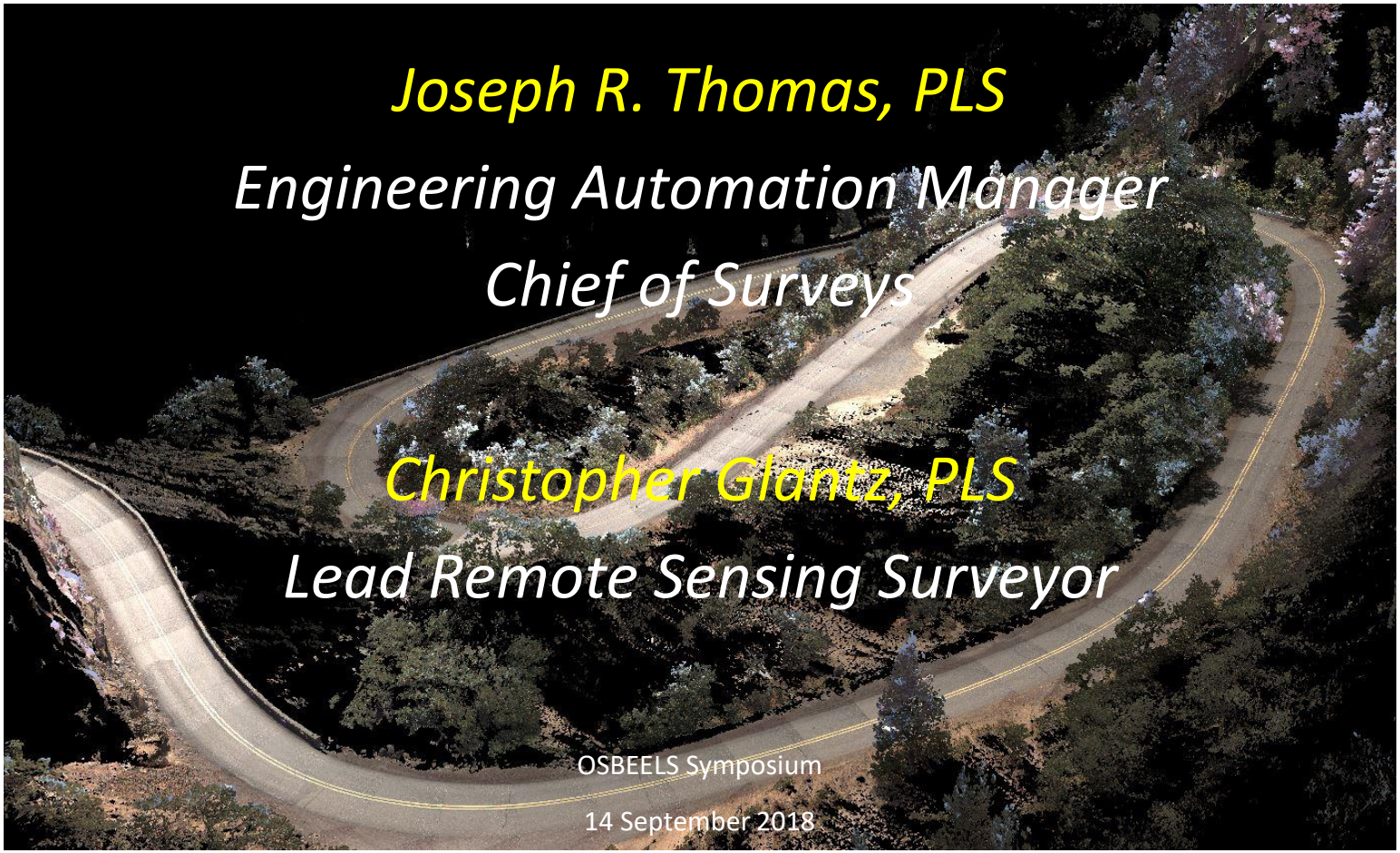
# Unexpected Uses of Geospatial Data

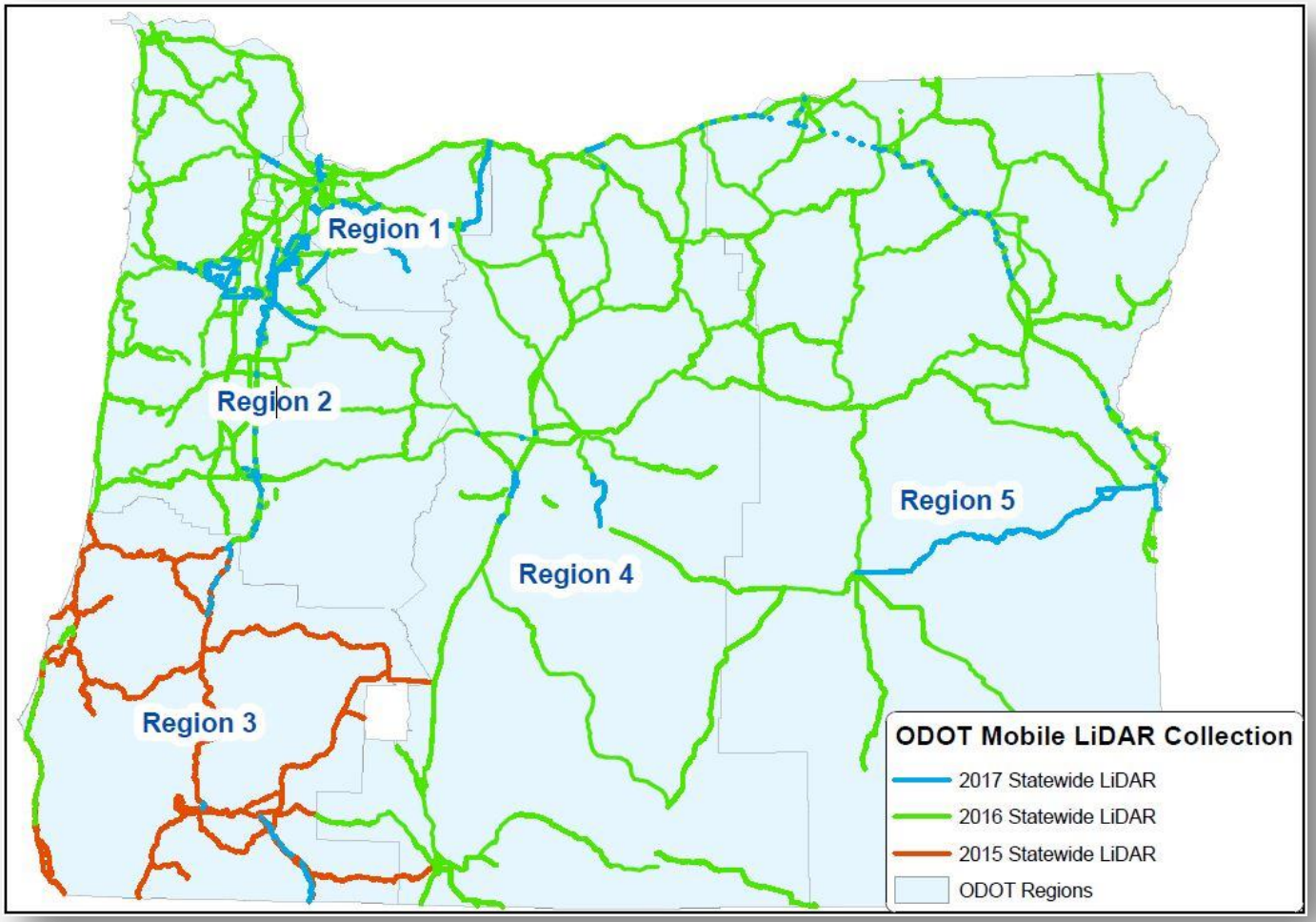


# Lidar at ODOT

## Leica Pegasus: Two


Photo Courtesy of ODOT

# ODOT's Mobile Lidar Program

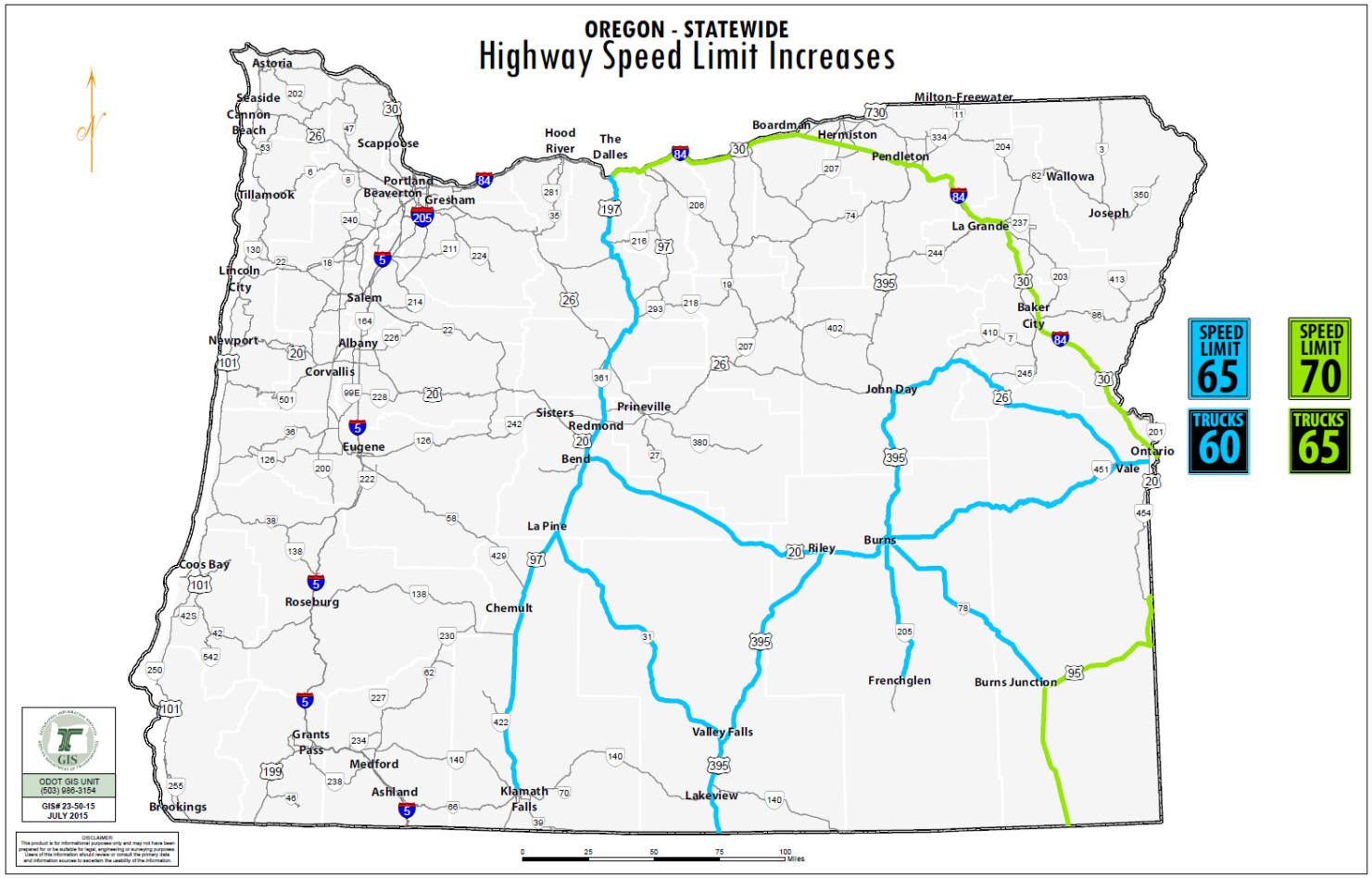


# ODOT's Mobile Lidar Program

# Ex. 1 – Changing Highway Speed Zones

- HB 3402 – What is it?
  - 2015 legislative action
  - Raised legal speed on the main Eastern Oregon highways
  - Speeds on these highways are Speed Limits as of March 1, 2016

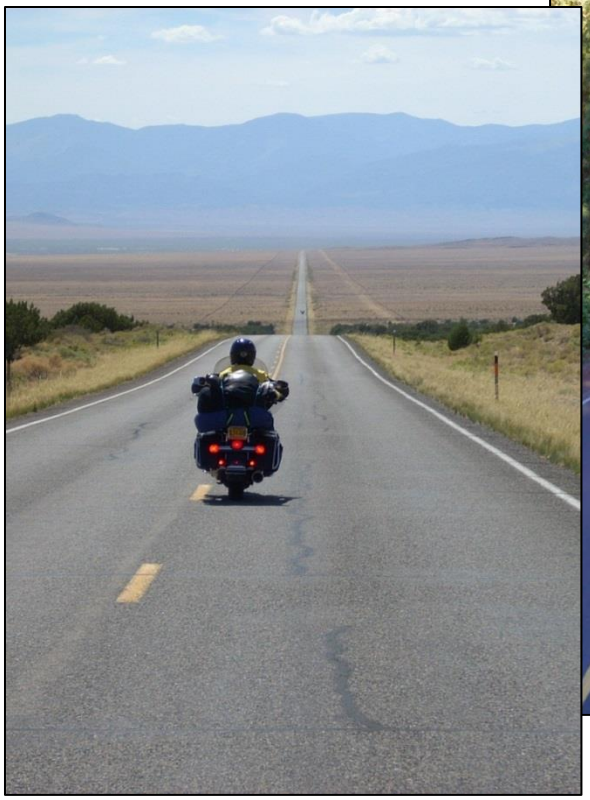
# HB 3402 – What is it?



# Implementation – No-Pass Zones

- Higher speed = longer distance to pass
- Longer distance to pass = longer sight distance
  - 5 mph = 100 feet additional passing lane distance

| Speed Limit | Min. Passing Sight Distance |
|---|---|
| 55 mph | **900 ft.** |
| 65 mph | **1100 ft.** |
| 70 mph | **1200 ft.** |



# No-Pass Evaluation – Std. Method

# Run Sight Distance Check

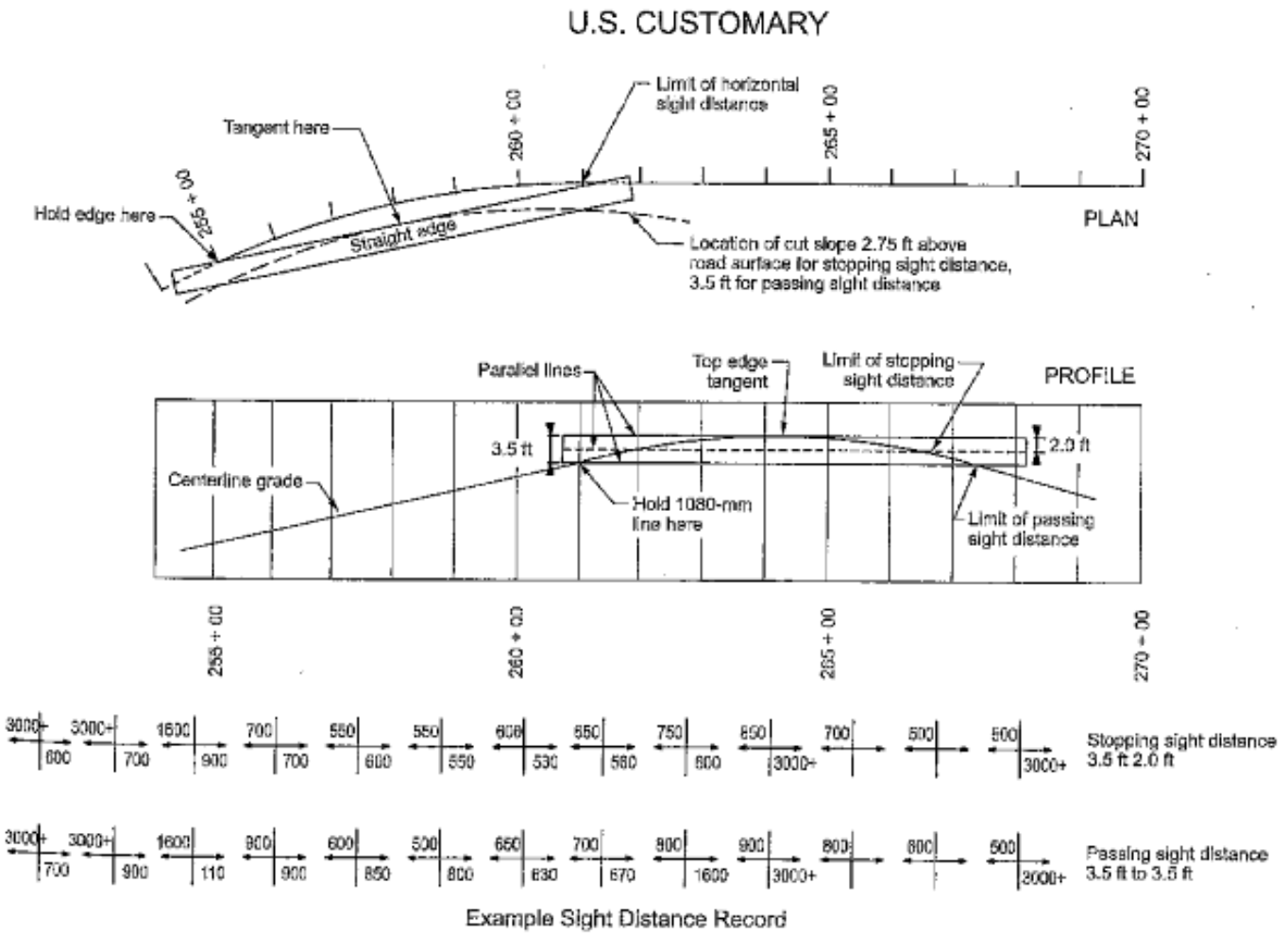
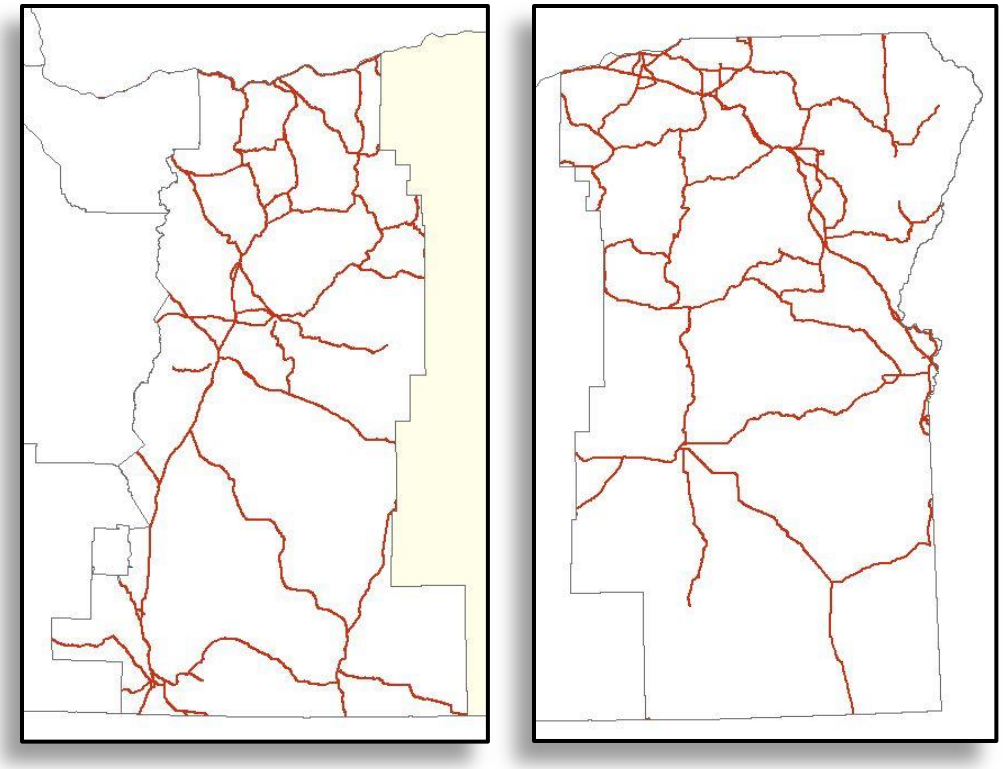


