

GROUND CONTROL SURVEY REPORT

**GPS SURVEY
FOR LIDAR CONTROL**

IOWA COUNTY, WI WROC LIDAR SURVEY

IOWA COUNTY, WISCONSIN

Services provided by:

AYRES

ASSOCIATES

**Geospatial Services
1802 Pankratz Street
Madison, WI 53716**

ABSTRACT

This report documents the GPS ground surveys conducted in support of FEMA accuracy testing of the lidar data collection for Iowa County, Wisconsin, in 2010. Surveys were conducted at 5 sites utilizing the base stations established in the static network. These surveys established “ground truth” data at each site on different surface types, including bare earth, low grass, brush lands, low trees, forest, high grass, weeds, crops, and urban areas. Statistical comparisons were made between ground truth points collected from the ground survey and the elevation at the associated horizontal coordinates represented on the LiDAR-derived digital terrain model.

SAMPLE POINTS/TEST POINTS

The ground survey test points were distributed and categorized into sites as shown in the Test Survey Locations map on the next page.

DATA ANALYSIS

To qualify as an acceptable accuracy test, the lidar data must be compared with a dataset of higher accuracy – in this instance ground survey. To develop a comparable dataset of points from the lidar dataset, a utility from proprietary software was used.

The ground control survey results were imported into an ESRI Pointz shapefile with each point’s information as attributes. The utility then accessed the lidar and generated a triangulated irregular network (TIN), which is a continuous digital terrain surface, using the bare-earth lidar points and the compiled breaklines. The utility probed the TIN surface to determine its elevations at each of the survey point’s horizontal locations.

The elevation was then appended as a field to the Pointz shapefile; the attributes for each point were exported to a database; and then statistical analysis was performed. The results can be seen on the following pages.

OVERALL ACCURACY

A comparison of ground survey versus lidar model values indicates a vertical root mean square error (RMSEz) of 0.36993 feet. This is within the FEMA specified vertical accuracy tolerance of 0.6. This RMSEz equates to a tested 0.725 feet vertical accuracy at 95% confidence level.

GROUND TRUTH ANALYSIS
Comparison of Lidar Points to Ground-Truth Points
Iowa County Coordinate System WISCRS
NAD 83 HARN / NAVD 88, survey feet

Field definitions

Name – The designation given to the ground survey point to identify it with its coordinates and land cover type

X, Y, and Z – The coordinates that describe the point's horizontal and vertical location within the Iowa County WISCRS Coordinate System. The X and Y values are shared between the ground control points and lidar comparison points. The Z field shows the elevation of the survey number. The lidar comparison point's elevation is implicit in the analysis' delta Z

Delta Z – The error, the difference between the elevation at a horizontal location as determined by ground survey and as determined by the lidar dataset

Delta Z Squared – The value of squaring Delta Z

Land Cover – The predominant land cover category at the location of the survey point

Statistic definitions

Sum – The sum of the analysis' Delta Z Squared values

Average – The average of the analysis' Delta Z Squared values

RMSE – The root mean squared error, the square root of the average of the squared errors

Accuracyz – The product of multiplying the RMSE with 1.96, a conversion between the RMSE value and a value with a 95% confidence level

Name	X	Y	Z	Delta_Z	Delta_Z_Squared	Type
60824	370521.069000	114189.715998	1069.660000	0.002000	0.000004	BRUSH/LOW TREES
60056	443645.992000	175392.067998	1240.710000	-0.003000	0.000009	BRUSH/LOW TREES
60075	443647.142000	175399.641998	1240.610000	-0.003000	0.000009	BRUSH/LOW TREES
60820	370514.147000	114204.600998	1071.380000	0.004000	0.000016	BRUSH/LOW TREES
60738	363713.446000	116268.348998	1138.180000	-0.004000	0.000016	ASPH
60053	443646.696000	175384.038998	1240.840000	-0.006000	0.000036	BRUSH/LOW TREES
60821	370510.408000	114203.118998	1071.350000	0.006000	0.000036	BRUSH/LOW TREES
60063	443640.167000	175387.254998	1240.650000	0.007000	0.000049	BRUSH/LOW TREES
60730	363718.926000	116261.199998	1138.200000	-0.008000	0.000064	ASPH
60529	377411.340000	185457.089998	1235.790000	0.008000	0.000064	TREE COVER
60822	370530.585000	114190.940998	1069.520000	-0.009000	0.000081	BRUSH/LOW TREES
60718	365434.622000	119659.265998	1118.870000	-0.010000	0.000100	MOWED GRASSS
60729	363718.668000	116264.981998	1138.210000	-0.010000	0.000100	ASPH
61200	312451.991000	184290.725998	1134.940000	-0.010000	0.000100	ASPH
60743	363710.520000	116266.851998	1138.030000	-0.014000	0.000196	ASPH
60708	365430.278000	119656.874998	1118.890000	0.015000	0.000225	MOWED GRASSS
61215	312438.840000	184301.236998	1134.520000	-0.015000	0.000225	ASPH
60933	419369.802000	119323.505998	1114.730000	0.015000	0.000225	TALL GRASS/WEEDS
60528	377411.803000	185460.174998	1235.680000	0.016000	0.000256	TREE COVER
60067	443638.658000	175390.612998	1240.430000	-0.016000	0.000256	BRUSH/LOW TREES
60021	443574.916000	175153.613998	1239.960000	-0.017000	0.000289	MOWED GRASS
60713	365432.459000	119658.186998	1118.830000	0.017000	0.000289	MOWED GRASSS
60714	365430.807000	119660.764998	1118.800000	-0.019000	0.000361	MOWED GRASSS
60928	419363.766000	119322.057998	1114.740000	0.020000	0.000400	TALL GRASS/WEEDS
60949	419386.435000	119319.413998	1114.390000	0.020000	0.000400	TALL GRASS/WEEDS
61211	312452.716000	184301.524998	1135.090000	0.020000	0.000400	ASPH
60055	443649.172000	175391.641998	1240.710000	-0.021000	0.000441	BRUSH/LOW TREES
60997b	430405.296000	123746.423998	858.630000	0.021000	0.000441	MOWED GRASS
61001	432338.828000	121408.846998	891.620000	0.022000	0.000484	ASPH
60064	443641.704000	175390.478998	1240.610000	0.023000	0.000529	BRUSH/LOW TREES
61203	312446.100000	184293.386998	1134.650000	-0.026000	0.000676	ASPH
60736	363712.951000	116275.182998	1138.250000	-0.027000	0.000729	ASPH
60712	365433.993000	119655.735998	1118.900000	0.032000	0.001024	MOWED GRASSS
60544	377422.656000	185462.418998	1235.570000	-0.032000	0.001024	TREE COVER
60052	443645.999000	175381.125998	1240.890000	0.034000	0.001156	BRUSH/LOW TREES
61017	432327.714000	121416.849998	891.350000	0.034000	0.001156	ASPH

