



Vertical Accuracy Report

Wisconsin WROC - 3DEP 2020

Columbia County Lidar

Ingenuity, Integrity, and Intelligence.

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Vertical Accuracy Report

Project Information

Prepared By: Ayres

Project Name: Wisconsin WROC – 3DEP Columbia County Lidar 2020

Sensor Info: Riegl LMS-Q1560 SN 1264

Required Nominal Pulse Spacing: 0.7

Consultant Name: Ayres primary and Quantum Spatial (now NV5 Geospatial) as lidar acquisition partner

Units: U.S. Survey Feet

Date of Acquisition: Start: 4/11/2020 | Finish: 4/18/2020

Report Information

This report documents the absolute vertical accuracy of the lidar data collected for the Columbia County, WI, QL2 lidar project. Independent vertical checkpoints were collected by land surveyors using Trimble GNSS equipment connected to WISCRS base stations. The checkpoints were collected from April 7 to April 8, 2020.

The checkpoints were collected under various land cover types that are predominant in the County. Each land cover type falls into either the Non-vegetated Vertical Accuracy (NVA) or the Vegetated Vertical Accuracy (VVA) group. For this project, 57 NVA points and 46 VVA points were collected throughout the County.

The following report shows the final statistics for the NVA checkpoints compared against the raw swath point cloud and the bare earth DEM, and the VVA statistics compared against the DEM. Statistics are reported for LAS and DEM by NVA and VVA categories.

Vertical Accuracy Specifications per USGS QL2 level:

LAS:

NVA equates to 10 cm RMSEz, or 19.6 cm (0.64 ft) at the 95% confidence level.

DEM:

NVA equates to 10 cm RMSEz, or 19.6 cm (0.64 ft) at the 95% confidence level.

VVA equates to 29.4 cm (0.96 ft) at the 95th percentile.

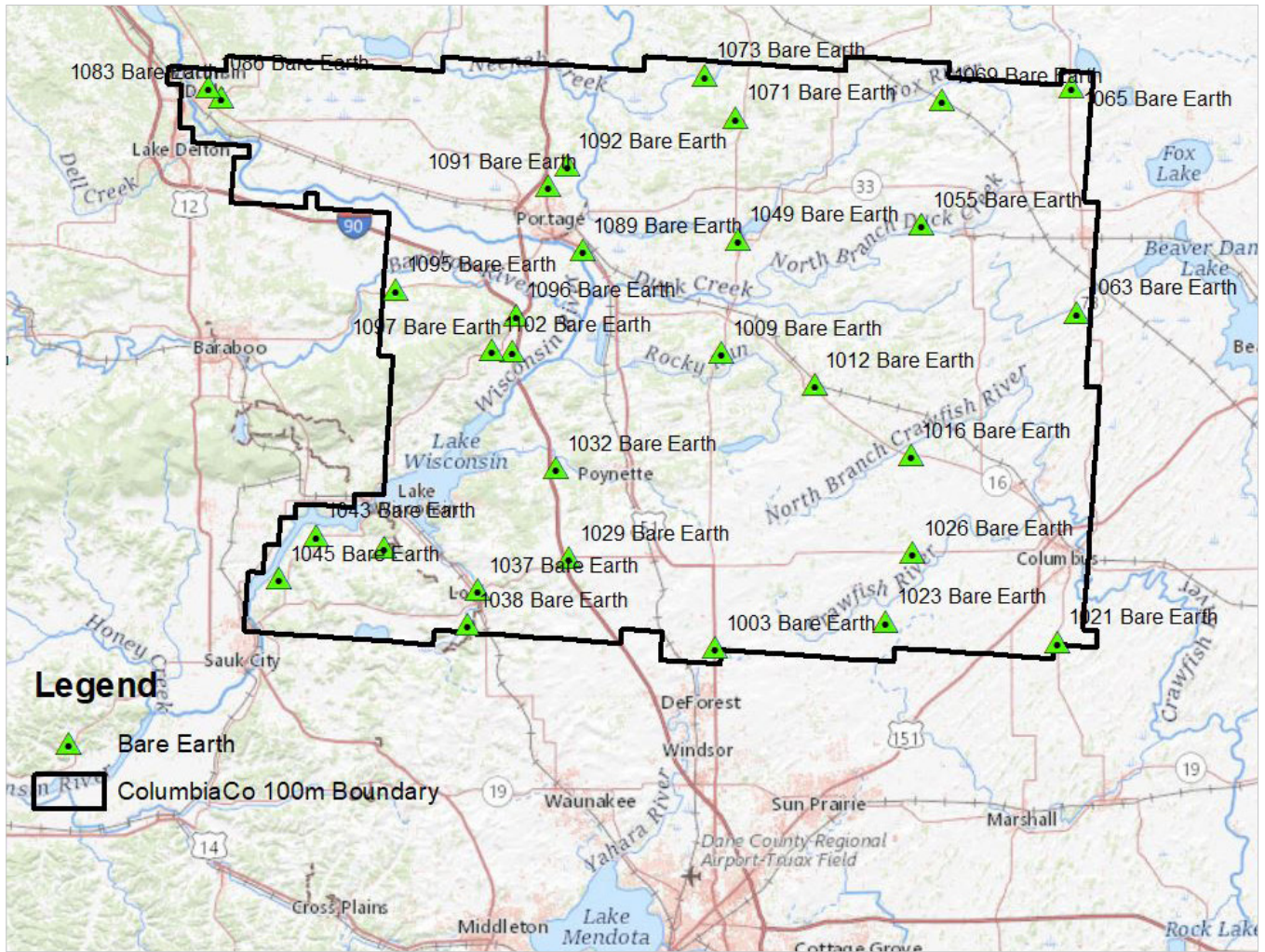
The NVA and VVA statistics for this project are within the above stated specifications.

