	167.242	17367	-12	1,1,1		
1431	371746.295	3142919.431	Yes	202.319	202.272	-0.047	202.271	202.299	202.304	12157	1646	1,1,1		
1434	469622.779	2980199.269	Yes	109.565	109.534	-0.031	109.518	109.536	109.547	6454	-837	1,1,1		
1435	474665.0779999999	2993423.08	Yes	163.959	164.043	0.084	164.038	164.04	164.049	7755	128	1,1,1		
1437	390474.934	3119607.578	Yes	194.379	194.388	0.009	194.373	194.399	194.401	16247	-693	1,1,1		
1438	450966.036	3021369.958	Yes	115.674	115.742	0.068	115.735	115.751	115.758	12094	-1039	1,1,1		

Check Points Vertical Accuracy - continued

ID	X	Y	Coverage	Z	Z From Lidar	Z Error	Minimum Z	Median Z	Maximum Z	Intensity	Scan Angle Rank	Returns	Description	Comments
1439	500483.326000	0030617.877	Yes	251.238	251.146	-0.092	251.126	251.136	251.149	19183	2225	1,1,1		
1443	468158.680000	0028591.033	Yes	143.517	143.472	-0.045	143.453	143.473	143.474	25323	-2596	1,1,1		
1445	402567.871999	9908644.586	Yes	188.436	188.442	0.006	188.441	188.446	188.454	18422	-3071	1,1,1		
1448	486140.249	2994259.894	Yes	118.096	118.142	0.046	118.128	118.13	118.146	14804	-2714	1,1,1		
1454	458386.512	3008679.937	Yes	106.629	106.786	0.157	106.76	106.793	106.795	15919	3020	1,1,1		
1459	508732.162000	0075951.199	Yes	180.983	181.004	0.021	180.992	180.997	181.036	10413	1217	1,1,1		
1468	500726.696	2993926.585	Yes	149.447	149.314	-0.133	149.308	149.326	149.326	14997	3127	1,1,1		
1471	502969.794	3022107.052	Yes	260.732	260.71	-0.022	260.708	260.708	260.714	14586	3345	1,1,1		
1474	509360.356	2983097.78	Yes	166.156	166.1	-0.056	166.094	166.1	166.105	11061	2028	1,1,1		
1476	487108.51	3012926.667	Yes	158.471	158.552	0.081	158.547	158.556	158.559	17938	1506	1,1,1		
1477	314878.281	3258781.804	Yes	354.048	354.05	0.002	354.031	354.052	354.07	6799	-2247	1,1,1		
1478	340300.419	3211218.902	Yes	263.82	263.814	-0.006	263.792	263.809	263.838	6918	2755	1,1,1		
1483	450840.075	3045275.743	Yes	127.683	127.733	0.050	127.703	127.732	127.744	2993	-1829	1,1,1		
1484	444686.035	3059009.167	Yes	164.321	164.287	-0.034	164.284	164.289	164.293	9072	2977	1,1,1		
1489	481564.604	2955844.919	Yes	103.039	103.047	0.008	103.034	103.044	103.054	9169	-2329	1,1,1		
1490	452456.282000	0033211.975	Yes	139.698	139.684	-0.014	139.657	139.673	139.699	12839	-2291	1,1,1		
1491	416942.313	3089959.179	Yes	189.08	189.098	0.018	189.091	189.101	189.101	9269	205	1,1,1		
1491B	416908.799	3089950.548	Yes	189.365	189.36	-0.005	189.356	189.362	189.367	9822	356	1,1,1		
1493	353275.816000	0073197.413	Yes	217.095	217.19	0.095	217.166	217.202	217.223	10599	3114	1,1,1		
1493A	353297.523	3173213.764	Yes	216.519	216.605	0.086	216.598	216.6	216.621	11253	3621	1,1,1		
1501	355571.753	3183367.881	Yes	235.647	235.604	-0.043	235.571	235.596	235.613	7468	-1611	1,1,1		
1502	303981.301000	0061264.985	Yes	356.767	356.81	0.043	356.769	356.81	356.814	3701	-3089	1,1,1		
1503	367231.755	3163046.725	Yes	247.148	247.158	0.010	247.141	247.175	247.178	6754	-3419	1,1,1		
1504	406836.785	3105004.269	Yes	188.238	188.24	0.002	188.237	188.239	188.247	13313	1012	1,1,1		
1504A	406849.698	3105021.895	Yes	188.291	188.329	0.038	188.318	188.33	188.337	14314	1135	1,1,1		
1506	511767.647000	0095031.961	Yes	204.785	204.725	-0.060	204.697	204.733	204.735	7742	-1694	1,1,1		
1512	336432.929	3227678.812	Yes	291.469	291.439	-0.030	291.437	291.439	291.443	14461	2863	1,1,1		
1514	346845.889000	0010254.28	Yes	262.723	262.729	0.006	262.717	262.72	262.734	8235	-329	1,1,1		
1515	490248.105999	9906689.165	Yes	117.536	117.488	-0.048	117.483	117.491	117.495	12186	1778	1,1,1		
1517	513083.167	2968541.977	Yes	175.234	175.27	0.036	175.268	175.269	175.273	20842	1573	1,1,1		
1518	339964.024	3220070.682	Yes	283.294	283.289	-0.005	283.285	283.289	283.301	12281	-678	1,1,1		
1522	318589.267	3248085.978	Yes	314.935	314.965	0.030	314.949	314.955	314.969	13319	244	1,1,1		
1523	500802.233	2975619.243	Yes	162.364	162.328	-0.036	162.308	162.326	162.355	10258	3305	1,1,1		
1528	304324.15	3255344.248	Yes	308.025	308.015	-0.010	308.004	308.014	308.029	11754	-54	1,1,1		
1538	451803.071999	9906330.323	Yes	164.736	164.657	-0.079	164.651	164.658	164.665	5718	1049	1,1,1		

