



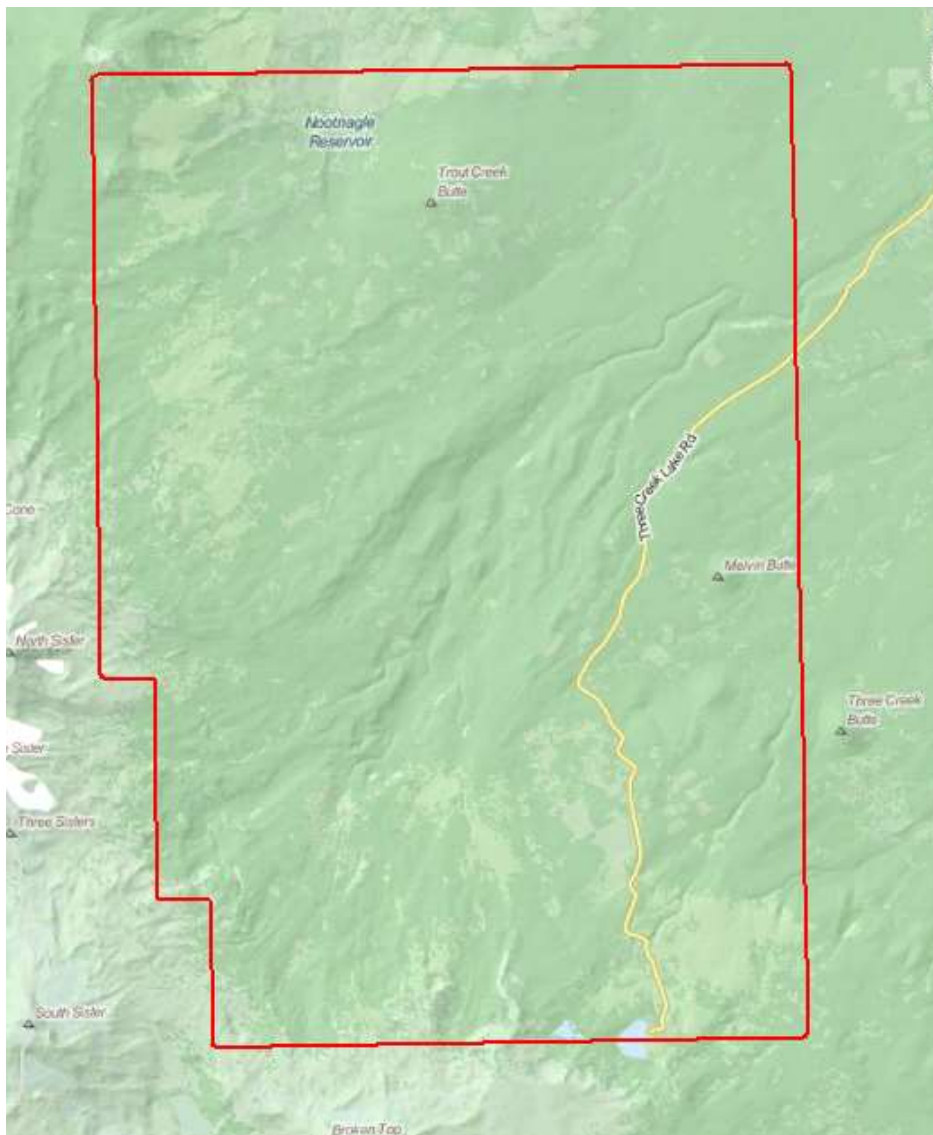
LiDAR Quality Assessment Report

The USGS National Geospatial Technical Operations Center, Data Operations Branch is responsible for conducting reviews of all Light Detection and Ranging (LiDAR) point-cloud data and derived products delivered by a data supplier before it is approved for inclusion in the National Elevation Dataset. The USGS recognizes the complexity of LiDAR collection and processing performed by the data suppliers and has developed this Quality Assessment (QA) procedure to accommodate USGS collection and processing specifications with flexibility. The goal of this process is to assure LiDAR data are of sufficient quality for database population and scientific analysis. Concerns regarding the assessment of these data should be directed to the Chief, Data Operations Branch, 1400 Independence Road, Rolla, Missouri 65401.