Lidar Accuracy Assessment Summary

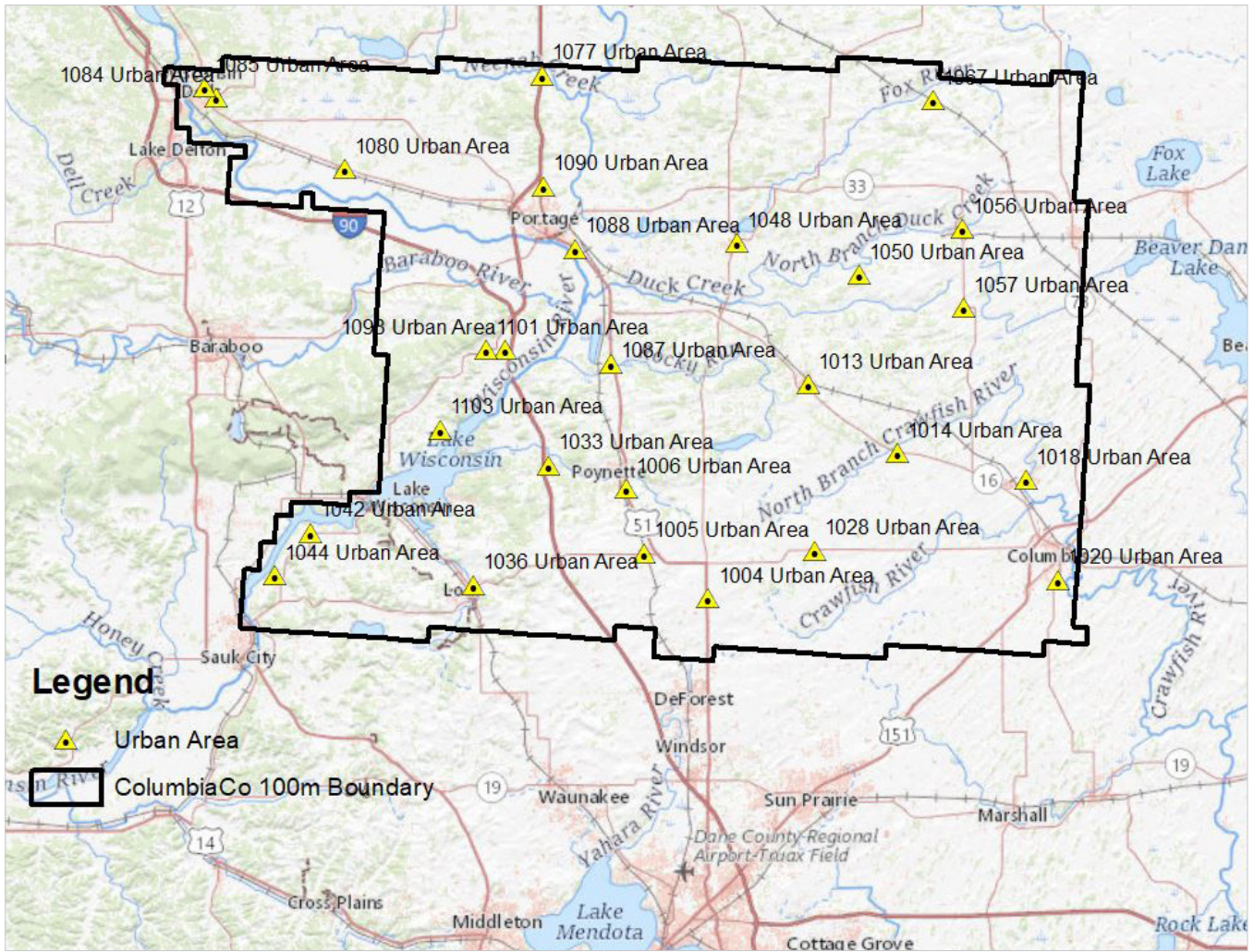
LAND COVER TYPE	# OF POINTS	NVA	VVA
LAS		95% confidence	
Bare Earth	30	0.231	N/A
Urban Area	27	0.165	N/A
Forest	22	N/A	N/A
Tall Weeds	24	N/A	N/A
Total	103	0.202	N/A
DEM		95% confidence	95th percentile
Bare Earth	30	0.201	N/A
Urban Area	27	0.150	N/A
Forest	22	N/A	0.454
Tall Weeds	24	N/A	0.873
Total	103	0.178	0.865

Units: U.S. Survey Feet

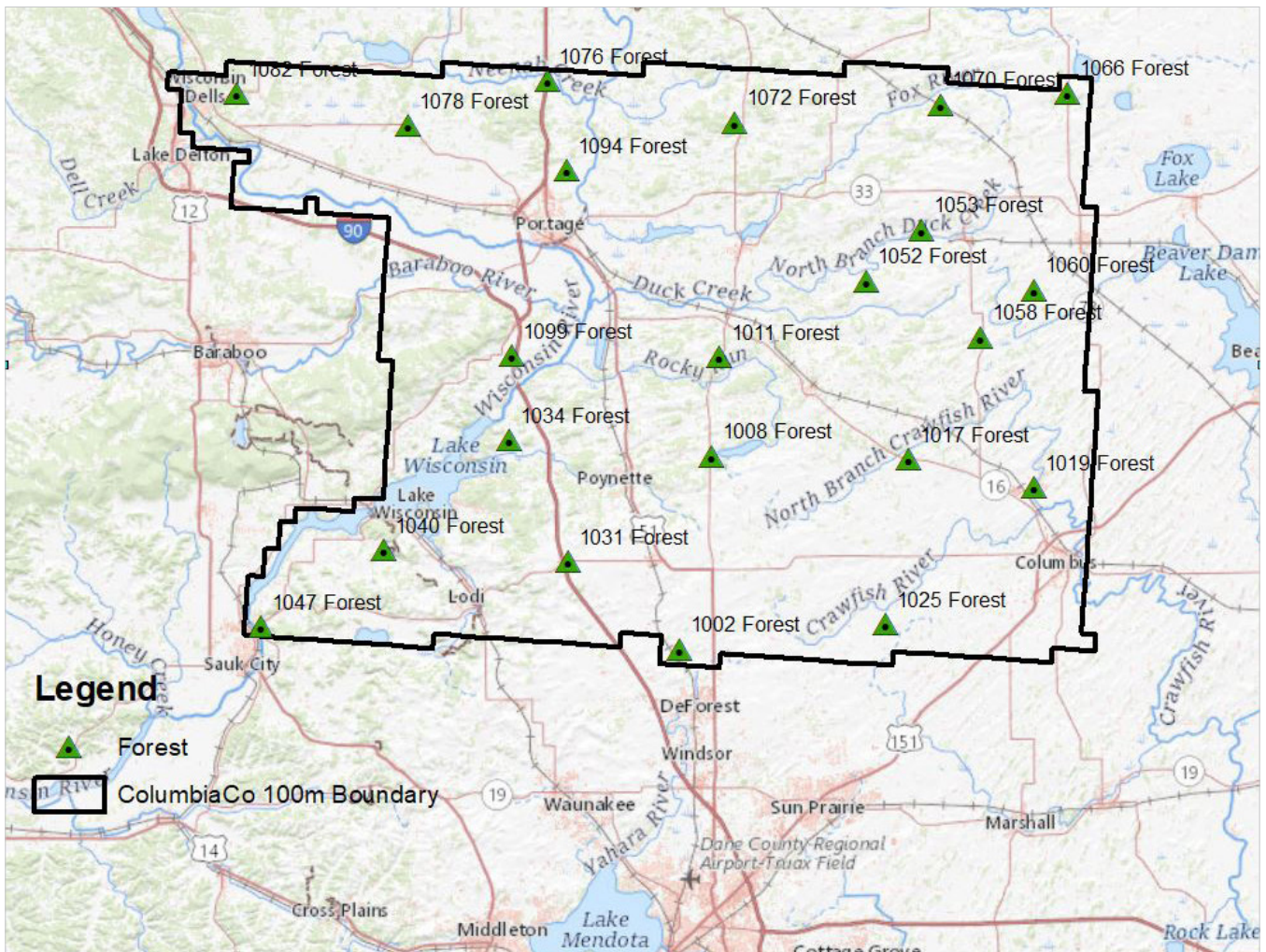
Map of NVA Checkpoint Locations - Bare Earth