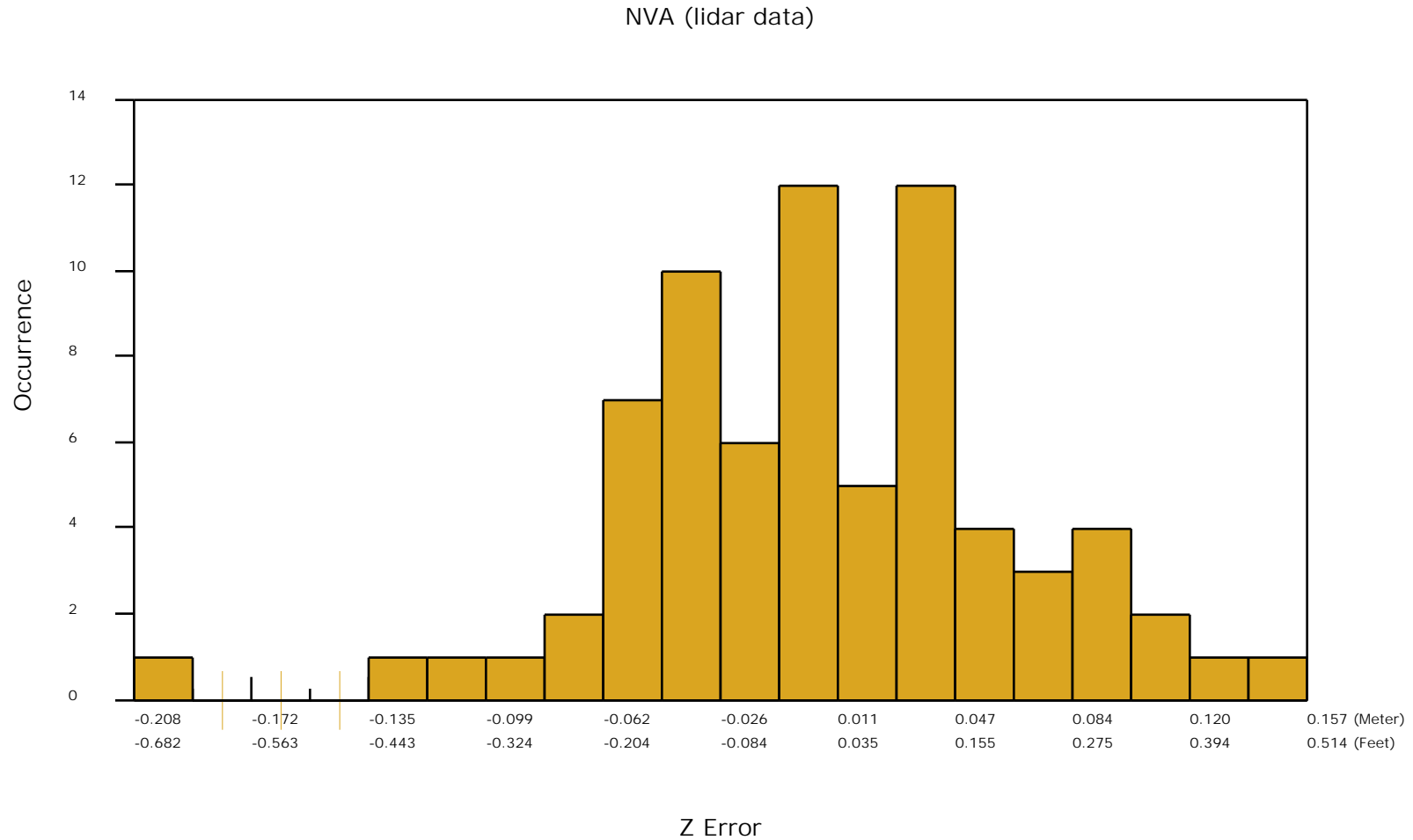
Check Points Vertical Accuracy - continued

