New Technology Trials for Pavement Management and Maintenance

FORT WORTH®

VAISALA

September 2021

CITIBOT

Overview

- Road Artificial Intelligence (AI)

  Using smart phone technology with artificial intelligence software from Vaisala to perform pavement condition assessments.

- CitiBot SMS Alerts

  Using an automated text messaging platform to drastically improve stakeholder communication on maintenance construction projects.

VAISALA RoadAI

Pavement Management Database/Inventory

Pavement Condition Rating

85

66

47

24

52

71

83

Citywide Pavement Assessment

- Services are procured

- Fleet of vans with sophisticated measurement devices are deployed to survey the network.

- In office data analysis of the photography is partially manual

- This traditional process is expensive and takes about a year.

Intermediate Condition Assessments

- Team member visually surveys the pavement segments
  - Single person decisions are more subjective, requires experience
  - Time Consuming
  - Not easily repeatable
  - PCI rating can vary by Team Member
  - May not correlate with Citywide assessment

The Webinar...

Puts Automated Data Collection in Team Members Hands

Analyzed By RoadAI Consistently Across All Team Members

Could Export Many Street Segments at a Time Into the CFW Existing Pavement Management Software Same Day for Responsiveness

Collect video through the RoadAI app

- Deploy in any existing vehicle
- User friendly
- Flexibility and control
- Cost-effective

What Assets can you Manage with RoadAI

- Roadways
- Signs
- Line Markings
- Ability to isolate almost any RoW asset
- Complete Video Library of entire road network

Pavement Conditions: Distress Type, Quantity, and Severity
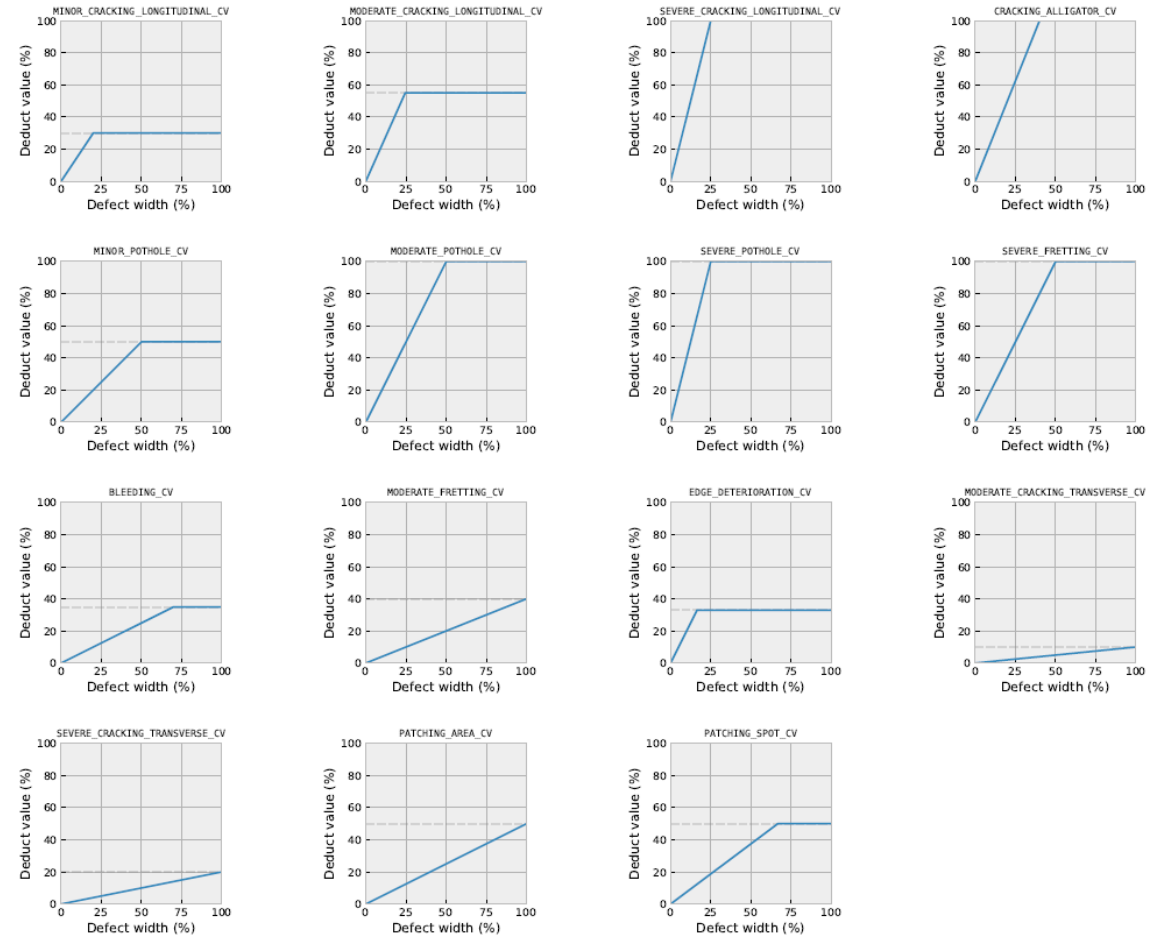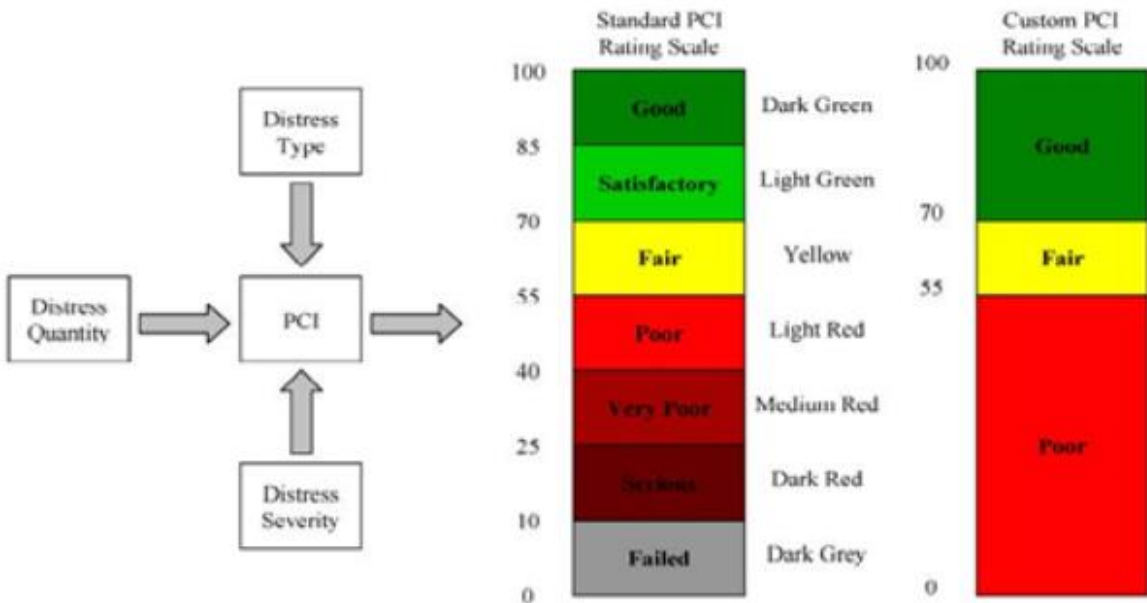
Figure 2. Defect severity to deduct value mappings for all defect types considered in the calculation of the pavement condition value.