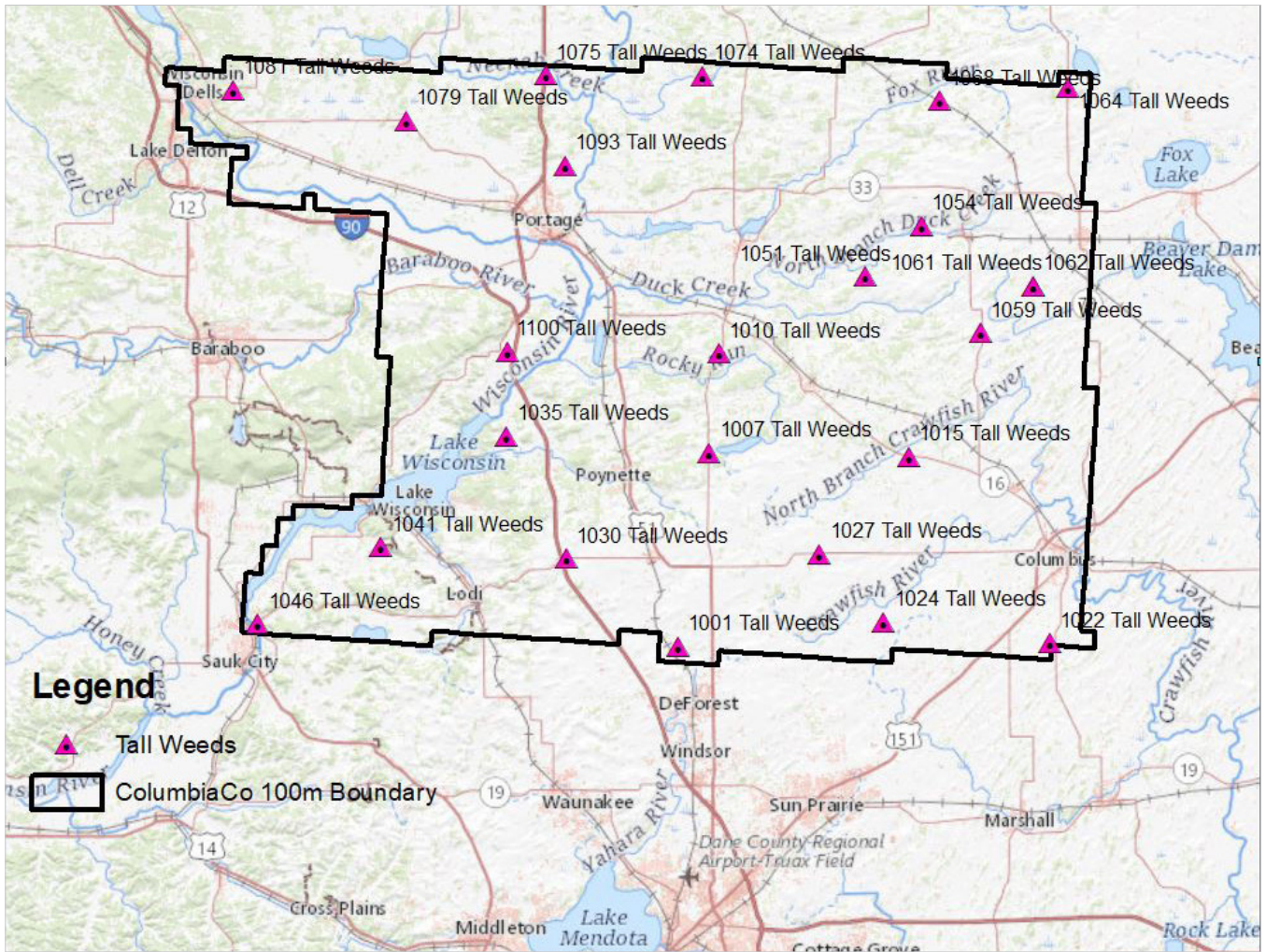
Map of NVA Checkpoint Locations - Urban Areas



Map of NVA Checkpoint Locations - Forested Areas



Map of NVA Checkpoint Locations - Tall Weeds



LAS

NONVEGETATED VERTICAL ACCURACY – OVERALL	
LAND COVER TYPE	BARE EARTH, URBAN AREA
Minimum DZ	-0.191
Maximum DZ	0.387
Mean DZ	0.031
Mean Magnitude DZ	0.281
Number Observations	57
Standard Deviation DZ	0.099
RMSE Z	0.103
95% Confidence Level Z	0.202
Units	U.S. Survey Feet

DEM

NONVEGETATED VERTICAL ACCURACY	
LAND COVER TYPE	BARE EARTH, URBAN AREA
Minimum DZ	-0.085
Maximum DZ	0.292
Mean DZ	0.038
Mean Magnitude DZ	0.272
Number Observations	57
Standard Deviation DZ	0.084
RMSE Z	0.091
95% Confidence Level Z	0.178
Units	U.S. Survey Feet

DEM (Continued)

VEGETATED VERTICAL ACCURACY	
LAND COVER TYPE	FOREST
Minimum DZ	0.033
Maximum DZ	0.512
Mean DZ	0.27
Mean Magnitude DZ	0.52
Number Observations	22
Standard Deviation DZ	0.129
RMSE Z	0.298
95th percentile	0.454
Units	U.S. Survey Feet

VEGETATED VERTICAL ACCURACY	
LAND COVER TYPE	TALL WEEDS
Minimum DZ	0.072
Maximum DZ	1.142
Mean DZ	0.38
Mean Magnitude DZ	0.616
Number Observations	24
Standard Deviation DZ	0.278
RMSE Z	0.467
95th percentile	0.873
Units	U.S. Survey Feet

Point: 1001 Tall Weeds

Survey X: 565618.09, Survey Y: 300362.6, Z1: 955.37, Z DEM: 956.51, Z LAS: 956.45, ΔZ DEM: 1.14, ΔZ LAS: 1.08