OR_PoleCreek_2013

NGTOC

Hannah Boggs



Project Information

Project:

Contractor:

Project Type:
GPSC

Applicable Specification:
NGP LiDAR Base Specification V 1.0

Project Points of Contact:

Name:	Type:	Email:
Robert Kelly	CPT	ckelly@usgs.gov

REPORT QUALIFICATION SUMMARY:

Task Order Overall:

Meets Requirements

Metadata:

1 of 1 Reviews Accepted

0 Reviews Not Accepted

Vertical Accuracy:

1 of 1 Reviews Accepted

0 Reviews Not Accepted

Swath/Raw LAS:

1 of 1 Reviews Accepted

0 Reviews Not Accepted

Tiled/Classified LAS:

1 of 1 Reviews Accepted

0 Reviews Not Accepted

Breakline:

1 of 1 Reviews Accepted

0 Reviews Not Accepted

DEM(s):

1 of 1 Reviews Accepted

0 Reviews Not Accepted

NED Review:

1 of 1 DEM tile reviews recommended for NED
1/3rd

1 of 1 DEM tile reviews recommended for NED
1/9th

Project Delivery Lots: Lots

List Lots:

- 1

of:

Dates Collected Range:

Collection Start:

Collection End:

Project Aliases:

Licensing:

Public Domain

Project Description:

Statement of Work (SOW): Reference C.1 of the Contract. This **Pole Creek 8ppsm Lidar Task Order** is for Planning, Acquisition, processing, and derivative products of lidar data to be collected at a nominal density of 8 points per square meter (ppsm). Specifications listed below are based on the "**National Geospatial Program Lidar Base Specification Version 1.0**", which is incorporated by reference to this task order. This specification may be viewed at <http://pubs.usgs.gov/tm/11b4/>. These lidar specifications are required minimum baseline specifications. In addition to the Specification Requirements, this task order shall meet NEEA QL1. For any item which is not specifically addressed, the referenced Specification Version 1 will be the required specification authority. This task is for lidar for a **very high resolution data set of lidar of approximately 86 total square miles, located North East of Bend Oregon.**

Review Information

Reviewer:

Date

Delivered:

3rd Party QA

Date

Performed:

Assigned:

Action To Contractor Date:	Issue Description:	Return Date:
2/20/2014	<p>Corrections to las headers requested.</p> <p>Accuracy of DEMs do not meet task order requirements for SVA or CVA.</p> <p>One correction to DEMs requested.</p>	

Review Complete:

Dates Project Worked:

Start:	<input type="text" value="2/13/2014"/>	<input type="text" value="3/11/2014"/>
End:	<input type="text" value="2/20/2014"/>	<input type="text" value="3/12/2014"/>

Project Materials Received

All project deliverables must be supplied according to collection and processing specifications. The USGS will postpone the QA process when any of the required deliverables are missing. When deliverables are missing, the Contracting Officer Technical Representative (COTR) will be contacted by the Elevation Section supervisor and informed of the problem. Processing will resume after the COTR has coordinated the deposition of remaining deliverables.

METADATA

Deliverables	Delivered	XML Metadata	Required	Format	Quantity	Additional Details
Collection Report:	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	PDF	<input type="text" value="1"/>	<input type="text" value="Combined"/>
Survey Report:	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	PDF	<input type="text" value="1"/>	<input type="text" value="Combined"/>
Processing Report:	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	PDF	<input type="text" value="1"/>	<input type="text" value="Combined"/>
QA/QC Report:	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	PDF	<input type="text" value="1"/>	<input type="text" value="Combined"/>
Project Level XML Metadata:	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	XML	<input type="text" value="1"/>	<input type="text" value="PoleCreek_LiDAR_Project_Level.xml"/>
Project Extent:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	.shp	<input type="text" value="1"/>	<input type="text" value="Pole_Creek_LiDAR_Boundary.shp"/>
Tile Scheme:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	.shp	<input type="text" value="1"/>	<input type="text" value="Pole_Creek_Tile_Index.shp"/>

<i>Control (Calibration) Points:</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<i>.shp</i>	<input type="text" value="1"/>	Pole_Creek_RTK_Checkpoints.shp
<i>Check (Validation) Points:</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<i>.shp</i>	<input type="text" value="1"/>	Pole_Creek_Landclass_RTK_Checkpoints.shp
<i>Additional Comments:</i>	Tile Index has 274 tiles, yet only 273 DEM and DSM tiles delivered. Contractor states, "We have provided 274 classified LAS v1.2 files and 273 DEM and DSM files. Due to the small area of lidar data coverage in tile 10TFP130930, the IMGs for the DEM and DSM were not able to be created for this tile. However, the classified LAS file was provided for tile 10TFP130930." Acceptable.					

