

# North Carolina LiDAR

2014+

Multi-phase  
High Resolution  
Coordination

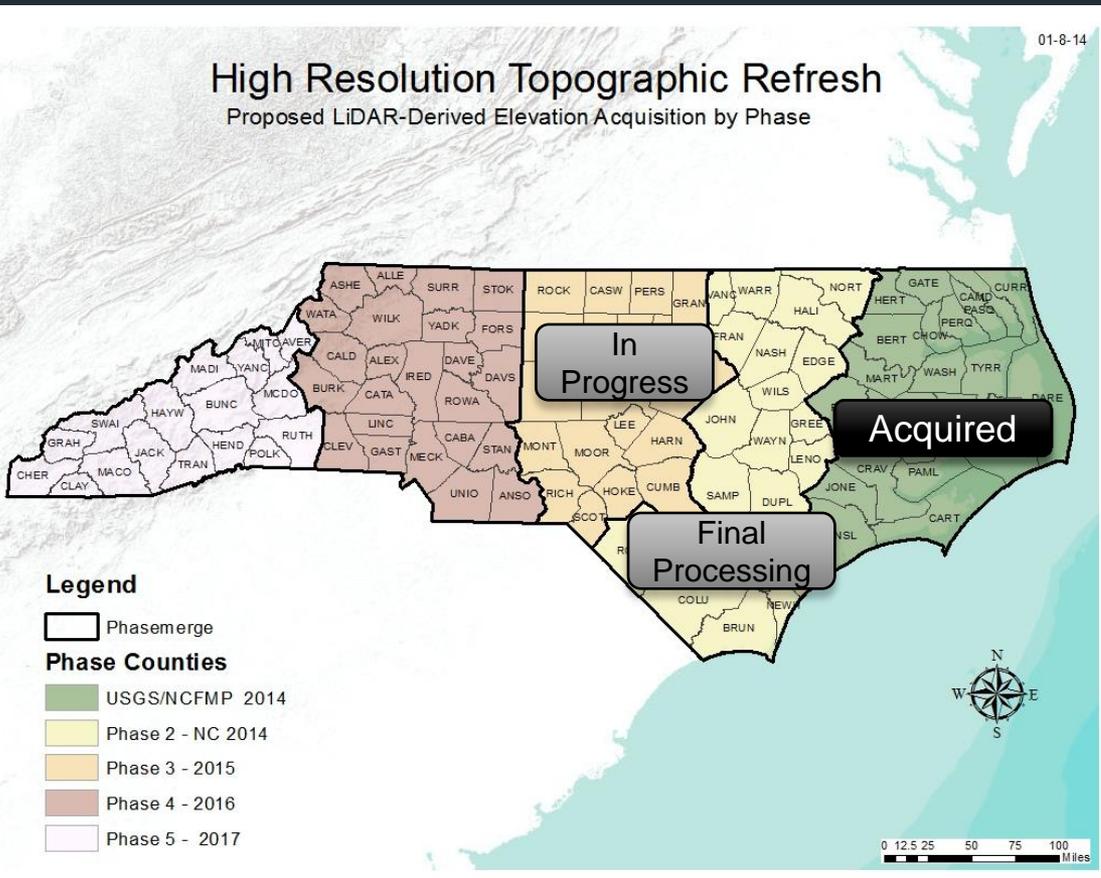
Gary Thompson  
North Carolina Geodetic Survey  
March 2015 NGAC Meeting

# STATEWIDE PHASES

## Original Plan

- The Plan put forward was a 5 phase 4 year plan
- Phase 1- USGS
- Phase 2- NC
- Both occurring in 2014
- Phase 3 – NC (2015)

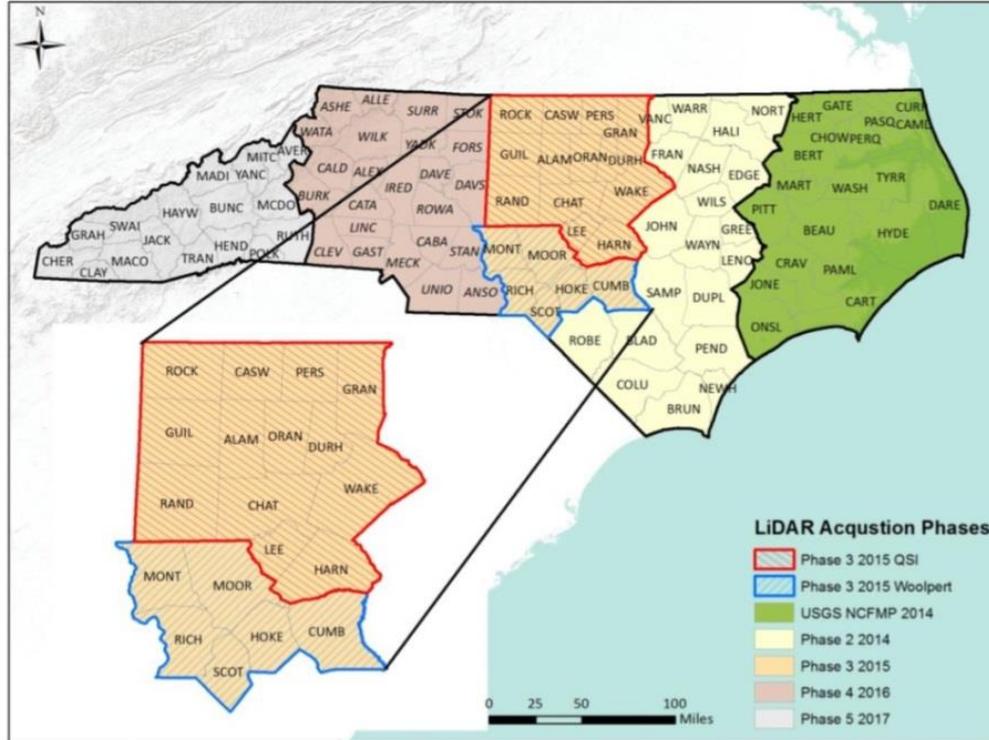
High Resolution Topographic Refresh  
Proposed LiDAR-Derived Elevation Acquisition by Phase



The Plan added Onslow County to Phase 1 with the Coordination effort of NRCS

Therefore moving the NC collection Phase 2 to add Robeson County

# Phase 3 NC Collection 2015



- 3.5 million appropriated by the General Assembly based on value to the state
- 1 million paid by NCDOT.

# State Specifications

## Collection

- The 2014 LiDAR data collection will meet 2 points per square meter standard with nominal post spacing of 0.7 meters.
- All data will include multi-return and intensity values.
- Data collected will support a 9.25 cm (3.36 inches) RMSEz and 18.13 cm FVA based on NDEP guidelines.

# State Specifications

- Classification

Class	Description
1	Processed Unclassified
2	Ground
3	Low Veg/Strata
4	Medium Veg/Strata
5	High Veg/Strata
6	Buildings (Automated)
7	Noise (High/Low)
9	Water (Hydro Cleaned Areas)
12	Flight Line Overlap
13	Roads
14	Bridges
17	Overlap Default
18	Overlap Ground
25	Overlap Water