North



South



East



West

Point: 1002 Forested

Survey X: 565717.78, Survey Y: 300372.2, Z1: 956.97, Z DEM: 957.29, Z LAS: 957.34, ΔZ DEM: 0.33, ΔZ LAS: 0.38



North



South



East



West

Point: 1003 Bare Earth

Survey X: 573646.99, Survey Y: 299934.13, Z1: 956.17, Z DEM: 956.4, Z LAS: 956.37, ΔZ DEM: 0.23, ΔZ LAS: 0.2



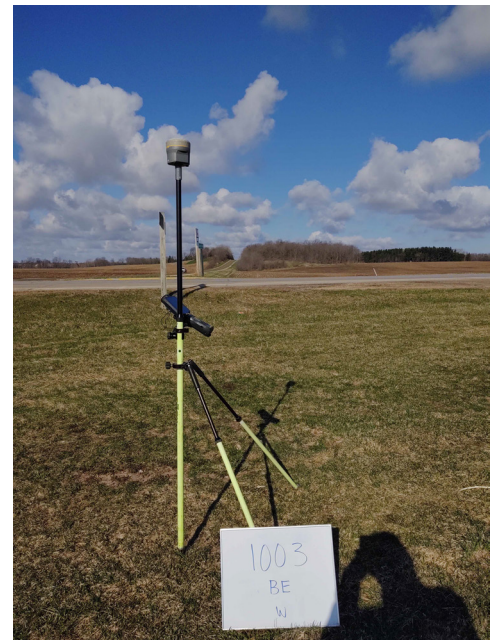
North



South



East



West

Point: 1004 Urban Area

Survey X: 573759.44, Survey Y: 310447.39, Z1: 1059.77, Z DEM: 1059.91, Z LAS: 1059.92, ΔZ DEM: 0.14, ΔZ LAS: 0.16



North



South



East



West

Point: 1005 Urban Area

Survey X: 559045.57, Survey Y: 320913.64, Z1: 1051.22, Z DEM: 1051.33, Z LAS: 1051.29, ΔZ DEM: 0.11, ΔZ LAS: 0.07



North



South



East



West

Point: 1006 Urban Area

Survey X: 554695.93, Survey Y: 335838.12, Z1: 936.1, Z DEM: 936.1, Z LAS: 936.08, ΔZ DEM: 0, ΔZ LAS: -0.01



North



South



East



West

Point: 1007 Tall Weeds

Survey X: 572816.12, Survey Y: 344813.03, Z1: 961.71, Z DEM: 962.07, Z LAS: 962.05, ΔZ DEM: 0.36, ΔZ LAS: 0.34



North



South



East



West

Point: 1008 Forested

Survey X: 572909.81, Survey Y: 344835.85, Z1: 960.93, Z DEM: 961.33, Z LAS: 961.28, ΔZ DEM: 0.4, ΔZ LAS: 0.35



North



South



East



West

Point: 1009 Bare Earth

Survey X: 575092.11, Survey Y: 367571.87, Z1: 930.84, Z DEM: 930.87, Z LAS: 930.86, ΔZ DEM: 0.04, ΔZ LAS: 0.02



North



South



East



West

Point: 1010 Tall Weeds

Survey X: 574979.32, Survey Y: 367558.38, Z1: 930.58, Z DEM: 930.77, Z LAS: 930.77, ΔZ DEM: 0.19, ΔZ LAS: 0.19



North



South



East



West

Point: 1011 Forested

Survey X: 574900.01, Survey Y: 367568.04, Z1: 923.63, Z DEM: 924.01, Z LAS: 923.99, ΔZ DEM: 0.38, ΔZ LAS: 0.36



North



South



East



West

Point: 1012 Bare Earth

Survey X: 596433.37, Survey Y: 360270.59, Z1: 935, Z DEM: 935.08, Z LAS: 935.08, ΔZ DEM: 0.08, ΔZ LAS: 0.09



North



South



East



West

Point: 1013 Urban Area

Survey X: 596931.29, Survey Y: 359860, Z1: 932.76, Z DEM: 932.85, Z LAS: 932.88, ΔZ DEM: 0.09, ΔZ LAS: 0.12



North



South



East



West

Point: 1014 Urban Area

Survey X: 617380.69, Survey Y: 343985.39, Z1: 952.99, Z DEM: 953.08, Z LAS: 953.06, ΔZ DEM: 0.09, ΔZ LAS: 0.07



North



South



East



West

Point: 1015 Tall Weeds

Survey X: 618451.41, Survey Y: 343867.07, Z1: 929.54, Z DEM: 930.41, Z LAS: 930.52, ΔZ DEM: 0.87, ΔZ LAS: 0.99



North



South



East



West

Point: 1016 Bare Earth

Survey X: 618478.11, Survey Y: 344074.75, Z1: 932.68, Z DEM: 932.8, Z LAS: 932.74, ΔZ DEM: 0.12, ΔZ LAS: 0.06



North



South



East



West

Point: 1017 Forested

Survey X: 618358.59, Survey Y: 344064.14, Z1: 930.45, Z DEM: 930.83, Z LAS: 930.77, ΔZ DEM: 0.38, ΔZ LAS: 0.32



North



South



East



West

Point: 1018 Urban Area

Survey X: 647142.48, Survey Y: 337817.36, Z1: 846.95, Z DEM: 846.92, Z LAS: 846.88, ΔZ DEM: -0.03, ΔZ LAS: -0.07



North



South



East



West

Point: 1019 Forested

Survey X: 647199.06, Survey Y: 337618.64, Z1: 842.69, Z DEM: 842.88, Z LAS: 842.83, ΔZ DEM: 0.19, ΔZ LAS: 0.14



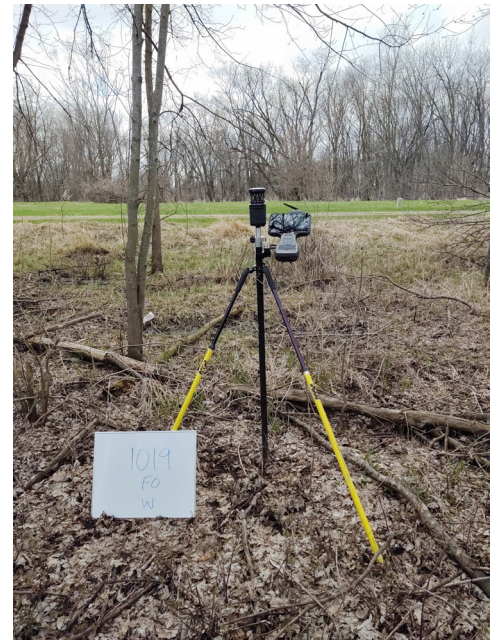
North



South



East



West

Point: 1020 Urban Area

Survey X: 654491.71, Survey Y: 314715.42, Z1: 841.29, Z DEM: 841.35, Z LAS: 841.32, ΔZ DEM: 0.06, ΔZ LAS: 0.04