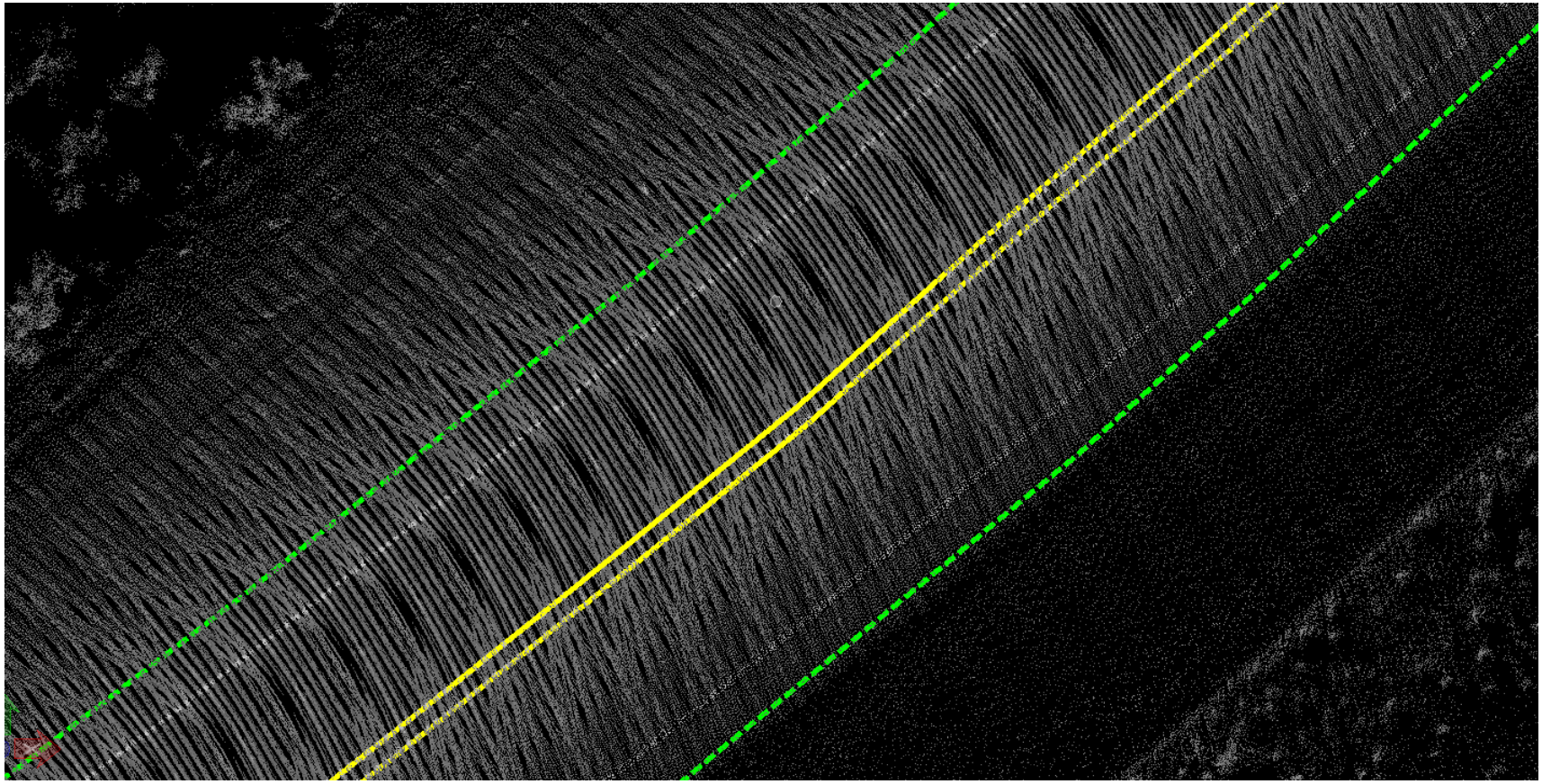

**Figure 3-2. Scaling and Recording Sight Distances on Plans**

# Data Source for Project

- Mobile lidar data was previously acquired in Region-wide collections
  - Region 4 - 2013
  - Region 5 - 2014

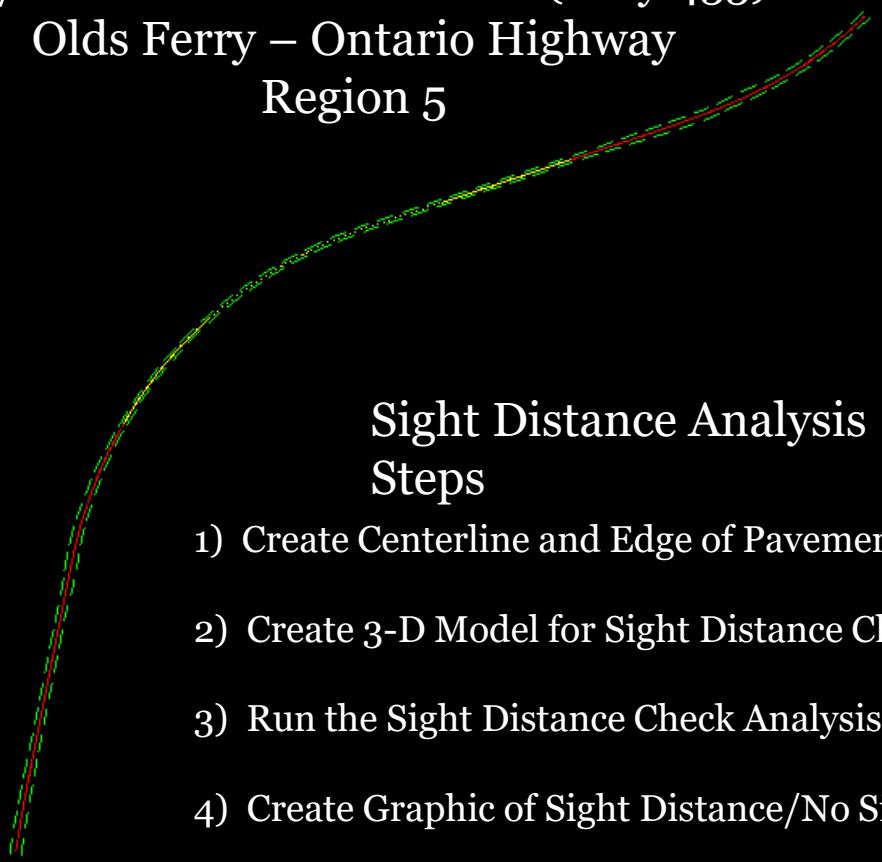


# Mapping & Automated Analysis



# Mapping & Automated Analysis

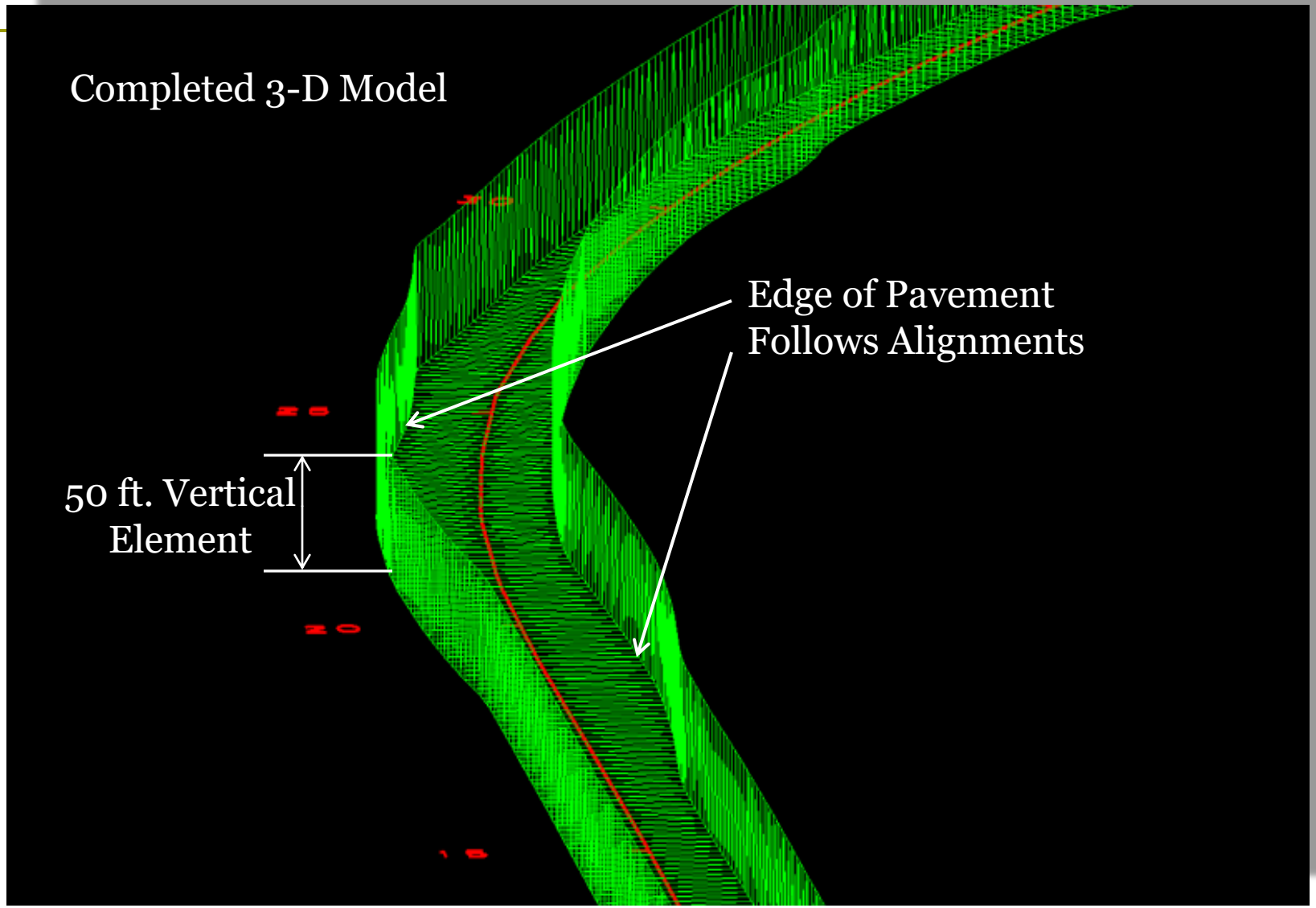
1-1/2 Mile Section - OR 201 (Hwy 455)
Olds Ferry – Ontario Highway
Region 5



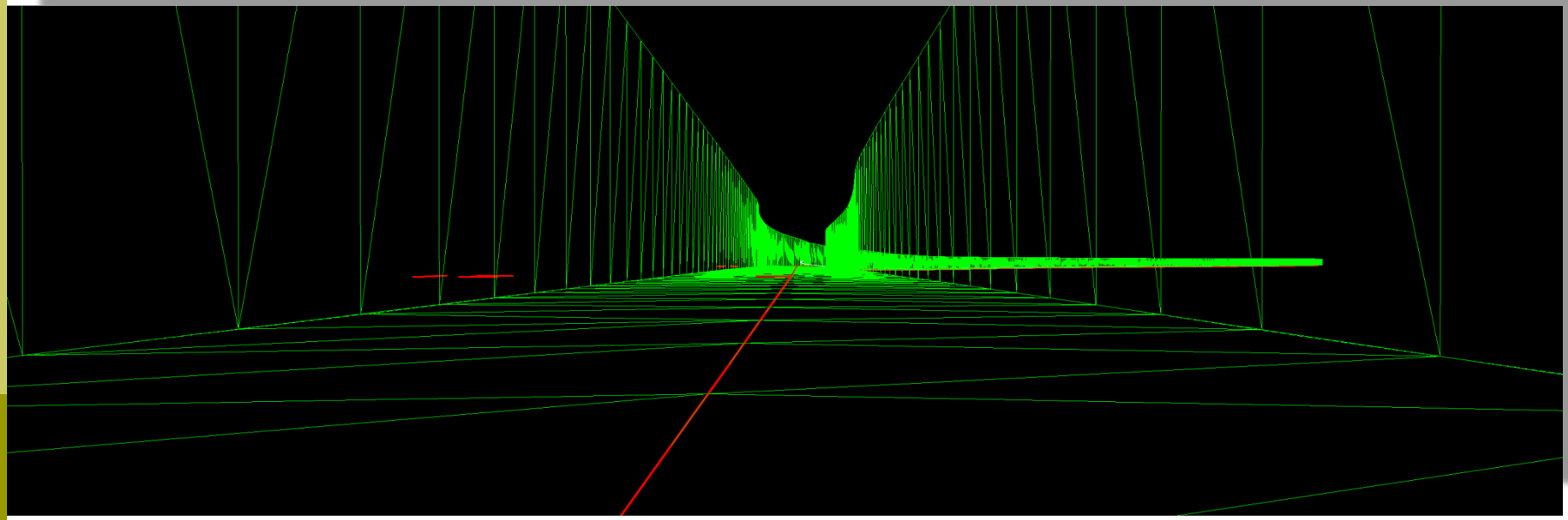

Sight Distance Analysis
Steps

1) Create Centerline and Edge of Pavement Alignments
2) Create 3-D Model for Sight Distance Check From Alignments
3) Run the Sight Distance Check Analysis Software Tool
4) Create Graphic of Sight Distance/No Sight Distance Areas
5) Attach Vertical Profile of Roadway for Final Verification

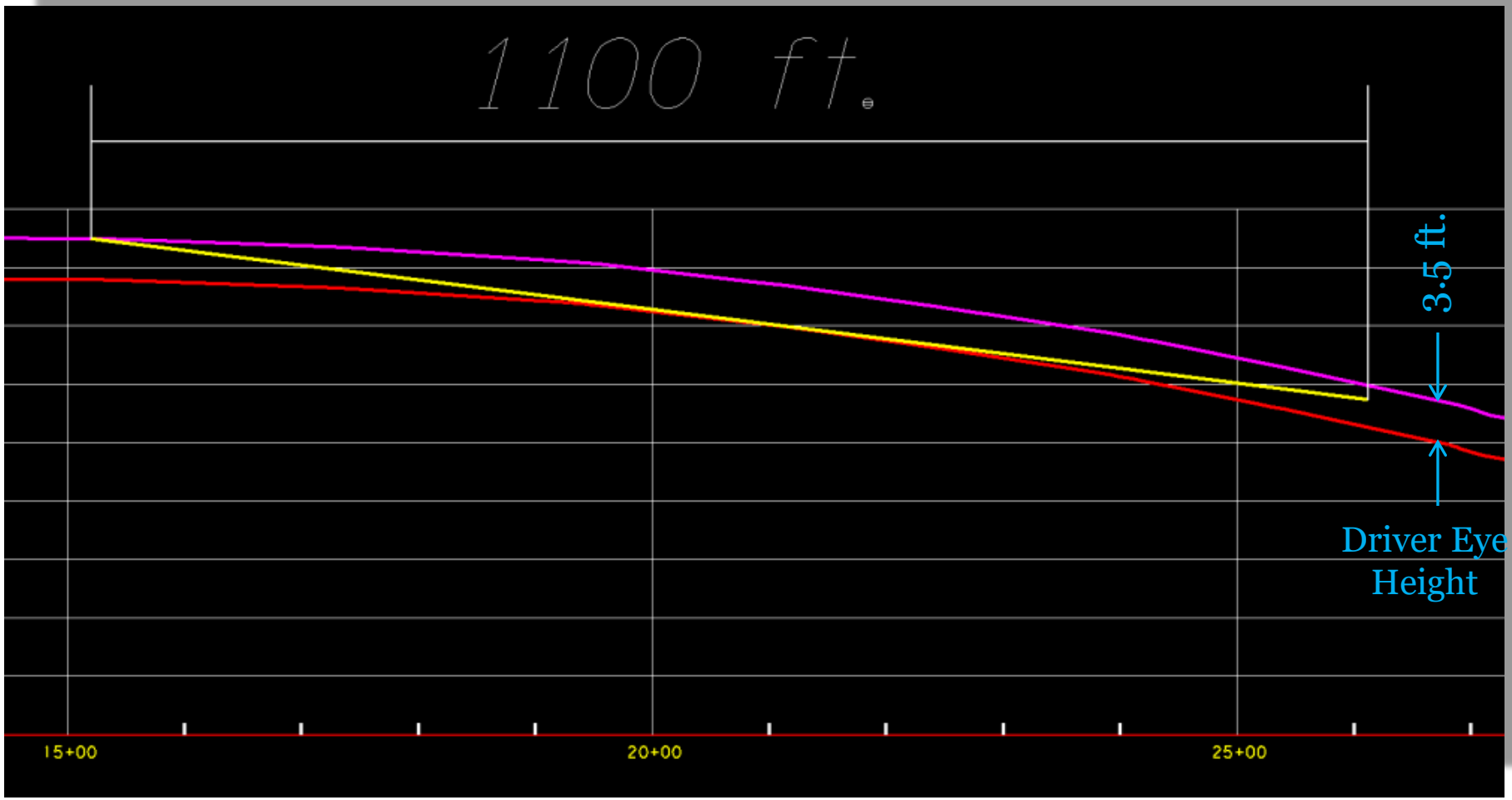
# Create 3-D Model for Sight Distance Check