# LiDAR Classification

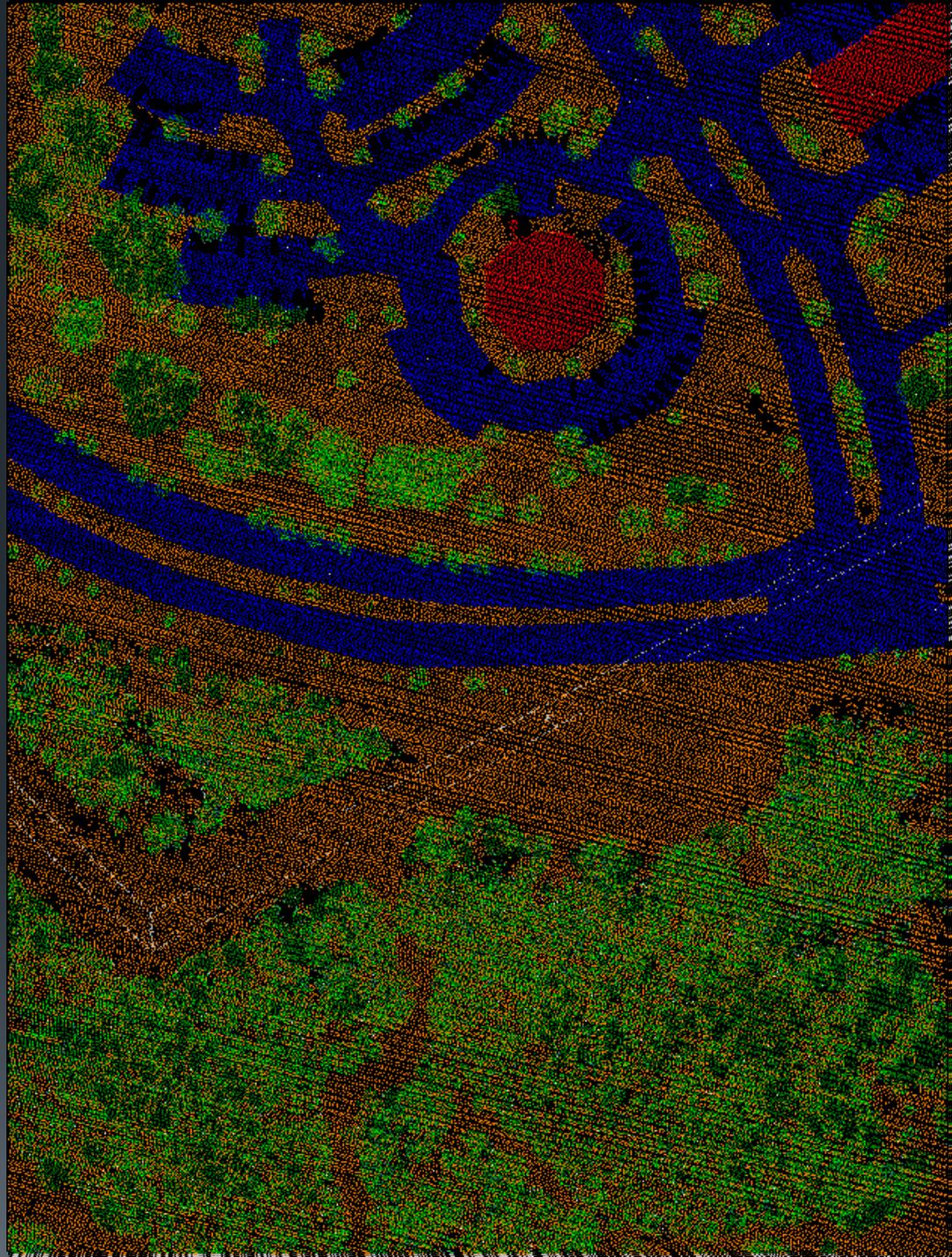
↳ Un-Classified Data

↳ Ground/Bare Earth

↳ Vegetation

↳ Buildings

↳ Roads/Impervious

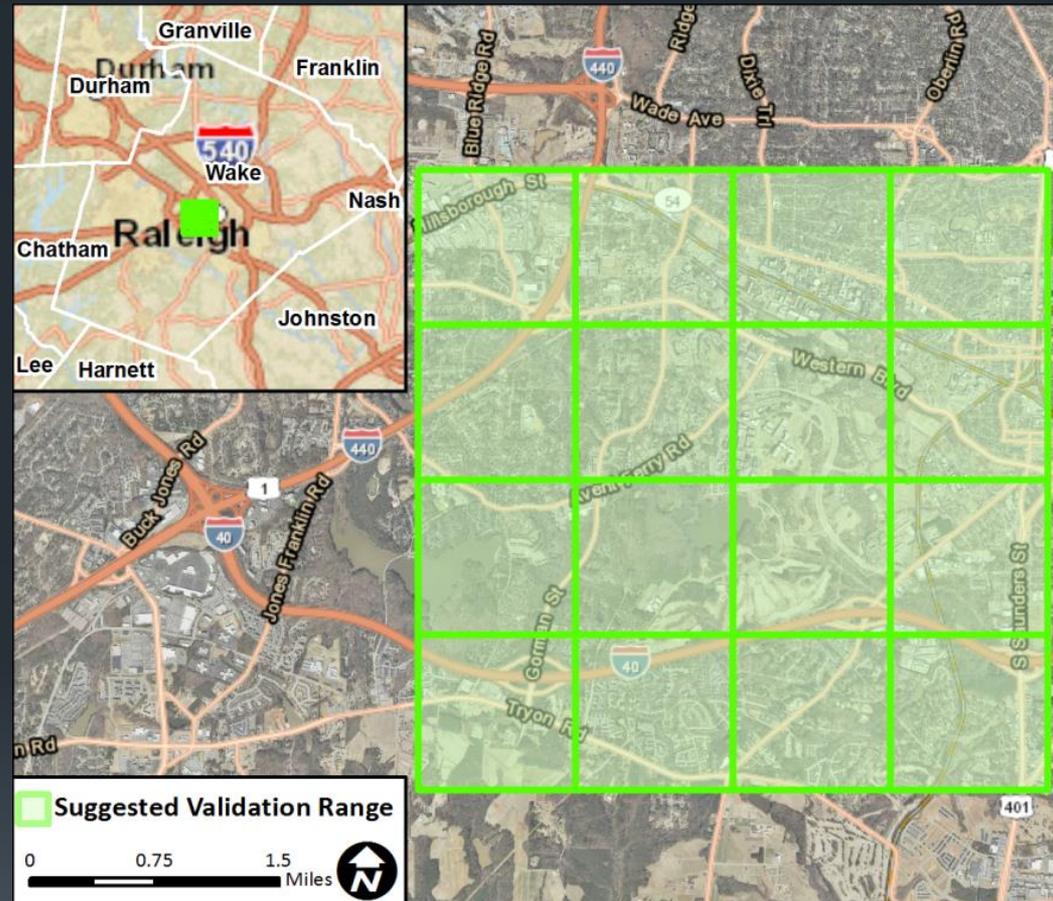


# State Specifications

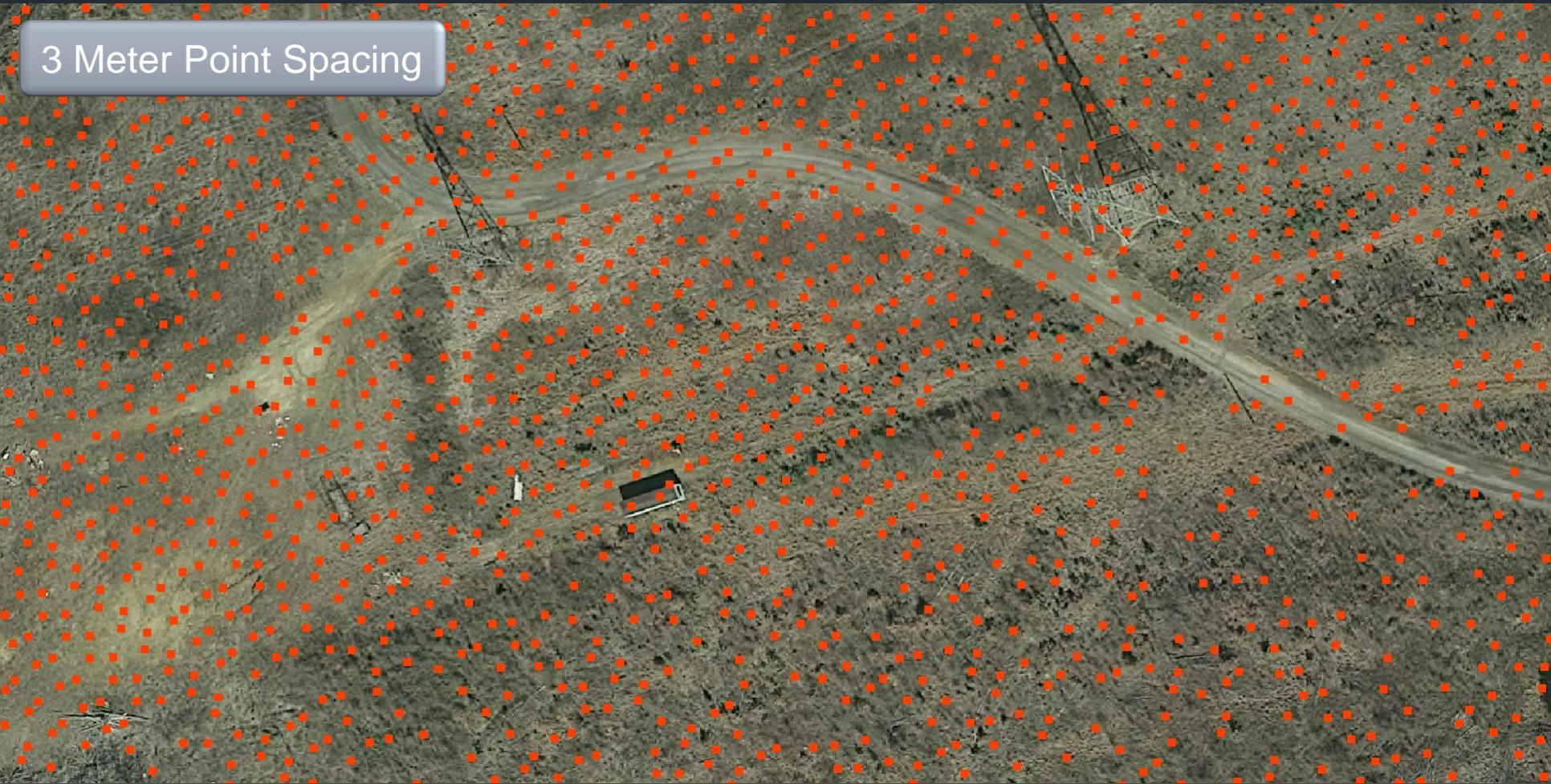
This project has set up an Validation Range

- Flown by each sensor to check horizontal and vertical Accuracy of the collection.
- Gives the teams the capability of adjusting the sensors to match on another
- USGS contractors utilized the validation range