ID	X	Y	Coverage	Z	Z From Lidar	Z Error	Minimum Z	Median Z	Maximum Z	Intensity	Scan Angle Rank	Returns	Description	Comments
1539	382899.93	3123417.088	Yes	197.475	197.527	0.052	197.521	197.528	197.529	14726	1773	1,1,1		
1540	464973.722	2988220.508	Yes	97.949	97.995	0.046	97.991	97.995	98.001	17072	-276	1,1,1		
1542	492090.025	2988904.996	Yes	143.584	143.694	0.110	143.685	143.695	143.695	6378	-2005	1,1,1		
1543	433890.225	3061263.036	Yes	144.527	144.319	-0.208	144.305	144.318	144.331	4593	-2318	1,1,1		
1543A	433890.225	3061263.036	Yes	144.308	144.319	0.011	144.305	144.318	144.331	4593	-2318	1,1,1		
63101	484193.208000001	0901.968	Yes	160.64	160.645	0.005	160.6	160.617	160.682	4890	-1236	2,2,2		
64102	494083.208999999	983332.707	Yes	132.304	132.393	0.089	132.383	132.387	132.393	16234	489	1,1,1		
64105	490580.481	2991822.35	Yes	137.335	137.377	0.042	137.34	137.359	137.433	13783	-335	1,1,1		

DPH-11 Report on Absolute Vertical Accuracy - continued

The purpose of this section is to show a frequency distribution chart of the non-vegetated vertical accuracy (NVA) of the lidar point cloud data measured against surveyed ground check points.

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DPH-11 Report on Absolute Vertical Accuracy - continued

The purpose of this section is to report the results of measuring the DEM data against surveyed ground NVA (nonvegetated vertical accuracy) check points. All XY coordinates and Z values reported are in the selected data units.

NVA (DEM)

ID	X	Y	Coverage	Z	Z From Lidar	Z Error	Description	Comments
1353	466579.294	3018998.412	Yes	127.532	127.573	0.041		
1362	467735.387	3036848.749	Yes	161.001	160.981	-0.020		
1363	371711.38	3154094.052	Yes	223.805	223.840	0.035		
1369	497680.275	3013255.79	Yes	189.592	189.702	0.110		
1372	469163.923	2999407.504	Yes	143.29	143.370	0.080		
1373	457878.039	2991567.479	Yes	106.501	106.624	0.123		
1377	488945.122	2954507.27	Yes	117.327	117.326	-0.001		
1378	494079.236	2983324.956	Yes	132.43	132.424	-0.006		
1379	325052.851999999	3244254.293	Yes	306.028	306.040	0.012		
1380	479488.459	3005953.318	Yes	148.587	148.641	0.054		
1383	483451.933	2966960.011	Yes	124.427	124.477	0.050		
1384	426653.458000002	3068010.012	Yes	149.157	149.212	0.055		
1390	502614.456000001	2989980.458	Yes	185.502	185.440	-0.062		
1395	506493.551	3009210.002	Yes	203.643	203.619	-0.024		
1403	475316.353999999	2978017.009	Yes	114.58	114.455	-0.125		
1406	483894.529000001	2983556.53	Yes	102.406	102.370	-0.036		
1408	330444.013999999	3236126.119	Yes	298.196	298.242	0.046		
1411	485059.091	3021924.111	Yes	156.152	156.221	0.069		
1414	349188.771000001	3193903.467	Yes	260.314	260.293	-0.021		
1414A	349197.449	3193895.596	Yes	260.675	260.651	-0.024		
1424	511663.800999999	3012717.215	Yes	252.772	252.758	-0.014		
1428	380699.01	3130951.523	Yes	231.996	231.939	-0.057		
1428A	379427.210000001	3133377.747	Yes	235.538	235.488	-0.050		
1429	495114.017	2967243.609	Yes	128.596	128.574	-0.022		
1430	461362.54	3040214.593	Yes	167.211	167.239	0.028		
1431	371746.295	3142919.431	Yes	202.319	202.270	-0.049		
1434	469622.779	2980199.269	Yes	109.565	109.522	-0.043		
1435	474665.077999999	3033423.08	Yes	163.959	164.054	0.095		
1437	390474.934	3119607.578	Yes	194.379	194.406	0.027		
1438	450966.036	3021369.958	Yes	115.674	115.758	0.084		