Computer Vision - Sign Inventory

- Saved history data is used to detect missing signs

- Includes sign category and code

- Filter to display specific sign categories

- Condition rating and action tools

- Exporting options to other systems
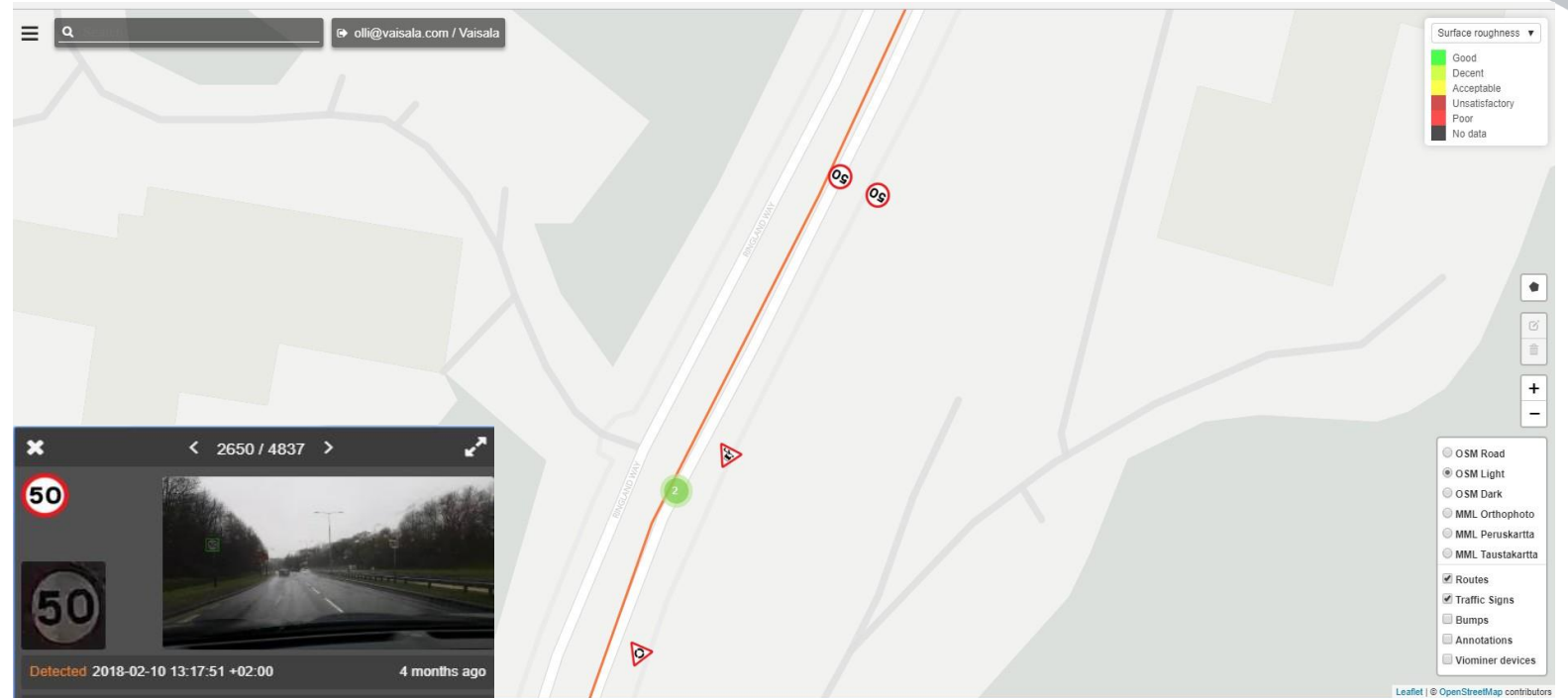
"RoadAI brings a new perspective to improving road asset management and maintenance operations"