60744	363710.711000	116270.339998	1138.200000	-0.036000	0.001296	ASPH
60074	443650.461000	175398.383998	1240.660000	-0.037000	0.001369	BRUSH/LOW TREES
60733	363715.682000	116267.106998	1138.170000	-0.037000	0.001369	ASPH
61214	312442.392000	184301.146998	1134.680000	0.038000	0.001444	ASPH
60737	363713.209000	116271.872998	1138.240000	-0.039000	0.001521	ASPH
61023	432330.747000	121419.231998	891.290000	0.040000	0.001600	ASPH
60809	370523.905000	114195.567998	1070.370000	-0.042000	0.001764	BRUSH/LOW TREES
60810	370518.759000	114195.343998	1070.420000	0.042000	0.001764	BRUSH/LOW TREES
60919	419379.981000	119360.201998	1113.110000	-0.042000	0.001764	BRUSH/LOW TREES
61206	312439.766000	184296.994998	1134.450000	-0.042000	0.001764	ASPH
61201	312452.094000	184293.224998	1134.870000	-0.043000	0.001849	ASPH
60735	363716.107000	116274.919998	1138.270000	0.044000	0.001936	ASPH
60004	443587.208000	175162.618998	1240.370000	-0.046000	0.002116	MOWED GRASS
60804	370524.813000	114193.088998	1069.990000	0.047000	0.002209	BRUSH/LOW TREES
60057	443645.283000	175388.828998	1240.730000	-0.048000	0.002304	BRUSH/LOW TREES
61212	312449.377000	184301.482998	1134.940000	0.048000	0.002304	ASPH
60732	363715.647000	116263.857998	1138.050000	0.049000	0.002401	ASPH
60818	370523.175000	114205.476998	1071.420000	-0.049000	0.002401	BRUSH/LOW TREES
61202	312449.508000	184293.247998	1134.800000	0.049000	0.002401	ASPH
60802	370521.901000	114193.002998	1070.100000	0.050000	0.002500	BRUSH/LOW TREES
60536	377420.078000	185464.915998	1235.460000	0.052000	0.002704	TREE COVER
61002	432334.860000	121408.692998	891.680000	0.052000	0.002704	ASPH
61216	312438.887000	184304.182998	1134.530000	0.054000	0.002916	ASPH
60011	443576.123000	175160.856998	1240.100000	-0.055000	0.003025	MOWED GRASS
60017	443585.638000	175152.167998	1240.230000	-0.055000	0.003025	MOWED GRASS
60734	363715.786000	116270.982998	1138.240000	-0.055000	0.003025	ASPH
60739	363713.748000	116264.147998	1138.010000	0.057000	0.003249	ASPH
60819	370518.115000	114205.049998	1071.440000	-0.060000	0.003600	BRUSH/LOW TREES
60742	363710.298000	116263.528998	1137.930000	0.061000	0.003721	ASPH
60025	443586.068000	175148.333998	1240.170000	-0.061000	0.003721	MOWED GRASS
60814	370514.402000	114201.135998	1071.030000	0.061000	0.003721	BRUSH/LOW TREES
60001	443577.049000	175167.613998	1240.240000	-0.062000	0.003844	MOWED GRASS
60724	365435.082000	119663.205998	1118.800000	0.062000	0.003844	MOWED GRASS
60748	363707.907000	116267.307998	1138.000000	-0.065000	0.004225	ASPH
60706	365426.936000	119662.571998	1118.700000	0.066000	0.004356	MOWED GRASS
60006	443589.849000	175158.360998	1240.240000	-0.067000	0.004489	MOWED GRASS
60022	443577.621000	175152.482998	1240.070000	-0.067000	0.004489	MOWED GRASS

60066	443639.872000	175394.017998	1240.450000	0.069000	0.004761	BRUSH/LOW TREES
61197	312442.397000	184290.739998	1134.550000	0.069000	0.004761	ASPH
61020	432338.521000	121416.697998	891.280000	0.071000	0.005041	ASPH
60108	435413.178000	184782.382998	897.560000	-0.073000	0.005329	TREE COVER
60715	365428.921000	119663.959998	1118.680000	0.075000	0.005625	MOWED GRASSS
60024	443583.194000	175149.737998	1240.150000	-0.078000	0.006084	MOWED GRASS
61022	432334.160000	121419.840998	891.210000	0.078000	0.006084	ASPH
61209	312449.046000	184296.807998	1134.840000	0.079000	0.006241	ASPH
61205	312439.678000	184293.922998	1134.380000	0.080000	0.006400	ASPH
60061	443638.055000	175381.218998	1240.620000	0.081000	0.006561	BRUSH/LOW TREES
60073	443645.770000	175398.461998	1240.560000	0.081000	0.006561	BRUSH/LOW TREES
60015	443589.680000	175153.657998	1240.230000	-0.082000	0.006724	MOWED GRASS
60741	363710.521000	116259.620998	1137.840000	-0.082000	0.006724	ASPH
61204	312442.975000	184293.666998	1134.500000	-0.083000	0.006889	ASPH
60054	443647.833000	175388.332998	1240.780000	-0.084000	0.007056	BRUSH/LOW TREES
60803	370515.158000	114193.505998	1070.210000	0.084000	0.007056	BRUSH/LOW TREES
60728	363718.432000	116268.677998	1138.290000	-0.086000	0.007396	ASPH
60062	443639.238000	175384.207998	1240.630000	-0.089000	0.007921	BRUSH/LOW TREES
61198	312445.592000	184290.710998	1134.660000	-0.089000	0.007921	ASPH
60816	370521.201000	114203.037998	1071.090000	0.091000	0.008281	BRUSH/LOW TREES
60740	363713.951000	116260.196998	1137.960000	0.093000	0.008649	ASPH
60065	443642.873000	175393.117998	1240.560000	0.094000	0.008836	BRUSH/LOW TREES
60719	365436.427000	119656.673998	1118.860000	0.094000	0.008836	MOWED GRASSS
60914	419382.499000	119373.282998	1111.960000	0.095000	0.009025	BRUSH/LOW TREES
61199	312448.854000	184290.911998	1134.780000	-0.095000	0.009025	ASPH
60709	365431.764000	119654.310998	1118.890000	0.097000	0.009409	MOWED GRASSS
60815	370517.063000	114202.290998	1071.070000	0.098000	0.009604	BRUSH/LOW TREES
60726	363718.057000	116275.760998	1138.460000	-0.100000	0.010000	ASPH
60932	419369.593000	119320.425998	1114.530000	0.100000	0.010000	TALL GRASS/WEEDS
60707	365429.028000	119659.626998	1118.770000	0.101000	0.010201	MOWED GRASSS
60533	377415.181000	185458.004998	1235.900000	0.102000	0.010404	TREE COVER
61005	432323.456000	121407.888998	891.830000	0.102000	0.010404	ASPH
60016	443588.602000	175150.841998	1240.270000	-0.103000	0.010609	MOWED GRASS
60059	443641.983000	175381.483998	1240.940000	-0.103000	0.010609	BRUSH/LOW TREES
61196	312438.770000	184290.891998	1134.330000	-0.104000	0.010816	ASPH
60722	365439.443000	119657.505998	1118.780000	0.105000	0.011025	MOWED GRASSS
60019	443579.162000	175155.347998	1240.190000	-0.107000	0.011449	MOWED GRASS

60825	370517.250000	114191.233998	1069.920000	0.107000	0.011449	BRUSH/LOW TREES
61013	432331.154000	121414.043998	891.400000	0.107000	0.011449	ASPH
61018	432331.211000	121416.748998	891.340000	0.108000	0.011664	ASPH
60723	365437.162000	119660.289998	1118.830000	0.109000	0.011881	MOWED GRASSS
60002	443580.489000	175166.118998	1240.300000	-0.110000	0.012100	MOWED GRASS
60072	443642.083000	175399.360998	1240.640000	-0.110000	0.012100	BRUSH/LOW TREES
60572	377553.884000	185382.328998	1240.140000	0.111000	0.012321	ASPH
61016	432324.586000	121416.433998	891.370000	0.111000	0.012321	ASPH
60105	435419.665000	184784.917998	897.740000	0.112000	0.012544	TREE COVER
61220	312453.102000	184303.922998	1135.090000	0.113000	0.012769	ASPH
61019	432335.059000	121416.890998	891.300000	0.115000	0.013225	ASPH
60745	363710.780000	116273.684998	1138.210000	-0.116000	0.013456	ASPH
60537	377419.314000	185462.446998	1235.600000	0.117000	0.013689	TREE COVER
60014	443586.005000	175155.706998	1240.300000	-0.119000	0.014161	MOWED GRASS
61210	312452.651000	184298.069998	1135.020000	0.119000	0.014161	ASPH
60711	365436.136000	119653.616998	1118.830000	0.120000	0.014400	MOWED GRASSS
60813	370510.615000	114198.023998	1070.870000	0.122000	0.014884	BRUSH/LOW TREES
61208	312445.774000	184296.769998	1134.690000	0.122000	0.014884	ASPH
60703	365427.539000	119656.153998	1118.820000	0.123000	0.015129	MOWED GRASSS
60069	443635.851000	175384.753998	1240.410000	-0.124000	0.015376	BRUSH/LOW TREES
60727	363718.326000	116272.472998	1138.270000	0.124000	0.015376	ASPH
61004	432327.003000	121408.224998	891.750000	0.125000	0.015625	ASPH
60747	363708.053000	116270.225998	1138.100000	-0.127000	0.016129	ASPH
61021	432338.095000	121419.923998	891.190000	0.128000	0.016384	ASPH
61012	432334.180000	121414.500998	891.390000	0.129000	0.016641	ASPH
60903	419389.679000	119370.214998	1111.630000	0.132000	0.017424	BRUSH/LOW TREES
60750	363708.092000	116259.918998	1137.760000	-0.133000	0.017689	ASPH
60994b	430407.598000	123748.581998	858.620000	0.136000	0.018496	MOWED GRASS
60704	365425.919000	119658.679998	1118.770000	0.137000	0.018769	MOWED GRASSS
60070	443635.173000	175382.050998	1240.380000	0.140000	0.019600	BRUSH/LOW TREES
60716	365431.117000	119665.334998	1118.650000	0.142000	0.020164	MOWED GRASSS
60123	435428.952000	184774.927998	897.760000	0.143000	0.020449	TREE COVER
61213	312445.907000	184301.434998	1134.790000	0.143000	0.020449	ASPH
60020	443576.195000	175156.731998	1240.090000	-0.146000	0.021316	MOWED GRASS
60978b	430412.329000	123757.244998	858.490000	0.146000	0.021316	MOWED GRASS
60705	365424.394000	119660.807998	1118.720000	0.147000	0.021609	MOWED GRASSS
61143	312571.473000	189684.929998	1169.510000	0.147000	0.021609	TALL GRASS/WEEDS