# Validation Range

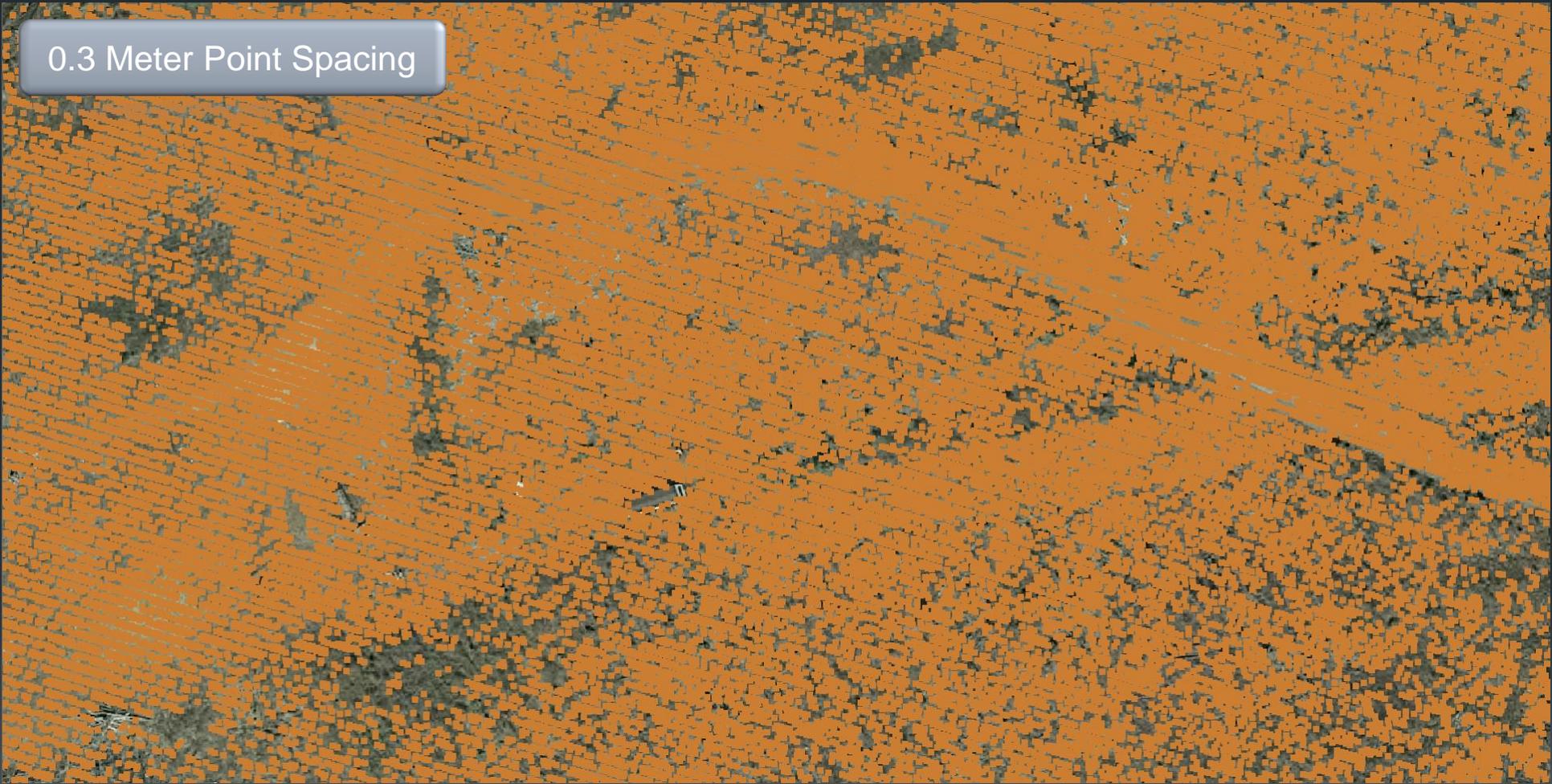


3 Meter Point Spacing

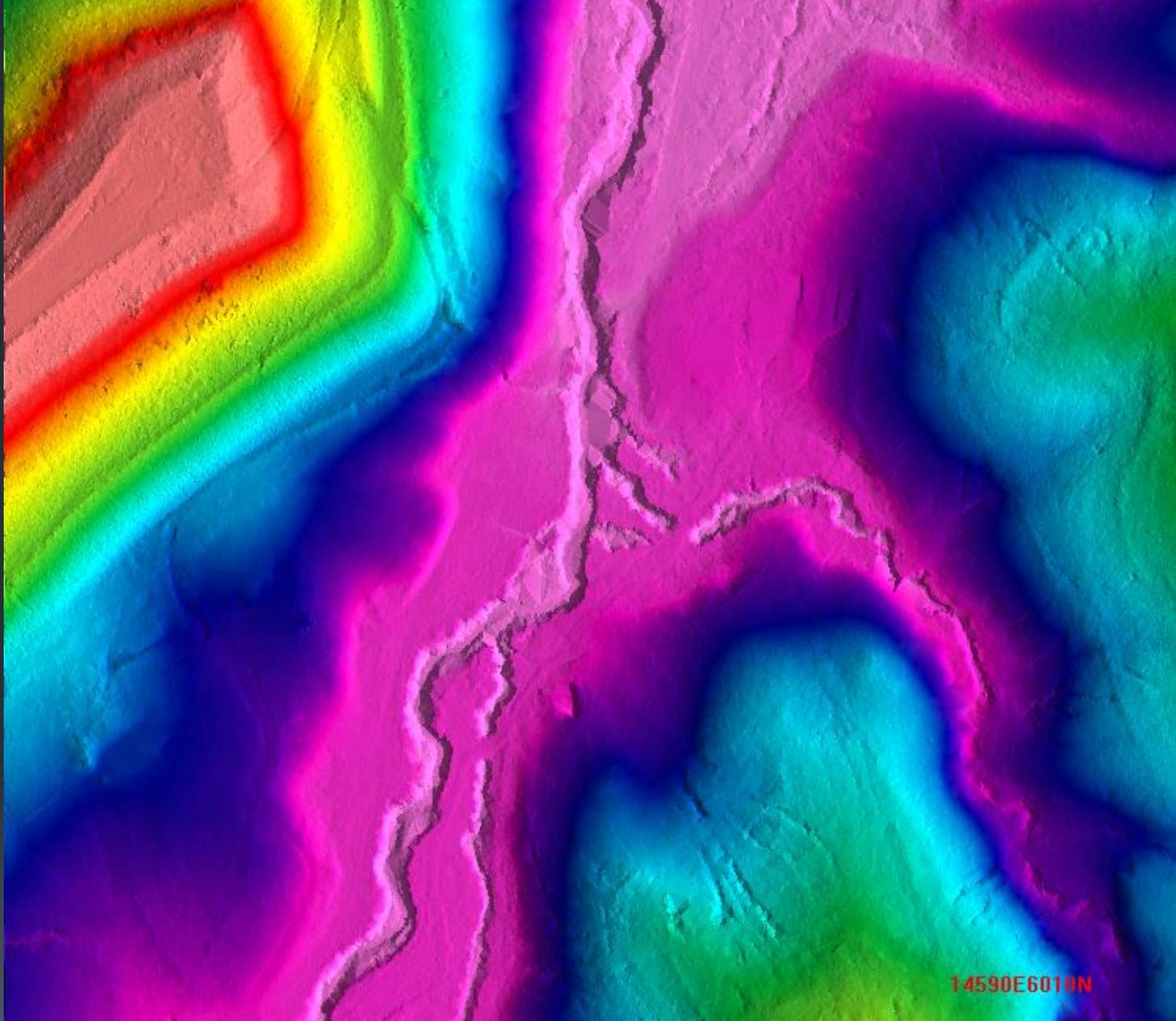


3 Meter Elevation Model (2003 NC LiDAR)

0.3 Meter Point Spacing



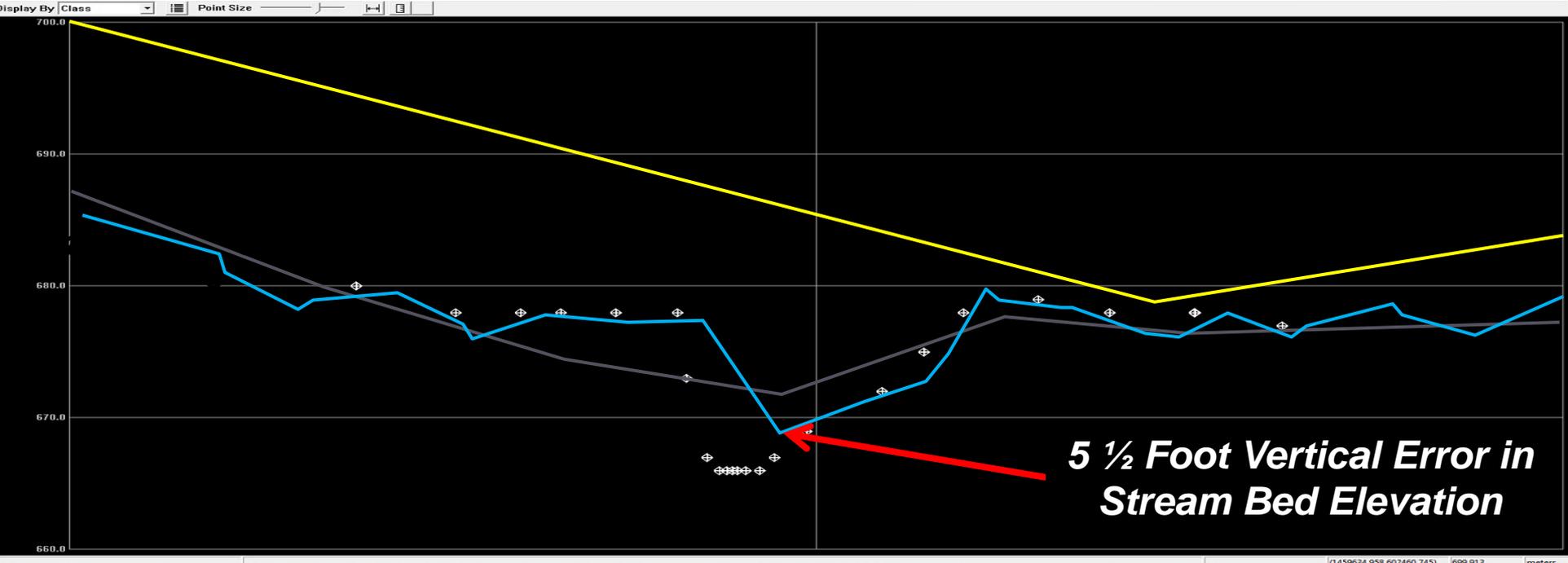
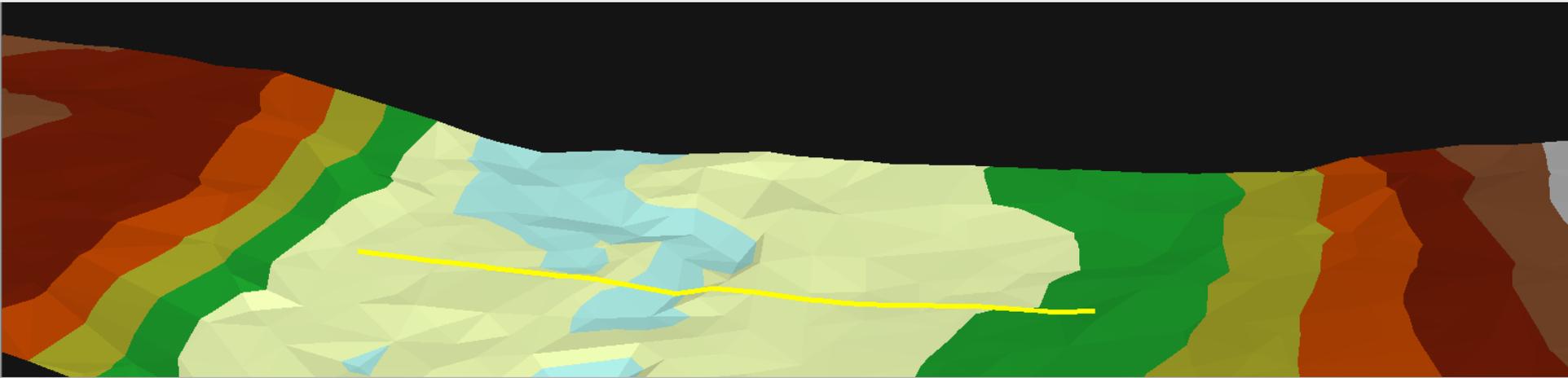
QL2 Elevation Model