Pasi Leimi, Director, City of Lappeenranta

Computer Vision – Pavement Markings

- Map line markings condition
- Export condition data
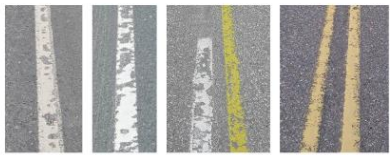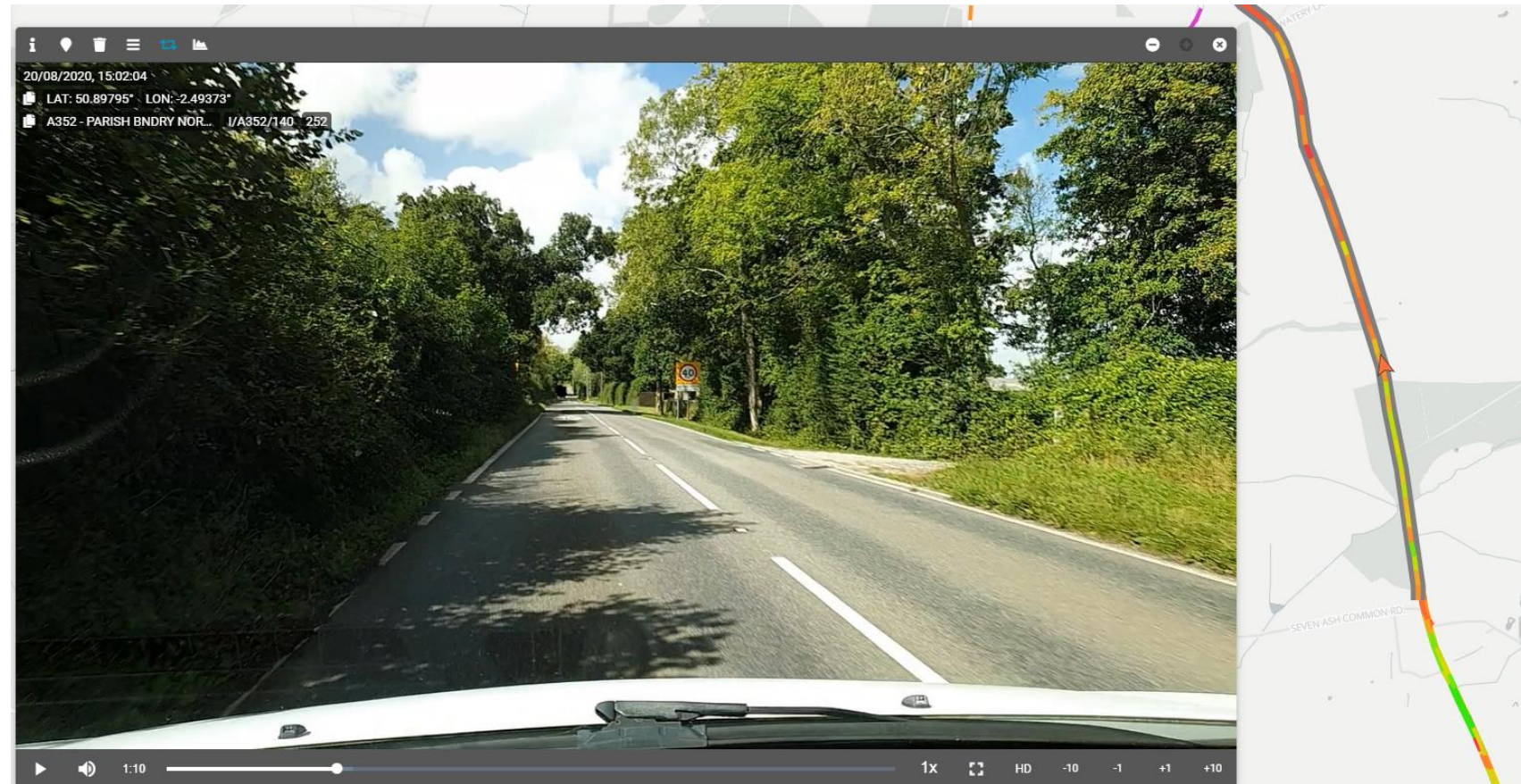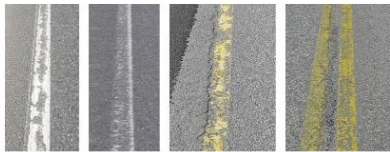
Computer Vision – Asset Detection