61217	312442.262000	184303.962998	1134.650000	0.147000	0.021609	ASPH
60977b	430414.632000	123754.507998	858.580000	0.147000	0.021609	MOWED GRASS
60801	370519.213000	114193.686998	1070.160000	0.150000	0.022500	BRUSH/LOW TREES
60984b	430412.997000	123751.776998	858.610000	0.150000	0.022500	MOWED GRASS
60068	443637.438000	175387.637998	1240.480000	-0.150000	0.022500	BRUSH/LOW TREES
60983b	430410.132000	123754.980998	858.550000	0.150000	0.022500	MOWED GRASS
60010	443577.766000	175164.404998	1240.220000	-0.151000	0.022801	MOWED GRASS
60998b	430403.430000	123749.209998	858.620000	0.152000	0.023104	MOWED GRASS
61006	432323.328000	121411.003998	891.600000	0.153000	0.023409	ASPH
61218	312445.617000	184303.839998	1134.780000	0.156000	0.024336	ASPH
60710	365433.247000	119651.935998	1118.890000	0.158000	0.024964	MOWED GRASSS
61219	312449.506000	184303.810998	1134.930000	0.159000	0.025281	ASPH
61007	432327.062000	121410.845998	891.620000	0.159000	0.025281	ASPH
61010	432337.808000	121411.367998	891.460000	0.159000	0.025281	ASPH
60542	377421.699000	185456.314998	1235.780000	0.159000	0.025281	TREE COVER
60071	443639.535000	175400.321998	1240.270000	0.161000	0.025921	BRUSH/LOW TREES
60701	365431.311000	119650.262998	1118.930000	0.161000	0.025921	MOWED GRASSS
60702	365429.250000	119653.283998	1118.870000	0.161000	0.025921	MOWED GRASSS
60058	443644.005000	175385.189998	1240.850000	-0.164000	0.026896	BRUSH/LOW TREES
60564	377548.523000	185375.070998	1240.190000	0.165000	0.027225	ASPH
60954c	426838.992000	118630.083998	1050.070000	0.166000	0.027556	TREE COVER
61124	312583.393000	189689.377998	1169.620000	0.168000	0.028224	TALL GRASS/WEEDS
60007	443587.139000	175160.004998	1240.340000	-0.169000	0.028561	MOWED GRASS
60950	419387.766000	119316.134998	1114.310000	0.171000	0.029241	TALL GRASS/WEEDS
60552	377556.093000	185367.696998	1240.190000	0.172000	0.029584	ASPH
60989b	430406.277000	123755.459998	858.530000	0.172000	0.029584	MOWED GRASS
60018	443582.697000	175153.612998	1240.220000	-0.174000	0.030276	MOWED GRASS
61008	432330.155000	121411.190998	891.520000	0.174000	0.030276	ASPH
60980b	430407.936000	123763.523998	858.520000	0.174000	0.030276	MOWED GRASS
60725	365432.941000	119666.128998	1118.640000	0.175000	0.030625	MOWED GRASSS
61014	432328.155000	121413.841998	891.450000	0.175000	0.030625	ASPH
61131	312577.067000	189678.935998	1169.950000	0.176000	0.030976	TALL GRASS/WEEDS
61188	312542.655000	189469.496998	1178.530000	0.176000	0.030976	MOWED GRASSS
60721	365441.406000	119654.636998	1118.760000	0.177000	0.031329	MOWED GRASSS
61183	312543.922000	189466.010998	1178.830000	0.177000	0.031329	MOWED GRASSS
60987b	430410.488000	123749.373998	858.600000	0.178000	0.031684	MOWED GRASS
60805	370527.832000	114191.917998	1069.570000	0.178000	0.031684	BRUSH/LOW TREES

61129	312580.195000	189682.433998	1169.850000	0.178000	0.031684	TALL GRASS/WEEDS
60051	443644.722000	175377.501998	1240.880000	-0.179000	0.032041	BRUSH/LOW TREES
60720	365438.562000	119653.257998	1118.800000	0.179000	0.032041	MOWED GRASS
61207	312442.685000	184296.942998	1134.570000	0.179000	0.032041	ASPH
61003	432330.614000	121408.319998	891.680000	0.180000	0.032400	ASPH
60985b	430415.164000	123748.429998	858.630000	0.180000	0.032400	MOWED GRASS
60003	443583.657000	175164.366998	1240.400000	-0.181000	0.032761	MOWED GRASS
60746	363707.975000	116273.496998	1138.230000	-0.181000	0.032761	ASPH
60999b	430400.981000	123752.305998	858.620000	0.181000	0.032761	MOWED GRASS
60013	443582.779000	175157.343998	1240.260000	-0.182000	0.033124	MOWED GRASS
61025	432323.267000	121418.272998	891.320000	0.182000	0.033124	ASPH
60979b	430410.185000	123760.401998	858.480000	0.183000	0.033489	MOWED GRASS
61015	432324.658000	121413.633998	891.520000	0.185000	0.034225	ASPH
61024	432327.107000	121418.930998	891.270000	0.185000	0.034225	ASPH
60911	419384.285000	119365.519998	1112.210000	0.186000	0.034596	BRUSH/LOW TREES
60556	377543.900000	185372.006998	1240.170000	0.186000	0.034596	ASPH
60749	363708.012000	116264.139998	1137.850000	0.186000	0.034596	ASPH
61140	312574.784000	189679.073998	1169.820000	0.186000	0.034596	TALL GRASS/WEEDS
60005	443591.005000	175160.966998	1240.360000	-0.187000	0.034969	MOWED GRASS
61191	312551.160000	189473.367998	1178.690000	0.187000	0.034969	MOWED GRASS
60930	419366.707000	119316.089998	1114.710000	0.188000	0.035344	TALL GRASS/WEEDS
60553	377551.759000	185368.011998	1240.180000	0.188000	0.035344	ASPH
60971c	426837.011000	118639.820998	1050.930000	0.188000	0.035344	TREE COVER
60008	443584.106000	175161.604998	1240.380000	-0.188000	0.035344	MOWED GRASS
60731	363716.019000	116260.646998	1138.020000	0.188000	0.035344	ASPH
60083	435872.248000	184760.519998	902.620000	0.189000	0.035721	TALL GRASS/WEEDS
61178	312543.310000	189461.540998	1178.980000	0.189000	0.035721	MOWED GRASS
61126	312580.224000	189693.359998	1169.500000	0.190000	0.036100	TALL GRASS/WEEDS
61011	432337.872000	121414.643998	891.330000	0.192000	0.036864	ASPH
60009	443580.915000	175163.038998	1240.370000	-0.194000	0.037636	MOWED GRASS
60929	419364.785000	119319.375998	1114.680000	0.194000	0.037636	TALL GRASS/WEEDS
61141	312571.663000	189678.567998	1169.840000	0.194000	0.037636	TALL GRASS/WEEDS
60023	443580.258000	175151.245998	1240.130000	-0.195000	0.038025	MOWED GRASS
60717	365432.874000	119662.028998	1118.850000	0.195000	0.038025	MOWED GRASS
60922	419377.601000	119368.422998	1112.540000	0.197000	0.038809	BRUSH/LOW TREES
60575	377541.756000	185382.816998	1240.090000	0.197000	0.038809	ASPH
60982b	430407.696000	123758.236998	858.500000	0.198000	0.039204	MOWED GRASS