LIDAR DATA

<i>Deliverables</i>	<i>Delivered</i>	<i>XML Metadata</i>	<i>Required</i>	<i>Format</i>	<i>Quantity</i>	<i>Additional Details</i>
<i>Swath Data:</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<i>.las</i>	<input type="text" value="92"/>	<input type="text"/>
<i>Classified/ Tiled Data:</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<i>.las</i>	<input type="text" value="274"/>	<input type="text"/>
<i>Additional Comments:</i>	Tile Index has 274 tiles, yet only 273 DEM and DSM tiles delivered. Contractor states, "We have provided 274 classified LAS v1.2 files and 273 DEM and DSM files. Due to the small area of lidar data coverage in tile 10TFP130930, the IMGs for the DEM and DSM were not able to be created for this tile. However, the classified LAS file was provided for tile 10TFP130930." Acceptable.					

DERIVED DELIVERABLES

<i>Deliverables</i>	<i>Delivered</i>	<i>XML Metadata</i>	<i>Required</i>	<i>Format</i>	<i>Quantity</i>	<i>Additional Details</i>
<i>DEM Tiles:</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<i>IMG</i>	<input type="text" value="273"/>	<input type="text"/>
<i>Breaklines:</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<i>.shp</i>	<input type="text" value="1"/>	Pole_Creek_Waters_Edge_Breakline_polygon.shp
<i>Additional Comments:</i>	Tile Index has 274 tiles, yet only 273 DEM and DSM tiles delivered. Contractor states, "We have provided 274 classified LAS v1.2 files and 273 DEM and DSM files. Due to the small area of lidar data coverage in tile 10TFP130930, the IMGs for the DEM and DSM were not able to be created for this tile. However, the classified LAS file was provided for tile 10TFP130930." Acceptable.					

OTHER

<i>Additional Deliverables</i>	<i>Delivered</i>	<i>XML Metadata</i>	<i>Required</i>	<i>Format</i>	<i>Quantity</i>	<i>Additional Details</i>
DSM Tiles	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	IMG	<input type="text" value="273"/>	<input type="text"/>
Corrected DEM Tiles	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	IMG	<input type="text" value="2"/>	<input type="text"/>
Corrected DSM	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	IMG	<input type="text" value="2"/>	<input type="text"/>

Tiles					
Additional Comments:	Tile Index has 274 tiles, yet only 273 DEM and DSM tiles delivered. Contractor states, "We have provided 274 classified LAS v1.2 files and 273 DEM and DSM files. Due to the small area of lidar data coverage in tile 10TFP130930, the IMGs for the DEM and DSM were not able to be created for this tile. However, the classified LAS file was provided for tile 10TFP130930." Acceptable.				

Geographic Information

Area Extent: Sq. Miles

Tile Size: Meters

DEM/DTM Grid Spacing: Meters

Coordinate Reference System:

Projection:

Horizontal Datum: Meters
 U.S. Feet
 Int'l Feet

Vertical Datum: Meters
 U.S. Feet
 Int'l Feet

THIS PROJECTION COORDINATE REFERENCE SYSTEM IS CONSISTENT ACROSS THE FOLLOWING DELIVERABLES

- | | |
|--|---|
| <input checked="" type="checkbox"/> Project Extent | <input checked="" type="checkbox"/> Tiled/Classified XML Metadata |
| <input checked="" type="checkbox"/> Project Extent XML Metadata | <input checked="" type="checkbox"/> Tiled/Classified LiDAR |
| <input checked="" type="checkbox"/> Project Tile Scheme | <input checked="" type="checkbox"/> Swath/Raw LiDAR XML Metadata |
| <input checked="" type="checkbox"/> Project Tile Scheme XML Metadata | <input checked="" type="checkbox"/> Swath/Raw LiDAR |
| <input checked="" type="checkbox"/> Control Points | <input checked="" type="checkbox"/> DEM(s) |
| <input checked="" type="checkbox"/> Control Points XML Metadata | <input checked="" type="checkbox"/> DEM XML Metadata |
| <input checked="" type="checkbox"/> Checkpoints | <input checked="" type="checkbox"/> Breakline(s) |
| <input checked="" type="checkbox"/> Checkpoint XML Metadata | <input checked="" type="checkbox"/> Breakline XML Metadata |
| <input checked="" type="checkbox"/> Project Level XML Metadata | |

Additional Comments:

Collection Information

Configured Project Nominal Pulse Spacing:
 Meters

Detailed Date(s) Collected:
 Start Date: End Date:

Details:

Sensor Information:
 Sensor Type: Aerial
 Sensor Used:

Configured Scan Angle ± from nadir: Degrees

Additional Comments:

Near nadir scan angle used to increase penetration of vegetation to ground surfaces.