- Detect: catch basins, manhole covers, streetlights, guardrails, traffic lights
- Assess these assets from a desktop environment
- Tools to tag, assess condition, and create workflows
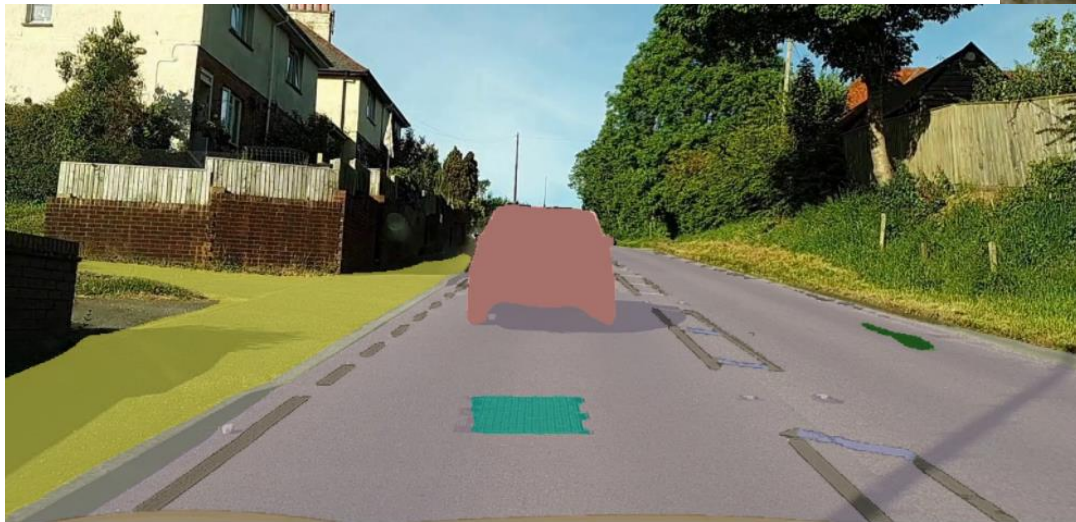
Data Collection & Processing
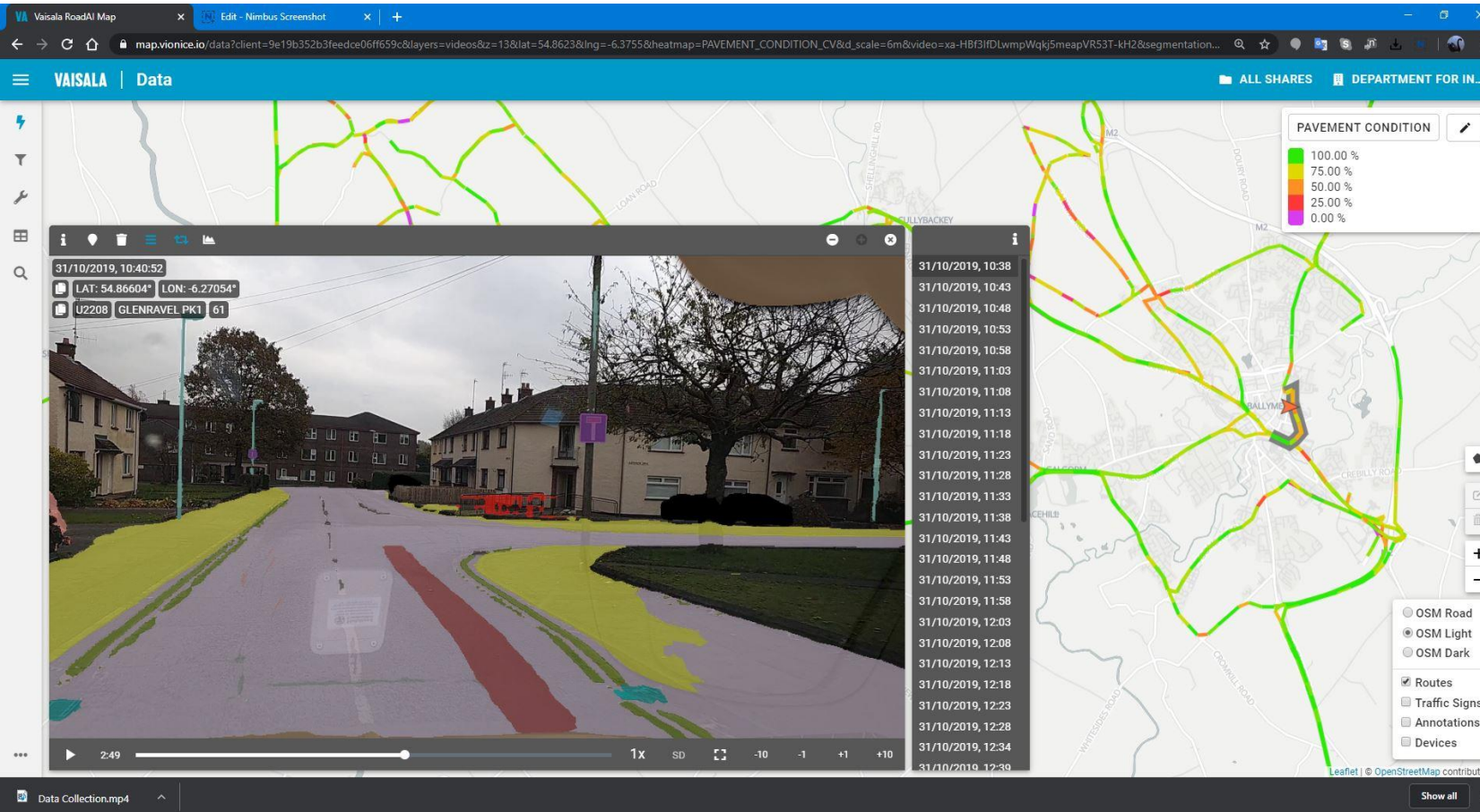
- Scalable data collection – Any vehicle can be equipped with a phone