60988b	430408.277000	123752.447998	858.580000	0.203000	0.041209	MOWED GRASS
61176	312536.842000	189460.812998	1178.710000	0.204000	0.041616	MOWED GRASSS
60993b	430405.211000	123750.985998	858.590000	0.205000	0.042025	MOWED GRASS
60573	377550.066000	185382.408998	1240.120000	0.205000	0.042025	ASPH
60046	443689.536000	175159.716998	1243.000000	-0.206000	0.042436	ASPH
61000b	430398.557000	123755.518998	858.550000	0.206000	0.042436	MOWED GRASS
60986b	430412.512000	123746.462998	858.590000	0.207000	0.042849	MOWED GRASS
61142	312571.384000	189681.931998	1169.560000	0.207000	0.042849	TALL GRASS/WEEDS
60927	419362.551000	119325.205998	1114.690000	0.212000	0.044944	TALL GRASS/WEEDS
60012	443579.598000	175159.113998	1240.260000	-0.213000	0.045369	MOWED GRASS
60118	435414.779000	184773.044998	897.360000	0.214000	0.045796	TREE COVER
60080	435866.643000	184754.018998	902.400000	0.215000	0.046225	TALL GRASS/WEEDS
60113	435416.479000	184777.030998	897.340000	0.216000	0.046656	TREE COVER
61108	312399.395000	189597.430998	1161.260000	0.216000	0.046656	TREE COVER
60806	370530.813000	114191.659998	1069.390000	0.224000	0.050176	BRUSH/LOW TREES
60060	443641.146000	175379.362998	1240.890000	-0.225000	0.050625	BRUSH/LOW TREES
61128	312580.032000	189685.987998	1169.740000	0.228000	0.051984	TALL GRASS/WEEDS
61187	312538.603000	189470.098998	1178.210000	0.228000	0.051984	MOWED GRASSS
60551	377560.324000	185367.753998	1240.180000	0.229000	0.052441	ASPH
60995b	430410.296000	123745.039998	858.600000	0.230000	0.052900	MOWED GRASS
61174	312541.361000	189457.553998	1179.140000	0.231000	0.053361	MOWED GRASSS
61177	312539.886000	189461.148998	1178.810000	0.231000	0.053361	MOWED GRASSS
61135	312577.312000	189691.011998	1169.470000	0.235000	0.055225	TALL GRASS/WEEDS
60570	377557.384000	185378.507998	1240.170000	0.236000	0.055696	ASPH
60939	419376.069000	119320.664998	1114.580000	0.237000	0.056169	TALL GRASS/WEEDS
61184	312539.706000	189466.113998	1178.540000	0.237000	0.056169	MOWED GRASSS
60973c	426843.138000	118644.072998	1051.630000	0.238000	0.056644	TREE COVER
60107	435416.502000	184781.871998	897.460000	0.238000	0.056644	TREE COVER
60921	419377.074000	119363.954998	1112.720000	0.239000	0.057121	BRUSH/LOW TREES
60981b	430404.953000	123761.381998	858.490000	0.239000	0.057121	MOWED GRASS
61107	312395.514000	189597.767998	1160.770000	0.240000	0.057600	TREE COVER
61106	312392.225000	189597.973998	1160.500000	0.241000	0.058081	TREE COVER
60104	435416.522000	184785.114998	897.430000	0.241000	0.058081	TREE COVER
61189	312546.075000	189469.616998	1178.600000	0.241000	0.058081	MOWED GRASSS
61009	432333.850000	121411.382998	891.470000	0.242000	0.058564	ASPH
60539	377418.729000	185456.442998	1235.810000	0.242000	0.058564	TREE COVER
61186	312535.125000	189469.885998	1178.200000	0.243000	0.059049	MOWED GRASSS

60555	377543.999000	185368.220998	1240.150000	0.244000	0.059536	ASPH
61171	312553.399000	189457.066998	1179.700000	0.246000	0.060516	MOWED GRASSS
60574	377546.026000	185382.676998	1240.120000	0.246000	0.060516	ASPH
60545	377423.559000	185463.807998	1235.370000	0.247000	0.061009	TREE COVER
61120	312404.238000	189605.038998	1161.240000	0.248000	0.061504	TREE COVER
60558	377552.098000	185372.259998	1240.190000	0.249000	0.062001	ASPH
60996b	430407.888000	123743.175998	858.620000	0.249000	0.062001	MOWED GRASS
60029	443693.113000	175143.599998	1243.050000	-0.250000	0.062500	ASPH
60079	435866.557000	184757.215998	902.460000	0.252000	0.063504	TALL GRASS/WEEDS
60125	435432.782000	184779.627998	897.790000	0.252000	0.063504	TREE COVER
60808	370527.921000	114195.383998	1070.110000	0.254000	0.064516	BRUSH/LOW TREES
61122	312583.332000	189681.662998	1169.930000	0.256000	0.065536	TALL GRASS/WEEDS
60028	443689.758000	175145.471998	1242.980000	-0.256000	0.065536	ASPH
60112	435413.447000	184777.699998	897.180000	0.256000	0.065536	TREE COVER
60963c	426843.718000	118640.166998	1051.320000	0.256000	0.065536	TREE COVER
60100	435889.510000	184762.921998	902.880000	0.257000	0.066049	TALL GRASS/WEEDS
60611	392607.057000	187905.511998	1258.850000	0.257000	0.066049	MOWED GRASSS
60907	419387.090000	119365.929998	1111.970000	0.257000	0.066049	BRUSH/LOW TREES
60992b	430403.095000	123753.981998	858.560000	0.257000	0.066049	MOWED GRASS
60962c	426844.928000	118637.791998	1051.110000	0.257000	0.066049	TREE COVER
61190	312550.044000	189469.745998	1178.850000	0.258000	0.066564	MOWED GRASSS
60926	419361.174000	119328.327998	1114.650000	0.259000	0.067081	TALL GRASS/WEEDS
60771	365727.519000	119821.947998	1112.190000	0.262000	0.068644	TREE COVER
60787	368302.328000	116111.609998	961.310000	0.262000	0.068644	TALL GRASS/WEEDS
60906	419387.922000	119363.575998	1112.090000	0.262000	0.068644	BRUSH/LOW TREES
60934	419370.036000	119326.503998	1114.580000	0.262000	0.068644	TALL GRASS/WEEDS
60902	419390.656000	119367.546998	1111.820000	0.264000	0.069696	BRUSH/LOW TREES
60991b	430400.684000	123757.220998	858.510000	0.267000	0.071289	MOWED GRASS
61185	312535.365000	189466.945998	1178.340000	0.268000	0.071824	MOWED GRASSS
60560	377561.089000	185372.315998	1240.170000	0.268000	0.071824	ASPH
61139	312574.627000	189682.477998	1169.600000	0.269000	0.072361	TALL GRASS/WEEDS
61172	312549.521000	189457.300998	1179.490000	0.269000	0.072361	MOWED GRASSS
60568	377550.883000	185378.306998	1240.150000	0.269000	0.072361	ASPH
60559	377556.476000	185372.344998	1240.180000	0.271000	0.073441	ASPH
60571	377557.450000	185381.943998	1240.130000	0.271000	0.073441	ASPH
60811	370515.572000	114195.102998	1070.180000	0.272000	0.073984	BRUSH/LOW TREES
60955c	426835.581000	118628.387998	1049.530000	0.272000	0.073984	TREE COVER