North



South



East



West

Point: 1021 Bare Earth

Survey X: 652213.39, Survey Y: 301231.71, Z1: 908.82, Z DEM: 909.11, Z LAS: 909.2, ΔZ DEM: 0.29, ΔZ LAS: 0.39



North



South



East



West

Point: 1022 Tall Weeds

Survey X: 650921.12, Survey Y: 301124.34, Z1: 925.85, Z DEM: 926.16, Z LAS: 926.09, ΔZ DEM: 0.31, ΔZ LAS: 0.24



North



South



East



West

Point: 1023 Bare Earth

Survey X: 612818.47, Survey Y: 305980.74, Z1: 936.41, Z DEM: 936.49, Z LAS: 936.52, ΔZ DEM: 0.08, ΔZ LAS: 0.11



North



South



East



West

Point: 1024 Tall Weeds

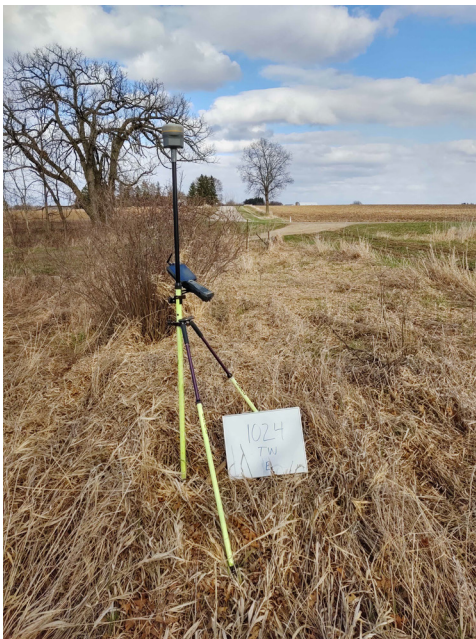
Survey X: 612783.87, Survey Y: 305895.81, Z1: 937.73, Z DEM: 938.17, Z LAS: 938.08, ΔZ DEM: 0.44, ΔZ LAS: 0.35



North



South



East



West

Point: 1025 Forested

Survey X: 612876.15, Survey Y: 306036.62, Z1: 934.25, Z DEM: 934.71, Z LAS: 934.8, ΔZ DEM: 0.45, ΔZ LAS: 0.55



North



South



East



West

Point: 1026 Bare Earth

Survey X: 618839.52, Survey Y: 321616.27, Z1: 927.42, Z DEM: 927.43, Z LAS: 927.33, ΔZ DEM: 0.01, ΔZ LAS: -0.09



North



South



East



West

Point: 1027 Tall Weeds

Survey X: 598126.81, Survey Y: 321533.82, Z1: 968.2, Z DEM: 968.82, Z LAS: 968.77, ΔZ DEM: 0.63, ΔZ LAS: 0.58



North



South



East



West

Point: 1028 Urban Area

Survey X: 598201.81, Survey Y: 321523.36, Z1: 971.28, Z DEM: 971.43, Z LAS: 971.4, ΔZ DEM: 0.15, ΔZ LAS: 0.12



North



South



East



West

Point: 1029 Bare Earth

Survey X: 540054.16, Survey Y: 320522.21, Z1: 1082.25, Z DEM: 1082.17, Z LAS: 1082.23, ΔZ DEM: -0.08, ΔZ LAS: -0.02



North



South



East



West

Point: 1030 Tall Weeds

Survey X: 539973.97, Survey Y: 320503.62, Z1: 1083.46, Z DEM: 1083.53, Z LAS: 1083.57, ΔZ DEM: 0.07, ΔZ LAS: 0.11



North



South



East



West

Point: 1031 Forested

Survey X: 539976.21, Survey Y: 320443.5, Z1: 1084.62, Z DEM: 1084.85, Z LAS: 1084.92, ΔZ DEM: 0.22, ΔZ LAS: 0.29



North



South



East



West

Point: 1032 Bare Earth

Survey X: 537285.65, Survey Y: 341064.74, Z1: 806.76, Z DEM: 806.72, Z LAS: 806.72, ΔZ DEM: -0.04, ΔZ LAS: -0.05



North



South



East



West

Point: 1033 Urban Area

Survey X: 536998.38, Survey Y: 341254.79, Z1: 808.69, Z DEM: 808.62, Z LAS: 808.67, ΔZ DEM: -0.07, ΔZ LAS: -0.03



North



South



East



West

Point: 1034 Forested

Survey X: 526491.94, Survey Y: 348456.26, Z1: 780.85, Z DEM: 781.3, Z LAS: 781.41, ΔZ DEM: 0.45, ΔZ LAS: 0.57



North



South



East



West

Point: 1035 Tall Weeds

Survey X: 526405.58, Survey Y: 348567.8, Z1: 782.29, Z DEM: 782.91, Z LAS: 782.88, ΔZ DEM: 0.62, ΔZ LAS: 0.59



North



South



East



West

Point: 1036 Urban Area

Survey X: 519556.09, Survey Y: 313628.36, Z1: 826.38, Z DEM: 826.3, Z LAS: 826.27, ΔZ DEM: -0.09, ΔZ LAS: -0.11



North



South



East



West

Point: 1037 Bare Earth

Survey X: 519289.83, Survey Y: 313200.61, Z1: 807.5, Z DEM: 807.51, Z LAS: 807.54, ΔZ DEM: 0.01, ΔZ LAS: 0.05



North



South



East



West

Point: 1038 Bare Earth

Survey X: 516883.46, Survey Y: 305163.66, Z1: 856.4, Z DEM: 856.34, Z LAS: 856.32, ΔZ DEM: -0.06, ΔZ LAS: -0.08



North



South



East



West

Point: 1039 Bare Earth

Survey X: 497689.1, Survey Y: 323039.3, Z1: 885.41, Z DEM: 885.33, Z LAS: 885.28, ΔZ DEM: -0.08, ΔZ LAS: -0.13



North



South



East



West

Point: 1040 Forested

Survey X: 497644.65, Survey Y: 323166.06, Z1: 886.92, Z DEM: 887.08, Z LAS: 887.04, ΔZ DEM: 0.16, ΔZ LAS: 0.12



North



South



East



West

Point: 1041 Tall Weeds

Survey X: 497587.71, Survey Y: 323150.17, Z1: 881.96, Z DEM: 882.08, Z LAS: 882.2, ΔZ DEM: 0.12, ΔZ LAS: 0.24