- Near real time processing results: Results are available in < 4 hours

Existing process

From Survey…

…to maintenance takes 2-4 years program time

Road AI

From Computer Vison "Survey"…

…to maintenance, could take as little as 6 months program time

Summary of Road AI Benefits

- Automated Data Collection process saves time/$
- Cover entire Road Network
- Objective and consistent data sets
- Collect fresh condition data more often leads to better decision making
- Automated process leads to faster implementation of Pavement Management Plans
- Manage multiple Right of Way Assets
- Complete Video Library of Road Network could be used by multiple departments

City of Fort Worth Expectations and Results

- Easy Set Up and Installation
  - Vaisala shipped the required accessories, assisted with the in-vehicle set up, and reviewed a data test run for proper phone alignment and data collection

- Efficient Data Capturing Process
  - Camera set up and driving streets at posted speed was significantly faster than alternative methods

- Consistent and Repeatable Review and Analysis Process
  - Process is evaluating streets fairly and equitably

City of Fort Worth Expectations and Results

- Fast Data Analysis
  - Easy data capture
  - Video date seamlessly transferred automatically at end of day

- Effective Data Visualization
  - Multiple data sets to view pavement defects

- Multiple Data Exporting Options
  - Data is accessible to VUEWorks, GIS, Excel/DBs

