Safety Concerns

- Traffic
Safety Concerns

- Footing
Safety Concerns

- Insects and Reptiles
Inventory Items

• Location
• Field Measurements
Inventory Items

• Historic Data
  • Plans
  • Annual Reports
  • Other Sources
Location
Material

- CMP
- Visual
- Probe
Material

- Plastic
- Deformation
- Joints
Material

- Concrete
- Joints
Material
Blockage

• Hampers Getting Size
• Makes Getting Condition Rating Difficult
• Effects Overall Culvert Rating
Blockage
Condition

- 1-10 is too Complex – Too Many Options
- Used more of a Good, Fair, Poor Rating
Data Collection

• Used a Laptop for Data Collection
• Set up Defaults in Roadsoft LDC to Suit Your Needs
• Backup Regularly Throughout Day
• Downloaded Data Every Day
• Created Filter for Every Day
Example Culvert Issues
Example Culvert Issues
Example Culvert Issues
Thank You

Larry Brown

lbrown@alleganroads.org
Culvert Pilot Background

• The pilot was funded though House Bill 4320 (S-3) - Supplemental Appropriation Adjustments, which added $2 million to TAMC’s fiscal year 2018 budget from the state restricted Michigan Infrastructure Fund.

• Based on recommendations made in the 21st Century Infrastructure Commission Report.

• TAMC Bridge Committee decided to use the funding for a local agency culvert project

• All work was to be completed by Sept. 30, 2018
Goal of the Pilot

• Estimate the total number of culverts in the state.
• Estimate the overall condition of culverts in the state using similar inspection components and rating.
• Determine the range of physical characteristics (inventory information) of culverts, such as material, size, and depth, that may impact the cost to maintain or replace the asset.
• Benchmark estimates of agency labor (time and materials) necessary to find and collect inventory data for culverts on a dollar per mile or other production rate basis.
• Benchmark estimates of agency labor (time and materials) necessary to find and collect condition data for culverts on a dollar per mile or other production rate basis.
Topics for Today

- Pilot Overview
- Importance – Houghton County Flood
- Culvert Pilot Results
- Tablet Experiences
- Roadsoft Improvements
- Roadsoft Next Steps
Houghton County Flood

- June 17, 2019
- 7-10” of rain in 4.5 hours
- 100+ Houghton County roads affected
- $100+ million in damages to publically-owned infrastructure
- 10 roads are still impassable
Houghton County Flood
Houghton County Flood
Houghton County Flood
Houghton County Flood
Culvert Pilot
Participating Agencies

- 49 Local Agencies
- Approximately 13 weeks to Collect Data
Culvert Pilot Data Collection
Culvert Pilot Participating Agencies

- 44 Agencies Used Roadsoft to Collect and Submit Data
- Non-Roadsoft Agencies Submitted Data to CTT for Conversion and Submittal to CSS
Culvert Pilot Data

- 49,644 Culverts inventoried
- 196,000 Local-Agency Owned Culverts
Culvert Data Collected

Overall Reported Culvert Condition Rating

- Failed: 1.8%
- Poor: 4.4%
- Fair: 10.1%
- Good: 15.0%
- Excellent: 14.1%
- Excellent: 26.1%
- Good: 15.1%
- Fair: 9.2%
- Poor: 2.7%

49,664 culverts inventoried, 34,354 recorded condition ratings
Pilot Findings

- Local agencies own between 7.3 to 9.2 million feet (1,389 to 1,756 miles) of culvert.
Pilot Findings

- Estimated total replacement value of locally-owned culverts in Michigan exceeds approximately $1.48 billion.

<table>
<thead>
<tr>
<th>Pilot Culvert Total</th>
<th>Culvert Span (in)</th>
<th>Pilot Size Distribution</th>
<th>Estimated Number of Culverts In State</th>
<th>Cost / Each Culvert Project</th>
<th>Cost For All Project</th>
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</thead>
<tbody>
<tr>
<td>5911</td>
<td>12</td>
<td>16.6%</td>
<td>32,443</td>
<td>$2,416</td>
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<tr>
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<tr>
<td>194</td>
<td>240</td>
<td>0.5%</td>
<td>1,065</td>
<td>$173,431</td>
<td>$184,663,661</td>
</tr>
</tbody>
</table>

| Total                | 100.0%          | 196,000                 | $1,481,363,931                      |
Pilot Findings

- Culvert material: 69% corrugated steel pipe, 21% concrete, and 5% plastic
- Culvert shape: 88.9% circular, 90% were 48 inches or less in span
- Depth of cover: 85% have 6 feet or less of cover
- Road surface: 66% asphalt pavement, 28% gravel
- Estimated cost of $10.5 - $11.5 million to collect data and evaluation all local agency culverts in the state
TABLET EXPERIENCES
Tablet Considerations

• Internal GPS
• Ruggedized & Weather Resistant
• Horsepower to Run Roadsoft LDC
• Built-in Camera
• Found Three That Met Criteria (may have been others):
  • MobileDemand xTablet T1600
  • Trimble T10
  • Getac F110
Tablet Use in the Field
Tablet Use in the Field
Tablet “Gotchas”

- GPS Setup
- GPS Driver Issues
  - Windows Updates Don’t Help
- Tablet Interface
  - Similar But Different to Windows Desktop
  - Screen “Real Estate” Issues
Tablet “Gotchas”
Tablet “Gotchas”
Tablet “Gotchas”
Tablet “Gotchas”

Roadsoft LDC Tablet GPS Setup

The MobileDemand T1600 tablet, as well as the Trimble T10 tablet, have an internal GPS chip manufactured by u-blox. The internal GPS on these tablets needs to be configured so that Roadsoft LDC will communicate with it.

The first thing to do is ensure the correct COM port driver is installed. Automatic Windows 10 updates often update the drivers to the latest version, which can cause problems. The correct driver is located on the CTT website at [http://cct.mtu.edu/tamc-culvert-pilot](http://cct.mtu.edu/tamc-culvert-pilot).

Download the Virtual COM Port Driver v2.30 file as highlighted below.
Roadsoft Improvements

• Updates to Culvert Module
• Updates to both LDC and Roadsoft to accommodate new data & provide upload functionality
• Updated LDC interface to accommodate touch screen
Roadsoft Next Steps

• Picture Attachments
• Data Quality Review
• Method for Reporting Collection Area
• Data Sharing
Questions?

THANK YOU
FOR NOT FALLING ASLEEP
Roadsoft

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