Check Points Vertical Accuracy - continued

ID	X	Y	Coverage	Z	Z From Lidar	Z Error	Description	Comments
1439	500483.326000001	3030617.877	Yes	251.238	251.136	-0.102		
1443	468158.680000001	3028591.033	Yes	143.517	143.471	-0.046		
1445	402567.871999998	3108644.586	Yes	188.436	188.417	-0.019		
1448	486140.249	2994259.894	Yes	118.096	118.136	0.040		
1454	458386.512	3008679.937	Yes	106.629	106.798	0.169		
1459	508732.162000001	2975951.199	Yes	180.983	181.019	0.036		
1468	500726.696	2993926.585	Yes	149.447	149.312	-0.135		
1471	502969.794	3022107.052	Yes	260.732	260.713	-0.019		
1474	509360.356	2983097.78	Yes	166.156	166.104	-0.052		
1476	487108.51	3012926.667	Yes	158.471	158.551	0.080		
1477	314878.281	3258781.804	Yes	354.048	354.043	-0.005		
1478	340300.419	3211218.902	Yes	263.82	263.809	-0.011		
1483	450840.075	3045275.743	Yes	127.683	127.703	0.020		
1484	444686.035	3059009.167	Yes	164.321	164.307	-0.014		
1489	481564.604	2955844.919	Yes	103.039	103.042	0.003		
1490	452456.282000001	3033211.975	Yes	139.698	139.709	0.011		
1491	416942.313	3089959.179	Yes	189.08	189.080	0.000		
1491B	416908.799	3089950.548	Yes	189.365	189.356	-0.009		
1493	353275.816000001	3173197.413	Yes	217.095	217.211	0.116		
1493A	353297.523	3173213.764	Yes	216.519	216.600	0.081		
1501	355571.753	3183367.881	Yes	235.647	235.633	-0.014		
1502	303981.301000001	3261264.985	Yes	356.767	356.806	0.039		
1503	367231.755	3163046.725	Yes	247.148	247.148	0.000		
1504	406836.785	3105004.269	Yes	188.238	188.243	0.005		
1504A	406849.698	3105021.895	Yes	188.291	188.340	0.049		
1506	511767.647000001	2995031.961	Yes	204.785	204.702	-0.083		
1512	336432.929	3227678.812	Yes	291.469	291.442	-0.027		
1514	346845.889000001	3210254.28	Yes	262.723	262.724	0.001		
1515	490248.105999999	2946689.165	Yes	117.536	117.486	-0.050		
1517	513083.167	2968541.977	Yes	175.234	175.272	0.038		
1518	339964.024	3220070.682	Yes	283.294	283.302	0.008		
1522	318589.267	3248085.978	Yes	314.935	314.956	0.021		
1523	500802.233	2975619.243	Yes	162.364	162.311	-0.053		
1528	304324.15	3255344.248	Yes	308.025	308.011	-0.014		
1538	451803.071999999	3056330.323	Yes	164.736	164.674	-0.062		

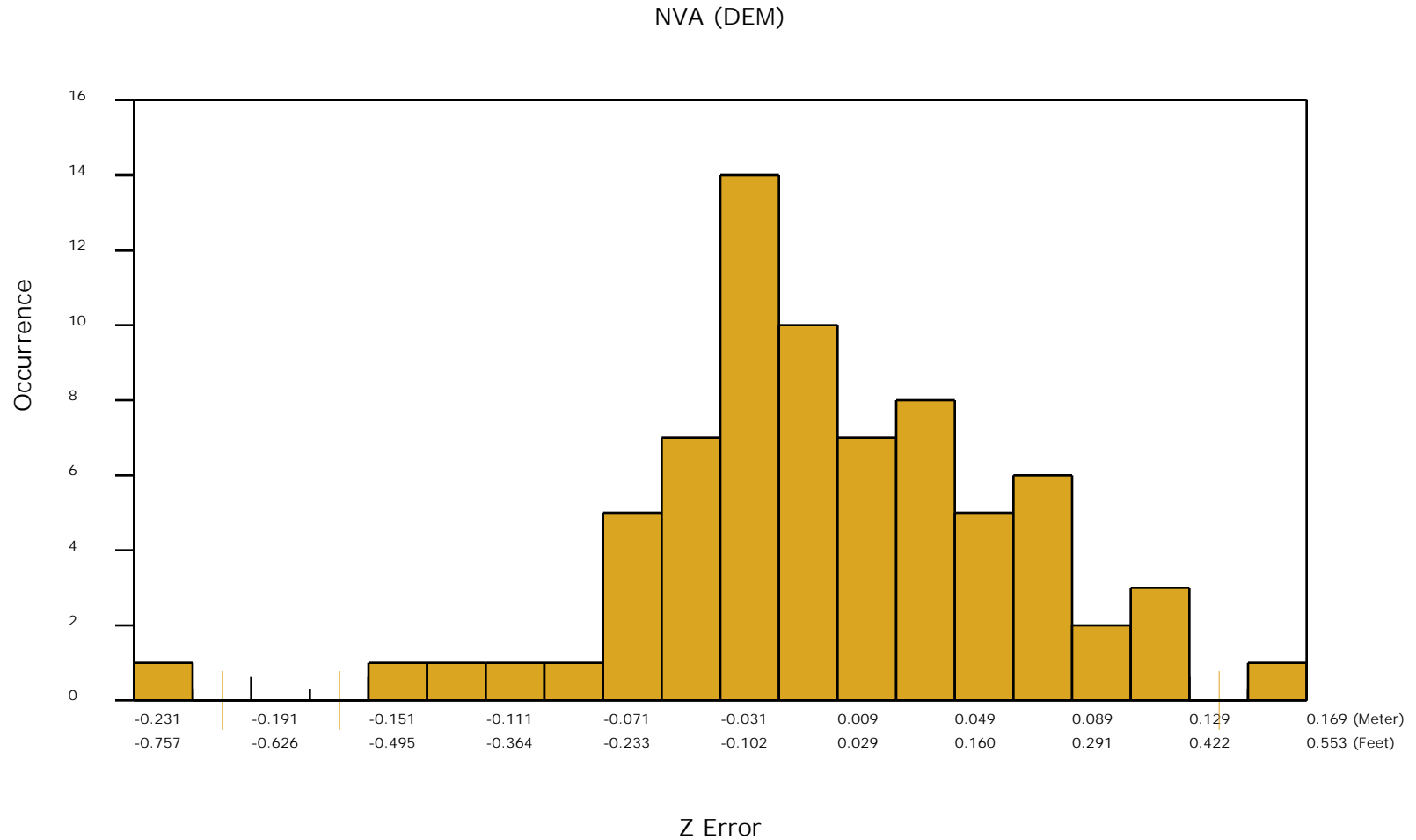
Check Points Vertical Accuracy - continued