QL2 Elevation Model

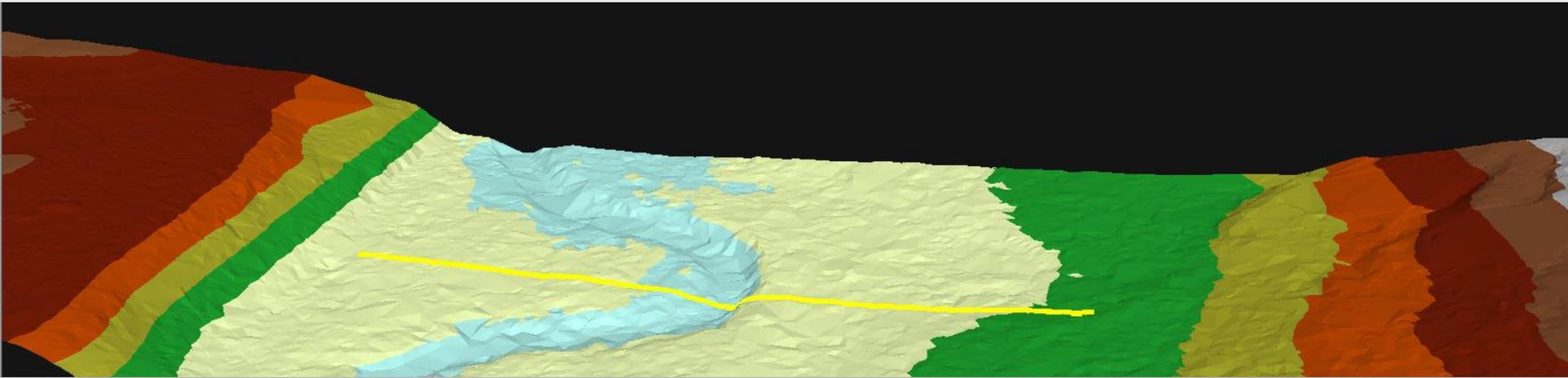
# 4 Meter LiDAR (2003)

\*A more defined surface. Lacks true channel topographic definition.



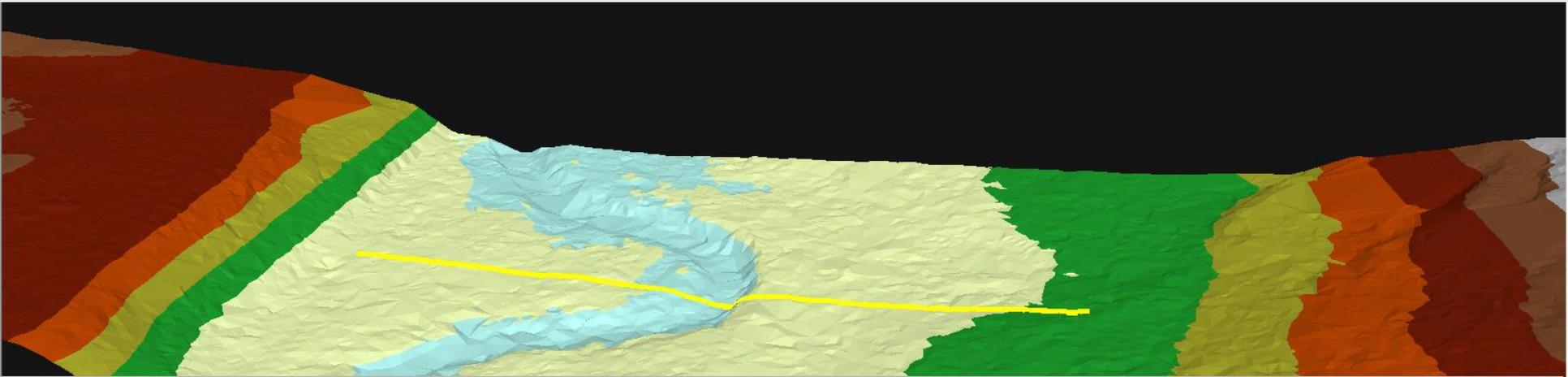
# NC QL2 LiDAR (2014)

\*Nearly mirrors existing high precision survey data.

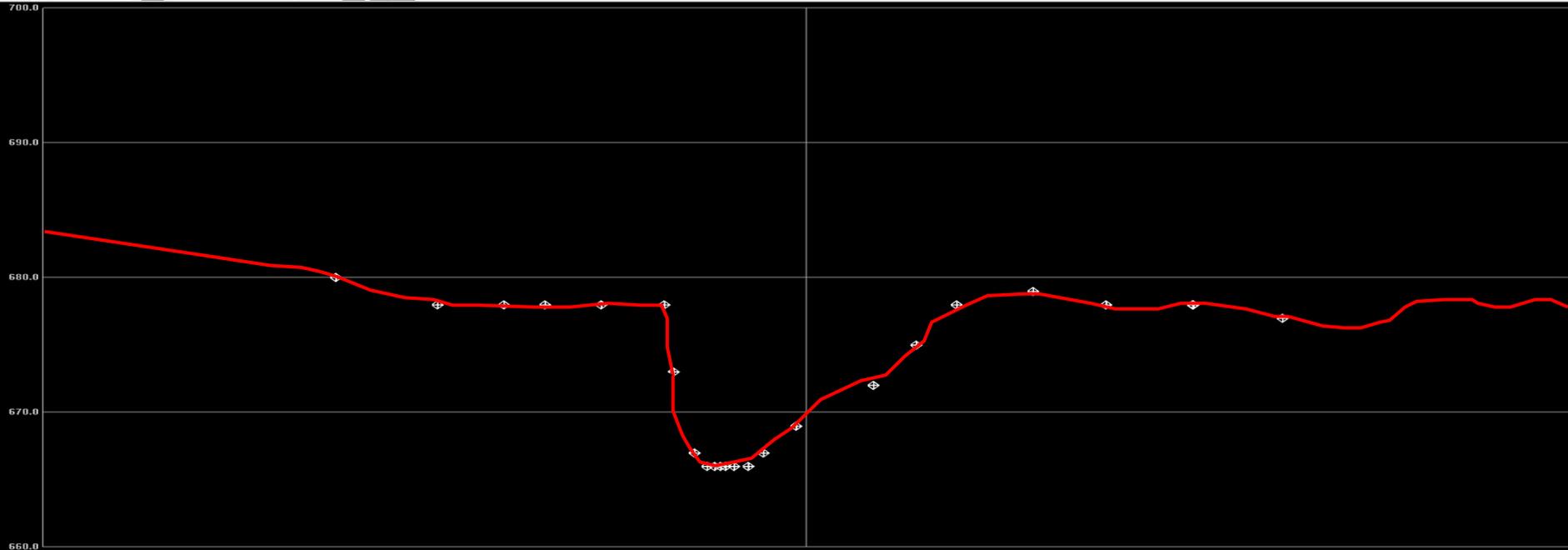


# NC QL2 LiDAR (2014)

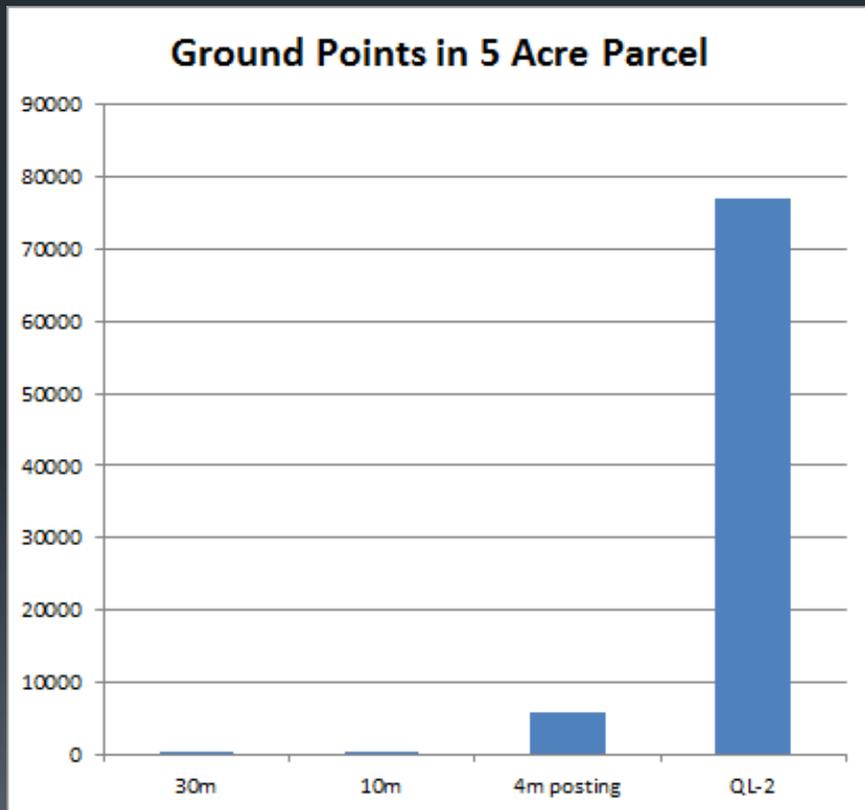
\*Nearly mirrors existing high precision survey data.