RoadAI Test Area
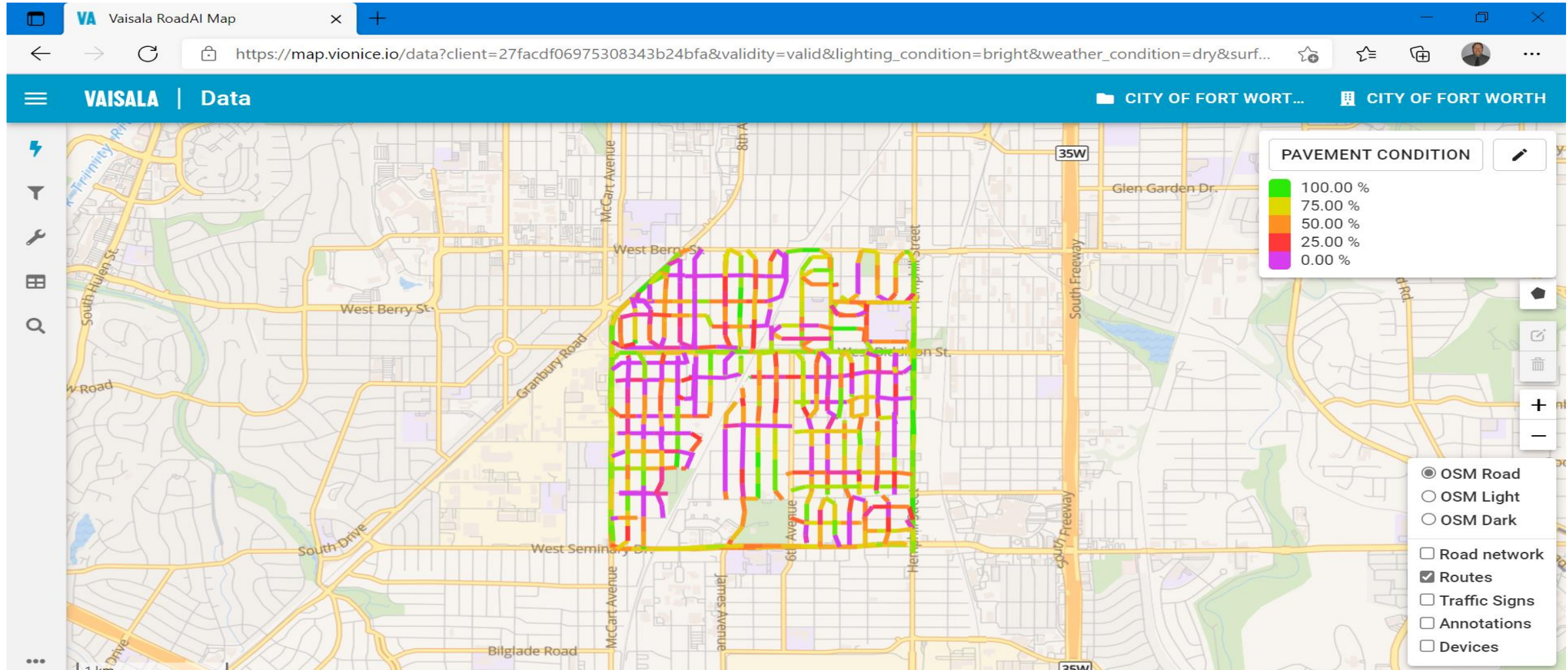
Actual HD Footage Next to Computer Vision

Results

- How did we validate RoadAI's data?
  - RoadAI data was compared to a current field review
- Overall test site differential was 8 points with very few outliers
- Set up, video capture, and processing are simple and seamless
- Multiple useful data displays and formatting options
- Collect data any time; scalable
- Impressive cost savings
- Customizable

CITIBOT SMS Alerts

Project Communication

- Existing Communication Tools
  - Door Hangers
  - Mailers/ Robocalls
  - Social Media
  - Neighborhood Meetings
- Maintenance Communication
- Disproportionate Response
- Questions During Construction