North



South



East



West

Point: 1042 Urban Area

Survey X: 481972.45, Survey Y: 325653.9, Z1: 839.32, Z DEM: 839.25, Z LAS: 839.29, ΔZ DEM: -0.07, ΔZ LAS: -0.03



North



South



East



West

Point: 1043 Bare Earth

Survey X: 482058.88, Survey Y: 325589.83, Z1: 839.24, Z DEM: 839.36, Z LAS: 839.35, ΔZ DEM: 0.12, ΔZ LAS: 0.11



North



South



East



West

Point: 1044 Urban Area

Survey X: 473702.15, Survey Y: 315771.36, Z1: 850.89, Z DEM: 850.82, Z LAS: 850.93, ΔZ DEM: -0.07, ΔZ LAS: 0.04



North



South



East



West

Point: 1045 Bare Earth

Survey X: 473664.98, Survey Y: 315861.29, Z1: 852.01, Z DEM: 852.1, Z LAS: 852.04, ΔZ DEM: 0.09, ΔZ LAS: 0.03



North



South



East



West

Point: 1046 Tall Weeds

Survey X: 469377.79, Survey Y: 305578.42, Z1: 760.27, Z DEM: 760.42, Z LAS: 760.3, ΔZ DEM: 0.15, ΔZ LAS: 0.03



North



South



East



West

Point: 1047 Forested

Survey X: 469423.59, Survey Y: 305589.54, Z1: 756.5, Z DEM: 756.75, Z LAS: 756.91, ΔZ DEM: 0.24, ΔZ LAS: 0.41



North



South



East



West

Point: 1048 Urban Area

Survey X: 580474.38, Survey Y: 392517.85, Z1: 814.92, Z DEM: 814.89, Z LAS: 814.93, ΔZ DEM: -0.03, ΔZ LAS: 0.02



North



South



East



West

Point: 1049 Bare Earth

Survey X: 578880.3, Survey Y: 393500.27, Z1: 815.08, Z DEM: 815.1, Z LAS: 815.14, ΔZ DEM: 0.02, ΔZ LAS: 0.07



North



South



East



West

Point: 1050 Urban Area

Survey X: 608721.17, Survey Y: 385160.58, Z1: 923.2, Z DEM: 923.32, Z LAS: 923.27, ΔZ DEM: 0.11, ΔZ LAS: 0.07



North



South



East



West

Point: 1051 Tall Weeds

Survey X: 608559.93, Survey Y: 385181.76, Z1: 916.61, Z DEM: 916.91, Z LAS: 916.83, ΔZ DEM: 0.3, ΔZ LAS: 0.22



North



South



East



West

Point: 1052 Forested

Survey X: 608600.8, Survey Y: 385076.41, Z1: 928.8, Z DEM: 929.09, Z LAS: 928.78, ΔZ DEM: 0.29, ΔZ LAS: -0.01



North



South



East



West

Point: 1053 Forested

Survey X: 621382.17, Survey Y: 396765.95, Z1: 834.92, Z DEM: 835.2, Z LAS: 835.26, ΔZ DEM: 0.28, ΔZ LAS: 0.34



North



South



East



West

Point: 1054 Tall Weeds

Survey X: 621518.78, Survey Y: 396811.45, Z1: 832.29, Z DEM: 832.88, Z LAS: 832.77, ΔZ DEM: 0.6, ΔZ LAS: 0.49



North



South



East



West

Point: 1055 Bare Earth

Survey X: 620964.6, Survey Y: 396910.45, Z1: 838.58, Z DEM: 838.73, Z LAS: 838.72, ΔZ DEM: 0.15, ΔZ LAS: 0.13



North



South



East



West

Point: 1056 Urban Area

Survey X: 632450.95, Survey Y: 395771.47, Z1: 888.1, Z DEM: 888.21, Z LAS: 888.33, ΔZ DEM: 0.11, ΔZ LAS: 0.23



North



South



East



West

Point: 1057 Urban Area

Survey X: 632720.81, Survey Y: 377490.39, Z1: 982.83, Z DEM: 982.75, Z LAS: 982.74, ΔZ DEM: -0.08, ΔZ LAS: -0.09



North



South



East



West

Point: 1058 Forested

Survey X: 634900.64, Survey Y: 372173.58, Z1: 934.96, Z DEM: 935.14, Z LAS: 935.26, ΔZ DEM: 0.18, ΔZ LAS: 0.3



North



South



East



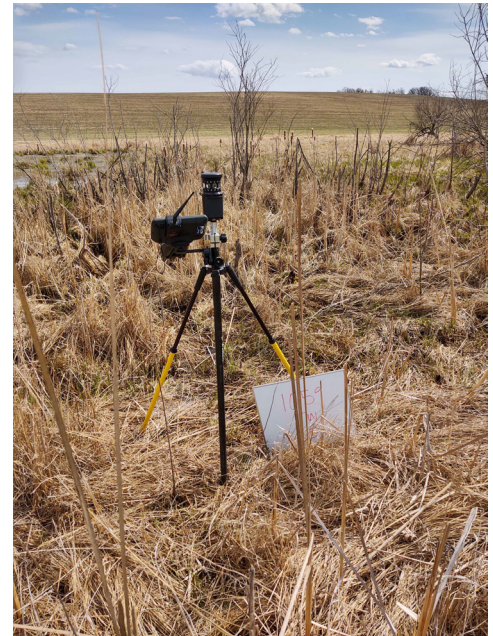
West

Point: 1059 Tall Weeds

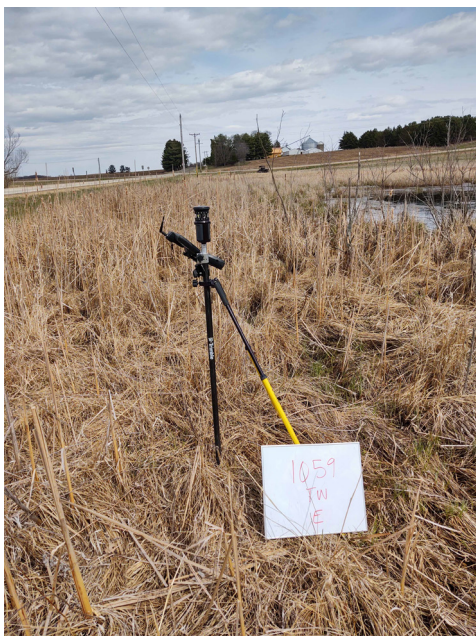
Survey X: 635004.62, Survey Y: 372198.84, Z1: 935.29, Z DEM: 935.59, Z LAS: 935.59, ΔZ DEM: 0.3, ΔZ LAS: 0.3