Display By Class Point Size

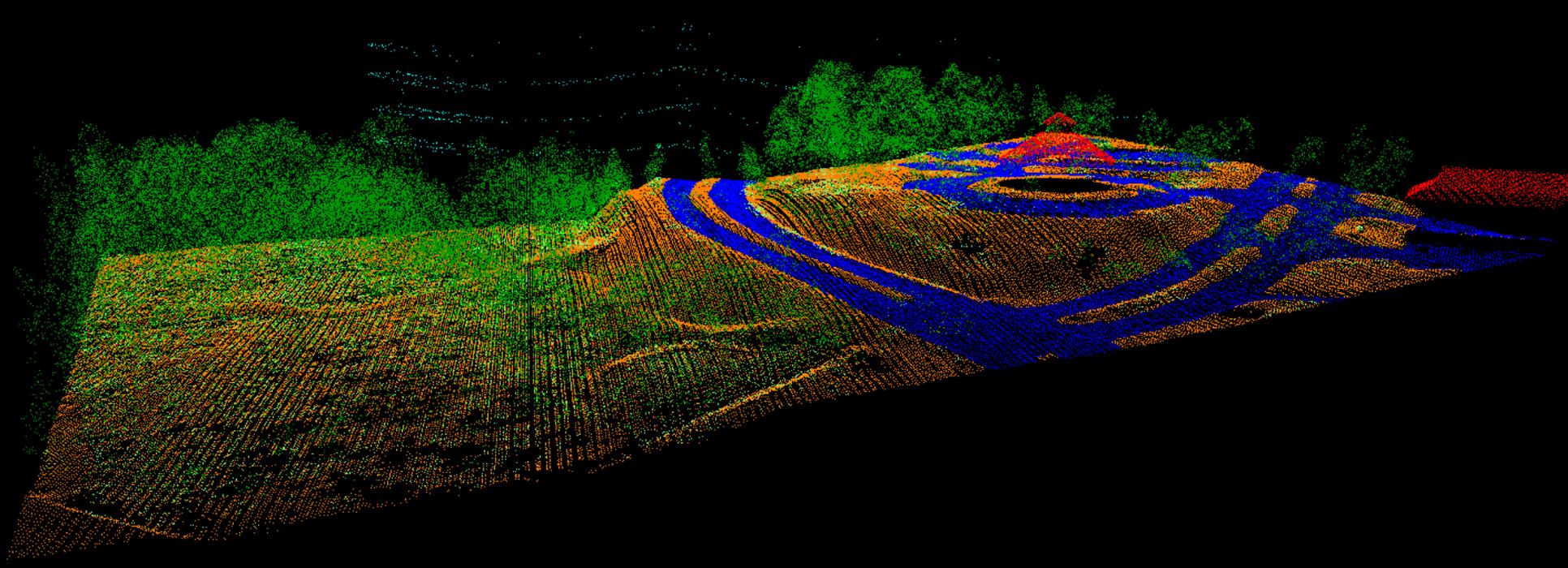
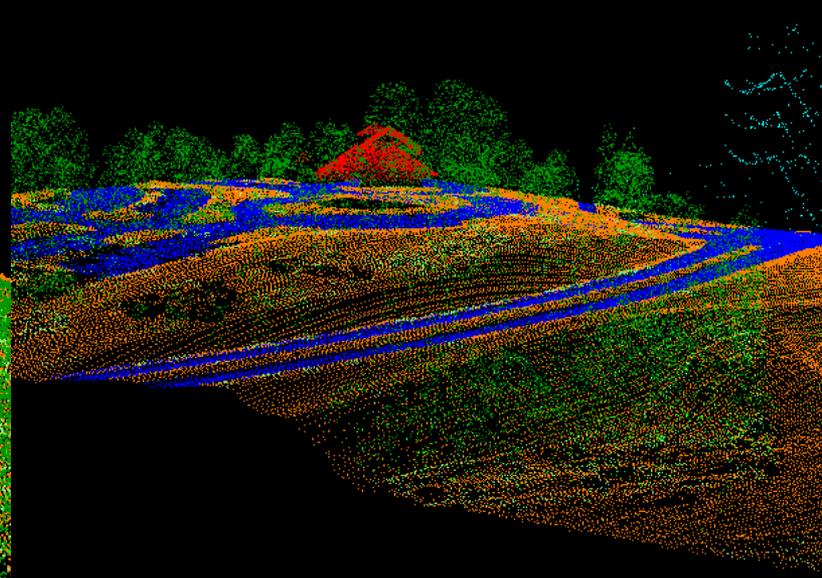
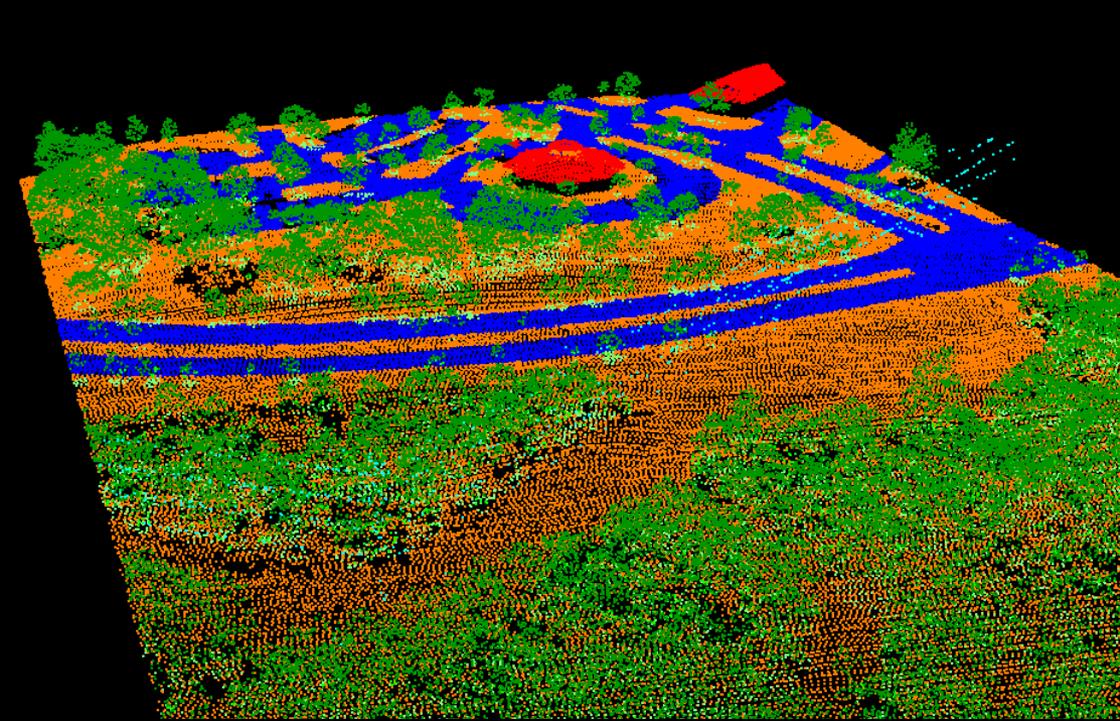


# Summary



LIDAR Quality	Ground Points in 5 Acre Parcel
30m NED	32
10m NED	300
3m (circa 2003)	7,696
QL2	76,957

