

Ground Control Report

WISCONSIN WROC - 3DEP | GREEN LAKE COUNTY LIDAR 2018

1.1 GROUND CONTROL DESIGN AND METHODOLOGY

The ground control network and design used for the Green Lake County lidar acquisition was made up of calibration points, GPS base stations, NGS base stations, and independent check points from the vertical accuracy ground control survey. This report will focus on the lidar calibration points that were collected at 10 locations in and around the Green Lake County project area. The control points are used for QC checks and calibration of the raw point cloud and for additional vertical checks against the processed bare earth surface.

The ground control calibration survey was done in Wisconsin County Coordinate System-Green Lake County, NAD83 (2011), US survey feet; NAVD88 (Geoid 12B), US survey feet. The field work was conducted by Ayres Associates surveyors. All field work was completed between April 17, 2018, and May 17, 2018.

CONTROL SUMMARY AND METHODOLOGY

Control Summary

Horizontal Datum:	NAD83 (2011)
Vertical Datum:	NAVD88 (2012), Wisconsin GEOID12B
Rectangular Coordinate System:	Wisconsin County Coordinate System-Green Lake County
Used NGS Control?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
List any NGS control points used:	DH5627,DH5625,DH5622,DH5619,DH5611
Summary of control checks and calibration (if applicable):	(See Field Notes for control checks on NGS monuments – No calibration was needed)
Survey Methods Used:	RTK-GPS using WISCORS Network through VRS connection were used for direct observations and to set control pairs for Robotic Total Station shots under canopy, etc
Equipment Used:	GPS Trimble R6-4 75.64 Total station Trimble S 6 75.22 Data Collector Trimble TSC 3

Crew Chief Notes

Set PK nails or spikes at control points used for total station measurements and for calibration points.

Took picture of each point.

Survey Methods (continued)

Established horizontal and vertical coordinate values on the points by a minimum of two – 90 epoch observations with separate initializations using RTK GPS and the WISCORS network. The resultant coordinates and elevations provided in the deliverables are an average of the two observations.

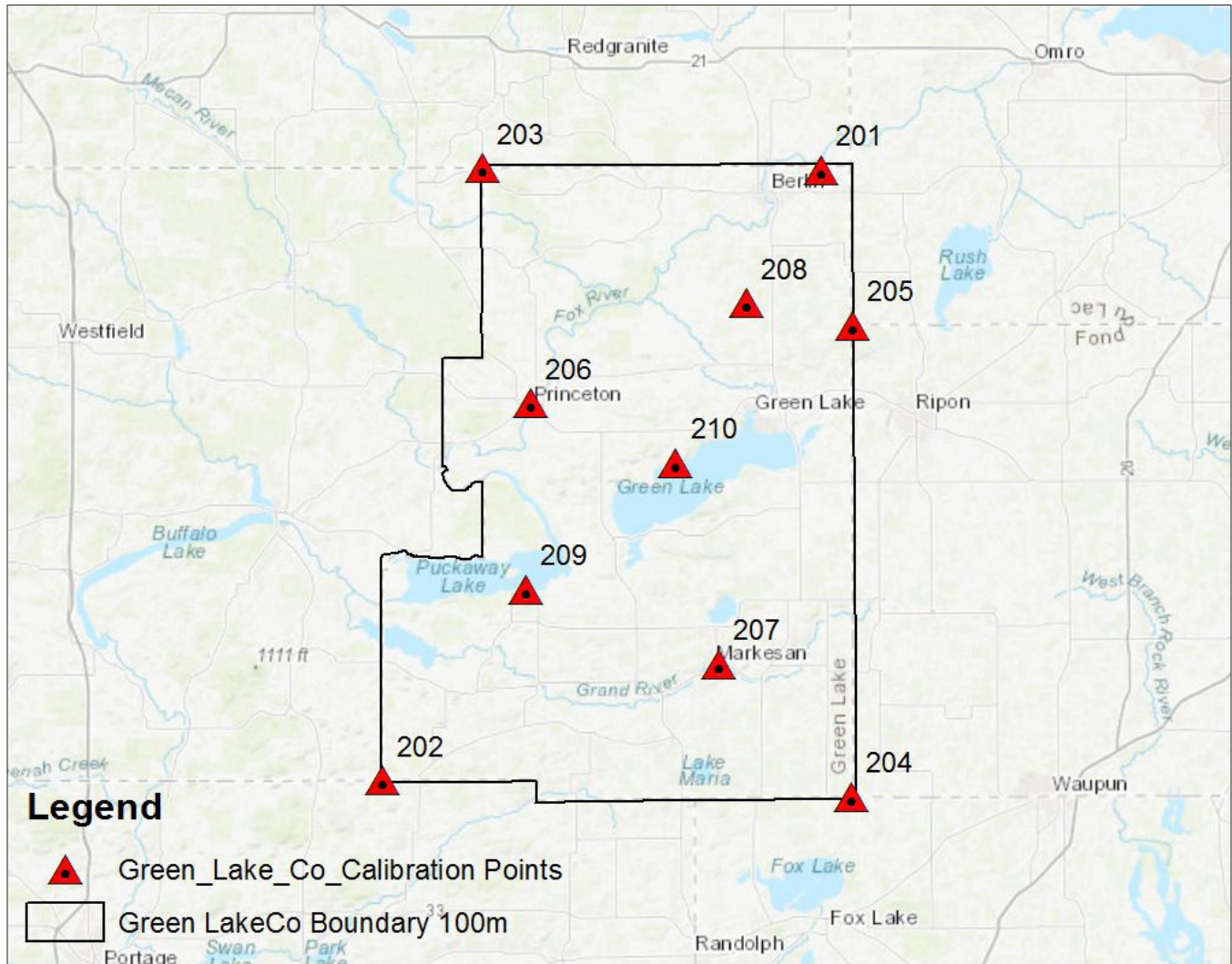
Check shots were taken on numerous NGS control points (see field notes) to verify that the values obtained are consistent with the datum/adjustment as described herein and meet the ± 3 centimeter vertical accuracy requirement at the 95% confidence level.