60976b	430417.065000	123751.185998	858.650000	0.273000	0.074529	MOWED GRASS
61123	312583.262000	189685.562998	1169.770000	0.273000	0.074529	TALL GRASS/WEEDS
61181	312551.710000	189465.491998	1179.170000	0.275000	0.075625	MOWED GRASSS
60975c	426834.526000	118642.094998	1051.130000	0.276000	0.076176	TREE COVER
60096	435886.727000	184769.427998	903.030000	0.276000	0.076176	TALL GRASS/WEEDS
60114	435420.141000	184776.247998	897.500000	0.276000	0.076176	TREE COVER
61130	312580.151000	189679.317998	1169.960000	0.276000	0.076176	TALL GRASS/WEEDS
60625	392582.166000	187903.566998	1257.370000	0.277000	0.076729	MOWED GRASSS
61132	312577.088000	189681.770998	1169.800000	0.277000	0.076729	TALL GRASS/WEEDS
60527	377412.158000	185463.133998	1235.570000	0.277000	0.076729	TREE COVER
60546	377426.471000	185464.060998	1235.490000	0.277000	0.076729	TREE COVER
60081	435870.157000	184753.985998	902.420000	0.283000	0.080089	TALL GRASS/WEEDS
60578	383787.182000	188147.975998	1278.260000	0.283000	0.080089	BRUSH/LOW TREES
60953c	426843.193000	118632.072998	1050.570000	0.283000	0.080089	TREE COVER
61133	312576.951000	189684.975998	1169.690000	0.284000	0.080656	TALL GRASS/WEEDS
60569	377554.252000	185378.362998	1240.160000	0.285000	0.081225	ASPH
60990b	430403.921000	123758.979998	858.480000	0.285000	0.081225	MOWED GRASS
61182	312547.997000	189466.205998	1178.940000	0.285000	0.081225	MOWED GRASSS
60618	392618.960000	187908.992998	1259.650000	0.286000	0.081796	MOWED GRASSS
60566	377543.982000	185378.291998	1240.150000	0.286000	0.081796	ASPH
61192	312547.615000	189474.069998	1178.430000	0.286000	0.081796	MOWED GRASSS
60038	443692.740000	175151.454998	1243.070000	-0.287000	0.082369	ASPH
60115	435419.864000	184773.345998	897.430000	0.287000	0.082369	TREE COVER
60026	443683.737000	175148.825998	1242.820000	-0.289000	0.083521	ASPH
60042	443697.620000	175152.310998	1243.140000	-0.289000	0.083521	ASPH
60039	443696.503000	175149.318998	1243.120000	-0.290000	0.084100	ASPH
60951c	426848.799000	118634.621998	1050.910000	0.290000	0.084100	TREE COVER
60043	443694.165000	175154.009998	1243.080000	-0.291000	0.084681	ASPH
60607	392601.134000	187908.408998	1258.820000	0.292000	0.085264	MOWED GRASSS
60937	419374.032000	119327.479998	1114.570000	0.292000	0.085264	TALL GRASS/WEEDS
61134	312576.905000	189688.197998	1169.570000	0.292000	0.085264	TALL GRASS/WEEDS
60782	368307.361000	116118.589998	961.440000	0.293000	0.085849	TALL GRASS/WEEDS
61136	312574.596000	189691.490998	1169.370000	0.294000	0.086436	TALL GRASS/WEEDS
61144	312571.540000	189688.201998	1169.340000	0.294000	0.086436	TALL GRASS/WEEDS
60823	370525.515000	114190.697998	1069.440000	0.295000	0.087025	BRUSH/LOW TREES
60567	377547.093000	185378.200998	1240.130000	0.296000	0.087616	ASPH
60094	435883.001000	184766.095998	902.880000	0.296000	0.087616	TALL GRASS/WEEDS

60103	435413.352000	184785.415998	897.310000	0.296000	0.087616	TREE COVER
61193	312543.804000	189474.583998	1178.230000	0.298000	0.088804	MOWED GRASSS
60563	377553.921000	185375.456998	1240.180000	0.298000	0.088804	ASPH
60974c	426836.910000	118643.250998	1051.340000	0.298000	0.088804	TREE COVER
60601	392591.912000	187907.850998	1258.260000	0.301000	0.090601	MOWED GRASSS
60605	392596.566000	187904.167998	1258.130000	0.301000	0.090601	MOWED GRASSS
60547	377426.040000	185461.929998	1235.650000	0.301000	0.090601	TREE COVER
60807	370531.080000	114195.017998	1069.870000	0.301000	0.090601	BRUSH/LOW TREES
61194	312540.628000	189475.406998	1177.970000	0.302000	0.091204	MOWED GRASSS
60121	435426.171000	184769.583998	897.480000	0.304000	0.092416	TREE COVER
60520	377327.825000	185480.138998	1233.150000	0.305000	0.093025	TALL GRASS/WEEDS
60090	435878.002000	184751.976998	902.390000	0.307000	0.094249	TALL GRASS/WEEDS
60120	435422.677000	184770.111998	897.470000	0.307000	0.094249	TREE COVER
60908	419386.771000	119368.926998	1111.690000	0.307000	0.094249	BRUSH/LOW TREES
60561	377561.599000	185375.366998	1240.170000	0.309000	0.095481	ASPH
60082	435870.835000	184757.942998	902.510000	0.310000	0.096100	TALL GRASS/WEEDS
60077	435866.268000	184763.732998	902.450000	0.311000	0.096721	TALL GRASS/WEEDS
60948	419384.716000	119323.082998	1114.210000	0.311000	0.096721	TALL GRASS/WEEDS
61145	312571.476000	189691.511998	1169.200000	0.311000	0.096721	TALL GRASS/WEEDS
60946	419382.588000	119329.736998	1114.060000	0.312000	0.097344	TALL GRASS/WEEDS
61125	312583.534000	189693.027998	1169.520000	0.312000	0.097344	TALL GRASS/WEEDS
60535	377417.411000	185464.592998	1235.440000	0.313000	0.097969	TREE COVER
60543	377422.117000	185459.149998	1235.690000	0.313000	0.097969	TREE COVER
61138	312574.517000	189685.433998	1169.550000	0.315000	0.099225	TALL GRASS/WEEDS
60565	377543.874000	185375.154998	1240.140000	0.317000	0.100489	ASPH
60030	443696.147000	175142.170998	1243.090000	-0.319000	0.101761	ASPH
60790	368310.410000	116118.063998	961.550000	0.319000	0.101761	TALL GRASS/WEEDS
60111	435410.711000	184778.585998	897.140000	0.320000	0.102400	TREE COVER
60035	443685.236000	175151.599998	1242.880000	-0.323000	0.104329	ASPH
60972c	426839.353000	118642.164998	1051.260000	0.323000	0.104329	TREE COVER
61127	312579.816000	189689.860998	1169.560000	0.324000	0.104976	TALL GRASS/WEEDS
60089	435877.691000	184755.990998	902.490000	0.325000	0.105625	TALL GRASS/WEEDS
61112	312398.646000	189601.382998	1160.770000	0.325000	0.105625	TREE COVER
60510	377321.897000	185480.029998	1232.930000	0.327000	0.106929	TALL GRASS/WEEDS
61101	312391.444000	189596.808998	1160.520000	0.327000	0.106929	TREE COVER
60751	365739.146000	119827.016998	1111.810000	0.328000	0.107584	TREE COVER
60944	419378.959000	119326.340998	1114.640000	0.329000	0.108241	TALL GRASS/WEEDS

60608	392601.848000	187904.745998	1258.460000	0.332000	0.110224	MOWED GRASSS
60622	392586.604000	187900.865998	1257.310000	0.332000	0.110224	MOWED GRASSS
60604	392596.306000	187901.128998	1257.940000	0.333000	0.110889	MOWED GRASSS
60613	392612.417000	187909.219998	1259.400000	0.334000	0.111556	MOWED GRASSS
60620	392590.228000	187905.214998	1257.940000	0.335000	0.112225	MOWED GRASSS
60800	368313.437000	116113.346998	961.390000	0.335000	0.112225	TALL GRASS/WEEDS
60931	419369.792000	119316.992998	1114.610000	0.335000	0.112225	TALL GRASS/WEEDS
61102	312394.949000	189596.408998	1160.890000	0.336000	0.112896	TREE COVER
61103	312398.605000	189595.902998	1161.150000	0.340000	0.115600	TREE COVER
60904	419389.333000	119372.693998	1111.320000	0.340000	0.115600	BRUSH/LOW TREES
60920	419376.689000	119361.087998	1112.910000	0.341000	0.116281	BRUSH/LOW TREES
60964c	426840.767000	118639.447998	1051.040000	0.342000	0.116964	TREE COVER
61179	312546.632000	189461.712998	1179.060000	0.343000	0.117649	MOWED GRASSS
61137	312574.360000	189688.612998	1169.400000	0.344000	0.118336	TALL GRASS/WEEDS
60049	443696.999000	175155.611998	1243.160000	-0.344000	0.118336	ASPH
60918	419379.971000	119364.636998	1112.330000	0.344000	0.118336	BRUSH/LOW TREES
60037	443689.722000	175152.883998	1242.990000	-0.346000	0.119716	ASPH
60602	392592.096000	187904.667998	1257.980000	0.346000	0.119716	MOWED GRASSS
60044	443690.271000	175155.772998	1242.990000	-0.347000	0.120409	ASPH
60088	435876.773000	184759.886998	902.620000	0.348000	0.121104	TALL GRASS/WEEDS
61180	312550.972000	189462.277998	1179.320000	0.348000	0.121104	MOWED GRASSS
60969c	426832.576000	118636.030998	1050.230000	0.349000	0.121801	TREE COVER
61105	312405.176000	189595.645998	1161.980000	0.350000	0.122500	TREE COVER
60554	377547.862000	185368.082998	1240.170000	0.352000	0.123904	ASPH
60791	368312.632000	116116.284998	961.550000	0.352000	0.123904	TALL GRASS/WEEDS
60519	377328.547000	185477.284998	1233.130000	0.353000	0.124609	TALL GRASS/WEEDS
60095	435883.455000	184769.092998	902.830000	0.354000	0.125316	TALL GRASS/WEEDS
60603	392592.313000	187901.591998	1257.710000	0.354000	0.125316	MOWED GRASSS
60027	443686.672000	175147.179998	1242.880000	-0.355000	0.126025	ASPH
60506	377323.911000	185466.860998	1232.650000	0.355000	0.126025	TALL GRASS/WEEDS
60532	377414.340000	185455.856998	1235.820000	0.355000	0.126025	TREE COVER
60941	419380.405000	119317.381998	1114.560000	0.356000	0.126736	TALL GRASS/WEEDS
60099	435887.199000	184758.972998	902.790000	0.356000	0.126736	TALL GRASS/WEEDS
60034	443687.673000	175150.137998	1242.940000	-0.361000	0.130321	ASPH
60534	377416.754000	185460.892998	1235.660000	0.362000	0.131044	TREE COVER
60508	377322.975000	185473.801998	1232.830000	0.362000	0.131044	TALL GRASS/WEEDS
61175	312537.387000	189457.307998	1178.970000	0.363000	0.131769	MOWED GRASSS