\*QL2 is a 1,000% increase in analysis points



# RGB Composite LiDAR 3D Fly through

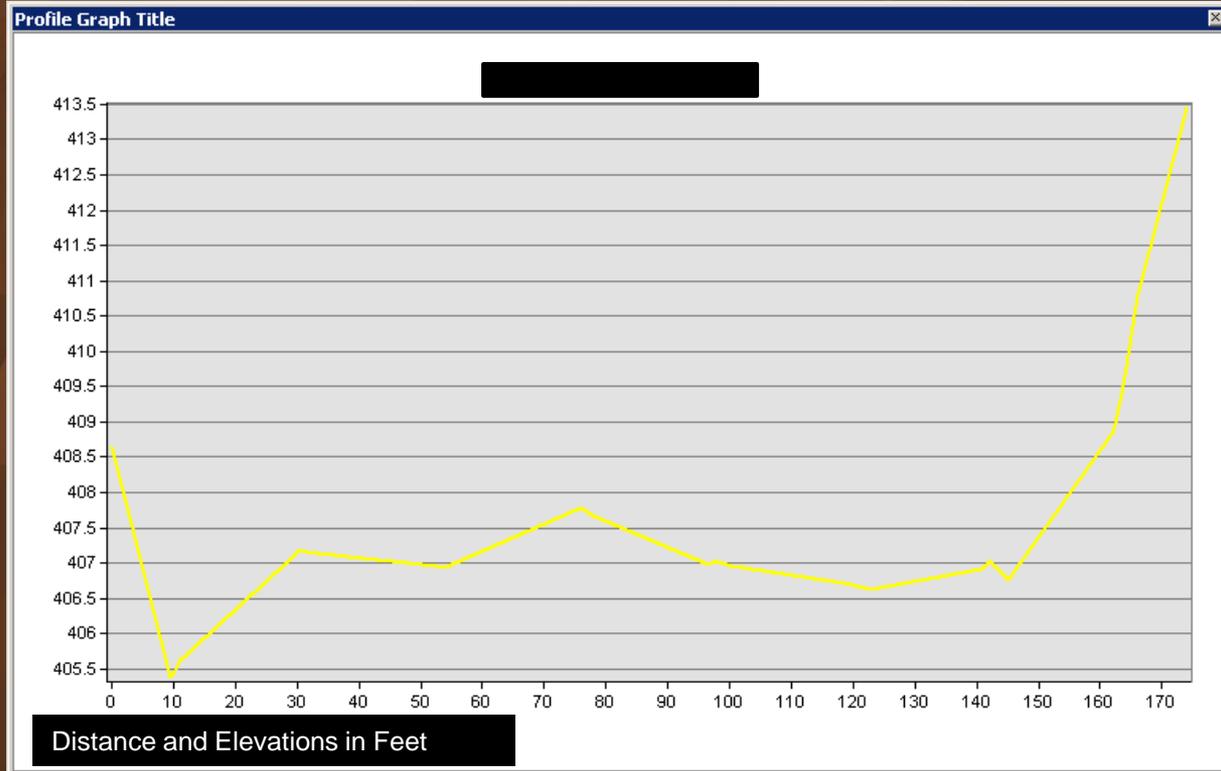


# Road Profile Comparisons



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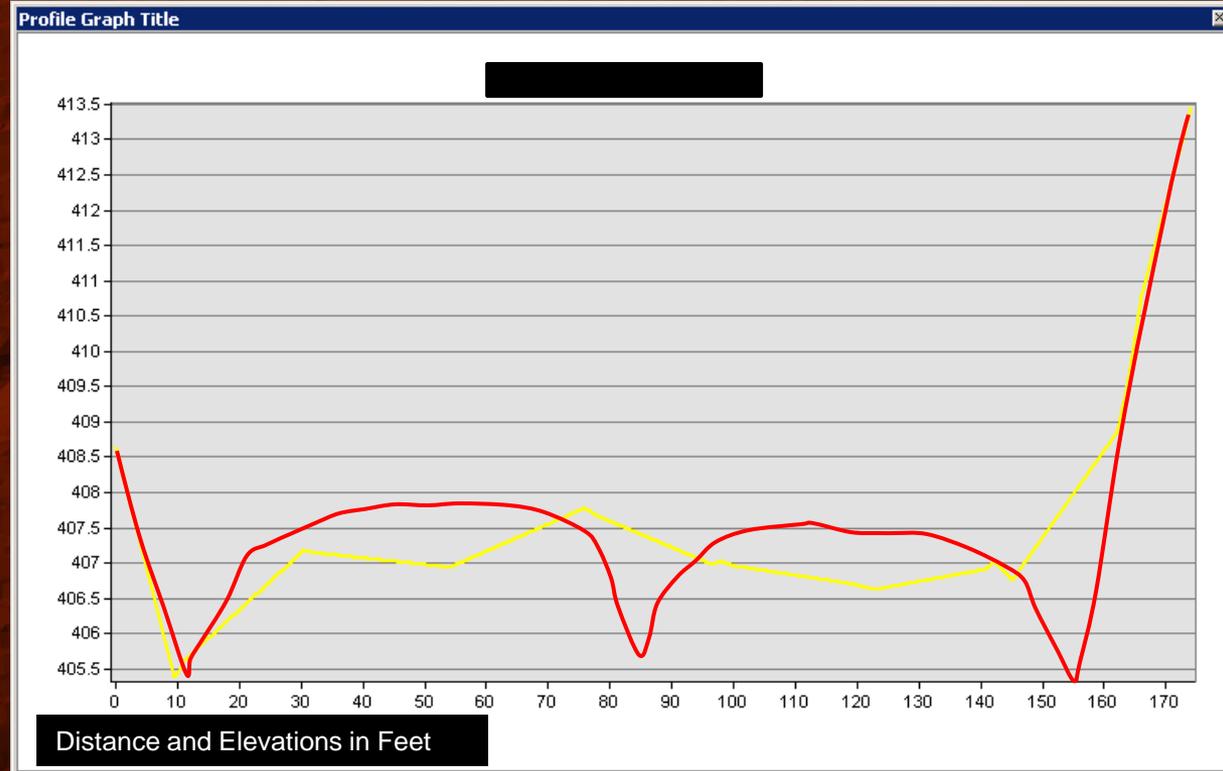
-Existing NC LiDAR TIN and Road Profile



# Road Profile Comparisons

- New QL2 NC LiDAR from 2014
- Much higher definition in road shape and extent

- Provides highly accurate dense data for preliminary designs
- Roads and Bridges are classified in LiDAR
- Create Roadway Ribbons
- Develop 3D road centerlines for analysis
- Aids in Edge of Pavement Detection



# Building Footprint Extraction and Updates

- Buildings are classified within the LiDAR point cloud
- Algorithm looks for planar surfaces with steep edges





What do you see????

What do you see????



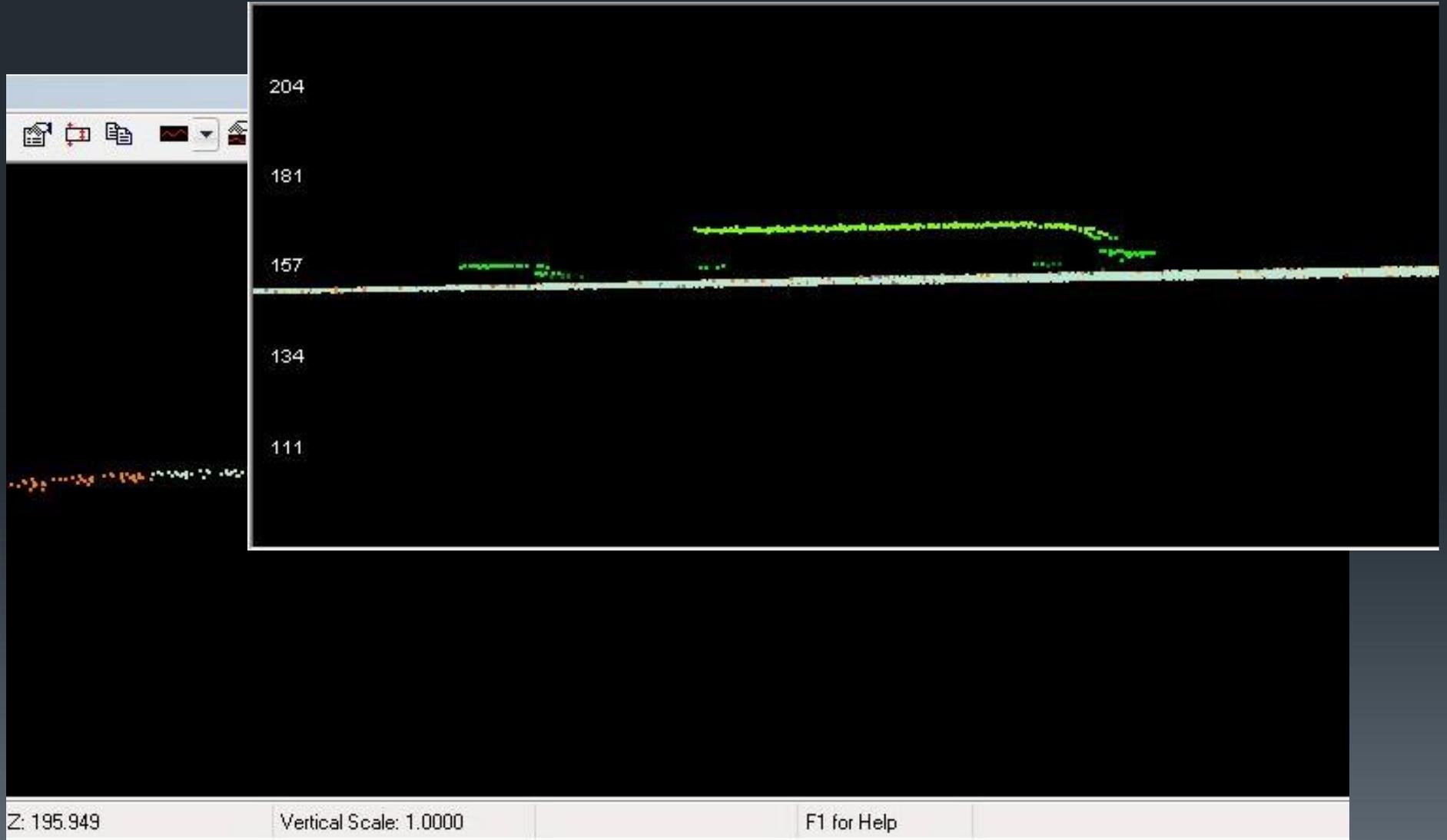


What do you see????