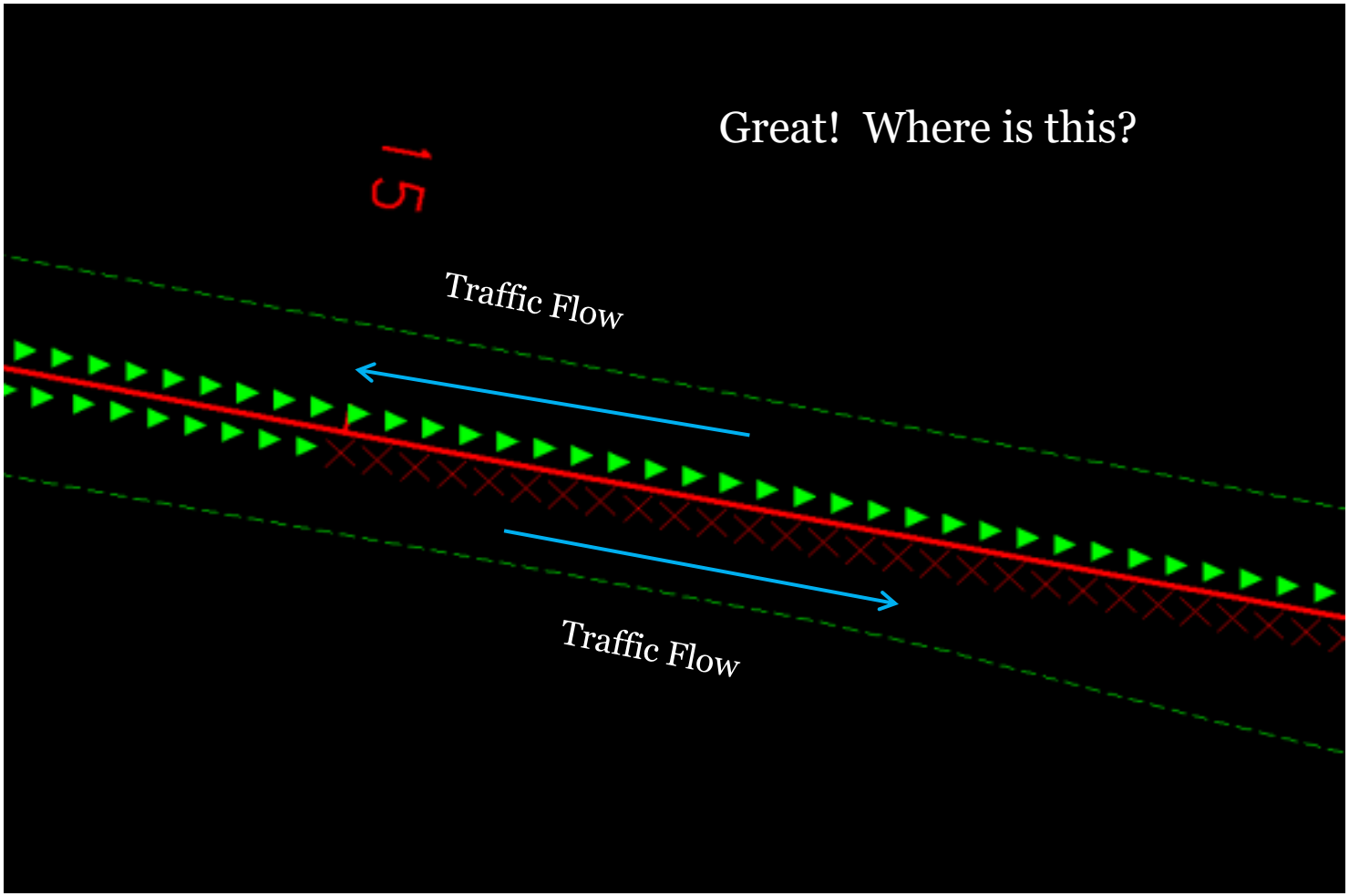
# Roadway Level View of Completed Model

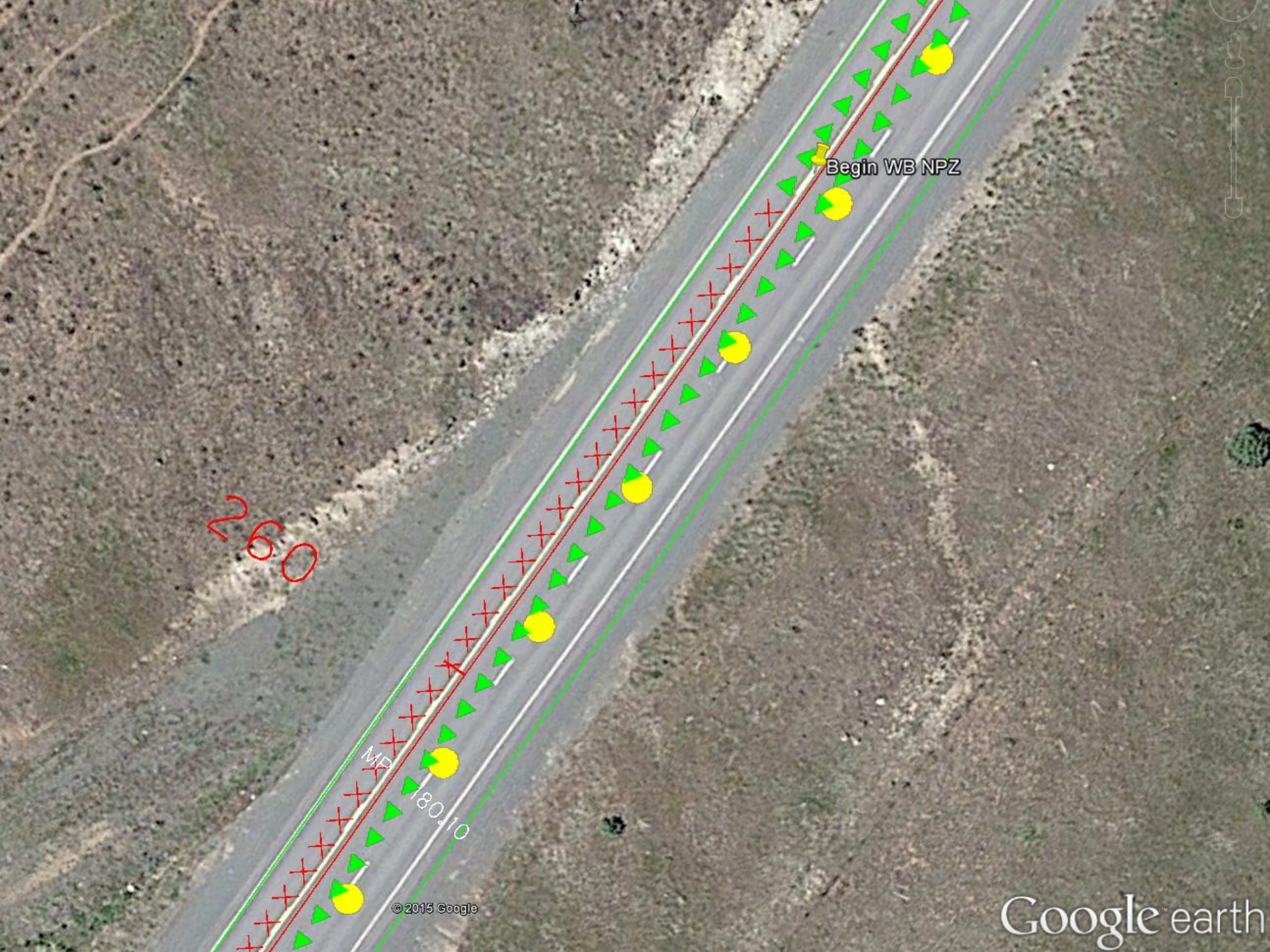


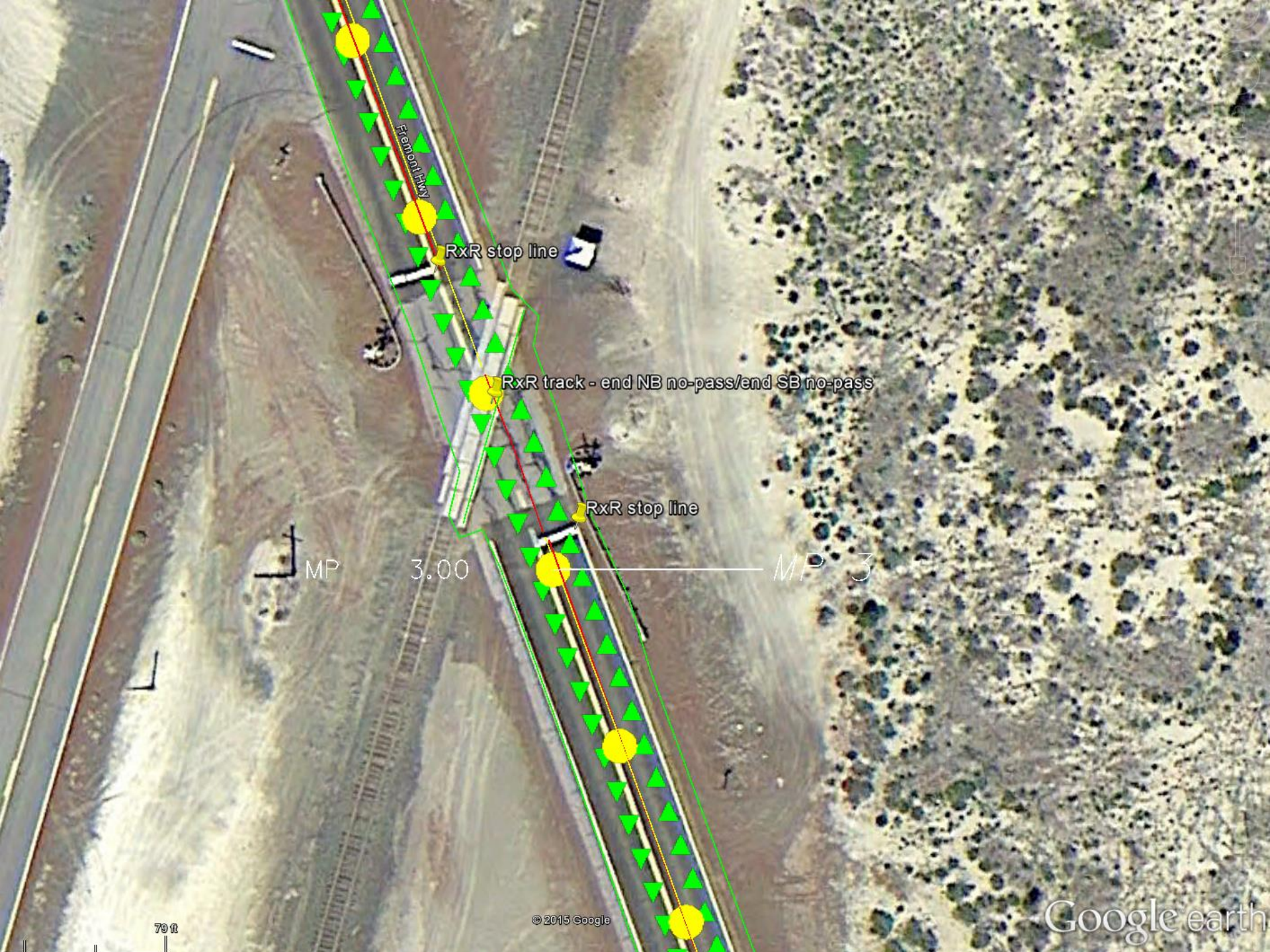
# Attach Vertical Profile for Verification

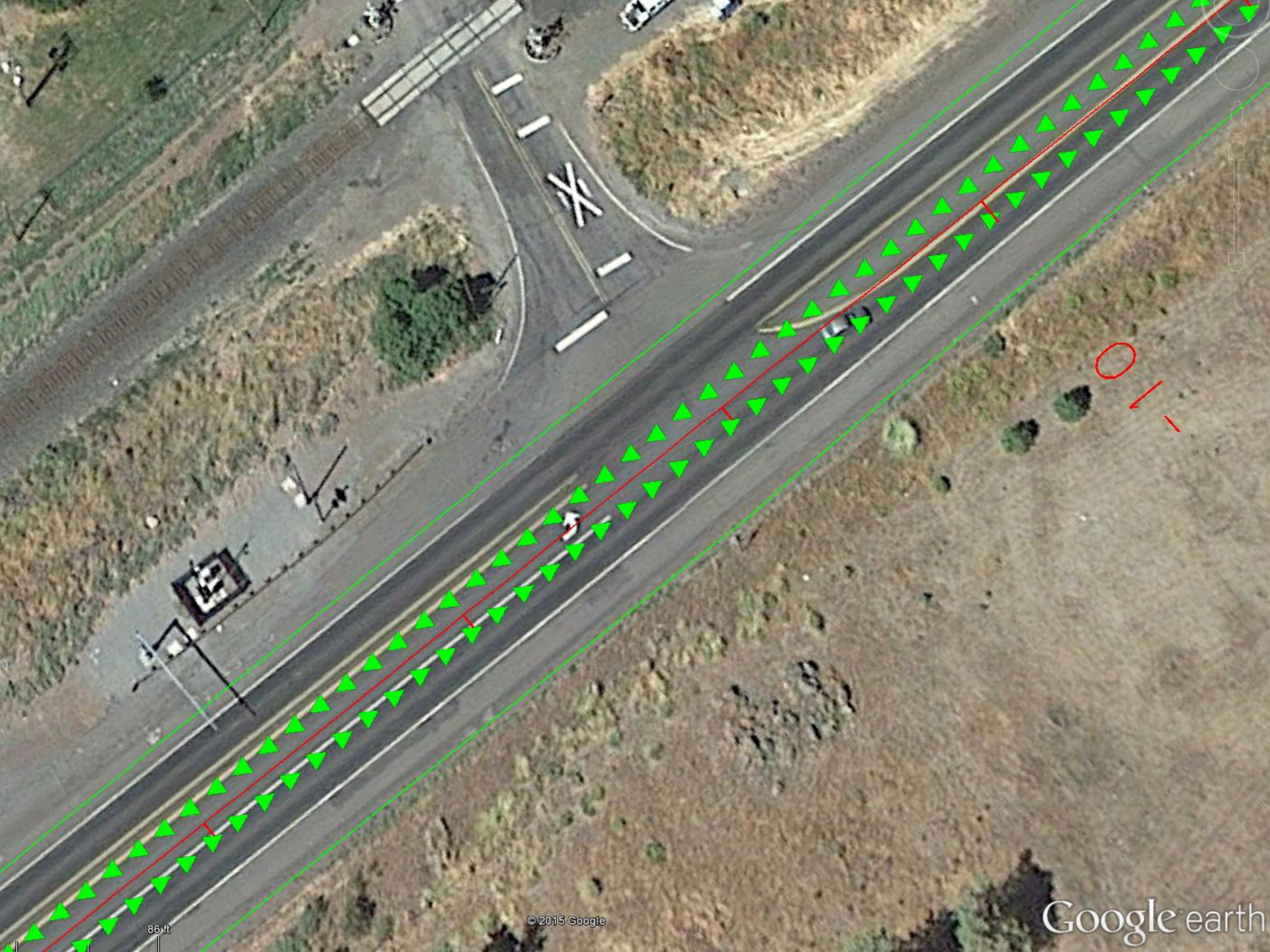


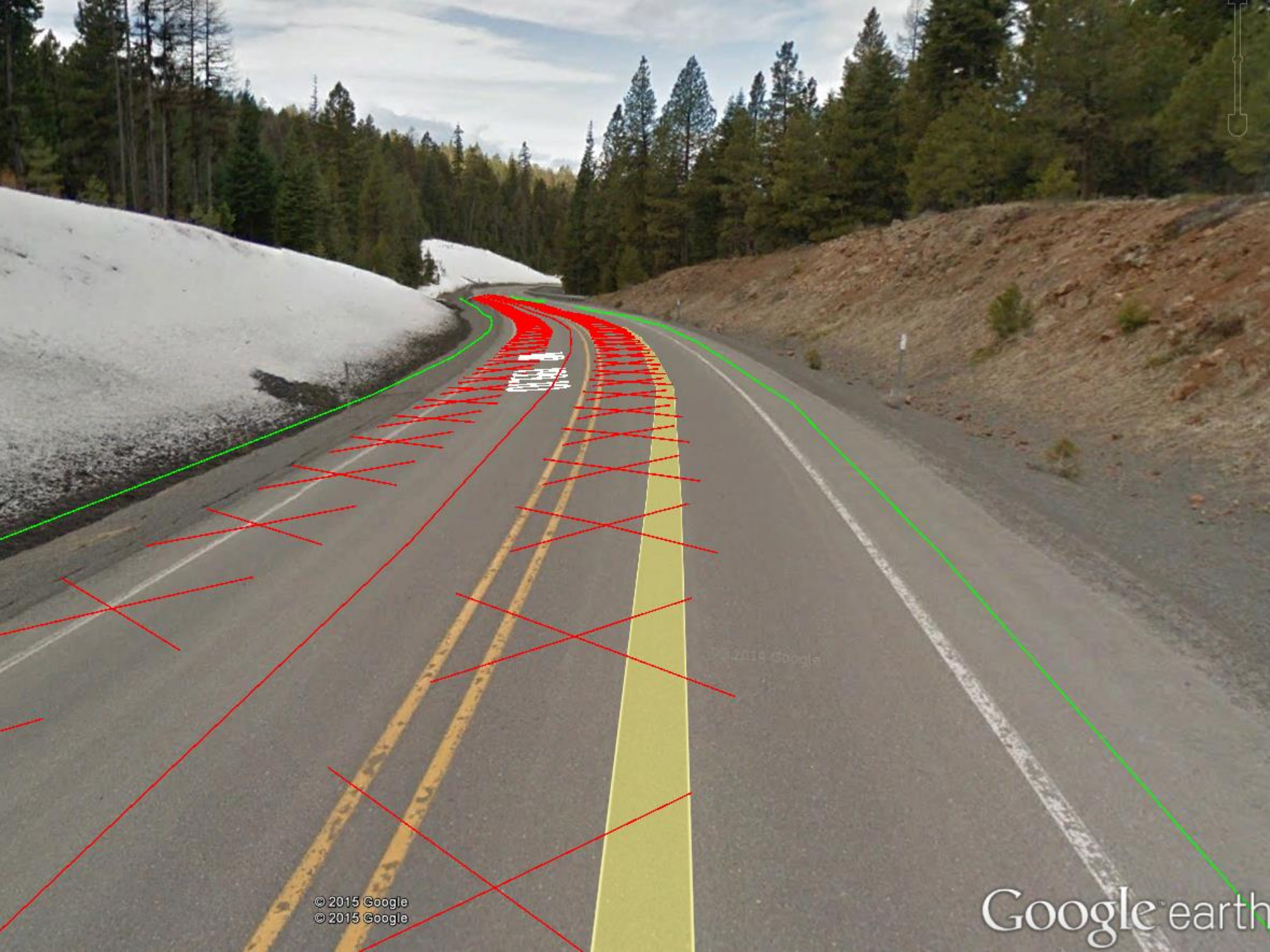
# Mapping & Automated Analysis




Begin WB NPZ
260
MP 180.10
© 2015 Google
Google earth


Fremont Hwy
RxR stop line
RxR track - end NB no-pass/end SB no-pass
RxR stop line
MP 3.00
MP 3
79 ft
© 2015 Google
Google earth