The beginning…

- Call Center Representatives

96% of Americans have a cell phone → English or Spanish Messaging → Opt-in info can be on the construction site to catch commuters → Information can be one-way or two-ways → Yes
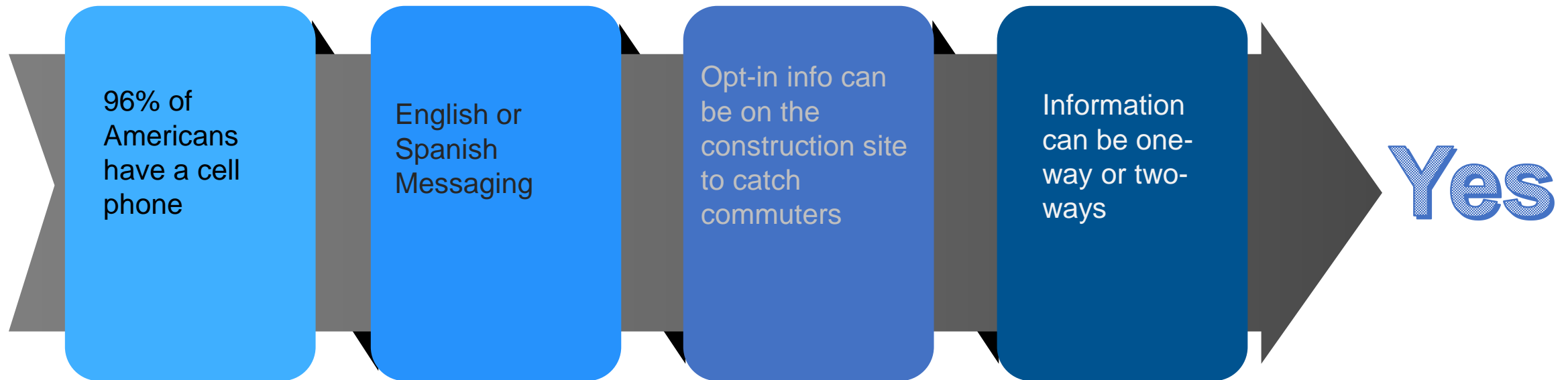
Implementation

- Set up was easy

- Pre determined messages based on schedule activities

- Sent Opt-in information through social media, neighborhood associations, portable message boards

Results

FORT WORTH MyFW

90 New Subscribers in July

The highest number of stakeholders heard of pilot project via on-site message boards as they passed through the construction

HISTORICAL NEIGHBORHOOD MEETING TURNOUTS

Cromwell Marine Creek	41
Kroger Dr.	24
N. Beach St. & Basswood	32

STAKEHOLDERS OPTING-IN PILOT

July 1st

44

63

87

90

July 31st

MISSED OPPORTUNITES

Started pilot trial after the Fossil Creek Blvd. project began. This feature will be more effective when

- The information is printed on door hangers, project signs and meeting handouts
- This feature can be discussed at neighborhood meetings and staff can assist people who might be intimidated by the technology
- A planned media campaign maximizes stakeholder interest; media communication was pushed inconsistently in pilot

Realized Benefits

- Easy for Stakeholders
- Consistent Communication
- Proactive
- Freeing up project manager time responding to stakeholders
- Reaching Commuters
- Sending links and other information

Yesterday 8:16 AM

Paving will continue westbound from N. Beach to Sandshell through the end of July, weather permitting
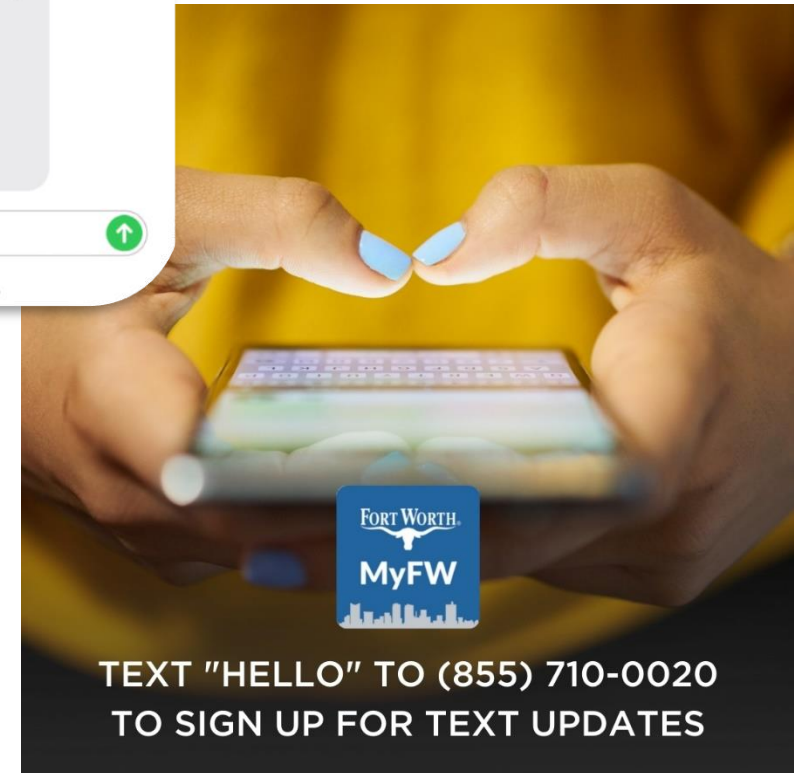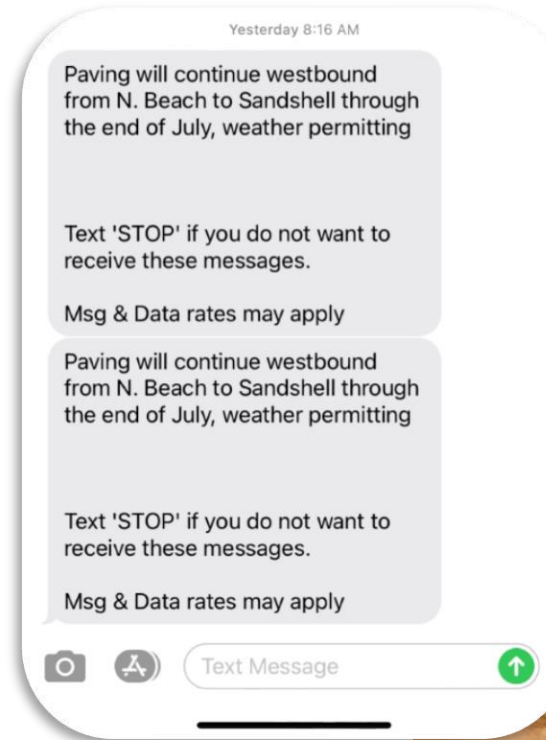
Text 'STOP' if you do not want to receive these messages.