# Neighborhood profile

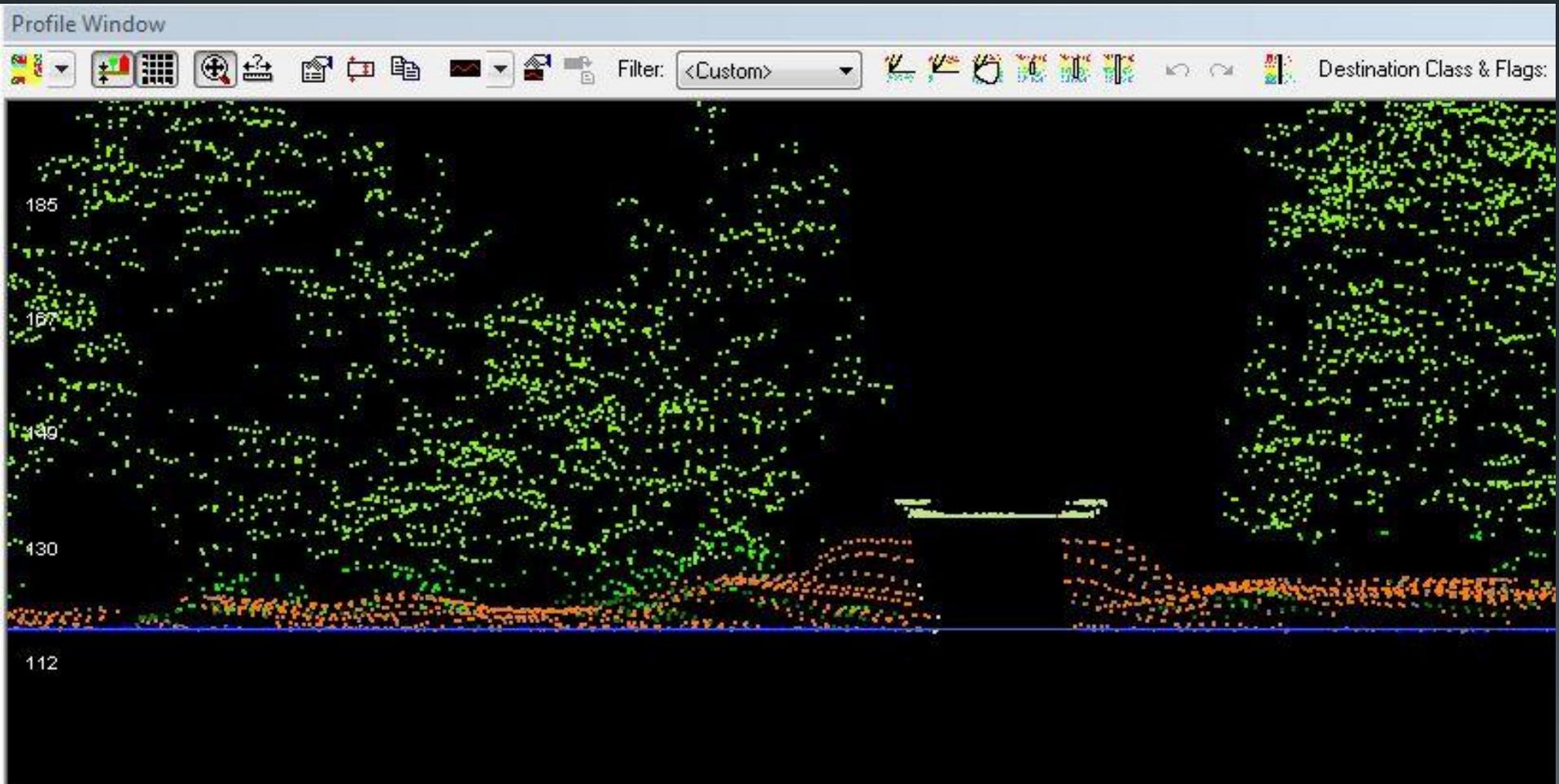


# Vehicles

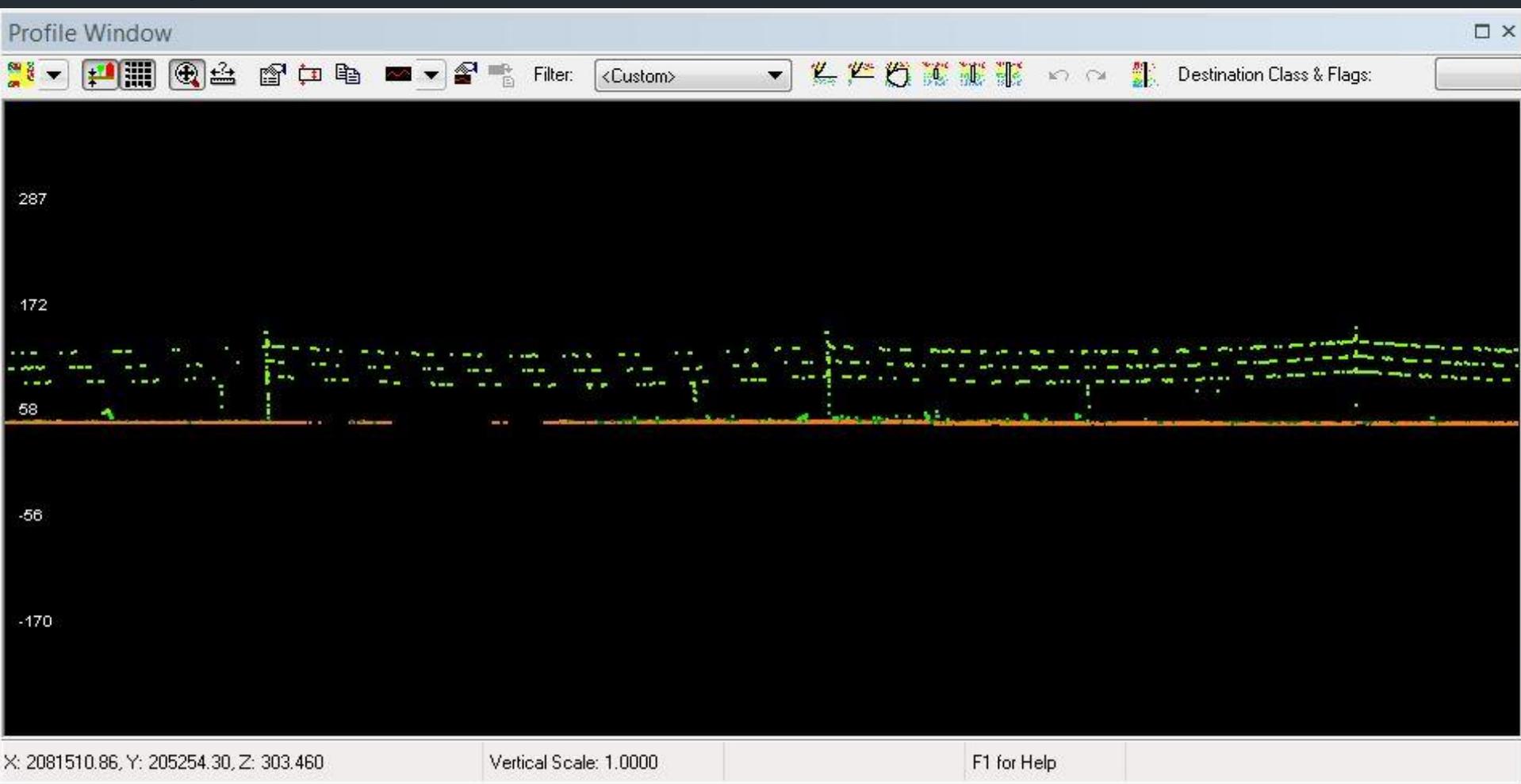


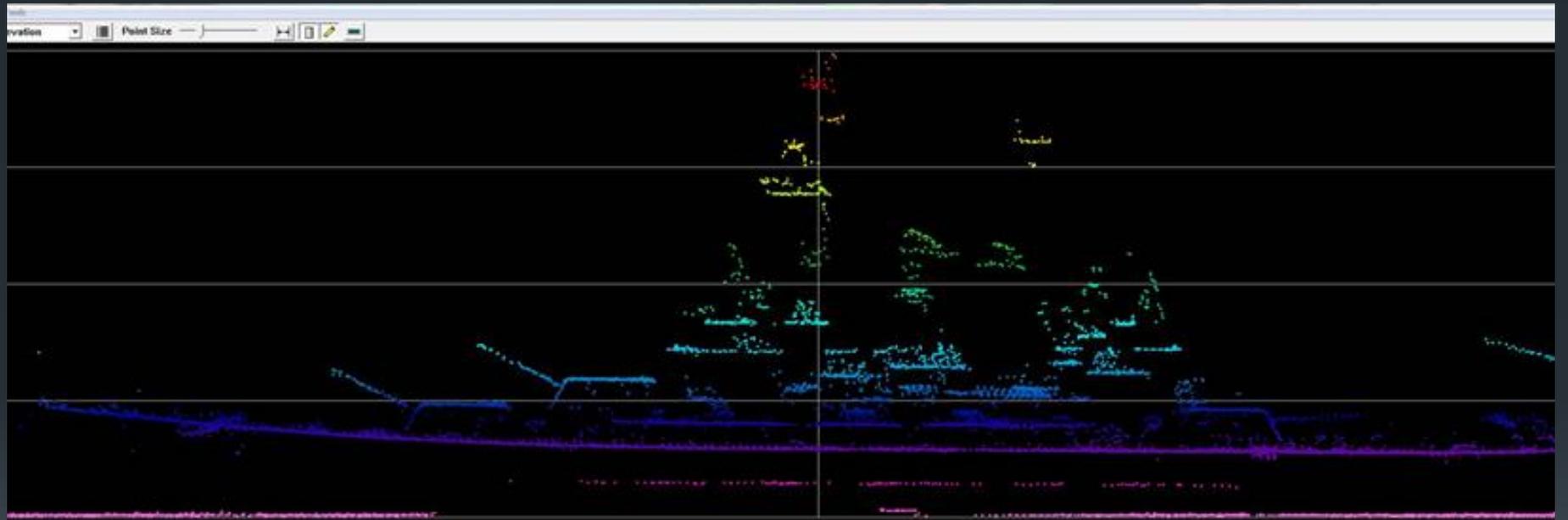


# Bridge Deck



# Utility Profile





# LAS

## Non-vegetated Vertical Accuracy

LandCover Type: 2B, 2U

Minimum DZ: -0.364

Maximum DZ: 0.313

Mean DZ: -0.019

Mean Magnitude DZ: 0.38

Number Observations: 55

Standard Deviation DZ: 0.177

RMSE Z: 0.176



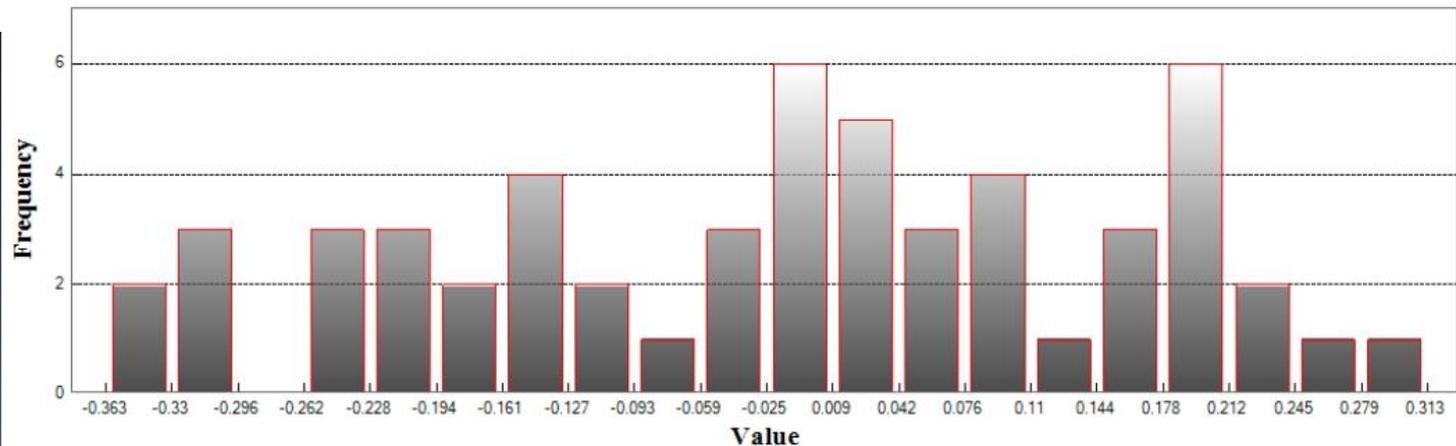
Looking to beat 0.328'

95% Confidence Level Z: 0.345



Looking to beat 0.643'