86 ft
© 2015 Google
Google earth


© 2015 Google
© 2015 Google
Google earth

| Highway | Beginning MP | Ending MP |
|---|---|---|
| Fremont Highway No. 019 (OR 31) | 68.610 | 77.980 |

| Beginning MP | Ending MP | Line Type | Notes |
|---|---|---|---|
| 68.610 | 68.820 | NPR | |
| 68.820 | 69.035 | D | |
| 69.035 | 69.245 | NPL | Thousand Springs Lane - MP 69.060 |
| 69.245 | 70.165 | YB | |
| 70.165 | 70.375 | NPR | Byway Kiosk sign - MP 70.370 |
| 70.375 | 70.920 | D | |
| 70.920 | 71.130 | NPL | |
| 71.130 | 71.395 | YB | |
| 71.395 | 71.605 | NPR | |
| 71.605 | 72.200 | D | |
| 72.200 | 72.410 | NPL | |
| 72.410 | 72.540 | YB | |
| 72.540 | 72.750 | NPR | |
| 72.750 | 73.895 | D | |
| 73.895 | 74.105 | NPL | |
| 74.105 | 74.145 | YB | |
| 74.145 | 74.350 | NPR | |
| 74.350 | 74.385 | D | |
| 74.385 | 74.595 | NPL | |
| 74.595 | 74.975 | YB | CEMETARY Sign - 74.930 |
| 74.975 | 75.180 | NPR | Adopt-A-Hwy SB - Ranch - MP 78.655 |
| 75.180 | 75.620 | D | |
| 75.620 | 75.830 | NPL | |
| 75.830 | 75.860 | YB | |
| 75.860 | 76.070 | NPR | |
| 76.070 | 76.875 | D | |
| 76.875 | 77.085 | NPL | |
| 77.085 | 77.250 | YB | |
| 77.250 | 77.350 | NPR | |
| 77.350 | 77.475 | YB | |
| 77.475 | 77.570 | NPL | |
| 77.570 | 77.980 | YB | |

*General Notes:*
1. *Refer to Standard Drawings TM500, TM530, TM539 for details.*
2. *Milepoint locations are approximate.*
   *Field verify prior to construction.*
   *Adjust as directed by the Engineer.*

*Legend*

| | |
|---|---|
| YB | *Inst. 4" yellow broken line* |
| NPR | *Inst. no-pass right, relative to increasing MP* |
| NPL | *Inst. no-pass left, relative to increasing MP* |
| D | *Inst. double no-pass* |
| No Work | *Retain and protect existing pavement markings* |

REGISTERED PROFESSIONAL ENGINEER
82393PE
OREGON
MAY 23, 2013
ERIC STANTON LEAMING
RENEWS: 12-31-2016

**STATE FORCE WORK**

OREGON DEPARTMENT OF TRANSPORTATION
TRAFFIC - ROADWAY SECTION

**2015 HB3402 CENTERLINE MODIFICATIONS**
**REGION 4**
VARIOUS HIGHWAYS
VARIOUS COUNTIES

Reviewed By - Katryn Johnson
Designed By - Eric Leaming
Drafted By - Eric Leaming

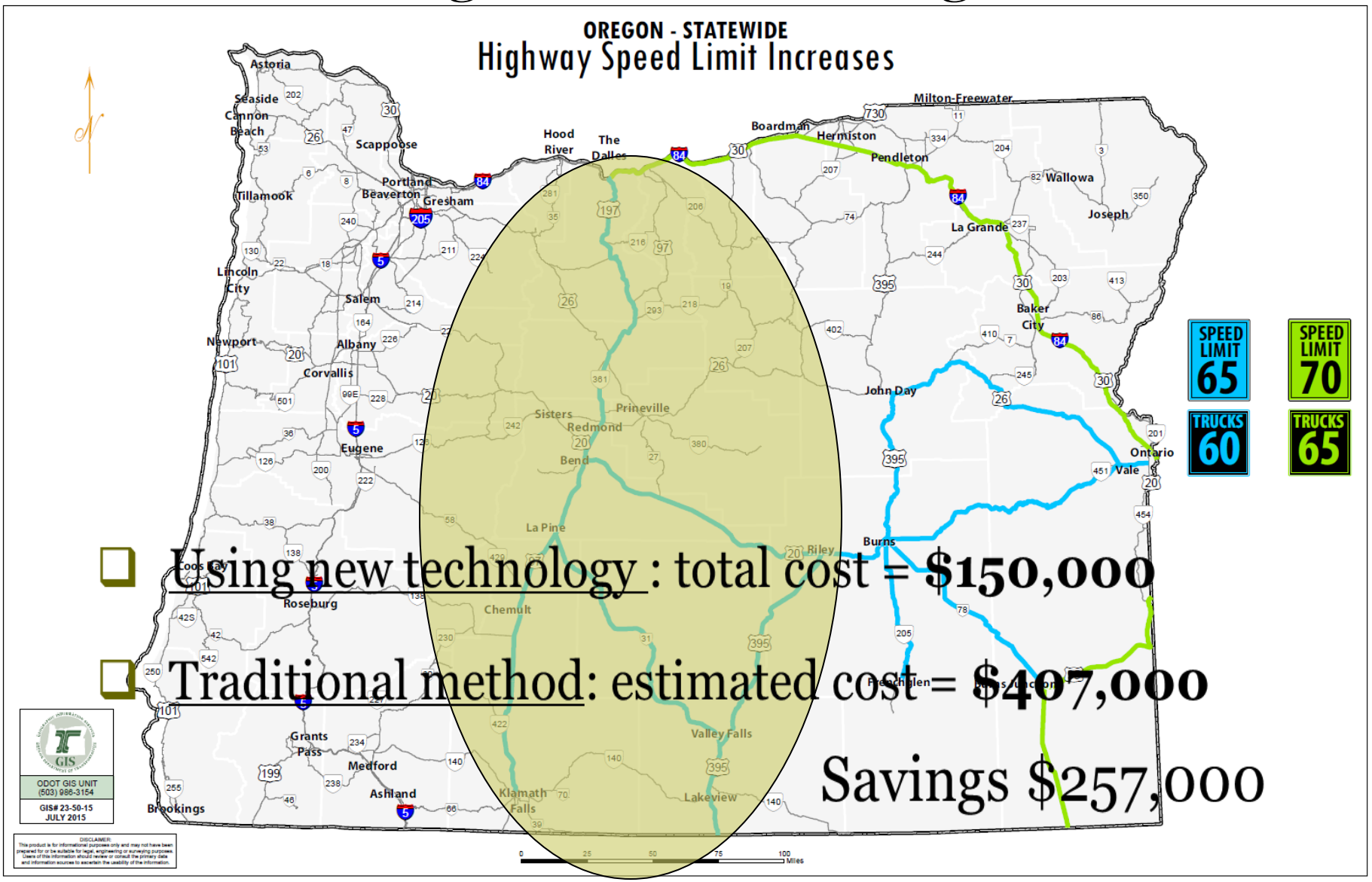
**STRIPING PLAN**

SHEET NO.
019-08


07-0170

# Wet Paint!

# Region 4 Cost Savings




- Using new technology : total cost = **$150,000**
- Traditional method: estimated cost = **$407,000**

Savings $257,000

# Ex. 2 – Vertical Clearance

To establish current, accurate, and reliable Vertical Clearance data for structures above Oregon highways

# Why?


VERTICAL CLEARANCE
12 FT — IN
100877
US DOT 063585
MC NO 311233
KYU 052486
90791322

# Old Measuring Method

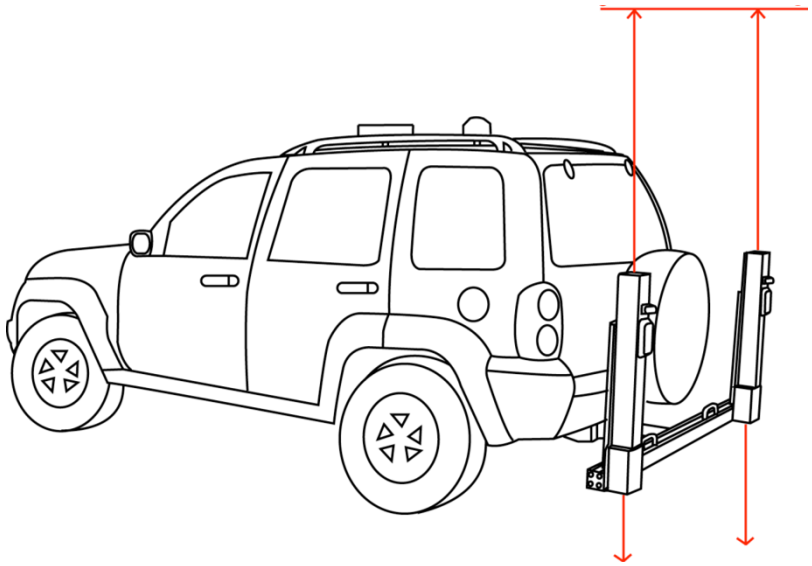
# Normal Distance



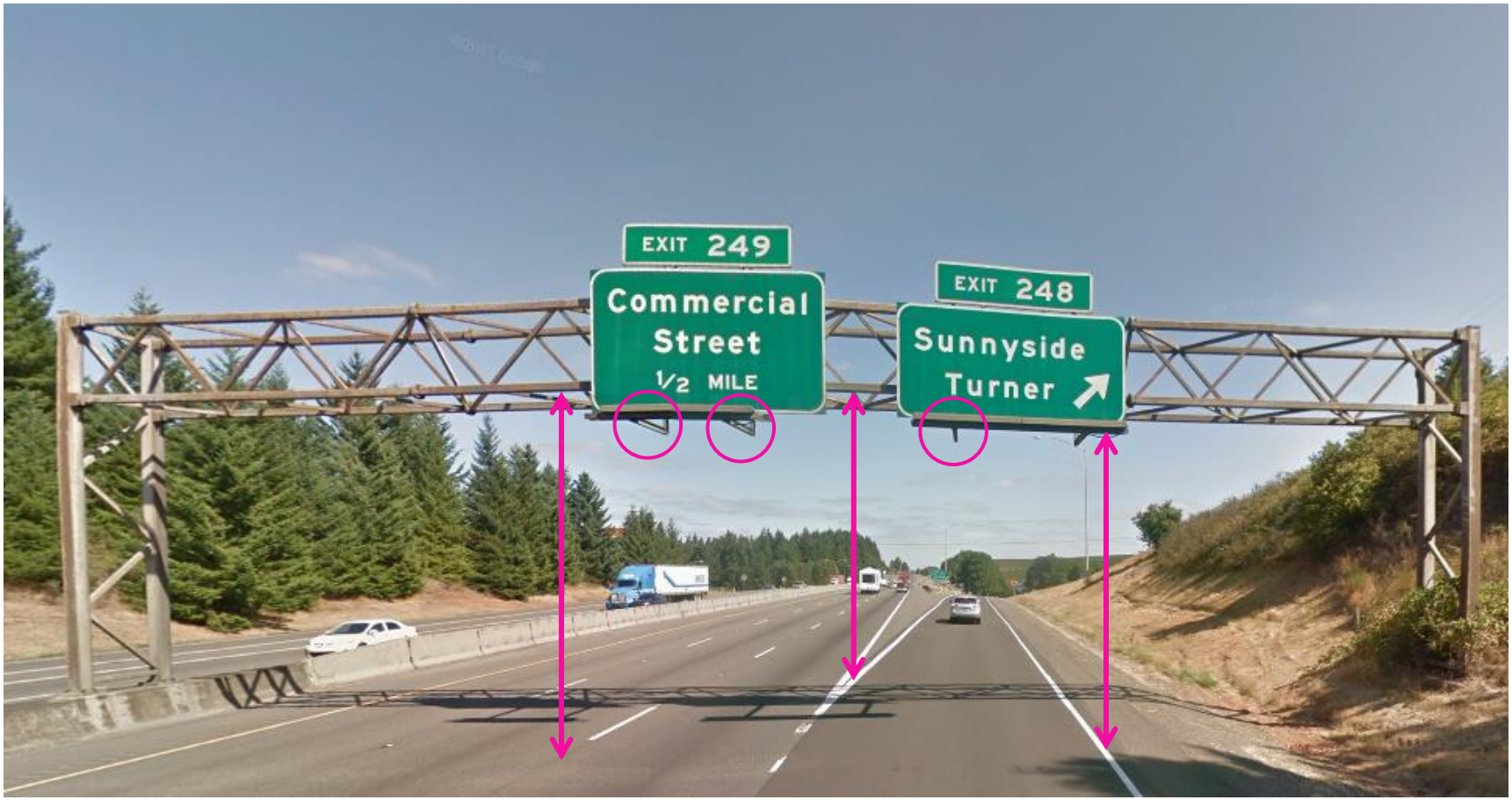

28

# Vertical Clearance - Background

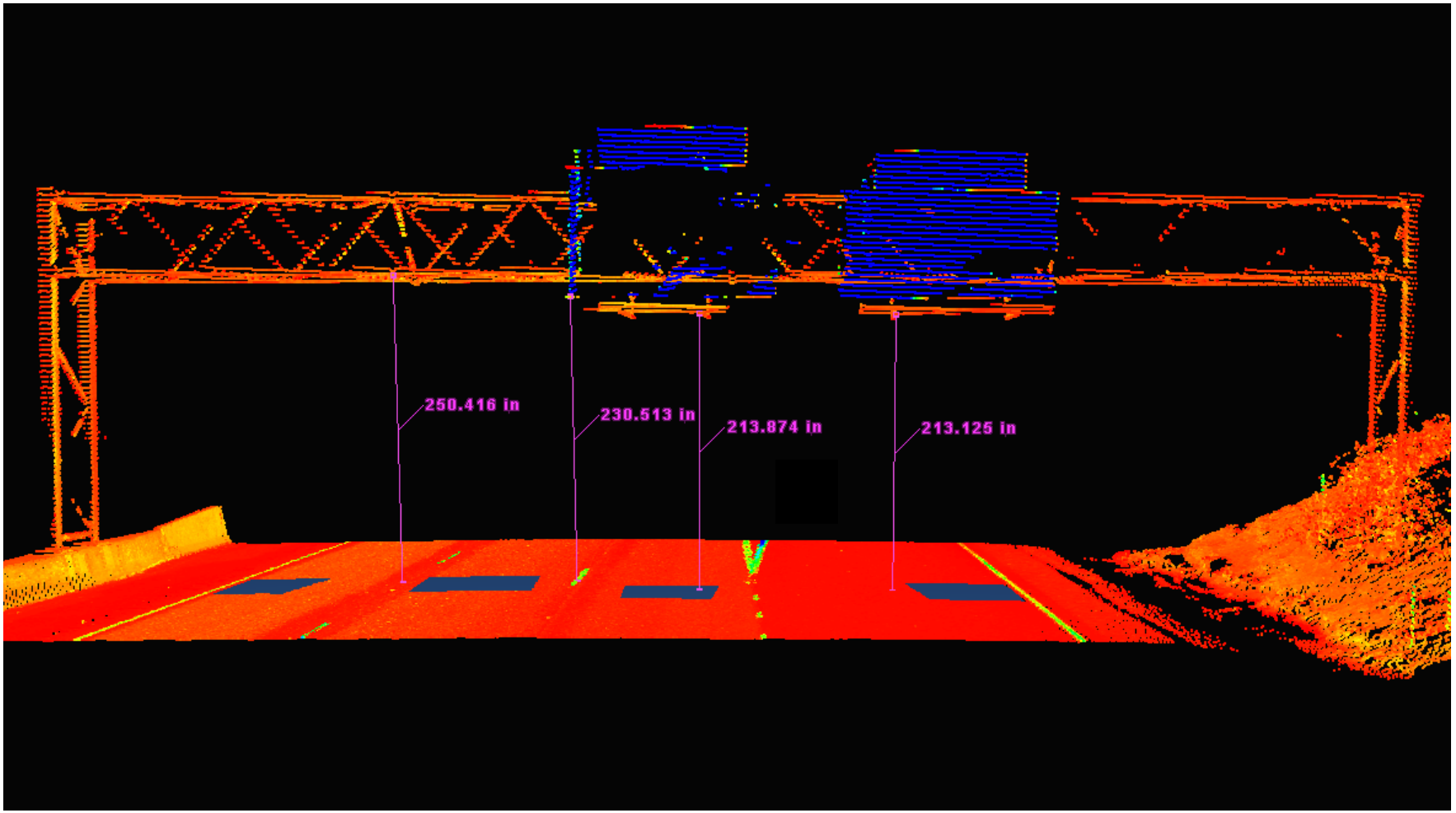
Vertical Clearance
Measurement System (VCMS)



# VCMS- Problems



# Lidar Point Cloud




http://transnet.odot.state.or.us/hwy/eta/PublishingImages/truck-bridge-low-clearance.gif