60522	377330.427000	185478.177998	1233.190000	0.364000	0.132496	TALL GRASS/WEEDS
60781	368310.212000	116120.827998	961.490000	0.367000	0.134689	TALL GRASS/WEEDS
60041	443701.483000	175150.655998	1243.190000	-0.368000	0.135424	ASPH
60045	443688.076000	175156.912998	1242.950000	-0.368000	0.135424	ASPH
60521	377330.031000	185480.604998	1233.240000	0.369000	0.136161	TALL GRASS/WEEDS
60788	368305.001000	116113.665998	961.340000	0.369000	0.136161	TALL GRASS/WEEDS
60557	377546.950000	185372.246998	1240.180000	0.370000	0.136900	ASPH
60047	443691.983000	175158.375998	1243.050000	-0.371000	0.137641	ASPH
61115	312390.347000	189603.752998	1159.860000	0.373000	0.139129	TREE COVER
60956c	426831.861000	118627.134998	1049.060000	0.373000	0.139129	TREE COVER
60116	435407.589000	184775.283998	897.080000	0.374000	0.139876	TREE COVER
60917	419379.588000	119368.272998	1112.350000	0.374000	0.139876	BRUSH/LOW TREES
60031	443697.640000	175145.191998	1243.120000	-0.375000	0.140625	ASPH
60087	435876.098000	184763.214998	902.530000	0.375000	0.140625	TALL GRASS/WEEDS
60779	368305.430000	116120.934998	961.450000	0.375000	0.140625	TALL GRASS/WEEDS
60936	419372.732000	119330.584998	1114.400000	0.375000	0.140625	TALL GRASS/WEEDS
60511	377324.711000	185480.369998	1233.030000	0.375000	0.140625	TALL GRASS/WEEDS
61109	312401.994000	189597.386998	1161.370000	0.375000	0.140625	TREE COVER
60076	435866.116000	184767.117998	902.490000	0.376000	0.141376	TALL GRASS/WEEDS
60965c	426837.975000	118637.624998	1050.710000	0.377000	0.142129	TREE COVER
61173	312544.976000	189457.646998	1179.330000	0.377000	0.142129	MOWED GRASSS
60048	443694.482000	175156.957998	1243.110000	-0.378000	0.142884	ASPH
60517	377329.930000	185471.868998	1233.130000	0.378000	0.142884	TALL GRASS/WEEDS
60102	435410.198000	184785.958998	897.260000	0.378000	0.142884	TREE COVER
60959c	426835.896000	118632.506998	1050.070000	0.378000	0.142884	TREE COVER
60905	419388.270000	119361.296998	1112.150000	0.379000	0.143641	BRUSH/LOW TREES
60910	419384.731000	119362.183998	1112.400000	0.379000	0.143641	BRUSH/LOW TREES
60952c	426845.361000	118633.223998	1050.700000	0.380000	0.144400	TREE COVER
60794	368303.663000	116110.012998	961.200000	0.380000	0.144400	TALL GRASS/WEEDS
61195	312537.147000	189476.201998	1177.850000	0.382000	0.145924	MOWED GRASSS
60085	435872.482000	184766.932998	902.650000	0.383000	0.146689	TALL GRASS/WEEDS
60621	392590.196000	187900.675998	1257.470000	0.385000	0.148225	MOWED GRASSS
60770	365731.385000	119826.325998	1112.090000	0.385000	0.148225	TREE COVER
60032	443694.365000	175146.672998	1243.050000	-0.387000	0.149769	ASPH
60777	368300.135000	116116.664998	961.280000	0.387000	0.149769	TALL GRASS/WEEDS
60078	435866.465000	184760.504998	902.380000	0.388000	0.150544	TALL GRASS/WEEDS
60778	368302.684000	116118.803998	961.360000	0.388000	0.150544	TALL GRASS/WEEDS

60615	392613.371000	187899.879998	1258.640000	0.389000	0.151321	MOWED GRASSS
60109	435409.791000	184782.328998	897.130000	0.392000	0.153664	TREE COVER
60514	377326.407000	185471.813998	1232.910000	0.392000	0.153664	TALL GRASS/WEEDS
60122	435427.348000	184772.449998	897.400000	0.393000	0.154449	TREE COVER
60619	392589.887000	187908.931998	1258.180000	0.393000	0.154449	MOWED GRASSS
60606	392596.658000	187908.234998	1258.510000	0.395000	0.156025	MOWED GRASSS
60097	435886.877000	184766.013998	902.850000	0.396000	0.156816	TALL GRASS/WEEDS
60789	368307.890000	116115.813998	961.410000	0.396000	0.156816	TALL GRASS/WEEDS
60530	377410.773000	185454.427998	1235.940000	0.397000	0.157609	TREE COVER
60966c	426835.913000	118635.834998	1050.260000	0.397000	0.157609	TREE COVER
60610	392606.676000	187900.344998	1258.370000	0.397000	0.157609	MOWED GRASSS
60609	392602.200000	187900.762998	1258.180000	0.398000	0.158404	MOWED GRASSS
60503	377320.524000	185472.262998	1232.630000	0.398000	0.158404	TALL GRASS/WEEDS
60562	377557.864000	185375.273998	1240.190000	0.398000	0.158404	ASPH
60795	368300.880000	116108.496998	961.160000	0.399000	0.159201	TALL GRASS/WEEDS
60515	377327.020000	185469.204998	1232.900000	0.400000	0.160000	TALL GRASS/WEEDS
60612	392607.455000	187909.366998	1259.180000	0.401000	0.160801	MOWED GRASSS
60968c	426831.767000	118632.912998	1049.790000	0.401000	0.160801	TREE COVER
60586	383776.286000	188149.809998	1278.480000	0.403000	0.162409	BRUSH/LOW TREES
60050	443701.494000	175152.960998	1243.270000	-0.404000	0.163216	ASPH
60091	435882.077000	184755.780998	902.610000	0.404000	0.163216	TALL GRASS/WEEDS
60086	435876.024000	184766.915998	902.650000	0.406000	0.164836	TALL GRASS/WEEDS
60119	435418.488000	184771.765998	897.350000	0.409000	0.167281	TREE COVER
60541	377421.268000	185453.790998	1235.950000	0.410000	0.168100	TREE COVER
60797	368304.204000	116107.546998	961.140000	0.411000	0.168921	TALL GRASS/WEEDS
60110	435407.628000	184779.191998	897.100000	0.413000	0.170569	TREE COVER
60784	368301.972000	116114.325998	961.210000	0.414000	0.171396	TALL GRASS/WEEDS
61121	312583.319000	189678.369998	1170.020000	0.414000	0.171396	TALL GRASS/WEEDS
61147	312486.492000	190088.459998	1149.300000	0.415000	0.172225	BRUSH/LOW TREES
60624	392586.258000	187909.512998	1258.060000	0.415000	0.172225	MOWED GRASSS
60752	365740.311000	119824.476998	1111.940000	0.417000	0.173889	TREE COVER
60940	419377.381000	119318.230998	1114.560000	0.417000	0.173889	TALL GRASS/WEEDS
60033	443691.235000	175148.489998	1243.020000	-0.418000	0.174724	ASPH
60577	383785.010000	188146.119998	1278.060000	0.420000	0.176400	BRUSH/LOW TREES
60901	419390.945000	119363.562998	1111.830000	0.421000	0.177241	BRUSH/LOW TREES
60935	419369.542000	119330.366998	1114.430000	0.421000	0.177241	TALL GRASS/WEEDS
60509	377322.531000	185476.845998	1232.850000	0.421000	0.177241	TALL GRASS/WEEDS