ID	X	Y	Coverage	Z	Z From Lidar	Z Error	Description	Comments
1539	382899.93	3123417.088	Yes	197.475	197.525	0.050		
1540	464973.722	2988220.508	Yes	97.949	97.997	0.048		
1542	492090.025	2988904.996	Yes	143.584	143.685	0.101		
1543	433890.225	3061263.036	Yes	144.527	144.296	-0.231		
1543A	433890.225	3061263.036	Yes	144.308	144.296	-0.012		
63101	484193.208000001	3010901.968	Yes	160.64	160.607	-0.033		
64102	494083.2089999999	2983332.707	Yes	132.304	132.389	0.085		
64105	490580.481	2991822.35	Yes	137.335	137.358	0.023		

DPH-11 Report on Absolute Vertical Accuracy - continued

The purpose of this section is to show a frequency distribution chart of the non-vegetated vertical accuracy (NVA) of the DEM data measured against surveyed ground check points.

[Data Source - Y:\Mapping\Projects\65220171_USGS-TX_West_Texas\Production\Final_Client_Deliverables\Lot6_utm14\point_cloud\tilecls](Y:\Mapping\Projects\65220171_USGS-TX_West_Texas\Production\Final_Client_Deliverables\Lot6_utm14\point_cloud\tilecls)



DPH-11 Report on Absolute Vertical Accuracy - continued

The purpose of this section is to report the results of measuring the DEM data against surveyed ground VVA (vegetated vertical accuracy) check points. All XY coordinates and Z values reported are in the selected data units.

VVA (DEM)

ID	X	Y	Coverage	Z	Z From Lidar	Z Error	Description	Comments
2238	466500.997	3018954.317	Yes	126.548	126.626	0.078		
2247	467706.638000001	3036813.379	Yes	160.757	160.729	-0.028		
2253	497656.508	3013221.458	Yes	189.227	189.502	0.275		
2256	469162.023000001	2999440.737	Yes	143.691	143.772	0.081		
2257	457523.954	2991269.618	Yes	105.387	105.562	0.175		
2261	494094.127	2983334.917	Yes	132.237	132.318	0.081		
2262	325723.662	3243461.374	Yes	312.307	312.367	0.060		
2263	479538.987	3005957.665	Yes	148.662	148.668	0.006		
2266	483644.439	2966751.537	Yes	129.007	129.107	0.100		
2267	426642.094	3067923.672	Yes	146.252	146.444	0.192		
2272	502972.533999998	2989925.159	Yes	183.909	184.018	0.109		
2286	484457.659999999	2983919.109	Yes	102.207	102.218	0.011		
2290	485035.324999999	3021905.31	Yes	156.046	156.211	0.165		
2293	349295.853	3194035.068	Yes	258.875	258.934	0.059		
2300	511591.547	3012694.994	Yes	252.783	252.782	-0.001		
2304	380700.86	3130940.424	Yes	231.979	232.049	0.070		
2304A	379429.959	3133358.882	Yes	235.445	235.416	-0.029		
2305	495113.04	2967285.696	Yes	129.231	129.188	-0.043		
2306	461349.83	3040256.726	Yes	167.694	167.881	0.187		
2307	371766.459	3142881.536	Yes	202.019	202.055	0.036		
2310	469708.891	2980096.055	Yes	107.522	107.498	-0.024		
2311	474703.713000001	3033465.092	Yes	163.937	163.992	0.055		
2313	390473.840000002	3119595.4	Yes	194.861	194.926	0.065		
2314	450975.073	3021403.153	Yes	115.599	115.756	0.157		
2315	500433.893	3030662.181	Yes	250.474	250.417	-0.057		
2318	468162.415	3028505.732	Yes	143.525	143.521	-0.004		
2320	402574.037000001	3108677.774	Yes	190.145	190.257	0.112		
2323	486171.955	2994238.814	Yes	117.63	117.674	0.044		
2329	458354.841	3008686.689	Yes	106.222	106.436	0.214		
2334	508765.93	2975942.362	Yes	180.662	180.726	0.064		