# Example 3

A Partnership with

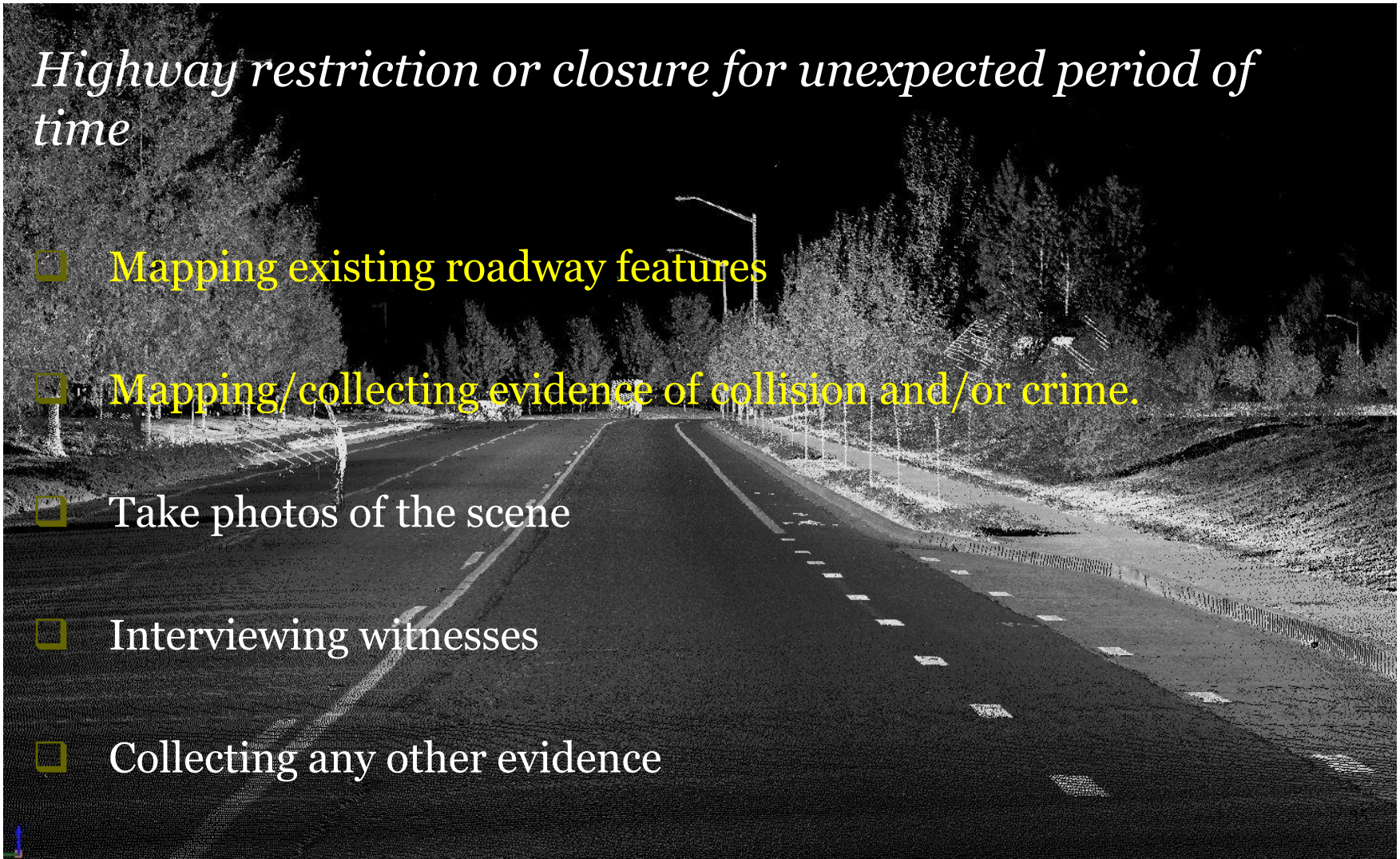
# Oregon State Police

# Collision Reconstruction

# Collision Reconstruction

*Highway restriction or closure for unexpected period of time*

- Mapping existing roadway features
- Mapping/collecting evidence of collision and/or crime.
- Take photos of the scene
- Interviewing witnesses
- Collecting any other evidence



# Ex. 4 – Pavement Marking

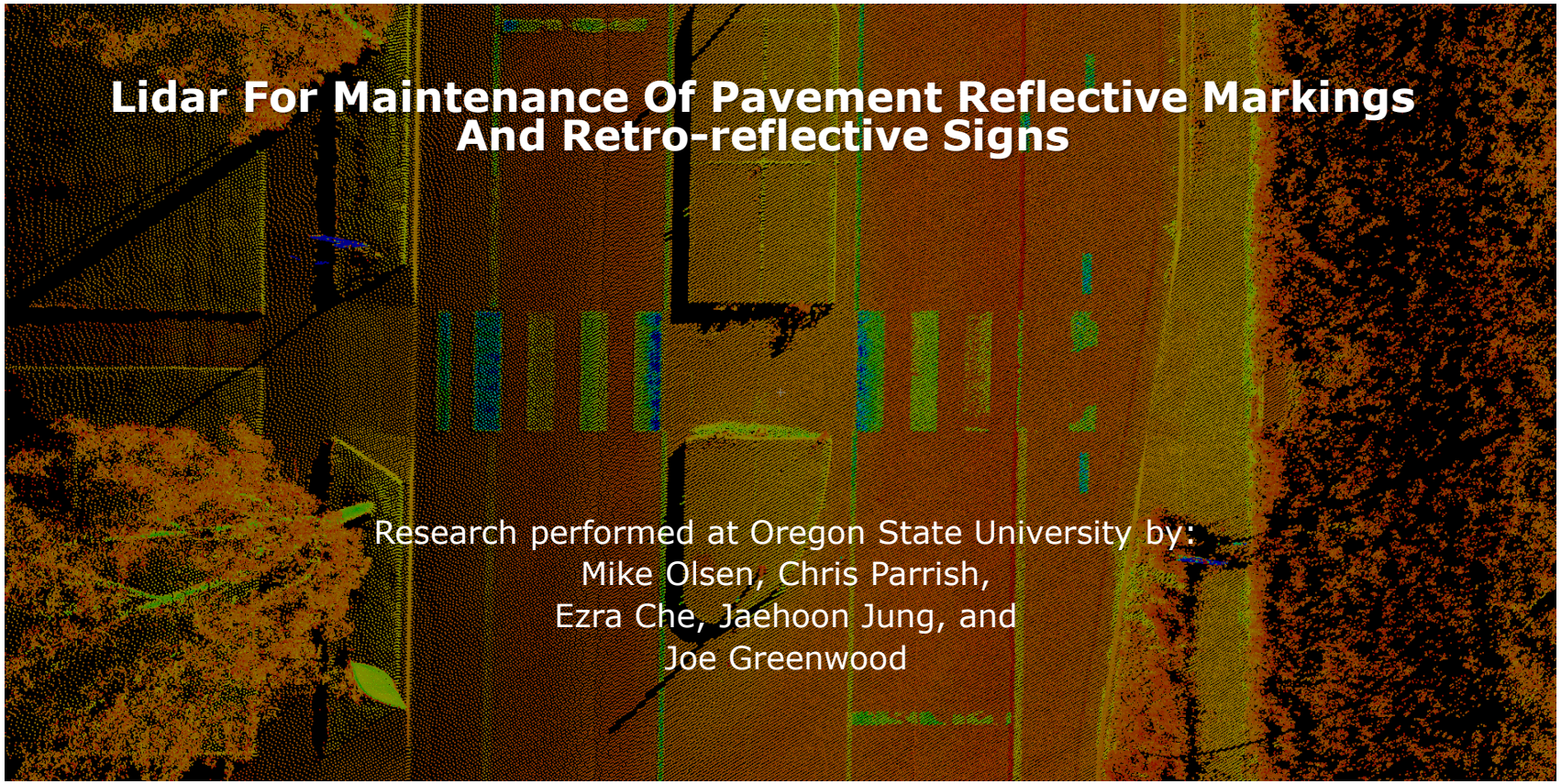



Image Courtesy of Oregon State University

# Project Objectives

- Motivation:
  - Potential for significant time and cost savings, if ODOT Geometronics mobile lidar data can be used to generate retro-reflectivity data
- Goals
  - Develop model for retro-reflectivity and radiometric calibration for ODOT's mobile lidar system.
  - Generate QC metrics for pavement marking and sign retro-reflectivity based on lidar-derived information
  - Establish procedures for creating GIS data layers from the output to support decision making by supervisors and integrate analysis results into ODOT's overall workflows

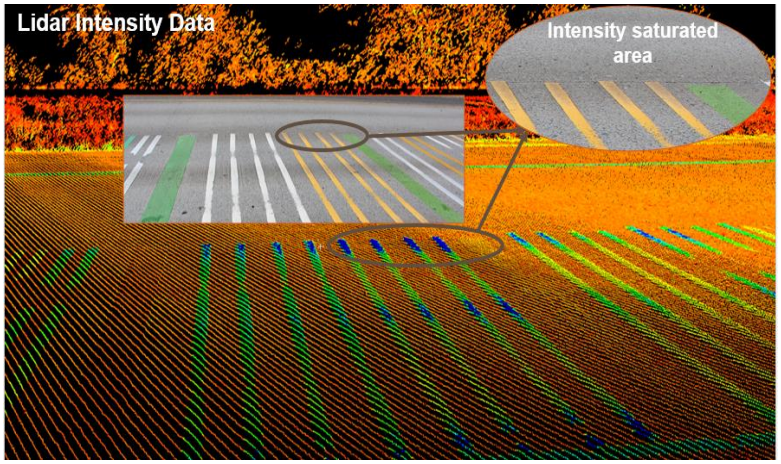



Image Courtesy of Oregon State University

# Pavement Marking – Vol I & II

- Vol I covers reflective markings
- Vol II covers retroreflective signs


Image Courtesy of Oregon State University

# Vol II – Sign Test

- Overarching objective
  - Investigate mobile lidar for sign assessment and maintenance
- Goals
  - Evaluate ability to measure sign retro-reflectivity
  - Evaluate ability to measure sign geometry and condition metrics
    - Location and height
    - Orientation
    - Deviation from planar (crumpling)
    - Contrast ratio
    - Evidence of vandalism (e.g., bullet holes)
    - Support type and condition
- Challenges
  - Saturation and range walk

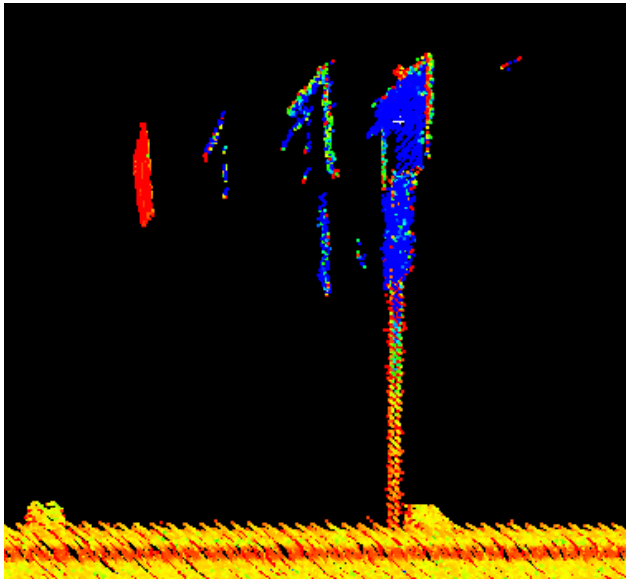


Image Courtesy of Oregon State University

# Vol II – Sign Test

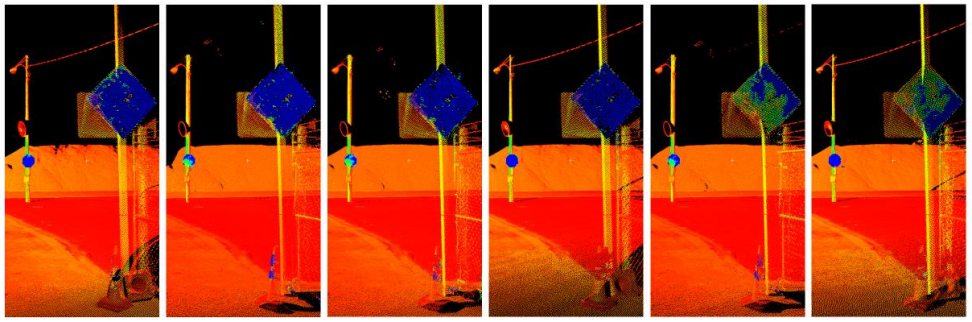
- Experiment Design:
  - Scans in maintenance yard:
    - Failing signs and damaged signs
    - Multiple passes from different lanes



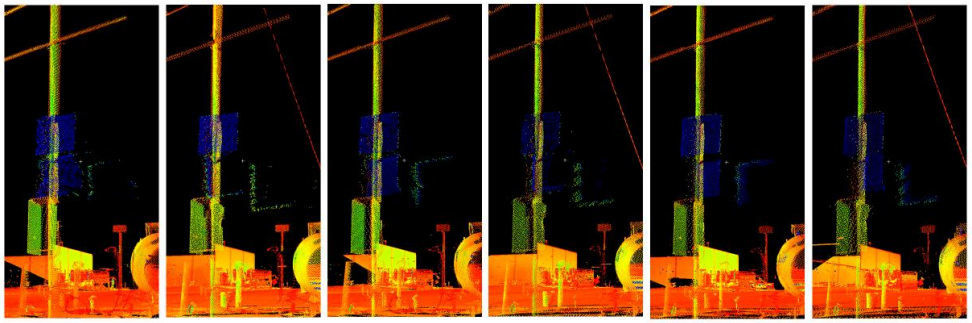
Images Courtesy of Oregon State University

# Vol II – Sign Test – detailed results





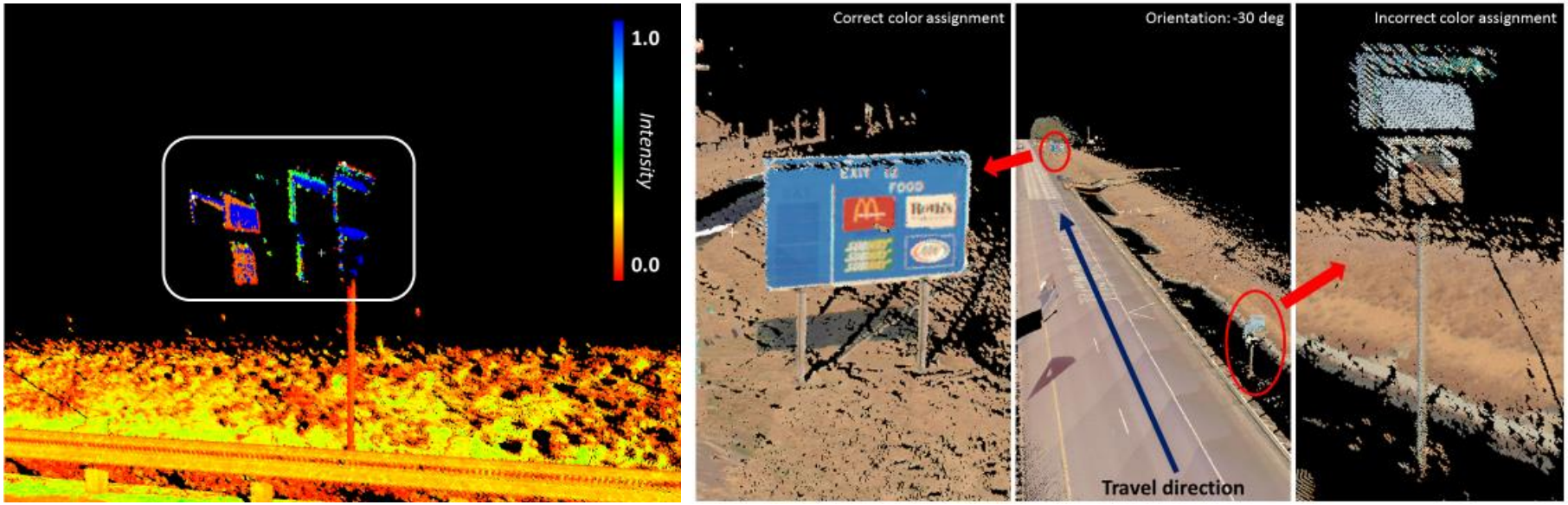
| T01 | T02 | T03 | T04 | T05 | T06 |
|---|---|---|---|---|---|
| South (right) | North (left) | South (right) | North (left) | South (right) | North (left) |
| Lane0 | Lane0 | Lane1 | Lane1 | Lane1/2 | Lane1/2 |



| T01 | T02 | T03 | T04 | T05 | T06 |
|---|---|---|---|---|---|
| South | North | South | North | South | North |
| Lane0 | Lane0 | Lane1 | Lane1 | Lane2 | Lane2 |

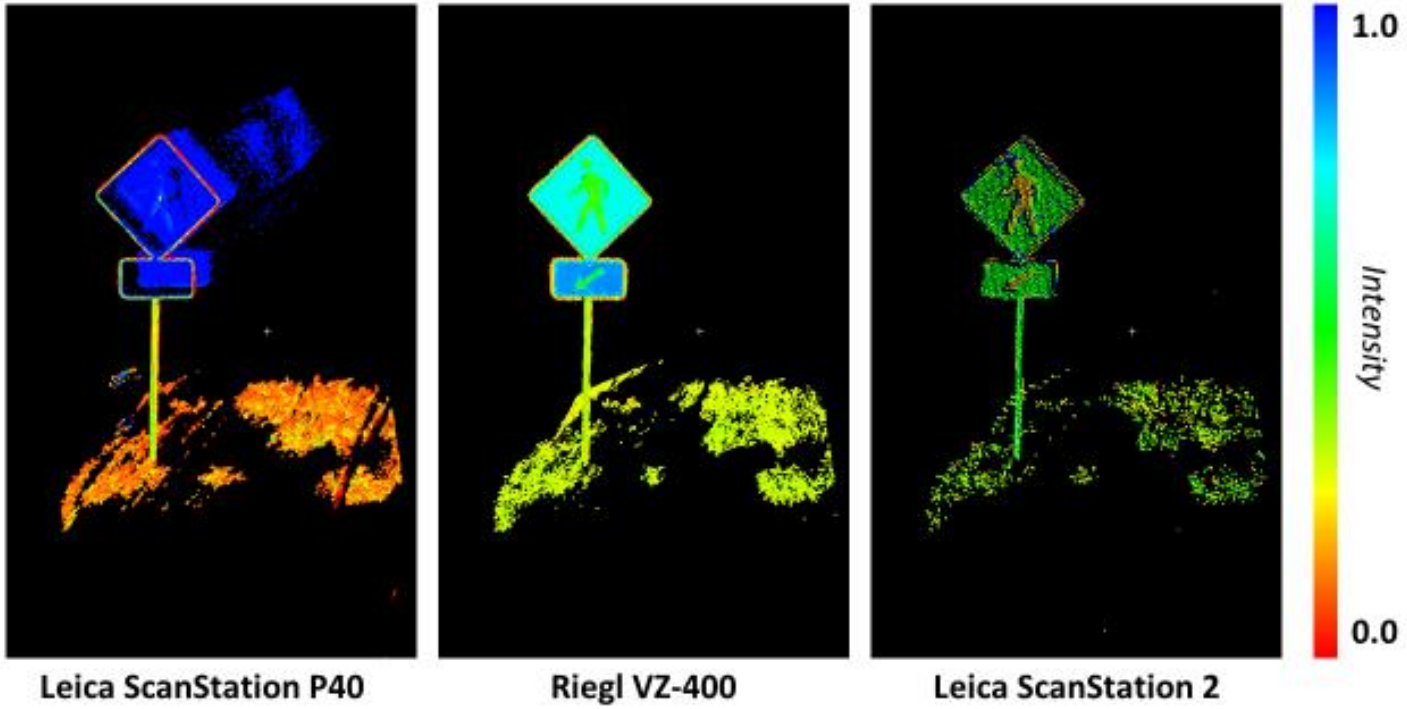
Images Courtesy of Oregon State University