61104	312402.982000	189595.539998	1161.700000	0.422000	0.178084	TREE COVER
61113	312398.254000	189601.983998	1160.520000	0.422000	0.178084	TREE COVER
60783	368304.625000	116116.787998	961.320000	0.423000	0.178929	TALL GRASS/WEEDS
60812	370512.699000	114194.695998	1070.170000	0.423000	0.178929	BRUSH/LOW TREES
60576	383782.011000	188144.241998	1278.190000	0.424000	0.179776	BRUSH/LOW TREES
60538	377419.094000	185459.487998	1235.730000	0.425000	0.180625	TREE COVER
60623	392586.388000	187904.742998	1257.640000	0.430000	0.184900	MOWED GRASSS
60617	392618.468000	187904.622998	1259.130000	0.432000	0.186624	MOWED GRASSS
60915	419380.533000	119374.458998	1111.800000	0.433000	0.187489	BRUSH/LOW TREES
60796	368301.854000	116105.895998	961.050000	0.433000	0.187489	TALL GRASS/WEEDS
60947	419383.425000	119326.240998	1114.110000	0.433000	0.187489	TALL GRASS/WEEDS
60595	383774.129000	188151.885998	1278.470000	0.434000	0.188356	BRUSH/LOW TREES
60799	368310.588000	116111.933998	961.420000	0.434000	0.188356	TALL GRASS/WEEDS
60913	419382.465000	119371.042998	1111.910000	0.436000	0.190096	BRUSH/LOW TREES
60101	435406.845000	184786.299998	897.090000	0.436000	0.190096	TREE COVER
60912	419383.686000	119367.646998	1112.050000	0.436000	0.190096	BRUSH/LOW TREES
60501	377319.602000	185479.084998	1232.770000	0.436000	0.190096	TALL GRASS/WEEDS
60961c	426841.715000	118635.970998	1050.710000	0.437000	0.190969	TREE COVER
60793	368306.800000	116111.712998	961.330000	0.437000	0.190969	TALL GRASS/WEEDS
60512	377325.363000	185477.255998	1232.980000	0.440000	0.193600	TALL GRASS/WEEDS
60599	383781.841000	188160.984998	1278.260000	0.441000	0.194481	BRUSH/LOW TREES
60504	377320.897000	185469.657998	1232.580000	0.442000	0.195364	TALL GRASS/WEEDS
60507	377323.609000	185469.935998	1232.740000	0.442000	0.195364	TALL GRASS/WEEDS
60614	392612.994000	187904.167998	1258.900000	0.443000	0.196249	MOWED GRASSS
60525	377332.015000	185469.982998	1233.140000	0.444000	0.197136	TALL GRASS/WEEDS
60958c	426833.631000	118631.109998	1049.760000	0.446000	0.198916	TREE COVER
60092	435882.489000	184759.012998	902.670000	0.450000	0.202500	TALL GRASS/WEEDS
60502	377320.238000	185475.987998	1232.710000	0.450000	0.202500	TALL GRASS/WEEDS
60548	377425.540000	185458.952998	1235.700000	0.450000	0.202500	TREE COVER
60518	377329.249000	185474.519998	1233.110000	0.451000	0.203401	TALL GRASS/WEEDS
60785	368298.748000	116112.204998	961.120000	0.452000	0.204304	TALL GRASS/WEEDS
60040	443700.095000	175147.494998	1243.160000	-0.453000	0.205209	ASPH
60938	419374.878000	119324.363998	1114.540000	0.453000	0.205209	TALL GRASS/WEEDS
60513	377325.967000	185474.573998	1232.910000	0.456000	0.207936	TALL GRASS/WEEDS
60756	365741.781000	119815.597998	1112.590000	0.456000	0.207936	TREE COVER
60098	435887.318000	184762.898998	902.770000	0.458000	0.209764	TALL GRASS/WEEDS
60093	435882.479000	184762.555998	902.710000	0.459000	0.210681	TALL GRASS/WEEDS

60084	435872.150000	184763.457998	902.580000	0.460000	0.211600	TALL GRASS/WEEDS
60524	377331.874000	185472.981998	1233.180000	0.461000	0.212521	TALL GRASS/WEEDS
60516	377330.012000	185469.471998	1233.020000	0.462000	0.213444	TALL GRASS/WEEDS
60523	377331.148000	185475.440998	1233.190000	0.463000	0.214369	TALL GRASS/WEEDS
60584	383784.007000	188150.015998	1278.380000	0.465000	0.216225	BRUSH/LOW TREES
60616	392618.080000	187899.235998	1258.820000	0.466000	0.217156	MOWED GRASSS
60755	365744.510000	119817.201998	1112.510000	0.467000	0.218089	TREE COVER
60581	383791.521000	188154.004998	1278.240000	0.470000	0.220900	BRUSH/LOW TREES
60585	383781.285000	188148.375998	1278.300000	0.471000	0.221841	BRUSH/LOW TREES
60786	368300.105000	116109.621998	961.090000	0.471000	0.221841	TALL GRASS/WEEDS
60792	368310.112000	116113.759998	961.380000	0.471000	0.221841	TALL GRASS/WEEDS
60597	383775.435000	188156.477998	1278.420000	0.475000	0.225625	BRUSH/LOW TREES
60960c	426838.837000	118634.264998	1050.490000	0.475000	0.225625	TREE COVER
60106	435419.210000	184781.707998	897.360000	0.475000	0.225625	TREE COVER
60761	365732.624000	119827.179998	1111.900000	0.476000	0.226576	TREE COVER
60957c	426830.350000	118629.770998	1049.270000	0.476000	0.226576	TREE COVER
60776	368297.912000	116114.422998	961.170000	0.485000	0.235225	TALL GRASS/WEEDS
60036	443686.694000	175154.228998	1242.900000	-0.486000	0.236196	ASPH
60596	383772.905000	188153.580998	1278.430000	0.488000	0.238144	BRUSH/LOW TREES
60967c	426833.618000	118634.626998	1049.910000	0.490000	0.240100	TREE COVER
60753	365741.936000	119821.196998	1112.200000	0.491000	0.241081	TREE COVER
60757	365740.063000	119818.356998	1112.400000	0.491000	0.241081	TREE COVER
61117	312395.487000	189605.009998	1159.960000	0.491000	0.241081	TREE COVER
61119	312401.259000	189605.124998	1160.750000	0.493000	0.243049	TREE COVER
60760	365735.535000	119828.343998	1111.770000	0.494000	0.244036	TREE COVER
60526	377412.710000	185465.825998	1235.500000	0.497000	0.247009	TREE COVER
61110	312404.057000	189598.003998	1161.500000	0.497000	0.247009	TREE COVER
60945	419379.275000	119329.562998	1114.290000	0.500000	0.250000	TALL GRASS/WEEDS
60923	419377.790000	119370.595998	1112.300000	0.502000	0.252004	BRUSH/LOW TREES
60774	365730.442000	119814.290998	1112.730000	0.504000	0.254016	TREE COVER
60590	383786.444000	188157.944998	1278.260000	0.505000	0.255025	BRUSH/LOW TREES
60505	377320.704000	185466.781998	1232.460000	0.514000	0.264196	TALL GRASS/WEEDS
60549	377424.898000	185456.457998	1235.810000	0.514000	0.264196	TREE COVER
60970c	426834.367000	118638.355998	1050.430000	0.537000	0.288369	TREE COVER
60780	368308.166000	116123.438998	961.340000	0.538000	0.289444	TALL GRASS/WEEDS
61114	312393.397000	189602.737998	1159.980000	0.542000	0.293764	TREE COVER
60579	383790.035000	188150.257998	1278.100000	0.545000	0.297025	BRUSH/LOW TREES