Metadata Review Accepted

Vendor provided metadata files have been parsed using 'mp' metadata parser. Any errors generated by the parser are documented below for reference and/or corrective action.

Parser can be found @ <http://geo-nsdi.er.usgs.gov/validation/>

The Project Level XML Metadata parsed without errors.

Check if 'Best Use' metadata for NED:

The Project Extent XML Metadata parsed without errors.

Check if 'Best Use' metadata for NED:

The Project Tile Scheme XML Metadata parsed without errors.

Check if 'Best Use' metadata for NED:

The Control Point XML Metadata parsed without errors.

Check if 'Best Use' metadata for NED:

The Check Point XML Metadata parsed without errors.

Check if 'Best Use' metadata for NED:

The Swath XML Metadata parsed without errors.

Check if 'Best Use' metadata for NED:

The Classified XML Metadata parsed without errors.

Check if 'Best Use' metadata for NED:

The DEM XML Metadata parsed without errors.

Check if 'Best Use' metadata for NED:

The Breakline XML Metadata parsed without errors.

Check if 'Best Use' metadata for NED:

Additional
Comments:

Based on this review, the USGS accepts the xml metadata provided.

End of Metadata Review

Vertical Accuracy Review Accepted

ASPRS recommends that checkpoint surveys be used to verify the vertical accuracy of LiDAR data sets. Checkpoints are to be collected by an independent survey firm licensed in the particular state(s) where the project is located. While subjective, checkpoints should be well distributed throughout the dataset. National Standards for Spatial Data Accuracy (NSSDA) guidance states that checkpoints may be distributed more densely in the vicinity of important features and more sparsely in areas that are of little or no interest. Checkpoints should be distributed so that points are spaced at intervals of at least ten percent of the

diagonal distance across the dataset and at least twenty percent of the points are located in each quadrant of the dataset.

NSSDA and ASPRS require that a minimum of twenty checkpoints (thirty is preferred) are collected for each major land cover category represented in the LiDAR data. Checkpoints should be selected on flat terrain, or on uniformly sloping terrain in all directions from each checkpoint. They should not be selected near severe breaks in slope, such as bridge abutments, edges of roads, or near river bluffs. Checkpoints are an important component of the USGS QA process. There is the presumption that the checkpoint surveys are error free and the discrepancies are attributable to the LiDAR dataset supplied.

For this dataset, USGS checked the spatial distribution of checkpoints with an emphasis on the bare-earth (open terrain) points; the number of points per class; the methodology used to collect these points; and the relationship between the data supplier and checkpoint collector. When independent control data are available, USGS has incorporated this into the analysis.

Required Vertical Accuracy

Yes No

REQUIRED FUNDAMENTAL VERTICAL ACCURACY FOR SWATH AND DEM FILES

Confidence Interval Required: th % CI

Required Unit:

Required # of checkpoints:

Required RMSEz:

Required Vertical Accuracy (RMSEz * .% CI)

REQUIRED SUPPLEMENTAL VERTICAL ACCURACY FOR DEM FILES

SVA Statistic Required: Percentile

SVA Confidence Level/Percentile Required:

Class	# of Checkpoints	SVA Required 95 th Percentile	
Tall Weeds & Crops	<input type="text" value="20"/>	<input type="text" value="26.9"/>	<input type="text" value="Centimeters"/>
Brushlands & Low Trees	<input type="text" value="20"/>	<input type="text" value="26.9"/>	<input type="text" value="Centimeters"/>
Forested Areas Fully Covered by Trees	<input type="text" value="20"/>	<input type="text" value="26.9"/>	<input type="text" value="Centimeters"/>

REQUIRED CONSOLIDATED VERTICAL ACCURACY FOR DEM FILES

CVA Statistic Required: Percentile

CVA Confidence Level/Percentile Required:

Total number of checkpoints:

Required CVA: at the 95 th Percentile

Additional Required Vertical Accuracy Information:

Reported Vertical Accuracy

Yes No

REPORTED FUNDAMENTAL VERTICAL ACCURACY FOR SWATH LIDAR FILES

Confidence Interval Reported: th % CI

Reported Unit:

Reported # of checkpoints:

Reported RMSEz:

Reported Vertical Accuracy (RMSEz * .% CI)