Msg & Data rates may apply

Paving will continue westbound from N. Beach to Sandshell through the end of July, weather permitting

Text 'STOP' if you do not want to receive these messages.

Msg & Data rates may apply

Text Message

FORT WORTH.
MyFW

TEXT "HELLO" TO (855) 710-0020
TO SIGN UP FOR TEXT UPDATES

Survey Results

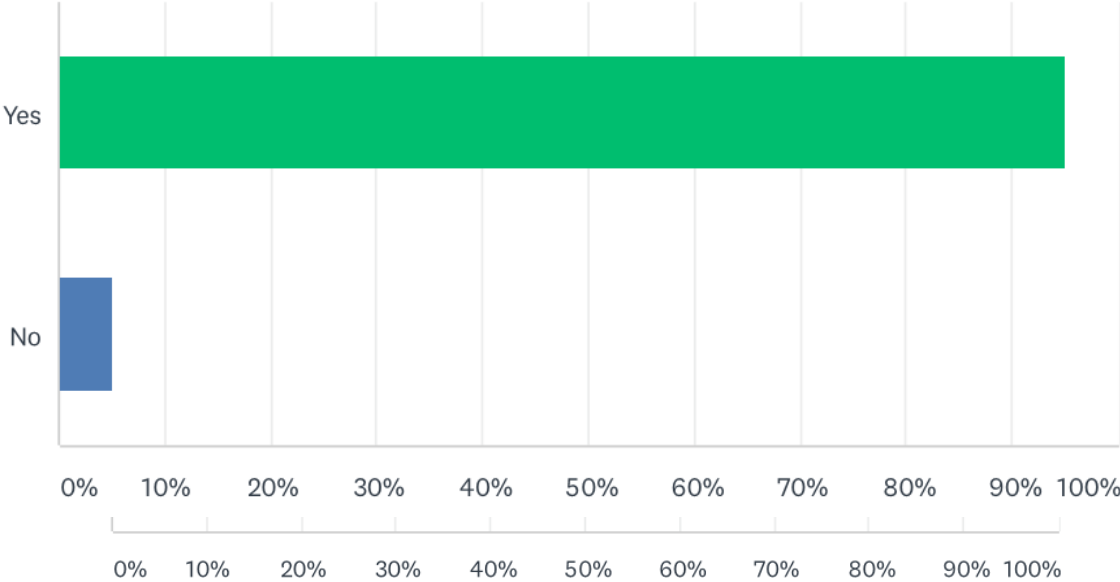Q3 Q5 How did you learn about the text message pilot program for Fossil Creek Boulevard?

Q1 [   ]ssil

Q6 Would you like the City of Fort Worth to continue proving text alert updates for projects in the future?

Answered: 20   Skipped: 0

Survey Responses

Since I have to drive on Fossil Creek every day this is helpful. I follow the city's projects in my area but I like that I could easily be sent updates instead of having to go search for it or call someone

Great service!

Its about time the city moves to the technology age! Love it

Is there a list of projects I can get texts about?

What else can you send

Text alerts were fine the construction just took too long

Questions

Contact Information

Jeffrey Perrigo

City of Fort Worth

Pavement Management Engineering Manager

Jeffrey.Perrigo@FortWorthTexas.gov

817-392-8117

Bill Eddy

Vaisala

Road Asset Management Sales Manager

Bill.Eddy@Vaisala.com

501-335-2400

Lane Zarate

City of Fort Worth

Pavement Management Administrator

Lane.Zarate@FortWorthTexas.gov

817-392-7802