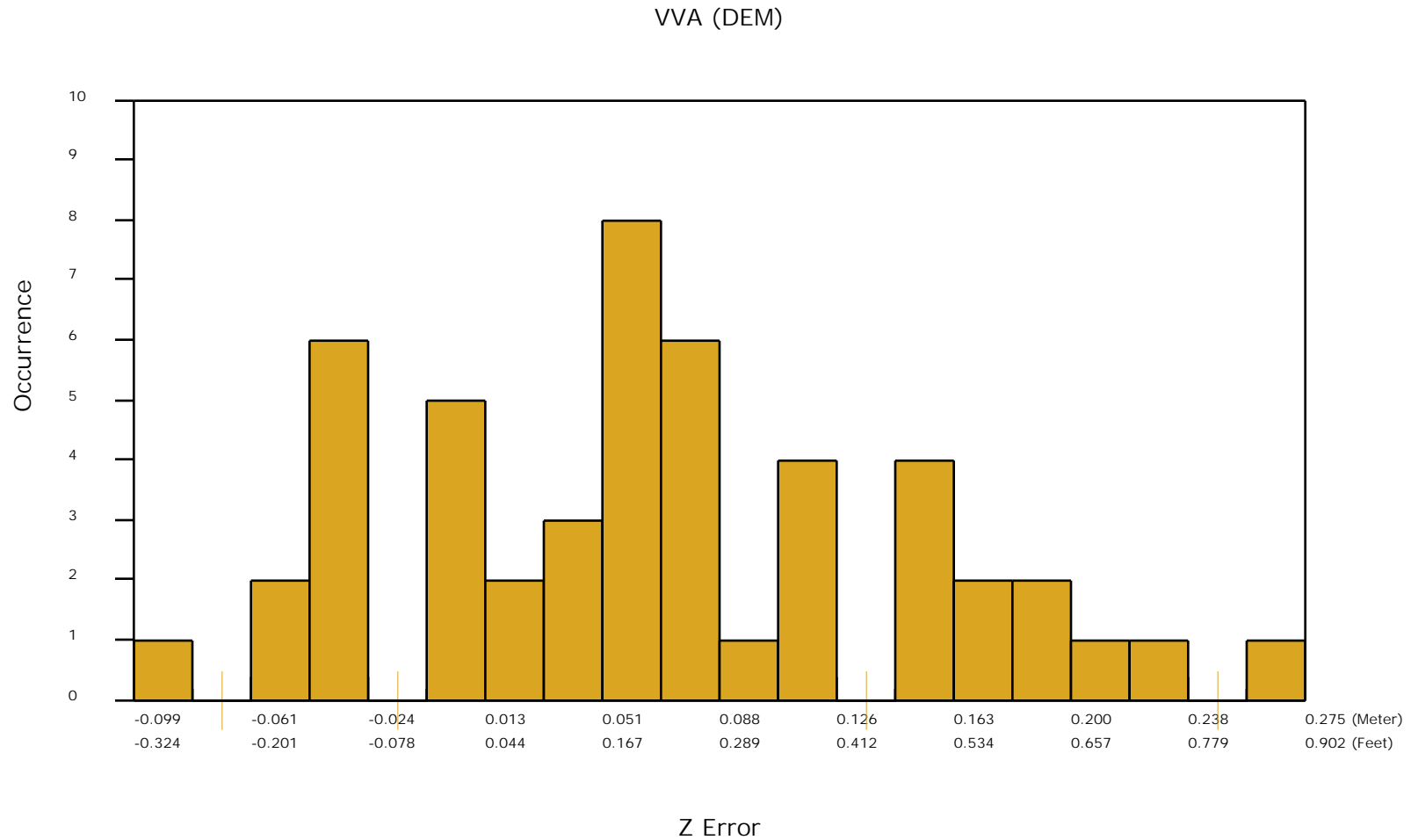
Check Points Vertical Accuracy - continued