REPORTED FUNDAMENTAL VERTICAL ACCURACY FOR DEM FILES

Confidence Interval Reported: th % CI

Reported Unit:

Reported # of checkpoints:

Reported RMSEz:

Reported Vertical Accuracy (RMSEz * .% CI)

REPORTED SUPPLEMENTAL VERTICAL ACCURACY FOR DEM FILES

SVA Statistic Reported: Percentile

SVA Confidence Level/Percentile Reported:

Class	# of Checkpoints	SVA Reported 95 th Percentile	
Tall Weeds & Crops	<input type="text" value="32"/>	<input type="text" value="0.122"/>	<input type="text" value="Meters"/>
Brushlands & Low Trees	<input type="text" value="24"/>	<input type="text" value="0.244"/>	<input type="text" value="Meters"/>
Forested Areas Fully Covered by Trees	<input type="text" value="30"/>	<input type="text" value="0.188"/>	<input type="text" value="Meters"/>

REPORTED CONSOLIDATED VERTICAL ACCURACY FOR DEM FILES

CVA Statistic Reported: Percentile

CVA Confidence Level/Percentile Reported:

Total number of checkpoints:

Reported CVA: Meters at the 95 th Percentile

Additional Reported Vertical Accuracy Information:

Reviewed Vertical Accuracy

Yes No

CHECKPOINT REVIEW

Checkpoints are well distributed?

Enough checkpoints for task order?

Checkpoints meet USGS LiDAR base-spec in quantity and quality?

REVIEWED FUNDAMENTAL VERTICAL ACCURACY FOR SWATH LIDAR FILES

Confidence Interval Reviewed: th % CI

Reviewed Unit:

Reviewed # of checkpoints:

Reviewed RMSEz:

Reviewed Vertical Accuracy (RMSEz * .% CI)

REVIEWED FUNDAMENTAL VERTICAL ACCURACY FOR DEM FILES

Confidence Interval Reviewed: th % CI

Reviewed Unit:

Reviewed # of checkpoints:

Reviewed RMSEz:

Reviewed Vertical Accuracy (RMSEz * .% CI)

REVIEWED SUPPLEMENTAL VERTICAL ACCURACY

SVA Statistic Reviewed: Percentile

SVA Confidence Level/Percentile Reviewed:

Class	# of Checkpoints	SVA Reviewed	
		95 th Percentile	
Tall Weeds & Crops	<input type="text" value="32"/>	<input type="text" value="0.13"/>	<input type="text" value="Meters"/>
Brushlands & Low Trees	<input type="text" value="24"/>	<input type="text" value="0.23"/>	<input type="text" value="Meters"/>
Forested Areas Fully Covered by Trees	<input type="text" value="30"/>	<input type="text" value="0.12"/>	<input type="text" value="Meters"/>