Units: US Survey Feet



# LAS (Continued)

## Vegetated Vertical Accuracy

LandCover Type: 2L, 2M, 2H

Minimum DZ: -0.748

Maximum DZ: 1.782

Mean DZ: 0.27

Mean Magnitude DZ: 0.577

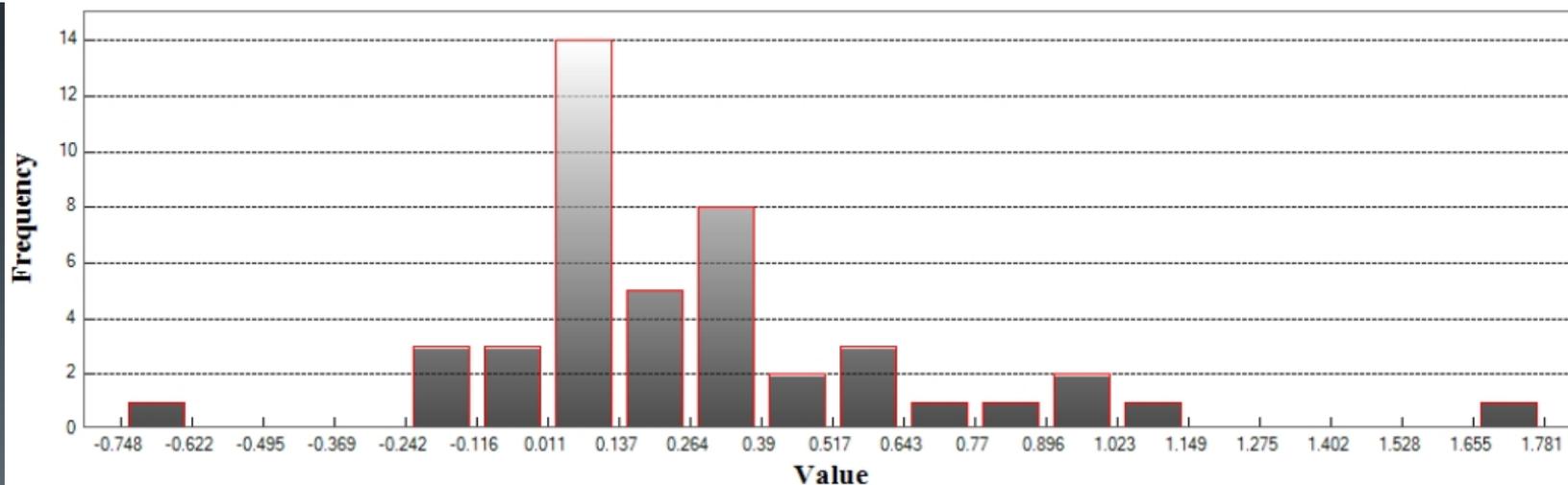
Number Observations: 45

Standard Deviation DZ: 0.41

RMSE Z: 0.487

95th Percentile: 0.965 ← Looking to beat 0.965'

Units: US Survey Feet



Clip and ship?



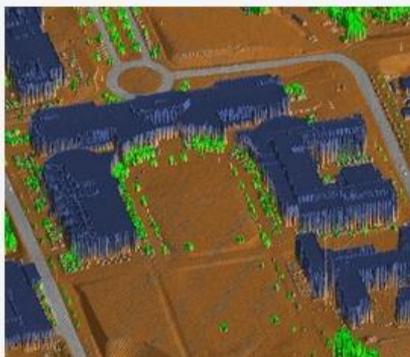
## Login with NCID

A North Carolina ID (NCID) is required.  
Don't have a NCID? Sign up [here](#).

NCID USER NAME:

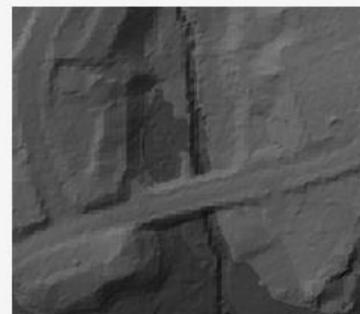
PASSWORD:

## Login here for QL2 LiDAR



This data is Quality Level 2 (QL2) and was collected at a spacing of approximately 2 points per meter. All returns classified data is available.

## Download legacy LiDAR at NC FRIS



All counties in North Carolina currently have legacy bare earth LiDAR from the initial statewide collection conducted from 2001-2005. This data was collected at a spacing of approximately 1 point per 3-4 meters.



### This is a beta version of the Spatial Data Download site.

This is not the final version and you may encounter downtime, errors or bugs. If you do: [Email Your Feedback](#)

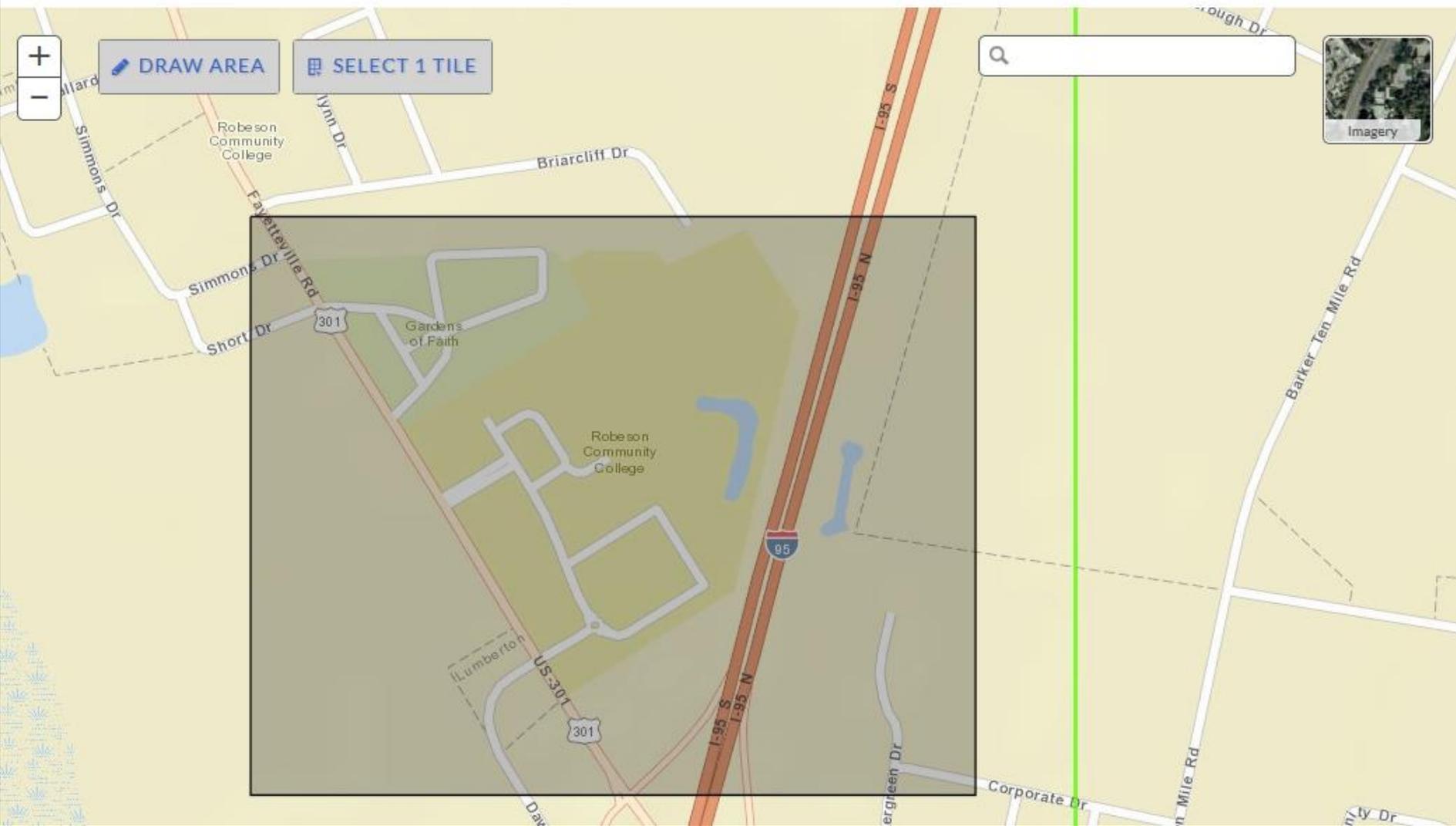
NCFMP will not be liable for any loss suffered by any party as a result of their use of the site. Any downloading of material is done at the users own risk and the user will be solely responsible for any loss that results from such activities.



❓ QL2 LiDAR is available on the **green areas** on the map. To select an area crossing multiple tiles, click "Draw Area" and then draw a small box on the map. Areas must be less than 4 tiles.

❓ Click Next to Continue

NEXT



## QL2 LIDAR DATA DOWNLOAD

To request an entire city or county, go to the [Large Data Request](#) page. Download legacy LiDAR at [NC FRIS](#)



Select Area



Select File Output



Submit Request

Select the classes of LiDAR you wish to include in your output **.LAS** file.

ALL CLASSES

This dataset contains all classes including ground, roads, vegetation and water

BARE EARTH

This dataset represents the earth's surface with all vegetation and human-made structures removed. The output .LAS file will contain classes 2 (Ground) and 13 (Roads).

INDIVIDUAL CLASSES

- Ground
- Strata/Vegetation
- Buildings
- Roads
- Bridges

PREVIOUS

SUBMIT REQUEST





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Select Area



Select File Output



Submit Request

**Your request has been submitted!**

Jobs are processed in the order they are received and may require up to 24 hours for processing. You will receive an email from [rmclipandship@ncdps.gov](mailto:rmclipandship@ncdps.gov) when your files are ready for download. Please make sure to add [rmclipandship@ncdps.gov](mailto:rmclipandship@ncdps.gov) to your safe sender list.

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**SPATIAL**  
Data Download

NC Floodplain Mapping Program  
4105 Reedy Creek Drive  
Raleigh, NC 27607

Mailing Address  
4218 Mail Service Center  
Raleigh, NC 27699-4218

Phone: (919) 715-5711

## REQUEST SUMMARY

Request Summary

-  Click the column names to sort your requests.
-  Pending requests may take up to 24 hours to process. You will receive an email when your data is ready for download.
-  Click the Download button to access your completed data request files.

Status	ID	Date	Type	
 Pending	61	3/11/2015 9:30:40 AM	Rectangle	
 Complete	32	3/2/2015 1:54:51 PM	Rectangle	<a href="#">↓ DOWNLOAD</a>

Your Spatial Data Download Job #61 is complete.

**Selected Area (NC State Plane Feet)**

Min X: 1,996,197.63

Min Y: 335,246.80

Max X: 1,999,539.66

Max Y: 337,937.92

The the data will be available for download for 3 days.

**Download Files**

Files are zipped using open source 7-Zip compression (.7z file type). 7-Zip is free and does not require registration.

**Download 7-Zip**

If you have any questions, please contact Hope Morgan at [hope.morgan@ncdps.gov](mailto:hope.morgan@ncdps.gov) or John Lay at [john.lay@ncdps.gov](mailto:john.lay@ncdps.gov).

*Thank you for using [Spatial Data Download!](#)*

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