AASHTO
AASHTO INNOVATION INITIATIVE

# AASHTO Innovation Initiative

[Proposed] Nomination of Innovation Ready for Implementation

## Sponsor

Nominations must be submitted by an AASHTO member DOT willing to help promote the innovation. If selected, the sponsoring DOT will be asked to promote the innovation to other states by participating on a Lead States Team supported by the AASHTO Innovation Initiative.

1. Sponsoring DOT (State): Oklahoma DOT

2. Name and Title: Siv Sundaram, Process Improvement Engineer

Organization: Oklahoma Department of Transportation

Street Address: 200 NE 21st Street

City: Oklahoma City

State: Oklahoma

Zip Code: 73105

Email: ssundaram@odot.org

Phone: 405-301-2531

Fax: Click or tap here to enter text.

## Innovation Description (10 points)

The term "innovation" may include processes, products, techniques, procedures, and practices.

3. Name of the innovation:

GIS Notebook for Project Selection

4. Please describe the innovation.

Oklahoma Department of Transportation (ODOT) updates the 8 Year Construction Program and 4 Year Asset Preservation Plan every year using asset management data to select projects to be added to the

program. The Field District Engineers work with the Project Managers to select projects based on the need and the available funding. The GIS Dashboard for project selection developed by ODOT's GIS Division allows the users to get all the information for a highway or bridge by clicking at any point on a highway or map. A pop up window appears with all the items when a user clicks on  a highway and bridge. The interactive dashboard allows the user to filter the data by the district or program year or corridor. The user can simply use the mouse to navigate the state map or type in the geographic information such as county or city and zoom into the location. They can turn information layers on or off depending on what they are looking for. They can eve change the base map layer. They can also view multiple dashboards at the same time. Information provided includes crash data, existence of shoulders, annual average daily traffic, pavement rating, bridge condition such as structurally deficient or functionally obsolete or bridges at risk of becoming structurally deficient; highway capacity, unsafe intersections, etc.

5. What is the existing baseline practice that the innovation intends to replace/improve?

The asset management data used to be provided in three ring binders with maps and reports for each Field District. Even when the binder was replaced with a pdf document, the document required time for assembly and was not the most user friendly.

6. What problems associated with the baseline practice does the innovation propose to solve?

Efficiency in project selection using all available asset management data. When the data was provided in three ring binders with maps and reports, it took days of assembling data from various areas and making multiple copies to provide to District Engineers and their assistants as well as senior staff and project managers. Even when the binder was replaced with a pdf document, the document required considerable time for assembly..

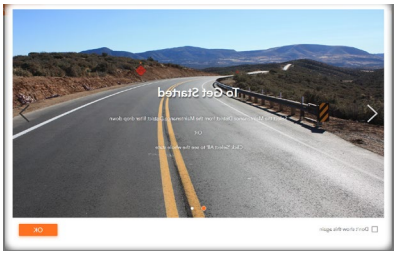
7. Briefly describe the history of its development.

As ODOT's GIS group developed layers with asset management data, it was efficient to transition from a report and map based information to GIS based information for project selection.

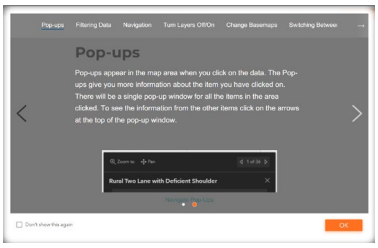
8. What resources—such as technical specifications, training materials, and user guides—have you developed to assist with the deployment effort? If appropriate, please attach or provide weblinks to reports, videos, photographs, diagrams, or other images illustrating the appearance or functionality of the innovation (if electronic, please provide a separate file). Please list your attachments or weblinks here.

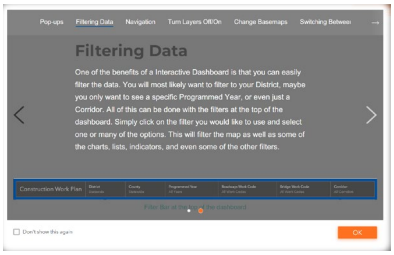
The recon scope includes data to be collected and is shared with the demand service consultants doing the work. The project initiation report has a project description and the constraints. Concept station was initially tried out by our Digital Delivery Team and the information was shared with the other design squads. The process is still evolving.