# Vol II – Sign Test – issues




Images Courtesy of Oregon State University

# Vol II – Sign Test – Diff. Scanners



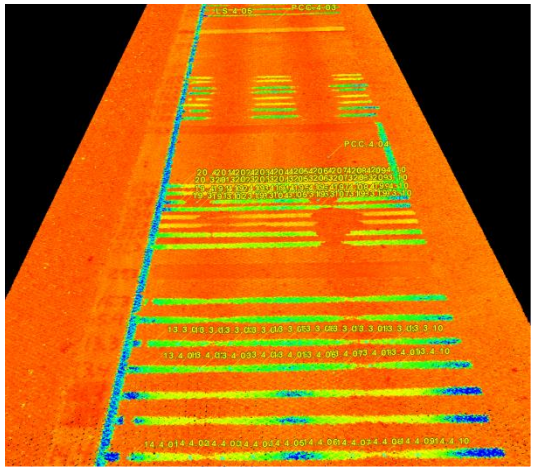

Images Courtesy of Oregon State University

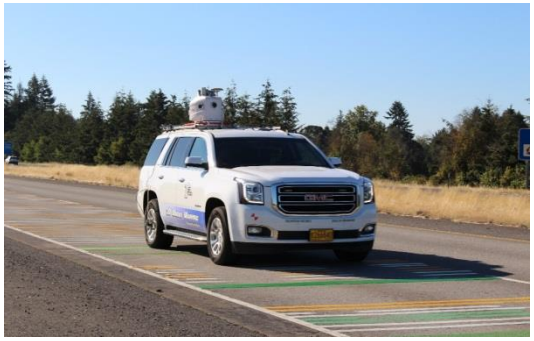
# Vol II – Sign Test – Conclusion

- ODOT's System **NOT** successful
- Tested wide range of geometric conditions
- Tested on signs of low retroreflectivity
- Led to positional and geometric inaccuracies
- Other systems (e.g., *Ai et al. 2016*) have been reported to be successful
- Data density on the sign face is heavily dependent on sensor configuration
- Inconsistencies in photographic mapping

# Vol I – Reflective Markings

| Testdeck # | Dates | Objectives |
|---|---|---|
| 1 | July 28, 2016 | • Preliminary test to acquire data<br>• Investigated effects of vehicle speed |
| 2 | Sept 13, 2016 | • More rigorous survey control |
| 3 | July 25, 2017 | • Fixed orientation<br>• Repeatability testing |





Images Courtesy of Oregon State University

# Vol I – Reflective Markings

- Goals:
  - Investigate optimal acquisition parameters (e.g., left vs. right lane) for longitudinal stripe
  - Validate radiometric calibration model
  - Test stripe-extraction methods
- Methods
  - ODOT scans in both traffic lanes at fixed system orientation (-30/+60 degree)
  - Delta LTL-X retro readings
  - Field survey: 5 control points, total station, Leica P40 TLS scans

Images Courtesy of Oregon State University

# Vol I – Reflective Markings

- Goals:
  - Investigate optimal acquisition parameters (e.g., left vs. right lane) for longitudinal stripe
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  - ODOT scans in both traffic lanes at fixed system orientation (-30/+60 degree)
  - Delta LTL-X retro readings
  - Field survey: 5 control points, total station, Leica P40 TLS scans

Images Courtesy of Oregon State University

# Vol I – Reflective Markings

- Retroreflectometer

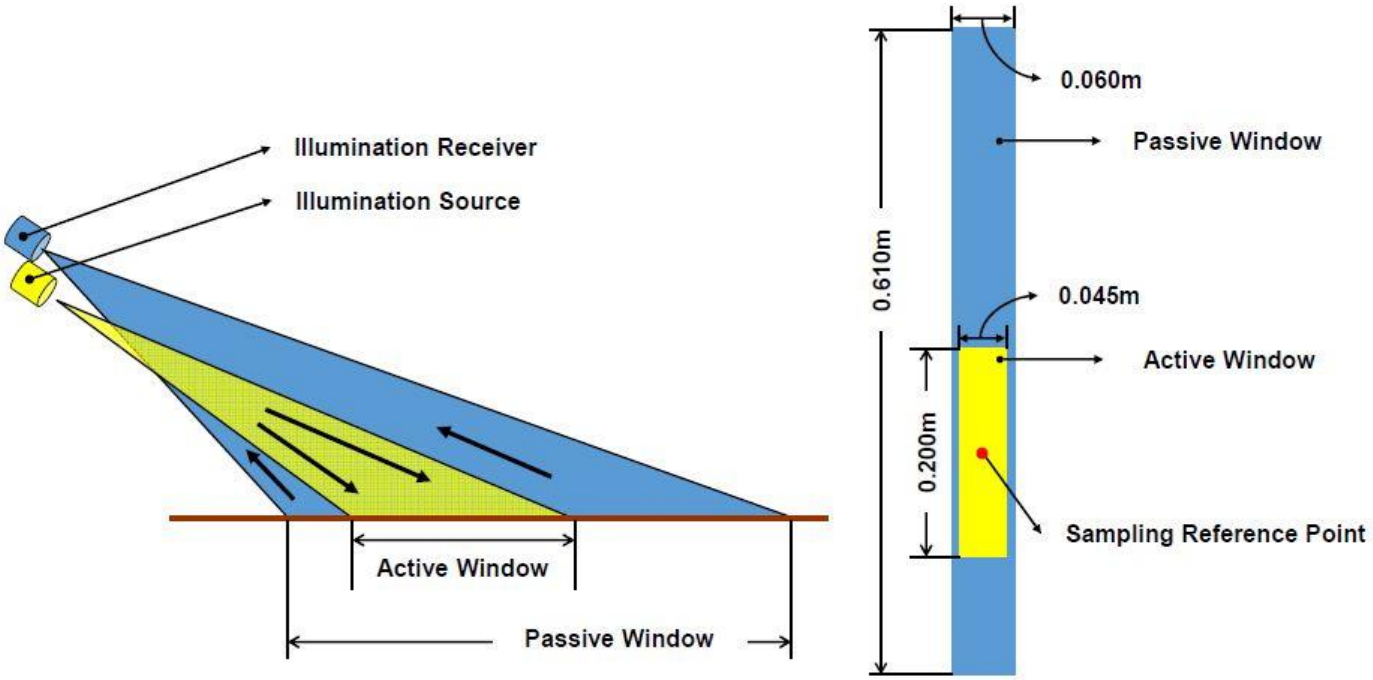



Image Courtesy of LTL-X Mark II User manual

# Vol I – Regression Analysis

| Model / Sampling tech. | $a \times Int.^{b}$ | $a \times Int. + b$ | $a^{b \times Int.}$ | $a \times Int.^{2} + b \times Int. + c$ | $a \times Int.^{b} + c$ | $(a \times range^{2} + b \times range + c) \times Int.^{d}$ |
|---|---|---|---|---|---|---|
| Nearest Neighbor | 0.7002 | 0.6963 | 0.6361 | 0.6982 | 0.6930 | 0.7128 |
| Active Window Mean | 0.7798 | 0.7815 | 0.6899 | 0.7817 | 0.7597 | 0.7795 |
| Active Window IDW^1 | 0.7670 | 0.7682 | 0.6802 | 0.7684 | 0.7500 | 0.7708 |
| Active Window IDW^2 | 0.7479 | 0.7474 | 0.6680 | 0.7478 | 0.7340 | 0.7553 |
| Active Window 05% | 0.8357 | 0.8273 | 0.7980 | 0.8348 | 0.8006 | 0.8191 |
| Active Window 10% | **0.8360** | 0.8306 | 0.7870 | 0.8352 | 0.8009 | 0.8190 |
| Active Window 15% | 0.8277 | 0.8248 | 0.7694 | 0.8273 | 0.7933 | 0.8147 |
| Active Window 20% | 0.8186 | 0.8173 | 0.7526 | 0.8187 | 0.7870 | 0.8094 |
| Active Window 30% | 0.8043 | 0.8041 | 0.7275 | 0.8048 | 0.7777 | 0.8006 |
| Active Window 40% | 0.7779 | 0.7786 | 0.6940 | 0.7788 | 0.7555 | 0.7779 |
| Active Window Median | 0.7436 | 0.7438 | 0.6543 | 0.7439 | 0.7283 | 0.7484 |
| Passive Window Mean | 0.5913 | 0.5856 | 0.5422 | 0.5905 | 0.5536 | 0.5764 |
| Passive Window IDW^1 | 0.7552 | 0.7537 | 0.6771 | 0.7556 | 0.7296 | 0.7516 |
| Passive Window IDW^2 | 0.7527 | 0.7525 | 0.6714 | 0.7530 | 0.7351 | 0.7571 |
| Passive Window 05% | 0.5412 | 0.5388 | 0.5242 | 0.5411 | 0.5349 | 0.5583 |
| Passive Window 10% | 0.5598 | 0.5591 | 0.5333 | 0.5600 | 0.5549 | 0.5819 |
| Passive Window 15% | 0.5677 | 0.5675 | 0.5353 | 0.5680 | 0.5624 | 0.5919 |
| Passive Window 20% | 0.5797 | 0.5787 | 0.5457 | 0.5798 | 0.5701 | 0.5988 |
| Passive Window 30% | 0.5839 | 0.5825 | 0.5387 | 0.5836 | 0.5662 | 0.5882 |
| Passive Window 40% | 0.5674 | 0.5664 | 0.5105 | 0.5670 | 0.5324 | 0.5490 |
| Passive Window Median | 0.5219 | 0.5200 | 0.4593 | 0.5207 | 0.4691 | 0.4832 |

Correlation Coefficients ($R^2$)

| Model / Sampling tech. | $a \times Int.^{b}$ | $a \times Int. + b$ | $a^{b \times Int.}$ | $a \times Int.^{2} + b \times Int. + c$ | $a \times Int.^{b} + c$ | $(a \times range^{2} + b \times range + c) \times Int.^{d}$ |
|---|---|---|---|---|---|---|
| Nearest Neighbor | 0.0249 | 0.0265 | 0.0269 | 0.0316 | 0.0367 | 0.0355 |
| Active Window Mean | 0.0213 | 0.0226 | 0.0248 | 0.0269 | 0.0324 | 0.0311 |
| Active Window IDW^1 | 0.0219 | 0.0232 | 0.0252 | 0.0277 | 0.0331 | 0.0317 |
| Active Window IDW^2 | 0.0228 | 0.0242 | 0.0257 | 0.0289 | 0.0342 | 0.0328 |
| Active Window 05% | 0.0189 | 0.0203 | 0.0209 | 0.0241 | 0.0304 | 0.0287 |
| Active Window 10% | **0.0188** | 0.0200 | 0.0213 | 0.0239 | 0.0302 | 0.0286 |
| Active Window 15% | 0.0192 | 0.0203 | 0.0221 | 0.0244 | 0.0306 | 0.0289 |
| Active Window 20% | 0.0196 | 0.0207 | 0.0227 | 0.0249 | 0.0310 | 0.0292 |
| Active Window 30% | 0.0202 | 0.0214 | 0.0236 | 0.0257 | 0.0315 | 0.0297 |
| Active Window 40% | 0.0214 | 0.0227 | 0.0248 | 0.0272 | 0.0328 | 0.0313 |
| Active Window Median | 0.0229 | 0.0244 | 0.0261 | 0.0290 | 0.0344 | 0.0332 |
| Passive Window Mean | 0.0294 | 0.0314 | 0.0300 | 0.0366 | 0.0440 | 0.0448 |
| Passive Window IDW^1 | 0.0224 | 0.0240 | 0.0252 | 0.0284 | 0.0344 | 0.0332 |
| Passive Window IDW^2 | 0.0226 | 0.0240 | 0.0255 | 0.0286 | 0.0341 | 0.0327 |
| Passive Window 05% | 0.0330 | 0.0336 | 0.0333 | 0.0408 | 0.0472 | 0.0476 |
| Passive Window 10% | 0.0319 | 0.0327 | 0.0325 | 0.0396 | 0.0456 | 0.0456 |
| Passive Window 15% | 0.0313 | 0.0322 | 0.0320 | 0.0389 | 0.0449 | 0.0446 |
| Passive Window 20% | 0.0305 | 0.0317 | 0.0312 | 0.0380 | 0.0441 | 0.0438 |
| Passive Window 30% | 0.0298 | 0.0313 | 0.0307 | 0.0373 | 0.0436 | 0.0437 |
| Passive Window 40% | 0.0300 | 0.0317 | 0.0310 | 0.0374 | 0.0448 | 0.0457 |
| Passive Window Median | 0.0312 | 0.0333 | 0.0320 | 0.0389 | 0.0472 | 0.0492 |