North



South



East



West

Point: 1060 Forested

Survey X: 647024.49, Survey Y: 383012.4, Z1: 935.37, Z DEM: 935.76, Z LAS: 935.84, ΔZ DEM: 0.39, ΔZ LAS: 0.47



North



South



East



West

Point: 1061 Tall Weeds

Survey X: 647199.87, Survey Y: 382945.68, Z1: 929.36, Z DEM: 929.74, Z LAS: 929.75, ΔZ DEM: 0.38, ΔZ LAS: 0.38



North



South



East



West

Point: 1062 Tall Weeds

Survey X: 647041.31, Survey Y: 382944.13, Z1: 931.95, Z DEM: 932.82, Z LAS: 932.77, ΔZ DEM: 0.87, ΔZ LAS: 0.82



North



South



East



West

Point: 1063 Bare Earth

Survey X: 656644.81, Survey Y: 376741.33, Z1: 929.18, Z DEM: 929.14, Z LAS: 929.07, ΔZ DEM: -0.03, ΔZ LAS: -0.1



North



South



East



West

Point: 1064 Tall Weeds

Survey X: 655079.24, Survey Y: 428340.66, Z1: 942.1, Z DEM: 942.45, Z LAS: 942.49, ΔZ DEM: 0.35, ΔZ LAS: 0.39



North



South



East



West

Point: 1065 Bare Earth

Survey X: 655455.23, Survey Y: 428391.13, Z1: 949.56, Z DEM: 949.64, Z LAS: 949.59, ΔZ DEM: 0.08, ΔZ LAS: 0.03



North



South



East



West

Point: 1066 Forested

Survey X: 654885.61, Survey Y: 428322.47, Z1: 946, Z DEM: 946.28, Z LAS: 946.27, ΔZ DEM: 0.28, ΔZ LAS: 0.27



North



South



East



West

Point: 1067 Urban Area

Survey X: 625764.49, Survey Y: 425431.05, Z1: 933.99, Z DEM: 933.93, Z LAS: 933.93, ΔZ DEM: -0.06, ΔZ LAS: -0.06



North



South



East



West

Point: 1068 Tall Weeds

Survey X: 625675.73, Survey Y: 425452.15, Z1: 929.05, Z DEM: 929.18, Z LAS: 929.28, ΔZ DEM: 0.13, ΔZ LAS: 0.23



North



South



East



West

Point: 1069 Bare Earth

Survey X: 625691.86, Survey Y: 425539.16, Z1: 928.45, Z DEM: 928.55, Z LAS: 928.57, ΔZ DEM: 0.1, ΔZ LAS: 0.12



North



South



East



West

Point: 1070 Forested

Survey X: 625717.16, Survey Y: 425596.7, Z1: 930.23, Z DEM: 930.74, Z LAS: 930.24, ΔZ DEM: 0.51, ΔZ LAS: 0.01



North



South



East



West

Point: 1071 Bare Earth

Survey X: 578410.39, Survey Y: 421433.12, Z1: 890.75, Z DEM: 890.81, Z LAS: 890.79, ΔZ DEM: 0.05, ΔZ LAS: 0.04



North



South



East



West

Point: 1072 Forested

Survey X: 578456.07, Survey Y: 421512.48, Z1: 892.99, Z DEM: 893.15, Z LAS: 893.25, ΔZ DEM: 0.17, ΔZ LAS: 0.26



North



South



East



West

Point: 1073 Bare Earth

Survey X: 571206.59, Survey Y: 431149.14, Z1: 829.48, Z DEM: 829.54, Z LAS: 829.49, ΔZ DEM: 0.06, ΔZ LAS: 0.01



North



South



East



West

Point: 1074 Tall Weeds

Survey X: 571300.6, Survey Y: 431249.29, Z1: 831.91, Z DEM: 832.18, Z LAS: 832.36, ΔZ DEM: 0.28, ΔZ LAS: 0.45



North



South



East



West

Point: 1075 Tall Weeds

Survey X: 535264.22, Survey Y: 431294.2, Z1: 788.88, Z DEM: 789.11, Z LAS: 789.08, ΔZ DEM: 0.23, ΔZ LAS: 0.2



North



South



East



West

Point: 1076 Forested

Survey X: 535368.73, Survey Y: 431084.92, Z1: 787.94, Z DEM: 788.17, Z LAS: 788.09, ΔZ DEM: 0.23, ΔZ LAS: 0.15



North



South



East



West

Point: 1077 Urban Area

Survey X: 535312.23, Survey Y: 431189.01, Z1: 789.87, Z DEM: 789.88, Z LAS: 789.84, ΔZ DEM: 0.01, ΔZ LAS: -0.03



North



South



East



West

Point: 1078 Forested

Survey X: 503471.82, Survey Y: 420796.79, Z1: 818.78, Z DEM: 818.92, Z LAS: 819.17, ΔZ DEM: 0.14, ΔZ LAS: 0.39



North



South



East



West

Point: 1079 Tall Weeds

Survey X: 503302.16, Survey Y: 420932.07, Z1: 820.86, Z DEM: 821.06, Z LAS: 821.12, ΔZ DEM: 0.2, ΔZ LAS: 0.26



North



South



East



West

Point: 1080 Urban Area

Survey X: 489870.94, Survey Y: 409584.21, Z1: 809.73, Z DEM: 809.7, Z LAS: 809.76, ΔZ DEM: -0.03, ΔZ LAS: 0.03



North



South



East



West

Point: 1081 Tall Weeds

Survey X: 463636.2, Survey Y: 428018.07, Z1: 994.21, Z DEM: 994.31, Z LAS: 994.25, ΔZ DEM: 0.1, ΔZ LAS: 0.05



North



South



East



West

Point: 1082 Forested

Survey X: 463838.22, Survey Y: 428111.02, Z1: 978.2, Z DEM: 978.35, Z LAS: 978.52, ΔZ DEM: 0.15, ΔZ LAS: 0.32



North



South



East



West

Point: 1083 Bare Earth

Survey X: 460343.93, Survey Y: 426195.5, Z1: 961.51, Z DEM: 961.65, Z LAS: 961.69, ΔZ DEM: 0.15, ΔZ LAS: 0.18



North



South



East



West

Point: 1084 Urban Area

Survey X: 460279.12, Survey Y: 425984.11, Z1: 977.28, Z DEM: 977.22, Z LAS: 977.16, ΔZ DEM: -0.06, ΔZ LAS: -0.12



North



South



East



West

Point: 1085 Urban Area

Survey X: 457576.54, Survey Y: 428393.08, Z1: 926.95, Z DEM: 926.98, Z LAS: 926.97, ΔZ DEM: 0.03, ΔZ LAS: 0.02