REVIEWED CONSOLIDATED VERTICAL ACCURACY

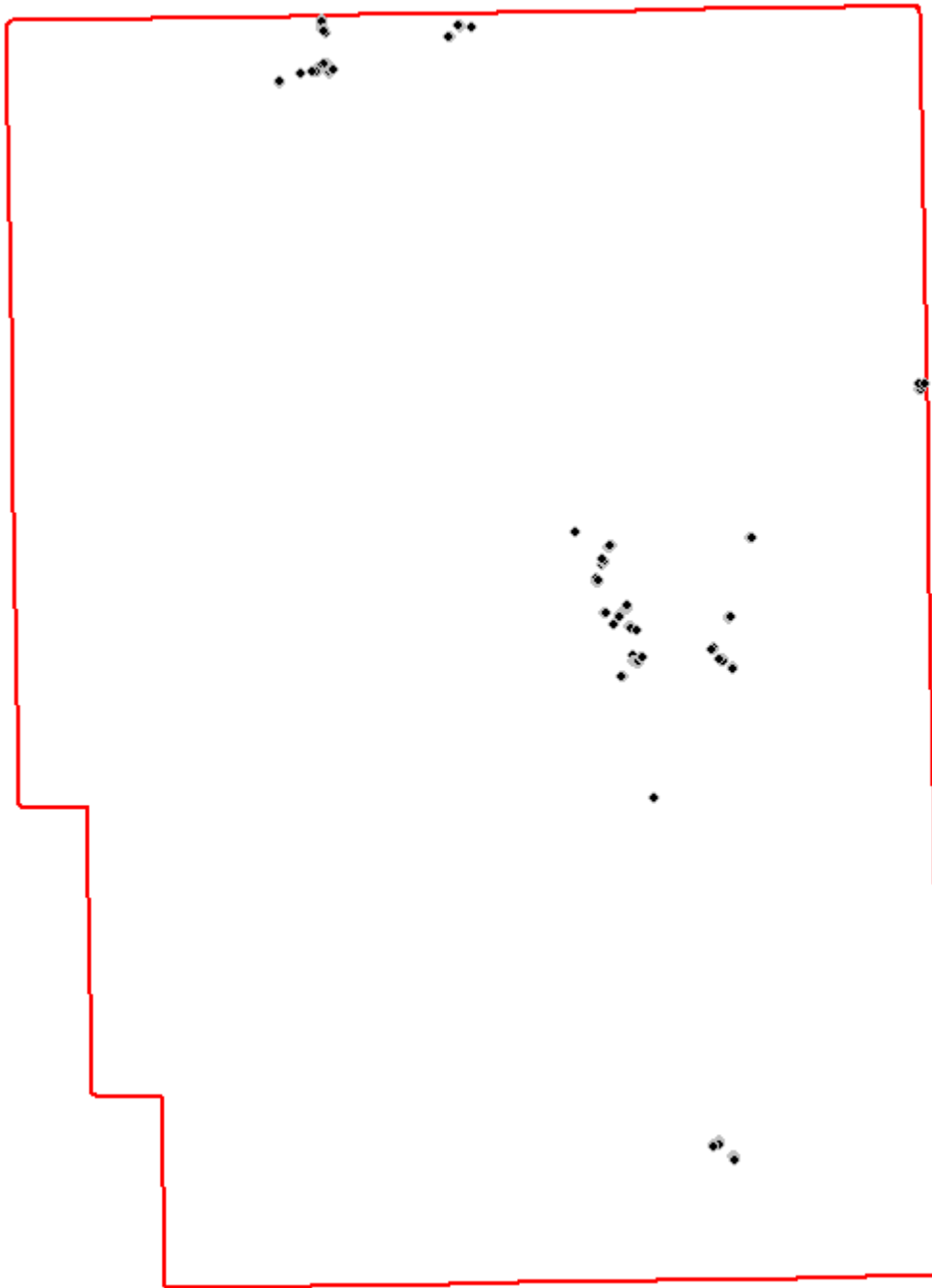
CVA Statistic Reviewed: Percentile

CVA Confidence Level/Percentile Reviewed:

Total number of checkpoints:

Reviewed CVA: at the 95 th Percentile

Checkpoint Distribution Image



Vertical Accuracy Results:

56 control points were tested for the BARE_EARTH class

The Minimum change in Z of the BARE_EARTH class is -0.0979901999235 Meters

The Maximum change in Z of the BARE_EARTH class is 0.201058998704 Meters

The Range of the change in Z for the BARE_EARTH class is 0.299049198627 Meters

The Average change in Z for the BARE_EARTH class is 0.0232247271696 Meters

The Standard Deviation of the change in Z distribution for the BARE_EARTH class is 0.0601450893187 Meters

The Skew of the change in Z distribution for the BARE_EARTH class is 0.254081190228

The Kurtosis of the change in Z distribution for the BARE_EARTH class is 0.289641239849

The RMSEz of the BARE_EARTH class is 0.0639704752057 Meters

The NSSDA AccuracyZ (=RMSEz*1.96) of the BARE_EARTH points is 0.125382131403 Meters at the 95% Confidence Level

The 95th Percentile Value for the BARE_EARTH class is 0.113722996786 Meters

30 control points were tested for the FORESTED class

The Minimum change in Z of the FORESTED class is -0.137951001525 Meters

The Maximum change in Z of the FORESTED class is 0.227019995451 Meters

The Range of the change in Z for the FORESTED class is 0.364970996976 Meters

The Average change in Z for the FORESTED class is 0.0222258622758 Meters

The Standard Deviation of the change in Z distribution for the FORESTED class is 0.0640264185807 Meters

The Skew of the change in Z distribution for the FORESTED class is 0.464622508473

The Kurtosis of the change in Z distribution for the FORESTED class is 2.46036694711

The RMSEz of the FORESTED class is 0.0667587190243 Meters

The NSSDA AccuracyZ (=RMSEz*1.96) of the FORESTED points is 0.130847089288 Meters at the 95% Confidence Level