Variance of intensity values

Charts Courtesy of Oregon State University

# Vol I – Regression Analysis

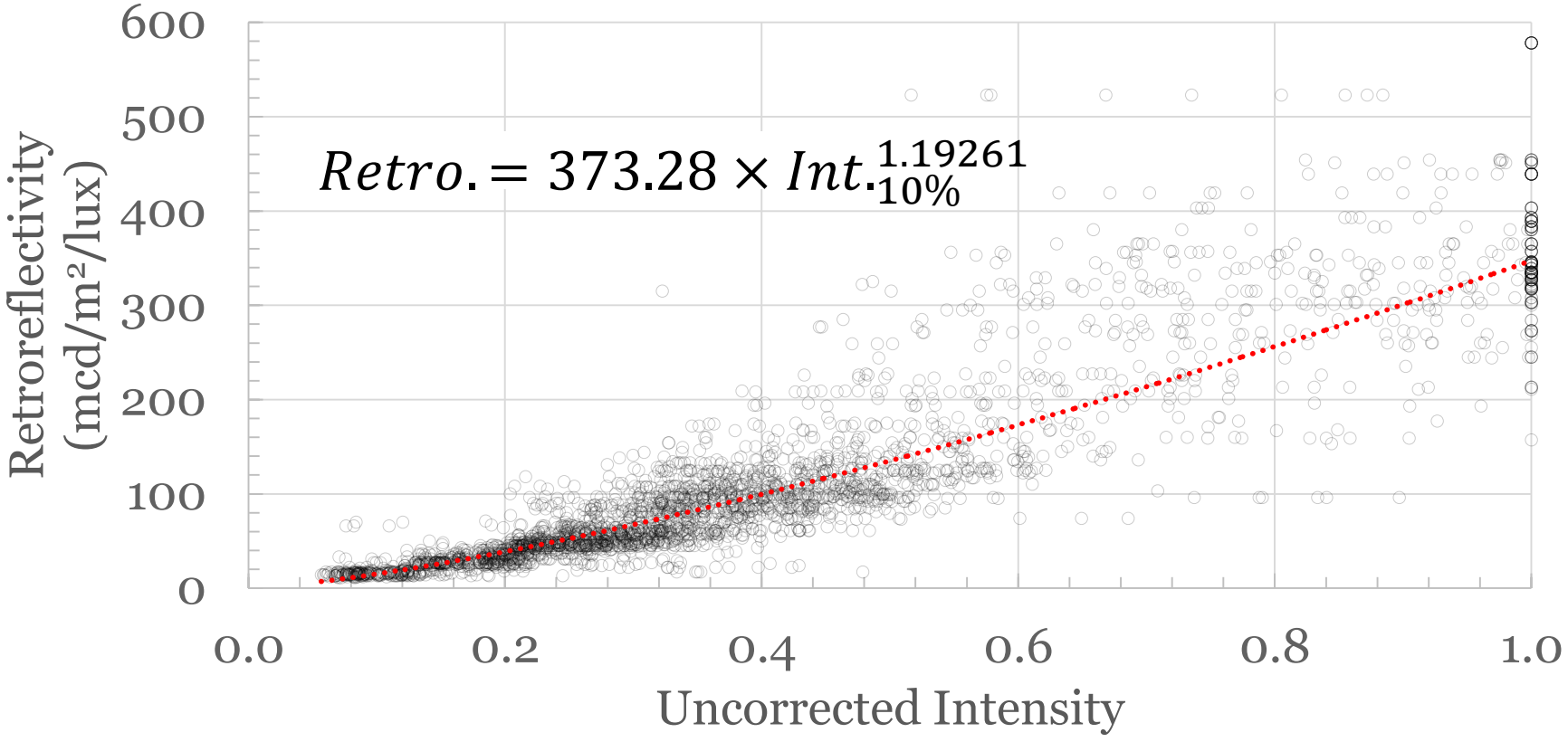



Chart Courtesy of Oregon State University

# Longitudinal Stripe – Single Profiler

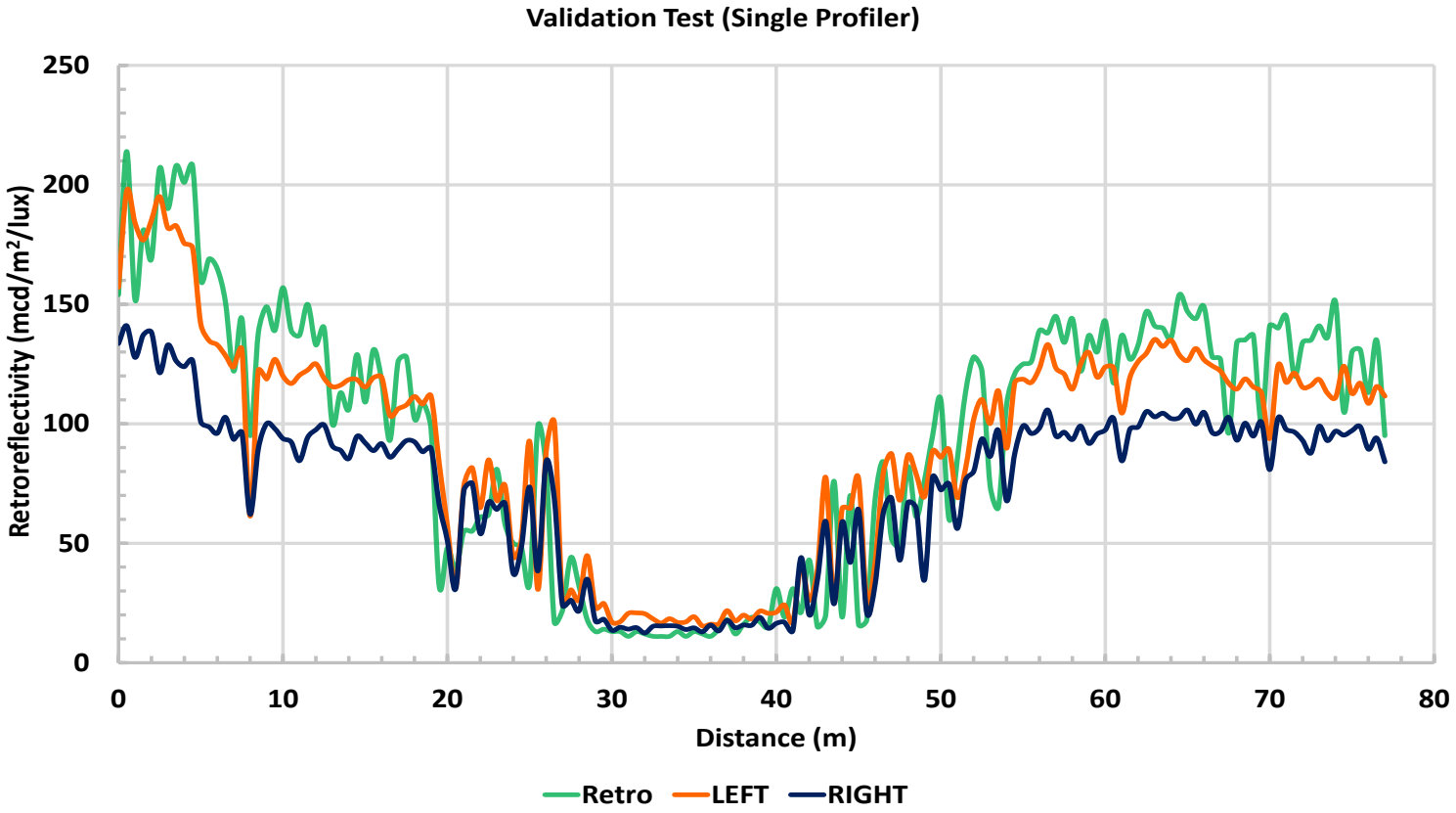



Chart Courtesy of Oregon State University

# Longitudinal Stripe – Dual Profiler

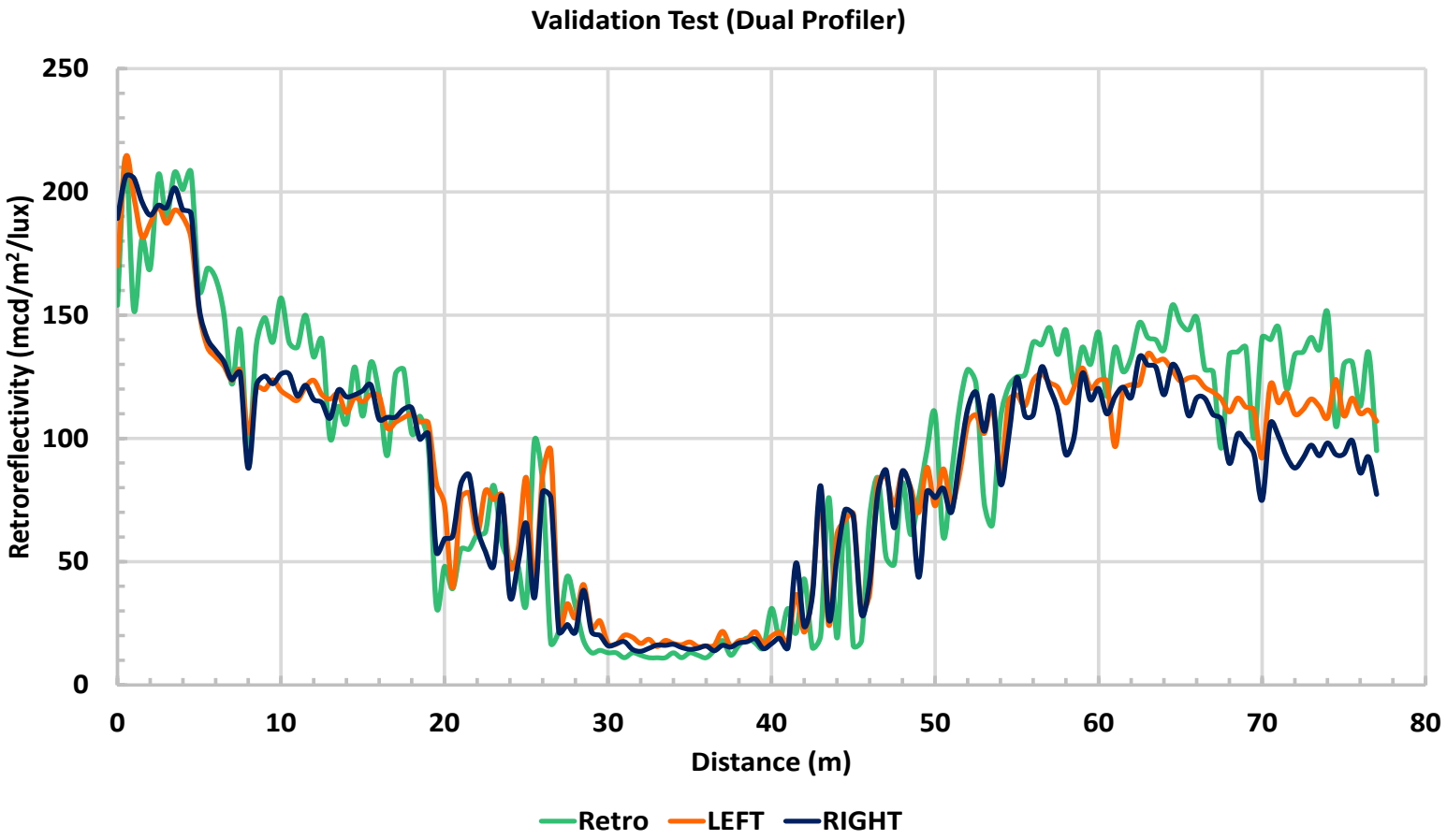
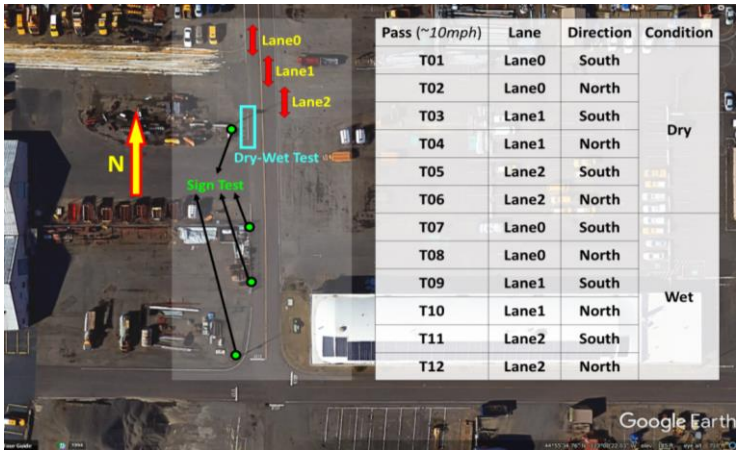
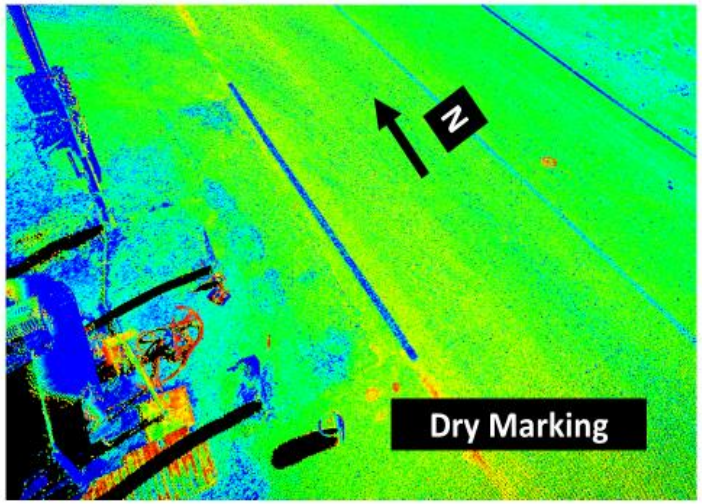



Chart Courtesy of Oregon State University

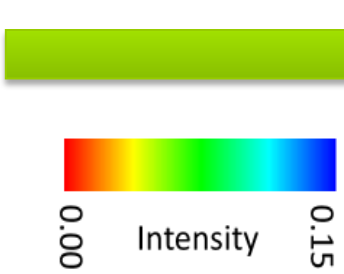
# Dry vs. Wet

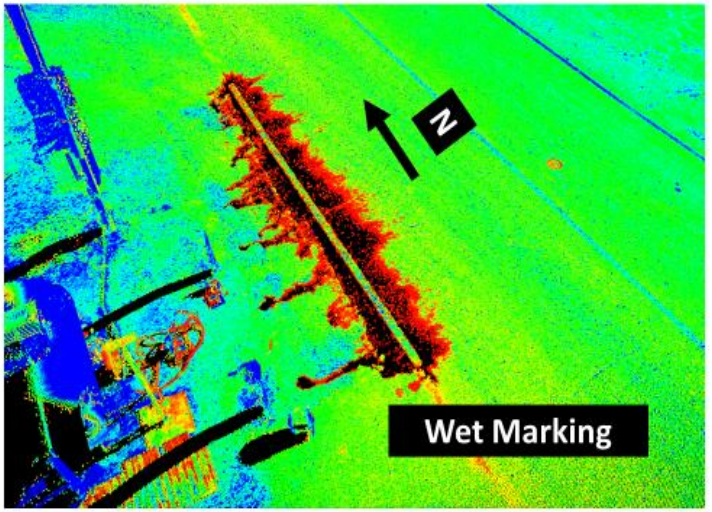



| Pass (~10mph) | Lane | Direction | Condition |
|---|---|---|---|
| T01 | Lane0 | South | |
| T02 | Lane0 | North | |
| T03 | Lane1 | South | Dry |
| T04 | Lane1 | North | |
| T05 | Lane2 | South | |
| T06 | Lane2 | North | |
| T07 | Lane0 | South | |
| T08 | Lane0 | North | |
| T09 | Lane1 | South | Wet |
| T10 | Lane1 | North | |
| T11 | Lane2 | South | |
| T12 | Lane2 | North | |

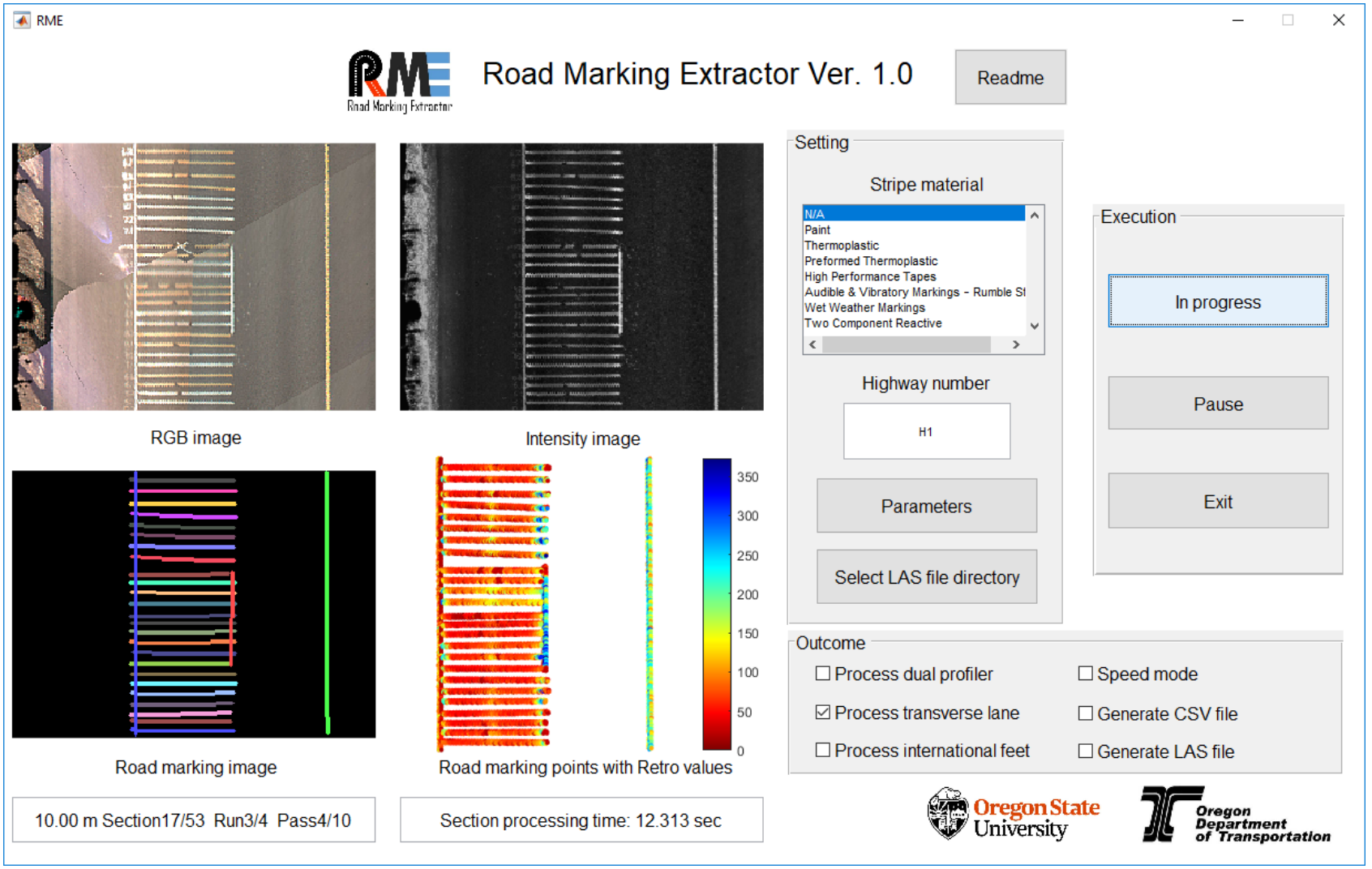




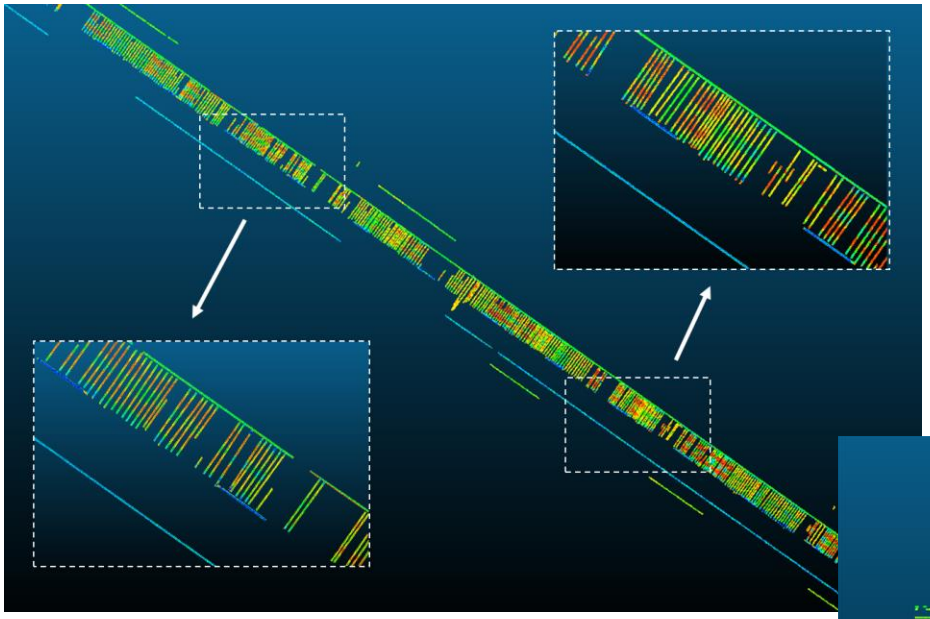


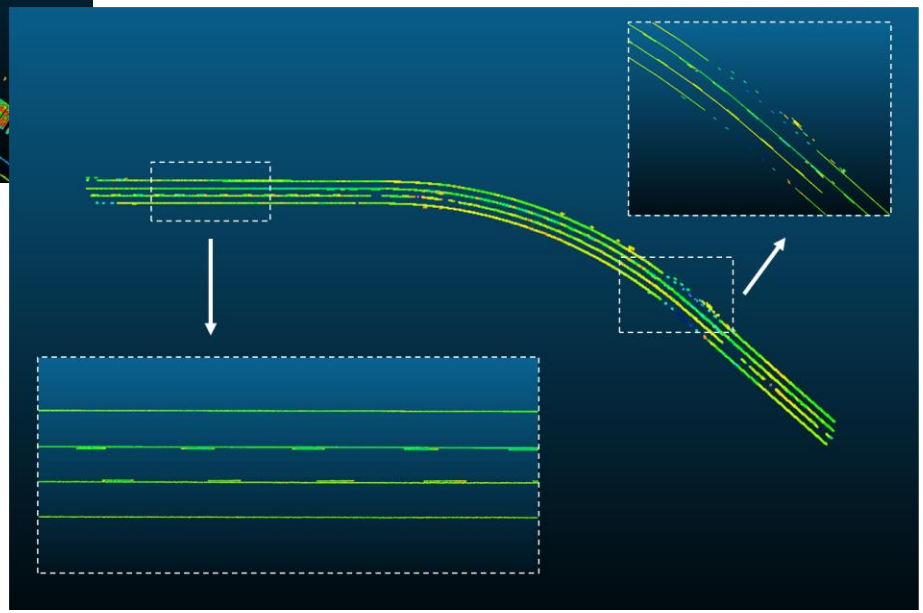



# Road Marking Extractor (RoME)



# Road Marking Extractor (RoME)





# Road Marking Extractor (RoME)

## Run table

| RunID | HWY Number | Date | Section IDStart | Section IDEnd | Stripe IDStart | Stripe IDEnd | Node Start | Node End | Section Interval | Grid CellSize | Angle DiffDeg | Stripe Width | Road Width | Software Version | File Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | H1 | 20170725 | 1 | 2 | 1 | 6 | 1 | 12 | 10 | 0.05 | 10 | 0.1 | 7.2 | 1.0 | T03 |
| 2 | H1 | 20170725 | 3 | 4 | 7 | 62 | 13 | 124 | 10 | 0.05 | 10 | 0.1 | 7.2 | 1.0 | T04 |