ID	X	Y	Coverage	Z	Z From Lidar	Z Error	Description	Comments
2342	500736.614	2993880.066	Yes	149.318	149.279	-0.039		
2345	503002.445999999	3022089.338	Yes	260.664	260.689	0.025		
2348	509340.784	2982726.723	Yes	167.339	167.306	-0.033		
2350	487140.218000001	3012952.109	Yes	158.377	158.532	0.155		
2352	340297.954000001	3211322.015	Yes	264.905	265.052	0.147		
2356	450857.827999999	3045270.133	Yes	127.633	127.714	0.081		
2356B	450862.547	3045215.836	Yes	127.602	127.715	0.113		
2357	444674.053	3058977.097	Yes	164.235	164.292	0.057		
2360	481595.467	2955865.917	Yes	104.878	104.881	0.003		
2361	416992.97	3089742.797	Yes	188.976	189.058	0.082		
2363	314925.226	3258804.316	Yes	352.368	352.491	0.123		
2364	367214.591	3163085.705	Yes	247.027	247.096	0.069		
2367	336425.210999999	3227683.356	Yes	291.459	291.424	-0.035		
2369	490396.084000001	2946265.973	Yes	129.592	129.493	-0.099		
62101	513111.013	2968516.532	Yes	174.727	174.758	0.031		
64100	482322.923	2985901.21	Yes	117.132	117.280	0.148		
64101	482318.929000001	2985883.494	Yes	117.306	117.352	0.046		
64104	496325.379	2977726.369	Yes	138.614	138.675	0.061		
64103	496337.299	2977746.302	Yes	137.891	138.116	0.225		

DPH-11 Report on Absolute Vertical Accuracy - continued

The purpose of this section is to show a frequency distribution chart of the vegetated vertical accuracy (VVA) of the DEM data measured against surveyed ground check points.

[Data Source - Y:\Mapping\Projects\65220171_USGS-TX_West_Texas\Production\Final_Client_Deliverables\Lot6_utm14\point_cloud\tilecls](#)

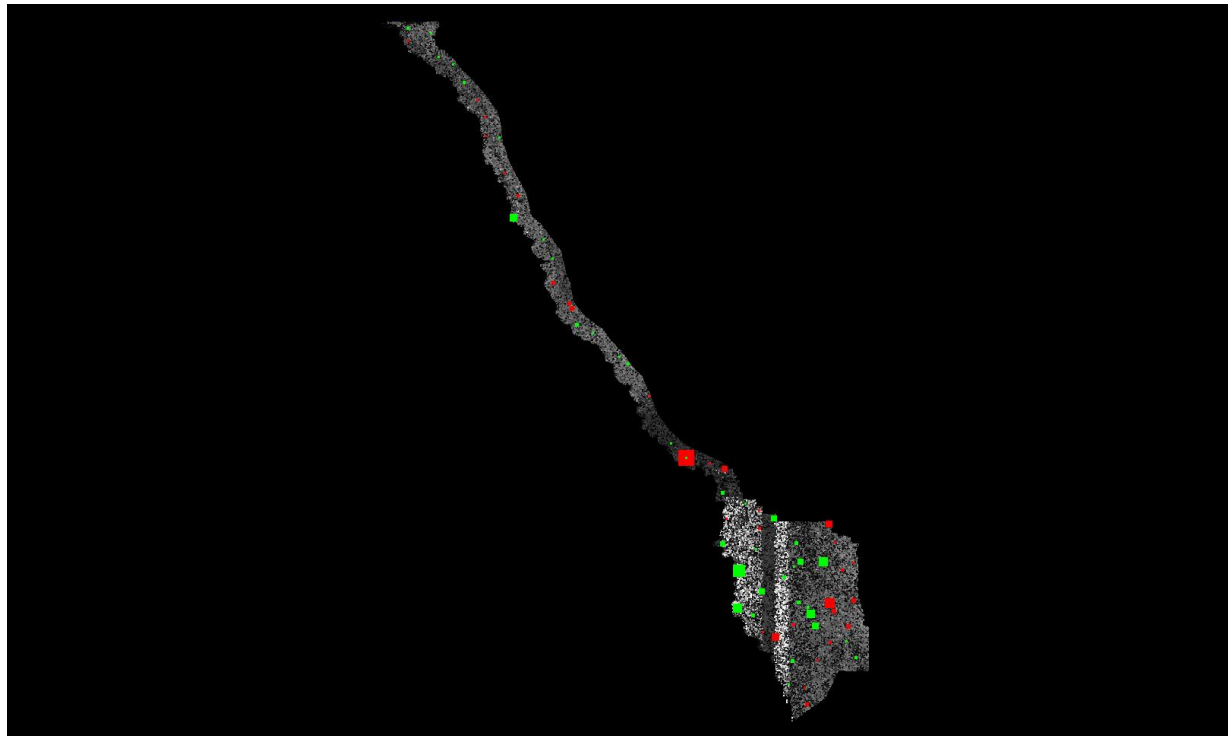


DPH-11 Report on Absolute Vertical Accuracy - continued

The purpose of this section is to show a graphic of lidar data points colored by intensity with NVA check points rendered "thematically" showing the green and red squares sized by Z error.