The 95th Percentile Value for the FORESTED class is 0.115929619595 Meters

24 control points were tested for the BRUSH_LANDS class

The Minimum change in Z of the BRUSH_LANDS class is -0.175019994378 Meters

The Maximum change in Z of the BRUSH_LANDS class is 0.249955996871 Meters

The Range of the change in Z for the BRUSH_LANDS class is 0.424975991249 Meters

The Average change in Z for the BRUSH_LANDS class is 0.0814499873668 Meters

The Standard Deviation of the change in Z distribution for the BRUSH_LANDS class is 0.108007657841 Meters

The Skew of the change in Z distribution for the BRUSH_LANDS class is -0.462789613877

The Kurtosis of the change in Z distribution for the BRUSH_LANDS class is -0.202112710528

The RMSEz of the BRUSH_LANDS class is 0.133467925874 Meters

The NSSDA AccuracyZ (=RMSEz*1.96) of the BRUSH_LANDS points is 0.261597134712 Meters at the 95% Confidence Level

The 95th Percentile Value for the BRUSH_LANDS class is 0.233863396198 Meters

32 control points were tested for the TALL_WEEDS class

The Minimum change in Z of the TALL_WEEDS class is -0.0669805034995 Meters

The Maximum change in Z of the TALL_WEEDS class is 0.166970998049 Meters

The Range of the change in Z for the TALL_WEEDS class is 0.233951501548 Meters

The Average change in Z for the TALL_WEEDS class is 0.0318076301337 Meters

The Standard Deviation of the change in Z distribution for the TALL_WEEDS class is 0.0569581162175 Meters

The Skew of the change in Z distribution for the TALL_WEEDS class is 0.426682675684

The Kurtosis of the change in Z distribution for the TALL_WEEDS class is -0.335071640187

The RMSEz of the TALL_WEEDS class is 0.0644559396935 Meters

The NSSDA AccuracyZ (=RMSEz*1.96) of the TALL_WEEDS points is 0.126333641799 Meters at the 95% Confidence Level

The 95th Percentile Value for the TALL_WEEDS class is 0.127303252369 Meters

142 total control points were tested

The Minimum change in Z of all control points is -0.175019994378 Meters

The Maximum change in Z of all control points is 0.249955996871 Meters

The Range of the change in Z for all control points is 0.424975991249 Meters

The Average change in Z for all control points is 0.0347887637384 Meters

The Standard Deviation for all control points is 0.0730046284096 Meters

The Skew for all control points is 0.422475878
 The Kurtosis for all control points is 0.920719288135
 The RMSEz for all control points is 0.0806374640733 Meters
 The NSSDA AccuracyZ (=RMSEz*1.96) for all control points is 0.158049429584 Meters at the 95% Confidence Level
 The Consolidated Vertical Accuracy (CVA) at the 95th percentile for the dataset is 0.167916243523 Meters

Additional Reviewed
 Vertical Accuracy
 Information:

Based on this review, the USGS accepts the vertical accuracy.

End of Vertical Accuracy Review

Raw-Swath LiDAR Review Accepted

LAS swath files or raw unclassified LiDAR data are reviewed to assess the quality control used by the data supplier during collection. Furthermore, LAS swath data are checked for positional accuracy. The data supplier should have calculated the Fundamental Vertical Accuracy using ground control checkpoints measured in clear open terrain (see *Vertical Accuracy Review Section*).

Review Required: Yes No

RAW-SWATH LIDAR FILE CHARACTERISTICS

Separate folder for swath/raw LiDAR files

LAS Version: 1.2

Point Record Format: 1

- Each swath file ≤ 2 GB and properly segmented
- Correct and properly formatted georeference information is included in all LAS file headers
- Adjusted GPS time used with the global encoder id set to 1
- Scan Angles conform to USGS base-spec recommendations
- All points set to class '0' (not classified)

Additional comments:

Based on this review, the USGS accepts the swath/raw LiDAR data.

End of Swath/Raw LiDAR Review

Tiled/Classified LiDAR Review Accepted

Classified LAS tile files are used to build digital terrain models using the points classified as ground. Therefore, it is important that the classified LAS are of sufficient quality to ensure that the derivative product accurately represents the landscape that was measured. Classified LAS Tiles are comprised as follows, "all project swaths, returns, and collected points, fully calibrated, adjusted to ground, and classified and cut, by tiles, excluding calibration swaths, cross-ties, and other swaths not used, or intended to be used, in product generation".