Points not able to be directly occupied by GPS means were measured using Total Station methods from control point pairs set utilizing GPS methods outlined above.

1.1.2 CONTROL LAYOUT

The locations were selected around the outer geometry of the project boundary and on major roads within the project area. This layout design is preferred when the calibration points will be used to check different areas across a large flight block. The control survey was conducted with a Trimble R-8 GPS receiver and a VRS connection with a TSC3 data collector.

1.1.2.1 MAP OF GREEN LAKE COUNTY CALIBRATION POINTS



1.1.3 GREEN LAKE COUNTY LIDAR, CALIBRATION POINT STATISTICS

The final step in using the calibration points is to run a statistical comparison against the bare earth ground surface to confirm that the vertical accuracy is within specification. The follow results indicate that the overall RMSEz of the calibration points is 0.124'. This is a separate check as compared to the Vertical Accuracy Survey QA/QC report. These points are used in the calibration of the raw point cloud, and therefore are not an independent set of checkpoints like those used in the vertical accuracy testing.

1.1.3.1 STATISTICAL REPORT FOR CALIBRATION POINTS

NUMBER	EASTING	NORTHING	KNOWN Z	LASER Z	Dz
209	522833.910	238647.088	770.322	770.520	+0.198
207	561843.681	223503.091	855.433	855.540	+0.107
206	523984.185	276251.961	766.734	766.840	+0.106
210	553257.096	264175.953	841.520	841.570	+0.050
208	567409.802	296447.012	807.009	807.050	+0.041
201	582700.416	323470.357	796.712	796.740	+0.028
204	588689.148	196710.096	961.470	961.430	-0.040
202	494041.494	199992.995	850.923	850.850	-0.073
205	588849.308	292024.277	975.923	975.810	-0.113
203	514224.740	323833.908	804.391	804.130	-0.261

Average Dz +0.004
Minimum Dz -0.261
Maximum Dz +0.198
Root Mean Square 0.124
Std Deviation 0.131

1.1.4 FIELD NOTES

72-0248.00

Green Lake County LIDAR
Control Survey

4-17-18
MJR

WCCS-Green Lake County
NAVD88 (2012) Vertical

72-0248.00
4-18-18
MJR 28°F Cloudy

√PT#	ΔN	ΔE	ΔZ	PT#
A1167	0.038	0.082	0.058	1003
A19569	Vertical only		0.049	1004
DH5607	0.002	0.061	0.102	1005
AJ4511	-0.037	-0.010	-0.049	1006

201	N Corner Conc. Dr
203	Sw Cor. W Striping
206	Q MH
210	Inside Cor. Tennis Court Striping
202	Sw Int White Cross
207	Flange @ Corner of CB
208	NE Cor Striping
204	Magn All NE Corner Strip
205	NE Cor Striping
208	NE Cor Striping
209	Center of CB in Asphalt Dr

1.15 FIELD PHOTOS



Point 202



Point 201



Point 203



Point 204

FIELD PHOTOS (CONTINUED)



Point 205



Point 206



Point 207



Point 208

FIELD PHOTOS (CONTINUED)



Point 209



Point 210