## Section table

| SectionID | trajMidX | trajMidY | trajMidZ | StripeIDStart | StripeIDEnd | RunID |
|---|---|---|---|---|---|---|
| 1 | 72337.45 | 54102.86 | 136.31 | 1 | 3 | 1 |
| 2 | 72328.69 | 54107.6 | 136.24 | 4 | 6 | 1 |
| 3 | 71391.53 | 54705.3 | 136.17 | 7 | 33 | 2 |
| 4 | 71383.38 | 54711.04 | 136.05 | 34 | 62 | 2 |

## Stripe table

| StripeID | SectionID | Node Start | Node End | Color | Material | Length | Condition Score | Retro NumPts | Retro Min | Retro Max | Retro Median | Retro Ave | Retro StdDev | Num PtsPC | Int Min | Int Max | Int Median | Int Ave | Int StdDev | Width | Stripe Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 2 | White | N/A | 10.00171 | E | 213 | 56.49419 | 135.1821 | 73.03991 | 82.58601 | 25.00726 | 808 | 0.054276 | 0.496376 | 0.191989 | 0.200423 | 0.067217 | 0.1 | L |
| 2 | 1 | 3 | 4 | White | N/A | 3.445397 | B | 257 | 34.64113 | 360.7918 | 315.8434 | 281.3713 | 111.3855 | 1011 | 0.019287 | 1 | 0.431724 | 0.430364 | 0.266884 | 0.1 | L |
| 3 | 1 | 5 | 6 | Yellow | N/A | 10.06449 | A | 387 | 276.9525 | 336.3742 | 302.2518 | 302.5339 | 16.52217 | 1460 | 0.075532 | 0.953338 | 0.600259 | 0.505834 | 0.219909 | 0.1 | L |
| 4 | 2 | 7 | 8 | White | N/A | 10.02149 | E | 224 | 58.54683 | 151.4477 | 73.62221 | 94.44509 | 32.84942 | 791 | 0.050935 | 0.467628 | 0.176944 | 0.184757 | 0.068567 | 0.1 | L |
| 5 | 2 | 9 | 10 | White | N/A | 3.38001 | B | 270 | 148.6238 | 372.9027 | 323.934 | 301.7919 | 73.75184 | 960 | 0.022248 | 1 | 0.299611 | 0.405832 | 0.270227 | 0.1 | T |
| 6 | 2 | 11 | 12 | Yellow | N/A | 10.06285 | A | 408 | 288.475 | 355.7217 | 316.9342 | 317.4209 | 18.31632 | 1497 | 0.075776 | 0.914656 | 0.630152 | 0.525263 | 0.227636 | 0.1 | T |

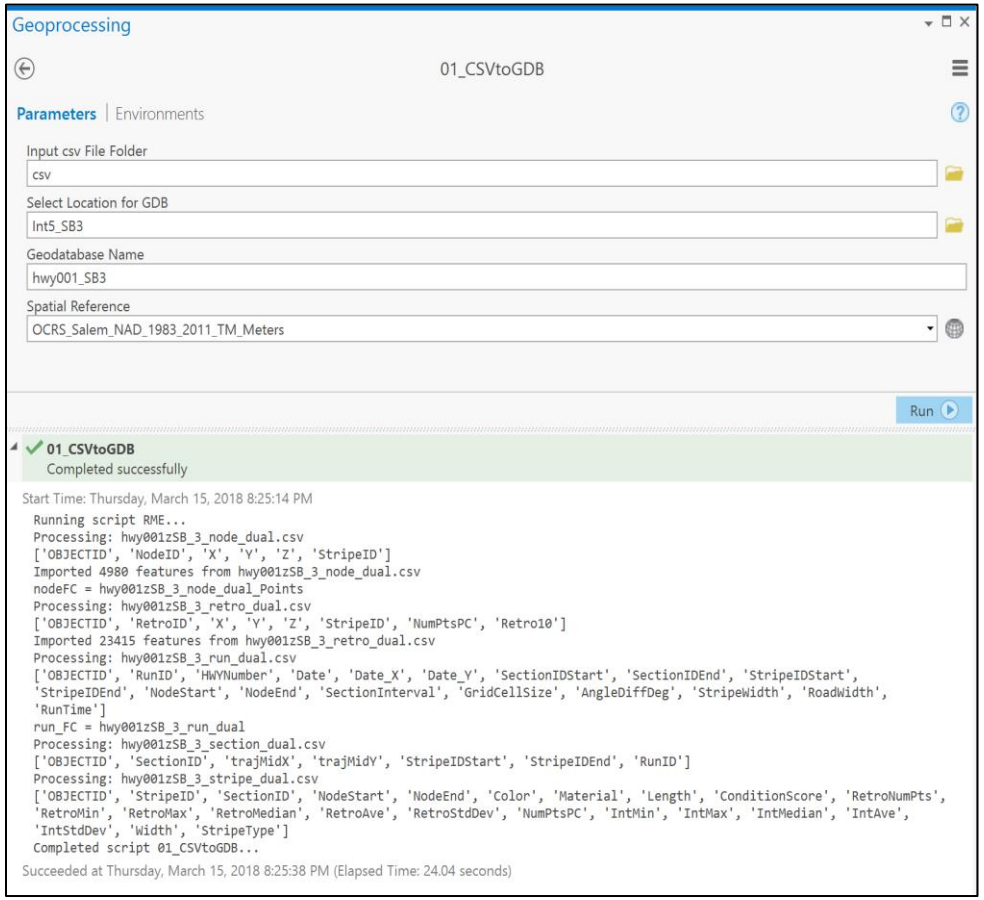
## Node table

| NodeID | X | Y | Z | StripeID |
|---|---|---|---|---|
| 1 | 72332.88 | 54098.91 | 146.8998 | 1 |
| 2 | 72342.88 | 54098.96 | 146.898 | 1 |
| 3 | 72336.82 | 54106.26 | 147.0378 | 2 |
| 4 | 72340.26 | 54106.3 | 147.0409 | 2 |
| 5 | 72332.85 | 54109.91 | 147.1491 | 3 |
| 6 | 72342.91 | 54109.97 | 147.1438 | 3 |

## Retro table

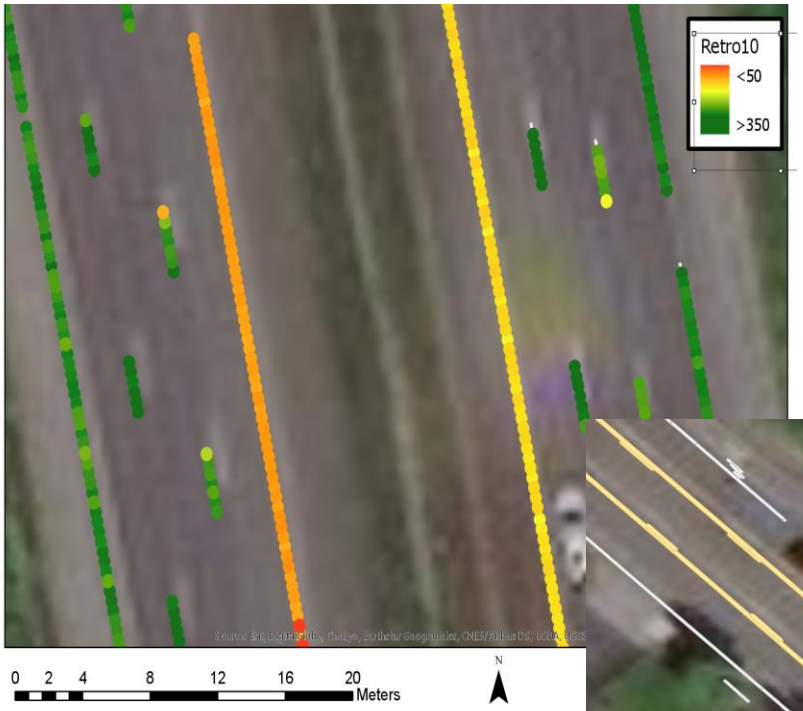
| RetroID | X | Y | Z | StripeID | NumPtsPC | Retro10 |
|---|---|---|---|---|---|---|
| 1 | 72332.98 | 54098.91 | 146.9025 | 1 | 11 | 65.3333 |
| 2 | 72333.48 | 54098.91 | 146.9038 | 1 | 15 | 71.72688 |
| 3 | 72333.98 | 54098.91 | 146.9076 | 1 | 14 | 78.88223 |
| 4 | 72334.48 | 54098.92 | 146.9101 | 1 | 14 | 84.08161 |
| 5 | 72334.98 | 54098.92 | 146.91 | 1 | 12 | 62.34572 |
| 6 | 72335.48 | 54098.92 | 146.9092 | 1 | 14 | 67.16561 |
| 7 | 72335.98 | 54098.92 | 146.9072 | 1 | 12 | 74.63528 |

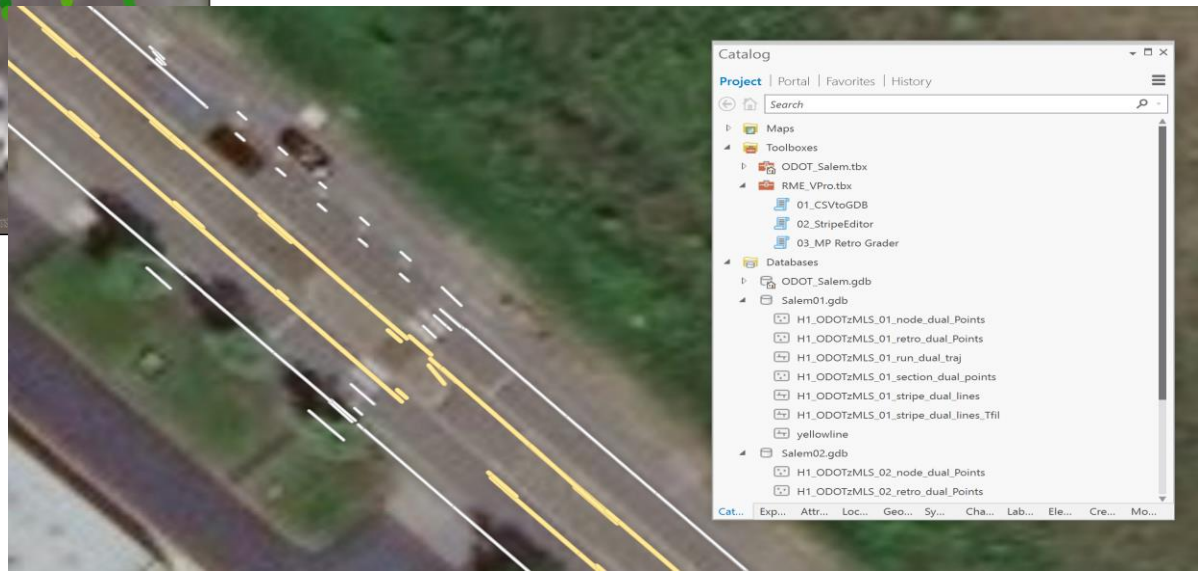
# ArcGIS Tool


Geoprocessing
01_CSVtoGDB
Parameters | Environments
Input csv File Folder
csv
Select Location for GDB
Int5_SB3
Geodatabase Name
hwy001_SB3
Spatial Reference
OCRS_Salem_NAD_1983_2011_TM_Meters
Run
01_CSVtoGDB
Completed successfully
Start Time: Thursday, March 15, 2018 8:25:14 PM
Running script RME...
Processing: hwy001zSB_3_node_dual.csv
['OBJECTID', 'NodeID', 'X', 'Y', 'Z', 'StripeID']
Imported 4980 features from hwy001zSB_3_node_dual.csv
nodeFC = hwy001zSB_3_node_dual_Points
Processing: hwy001zSB_3_retro_dual.csv
['OBJECTID', 'RetroID', 'X', 'Y', 'Z', 'StripeID', 'NumPtsPC', 'Retro10']
Imported 23415 features from hwy001zSB_3_retro_dual.csv
Processing: hwy001zSB_3_run_dual.csv
['OBJECTID', 'RunID', 'HWYNumber', 'Date', 'Date_X', 'Date_Y', 'SectionIDStart', 'SectionIDEnd', 'StripeIDStart',
'StripeIDEnd', 'NodeStart', 'NodeEnd', 'SectionInterval', 'GridCellSize', 'AngleDiffDeg', 'StripeWidth', 'RoadWidth',
'RunTime']
run_FC = hwy001zSB_3_run_dual
Processing: hwy001zSB_3_section_dual.csv
['OBJECTID', 'SectionID', 'trajMidX', 'trajMidY', 'StripeIDStart', 'StripeIDEnd', 'RunID']
Processing: hwy001zSB_3_stripe_dual.csv
['OBJECTID', 'StripeID', 'SectionID', 'NodeStart', 'NodeEnd', 'Color', 'Material', 'Length', 'ConditionScore', 'RetroNumPts',
'RetroMin', 'RetroMax', 'RetroMedian', 'RetroAve', 'RetroStdDev', 'NumPtsPC', 'IntMin', 'IntMax', 'IntMedian', 'IntAve',
'IntStdDev', 'Width', 'StripeType']
Completed script 01_CSVtoGDB...
Succeeded at Thursday, March 15, 2018 8:25:38 PM (Elapsed Time: 24.04 seconds)

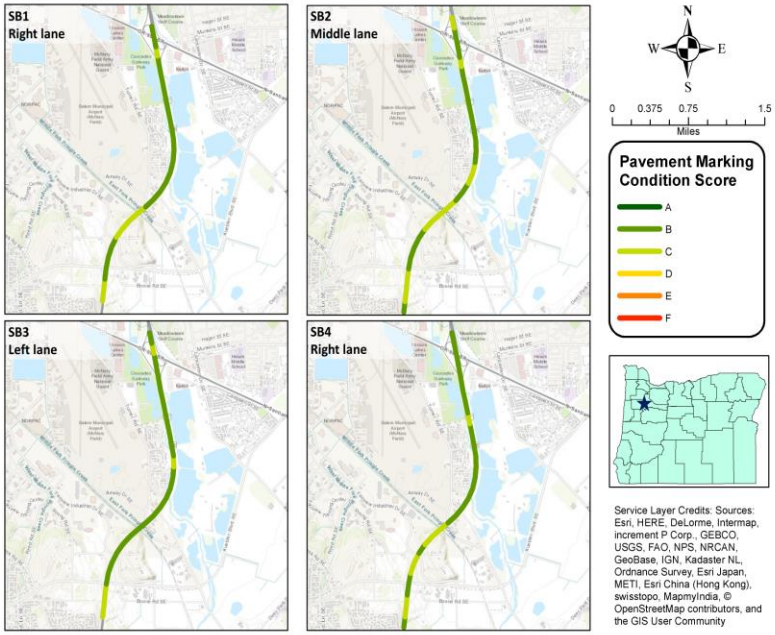

Sections
Nodes
RunTrajectory
Stripes
0 5 10 20 30 40 50
Meters
N

# ArcGIS Tool

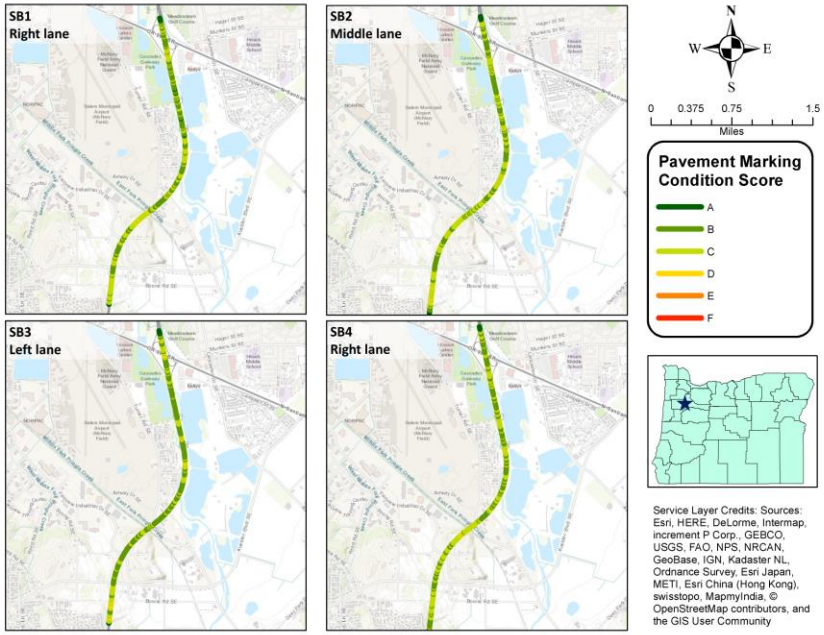

Retro10
<50
>350
0 2 4 8 12 16 20
Meters
N


Catalog
Project | Portal | Favorites | History
Search
Maps
Toolboxes
ODOT_Salem.tbx
RME_VPro.tbx
01_CSVtoGDB
02_StripeEditor
03_MP Retro Grader
Databases
ODOT_Salem.gdb
Salem01.gdb
H1_ODOTzMLS_01_node_dual_Points
H1_ODOTzMLS_01_retro_dual_Points
H1_ODOTzMLS_01_run_dual_traj
H1_ODOTzMLS_01_section_dual_points
H1_ODOTzMLS_01_stripe_dual_lines
H1_ODOTzMLS_01_stripe_dual_lines_Tfil
yellowline
Salem02.gdb
H1_ODOTzMLS_02_node_dual_Points
H1_ODOTzMLS_02_retro_dual_Points

# RoME Tool Evaluation




Southbound at tenths of a mile




Southbound at hundredths of a mile

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