60773	365729.329000	119816.603998	1112.470000	0.552000	0.304704	TREE COVER
60594	383776.243000	188152.423998	1278.390000	0.555000	0.308025	BRUSH/LOW TREES
60600	383784.907000	188163.100998	1278.190000	0.569000	0.323761	BRUSH/LOW TREES
60582	383789.478000	188153.263998	1278.210000	0.570000	0.324900	BRUSH/LOW TREES
60817	370524.852000	114203.165998	1070.580000	0.572000	0.327184	BRUSH/LOW TREES
61111	312402.708000	189600.774998	1160.990000	0.598000	0.357604	TREE COVER
60909	419383.287000	119358.956998	1112.650000	0.604000	0.364816	BRUSH/LOW TREES
60583	383786.394000	188152.062998	1278.260000	0.614000	0.376996	BRUSH/LOW TREES
60754	365743.238000	119819.332998	1112.290000	0.614000	0.376996	TREE COVER
60591	383784.292000	188159.632998	1278.110000	0.615000	0.378225	BRUSH/LOW TREES
60772	365728.645000	119818.992998	1112.220000	0.617000	0.380689	TREE COVER
60117	435411.282000	184774.021998	897.010000	0.620000	0.384400	TREE COVER
60540	377418.452000	185453.567998	1235.880000	0.630000	0.396900	TREE COVER
60758	365738.252000	119821.414998	1112.130000	0.639000	0.408321	TREE COVER
60798	368307.708000	116109.842998	961.250000	0.644000	0.414736	TALL GRASS/WEEDS
60775	365732.023000	119811.572998	1112.870000	0.656000	0.430336	TREE COVER
61159	312480.140000	190087.671998	1148.800000	0.657000	0.431649	BRUSH/LOW TREES
60598	383778.696000	188158.615998	1278.300000	0.659000	0.434281	BRUSH/LOW TREES
60916	419379.884000	119371.101998	1112.190000	0.666000	0.443556	BRUSH/LOW TREES
60769	365732.089000	119823.384998	1112.120000	0.671000	0.450241	TREE COVER
61148	312483.555000	190089.838998	1148.850000	0.674000	0.454276	BRUSH/LOW TREES
61118	312398.109000	189604.772998	1160.240000	0.681000	0.463761	TREE COVER
60762	365733.867000	119824.834998	1112.030000	0.682000	0.465124	TREE COVER
61160	312477.674000	190088.267998	1148.780000	0.687000	0.471969	BRUSH/LOW TREES
61150	312477.274000	190090.290998	1148.730000	0.690000	0.476100	BRUSH/LOW TREES
61149	312480.407000	190090.094998	1148.750000	0.693000	0.480249	BRUSH/LOW TREES
61158	312484.044000	190085.451998	1149.180000	0.701000	0.491401	BRUSH/LOW TREES
60580	383792.804000	188151.994998	1277.940000	0.708000	0.501264	BRUSH/LOW TREES
61146	312489.715000	190087.969998	1149.370000	0.711000	0.505521	BRUSH/LOW TREES
60765	365737.227000	119814.827998	1112.580000	0.712000	0.506944	TREE COVER
60587	383778.769000	188152.188998	1278.330000	0.713000	0.508369	BRUSH/LOW TREES
60924	419378.135000	119373.036998	1112.050000	0.716000	0.512656	BRUSH/LOW TREES
60593	383779.846000	188155.696998	1278.380000	0.717000	0.514089	BRUSH/LOW TREES
60550	377424.332000	185452.539998	1235.950000	0.717000	0.514089	TREE COVER
60588	383781.266000	188154.148998	1278.470000	0.718000	0.515524	BRUSH/LOW TREES
60759	365736.819000	119824.925998	1111.930000	0.722000	0.521284	TREE COVER
61151	312478.654000	190086.698998	1148.820000	0.735000	0.540225	BRUSH/LOW TREES

60943	419379.149000	119323.033998	1114.470000	0.750000	0.562500	TALL GRASS/WEEDS
61116	312391.923000	189605.587998	1159.650000	0.756000	0.571536	TREE COVER
60767	365733.211000	119817.489998	1112.410000	0.765000	0.585225	TREE COVER
61153	312485.704000	190086.134998	1149.170000	0.783000	0.613089	BRUSH/LOW TREES
61152	312481.544000	190086.141998	1148.900000	0.785000	0.616225	BRUSH/LOW TREES
60592	383782.404000	188157.563998	1278.210000	0.786000	0.617796	BRUSH/LOW TREES
60768	365732.312000	119820.175998	1112.210000	0.786000	0.617796	TREE COVER
60763	365734.514000	119822.108998	1112.140000	0.794000	0.630436	TREE COVER
61163	312482.146000	190085.011998	1149.050000	0.797000	0.635209	BRUSH/LOW TREES
60942	419379.726000	119320.276998	1114.440000	0.803000	0.644809	TALL GRASS/WEEDS
61164	312484.289000	190083.396998	1149.370000	0.817000	0.667489	BRUSH/LOW TREES
61167	312485.513000	190079.304998	1149.860000	0.820000	0.672400	BRUSH/LOW TREES
61161	312476.865000	190085.024998	1148.800000	0.824000	0.678976	BRUSH/LOW TREES
60531	377413.955000	185453.246998	1235.900000	0.847000	0.717409	TREE COVER
60764	365735.874000	119817.349998	1112.350000	0.851000	0.724201	TREE COVER
60766	365734.275000	119814.205998	1112.500000	0.863000	0.744769	TREE COVER
60589	383783.834000	188155.209998	1278.280000	0.866000	0.749956	BRUSH/LOW TREES
61169	312480.596000	190081.989998	1149.330000	0.888000	0.788544	BRUSH/LOW TREES
61166	312488.469000	190079.030998	1149.890000	0.897000	0.804609	BRUSH/LOW TREES
60925	419378.281000	119375.612998	1111.710000	0.923000	0.851929	BRUSH/LOW TREES
61165	312488.851000	190081.401998	1149.630000	0.924000	0.853776	BRUSH/LOW TREES
61162	312479.543000	190084.495998	1148.940000	0.925000	0.855625	BRUSH/LOW TREES
61168	312477.315000	190082.926998	1148.880000	0.933000	0.870489	BRUSH/LOW TREES
61170	312482.613000	190081.051998	1149.420000	0.991000	0.982081	BRUSH/LOW TREES
61154	312488.241000	190086.011998	1149.150000	1.021000	1.042441	BRUSH/LOW TREES
61155	312490.427000	190085.926998	1149.300000	1.023000	1.046529	BRUSH/LOW TREES
60124	435430.383000	184777.410998	897.060000	1.035000	1.071225	TREE COVER
61156	312489.144000	190083.702998	1149.340000	1.038000	1.077444	BRUSH/LOW TREES
61157	312486.984000	190084.779998	1149.050000	1.185000	1.404225	BRUSH/LOW TREES

SUM	84.846065
AVERAGE	0.136848
RMSE	0.369930
AccuracyZ	0.725064

FIELD NOTES

Project FEMA ground survey notes

Contains point number and descriptions

Includes Control and Check Points left out of statistical analysis

Iowa County Ground-Truthing

Sage
Vegeter

10-28-2010 Control Pt. Setups

Location #12:

* Base Setup over PID "DH 5272" (Brigham N GPS)
* Checked into PID "DH5029" (Barnesfeld GPS)
- Vertical within 0.05' ✓

Tall Grass/Weeds: Pts ~~60,076~~ 60,076 - 60,100
Mowed Grass: Pts 60,001 - 60,025

Asphalt: Pts 60,026 - 60,050
Brush/Low Trees: Pts 60,051 - 60,075
Tree Cover: 60,101 - 60,125

Location #14:

* Base Setup over PID "DH5270" (Podgenville E GPS)
* Checked into PID "DH5225" (Podgenville N GPS)
- Vertical within 0.05' ✓

Tall grass/weeds: 60,501 - 60,525

Tree Cover: 60,526 - 60,550

Asphalt: 60,551 - 60,575

Brush/Low Trees: 60,576 - 60,600

Mowed Grass: 60,601 - 60,625

Location #10:

* Base Setup over PID "DH5259" (Mineral Point S GPS)

* Checked into PID "DH5258"
- Vertical within 0.05' ✓ (Mineral Point W GPS)

Mowed Grass: Pts 60,701 - 60,725

Asphalt: Pts 60,726 - 60,750

Tree Cover: Pts 60,751 - 60,775

Tall Grass/Weeds: 60,776 - 60,800

Brush/Low Trees = 60,801 - 60,825

Location #11:

* Base Setup over PID "DH5230" (Moscow C GPS)

* Checked into PID "DH5232" (Waldwick E GPS)
- Vertical within 0.07' ✓

Brush/Low Trees: 60,901 - 60,925

Tall grass/weeds = 60,926 - 60,950

Tree Cover: 60,951 - 60,975

Mowed Grass = 60,976 - 61,000

Asphalt: 61,001 - 61,025

(Note "a")
Letter "C")

(Note "b")
Letter "b")

11-01-2010 Iowa County Ground-Truthing

Control Pt. Setups

Dace
VegeterLocation ~~28~~: 13:* Base Setup over PID "DH 5283"
(Highland GPS)

* Checked into PID "5285"

(Highland C GPS)

- Vertical within 0.05'

(actual shot may show worse
because of long distance from
base - poor radio results)

Tree Cover: Pts 61,101 - 61,120

Tall Grass/Weeds: 61,121 - 61,145

~~Mowed Grass:~~

Brush/Low Trees: 61,146 - 61,170

Mowed Grass: 61,171 - 61,195

Asphalt: 61,196 - 61,220