North



South



East



West

Point: 1086 Bare Earth

Survey X: 457572.94, Survey Y: 428480.1, Z1: 926.98, Z DEM: 926.94, Z LAS: 926.95, ΔZ DEM: -0.04, ΔZ LAS: -0.02



North



South



East



West

Point: 1087 Urban Area

Survey X: 551238.82, Survey Y: 364736, Z1: 798.24, Z DEM: 798.26, Z LAS: 798.23, ΔZ DEM: 0.02, ΔZ LAS: -0.01



North



South



East



West

Point: 1088 Urban Area

Survey X: 543177.02, Survey Y: 391166.09, Z1: 788.32, Z DEM: 788.42, Z LAS: 788.38, ΔZ DEM: 0.11, ΔZ LAS: 0.07



North



South



East



West

Point: 1089 Bare Earth

Survey X: 543222.18, Survey Y: 391142.92, Z1: 787.4, Z DEM: 787.51, Z LAS: 787.54, ΔZ DEM: 0.11, ΔZ LAS: 0.14



North



South



East



West

Point: 1090 Urban Area

Survey X: 535581.9, Survey Y: 405624.34, Z1: 802.17, Z DEM: 802.18, Z LAS: 802.17, ΔZ DEM: 0, ΔZ LAS: -0.01



North



South



East



West

Point: 1091 Bare Earth

Survey X: 535490.01, Survey Y: 405770.61, Z1: 800.84, Z DEM: 800.96, Z LAS: 800.92, ΔZ DEM: 0.12, ΔZ LAS: 0.08



North



South



East



West

Point: 1092 Bare Earth

Survey X: 539695.21, Survey Y: 410457.67, Z1: 797.98, Z DEM: 798.06, Z LAS: 798.01, ΔZ DEM: 0.08, ΔZ LAS: 0.03



North



South



East



West

Point: 1093 Tall Weeds

Survey X: 539743.46, Survey Y: 410604.21, Z1: 790.55, Z DEM: 790.91, Z LAS: 790.82, ΔZ DEM: 0.36, ΔZ LAS: 0.27



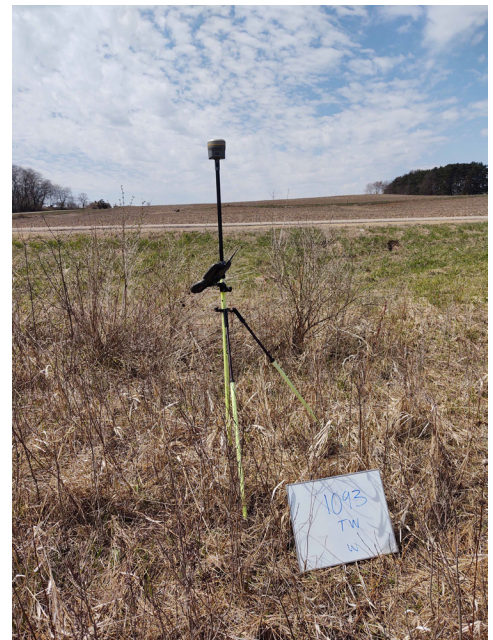
North



South



East



West

Point: 1094 Forested

Survey X: 539677.33, Survey Y: 410404.4, Z1: 797.28, Z DEM: 797.32, Z LAS: 797.15, ΔZ DEM: 0.03, ΔZ LAS: -0.13



North



South



East



West

Point: 1095 Bare Earth

Survey X: 500454.93, Survey Y: 382154.76, Z1: 833.59, Z DEM: 833.63, Z LAS: 833.58, ΔZ DEM: 0.04, ΔZ LAS: -0.01



North



South



East



West

Point: 1096 Bare Earth

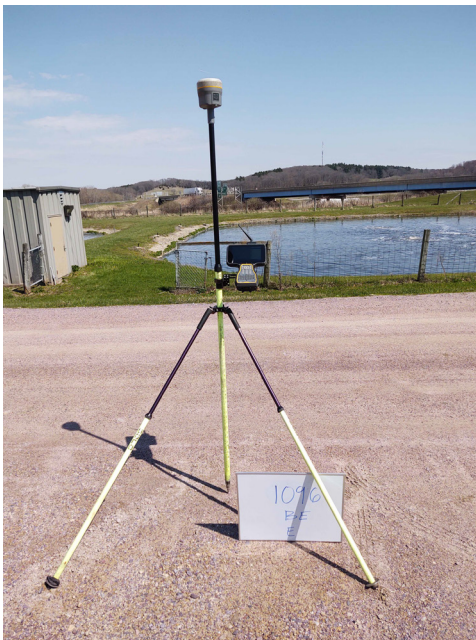
Survey X: 527912.6, Survey Y: 376287.19, Z1: 830.88, Z DEM: 830.84, Z LAS: 830.95, ΔZ DEM: -0.04, ΔZ LAS: 0.07



North



South



East



West

Point: 1097 Bare Earth

Survey X: 527038.27, Survey Y: 367857.15, Z1: 849.96, Z DEM: 849.93, Z LAS: 849.77, ΔZ DEM: -0.03, ΔZ LAS: -0.19



North



South



East



West

Point: 1098 Urban Area

Survey X: 527003.07, Survey Y: 367849.57, Z1: 848.73, Z DEM: 848.69, Z LAS: 848.64, ΔZ DEM: -0.04, ΔZ LAS: -0.09



North



South



East



West

Point: 1099 Forested

Survey X: 527110.79, Survey Y: 367805.23, Z1: 851.82, Z DEM: 851.9, Z LAS: 851.99, ΔZ DEM: 0.08, ΔZ LAS: 0.17



North



South



East



West

Point: 1100 Tall Weeds

Survey X: 526442.14, Survey Y: 367938.38, Z1: 817.23, Z DEM: 817.34, Z LAS: 817.31, ΔZ DEM: 0.11, ΔZ LAS: 0.08



North



South



East



West

Point: 1101 Urban Area

Survey X: 522392.49, Survey Y: 367858.38, Z1: 896.32, Z DEM: 896.37, Z LAS: 896.37, ΔZ DEM: 0.06, ΔZ LAS: 0.06



North



South



East



West

Point: 1102 Bare Earth

Survey X: 522366.63, Survey Y: 368223.18, Z1: 913.11, Z DEM: 913.1, Z LAS: 913.16, ΔZ DEM: -0.02, ΔZ LAS: 0.04



North



South



East



West

Point: 1103 Urban Area

Survey X: 511834.43, Survey Y: 349481.66, Z1: 923.53, Z DEM: 923.6, Z LAS: 923.58, ΔZ DEM: 0.06, ΔZ LAS: 0.04



North



South



East



West