[Data Source - Y:\Mapping\Projects\65220171_USGS-TX_West_Texas\Production\Final_Client_Deliverables\Lot6_utm14\point_cloud\tilecls](Y:\Mapping\Projects\65220171_USGS-TX_West_Texas\Production\Final_Client_Deliverables\Lot6_utm14\point_cloud\tilecls)

[Result Path - Y:\Mapping\Projects\65220171_USGS-TX_West_Texas\Admin\OA_OC\Lot6_A\DPH_11\ColorByIntensity_Check_Points_NVA.jpg](Y:\Mapping\Projects\65220171_USGS-TX_West_Texas\Admin\OA_OC\Lot6_A\DPH_11\ColorByIntensity_Check_Points_NVA.jpg)



■ Green represents where the lidar surface is above the check point (positive elevation error).

■ Red represents where the lidar surface is below the check point (negative elevation error).

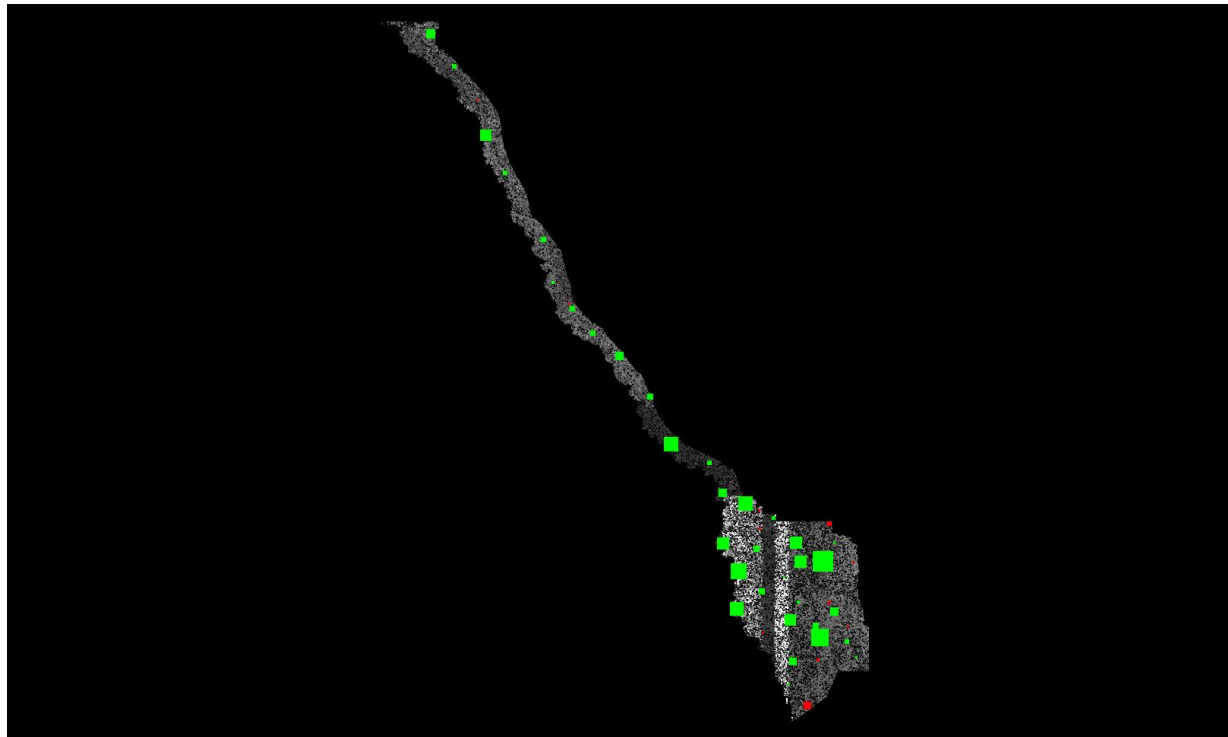
The size of the square symbol represents the absolute value magnitude of error.

DPH-11 Report on Absolute Vertical Accuracy - continued

The purpose of this section is to show a graphic of lidar data points colored by intensity with VVA check points rendered "thematically" showing the green and red squares sized by Z error.

[Data Source - Y:\Mapping\Projects\65220171_USGS-TX_West_Texas\Production\Final_Client_Deliverables\Lot6_utm14\point_cloud\tilecls](Y:\Mapping\Projects\65220171_USGS-TX_West_Texas\Production\Final_Client_Deliverables\Lot6_utm14\point_cloud\tilecls)

[Result Path - Y:\Mapping\Projects\65220171_USGS-TX_West_Texas\Admin\OA_OC\Lot6_A\DPH_11\ColorByIntensity_CheckPoints_VVA.jpg](Y:\Mapping\Projects\65220171_USGS-TX_West_Texas\Admin\OA_OC\Lot6_A\DPH_11\ColorByIntensity_CheckPoints_VVA.jpg)



■ Green represents where a DEM of the lidar surface is above the check point (positive elevation error).

■ Red represents where a DEM of the lidar surface is below the check point (negative elevation error).

The size of the square symbol represents the absolute value magnitude of error.