Review Required: Yes No

CLASSIFIED LIDAR TILE CHARACTERISTICS

Separate folder for classified/tiled LiDAR files

LAS Version: 1.2

Point Record Format: 1

- Classified LAS tile files conform to project tiling scheme
- Quantity of classified LAS tile files conforms to project tiling scheme

- Classified LAS tile files do not overlap
- Classified LAS tile files are uniform in size
- Correct and properly formatted georeference information is included in all LAS file headers
- Adjusted GPS time used with the global encoder id set to 1
- Classified LAS tile files have no points classified as '12' (Overlap)
- Point classifications are limited to the standard values listed below:

Code	Description	Used
1	Processed, but unclassified	<input type="checkbox"/>
2	Bare-earth/Ground	<input type="checkbox"/>
7	Noise(low or high, manually identified, if needed)	<input type="checkbox"/>
8	Model key points	<input type="checkbox"/>
9	Water	<input type="checkbox"/>
10	Ignored ground (breakline proximity)	<input type="checkbox"/>
11	Withheld (if the "Withheld Bit" is not implemented in the processing software	<input type="checkbox"/>

Additional comments:

Based on this review, the USGS accepts classified/tiled LiDAR data.

End of Tiled/Classified LiDAR Review

Breakline Review Accepted
 Breaklines are vector feature classes that are used to hydro-flatten the bare earth Digital Elevation Models.

Review Required: Yes No

BREAKLINE FILE CHARACTERISTICS:

- Separate folder for breakline files.
- Breaklines contain elevation values.

Elevation values stored in Geometry (ZEnabled)

Units: Meters

- Waterbody Breaklines.

Polyline Polygon

Single elevation value per waterbody feature.

Required.

Waterbody Elevations were created via Proprietary _____ waterbody level techniques.

- Double Line Stream Breaklines (Streams Approximately > 100 ft).
- Single Line Breaklines.
- No missing or misplaced breaklines.

Based on this review, the USGS accepts the breakline files.

End of Breakline Review

DEM Review Accepted

The derived bare-earth file(s) receive a review of the vertical accuracies provided by the data supplier, vertical accuracies calculated by the USGS using supplied and independent checkpoints (*see the prior Vertical Accuracy Review Section*), and a thorough visual review for any anomalies or inconsistencies in assessing the quality of the DEM(s).

BARE-EARTH DEM TILE CHARACTERISTICS:

Separate folder for bare-earth DEM files

Raster File Type: IMG

Raster Cell Size: 1 Meters

Tile bit depth/pixel Type: 3

Interpolation or Resampling Technique: Unknown

DEM tiles do not overlap

DEM tiles conform to Project Tiling Scheme

Tile Index has 274 tiles, yet only 273 DEM and DSM tiles delivered, conflict appears to be 10TFP130930. Contractor states, "We have provided 274 classified LAS v1.2 files and 273 DEM and DSM files. Due to the small area of lidar data coverage in tile 10TFP130930, the IMGs for the DEM and DSM were not able to be created for this tile. However, the classified LAS file was provided for tile 10TFP130930." Acceptable.

Quantity of DEM files conforms to Project Tiling Scheme

Tile Index has 274 tiles, yet only 273 DEM and DSM tiles delivered, conflict appears to be 10TFP130930. Contractor states, "We have provided 274 classified LAS v1.2 files and 273 DEM and DSM files. Due to the small area of lidar data coverage in tile 10TFP130930, the IMGs for the DEM and DSM were not able to be created for this tile. However, the classified LAS file was provided for tile 10TFP130930." Acceptable.

DEM tiles are uniform in size

DEM tiles properly edge match and free of edge artifacts

Tiles are free from Spikes and Pits

Tiles are free from Data Holidays (*voids due to processing or collection errors*)

Tiles do not exhibit systematic sensor error or crowding

DEM tiles are properly Hydro Flattened Yes No

Waterbodies 2 Acres or greater are flattened

Streams 100 ft. or greater are flattened in a downstream manner

Tidal Boundaries/Shorelines are flattened

No missing islands 1 Acre or larger

Bridges/Overpasses are properly removed

Culverts are maintained (Not Hydro Enforced)

Depressions, Sinks, are not filled in (Not Hydro Conditioned)

Vegetation properly removed

Manmade structures properly removed

ADDITIONAL COMMENTS, ERRORS, ANOMALIES, OR OTHER ISSUES:

Tiles recommended for NED 1/3rd: Yes. No.

Tiles recommended for NED 1/9th: Yes. No.

Based on this review, the USGS accepts the DEM tiles.

End of DEM Review

Based on this review, the provided delivery Meets the Contract and/or Task Order requirements.

Additional Comments:

INTERNAL COMMENTS

END OF REPORT (v2.1.1)