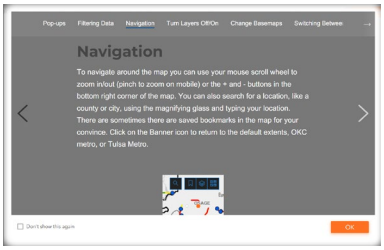
Attach photographs, diagrams, or other images here. If images are of larger resolution size, please provide as separate files.

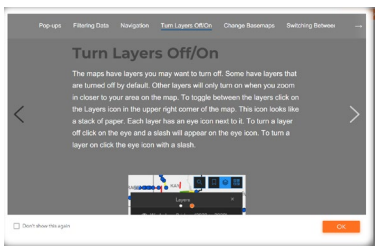

To Get Started

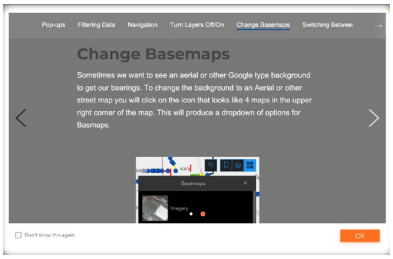

How to Use ODOT's Dashboards
FAQ for using ODOT's Dashboards

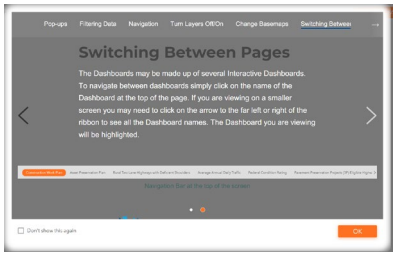

Pop-ups
Pop-ups appear in the map area when you click on the data. The Pop-ups give you more information about the item you have clicked on. There will be a single pop-up window for all the items in the area clicked. To see the information from the other items click on the arrows at the top of the pop-up window.

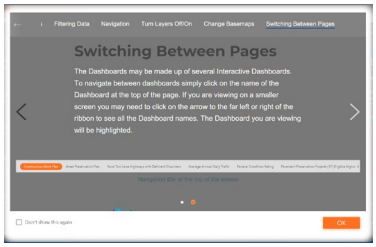

Filtering Data
One of the benefits of a Interactive Dashboard is that you can easily filter the data. You will most likely want to filter to your District, maybe you only want to see a specific Programmed Year, or even just a Corridor. All of this can be done with the filters at the top of the dashboard. Simply click on the filter you would like to use and select one or many of the options. This will filter the map as well as some of the charts, lists, indicators, and even some of the other filters.


Navigation
To navigate around the map you can use your mouse scroll wheel to zoom in/out (pinch to zoom on mobile) or the + and - buttons in the bottom right corner of the map. You can also search for a location, like a county or city, using the magnifying glass and typing your location. There are sometimes there are saved bookmarks in the map for your convince. Click on the Banner icon to return to the default extents, OKC metro, or Tulsa Metro.


Turn Layers Off/On
The maps have layers you may want to turn off. Some have layers that are turned off by default. Other layers will only turn on when you zoom in closer to your area on the map. To toggle between the layers click on the Layers icon in the upper right corner of the map. This icon looks like a stack of paper. Each layer has an eye icon next to it. To turn a layer off click on the eye and a slash will appear on the eye icon. To turn a layer on click the eye icon with a slash.


Change Basemaps
Sometimes we want to see an aerial or other Google type background to get our bearings. To change the background to an Aerial or other street map you will click on the icon that looks like 4 maps in the upper right corner of the map. This will produce a dropdown of options for Basmaps.


Switching Between Pages
The Dashboards may be made up of several Interactive Dashboards. To navigate between dashboards simply click on the name of the Dashboard at the top of the page. If you are viewing on a smaller screen you may need to click on the arrow to the far left or right of the ribbon to see all the Dashboard names. The Dashboard you are viewing will be highlighted.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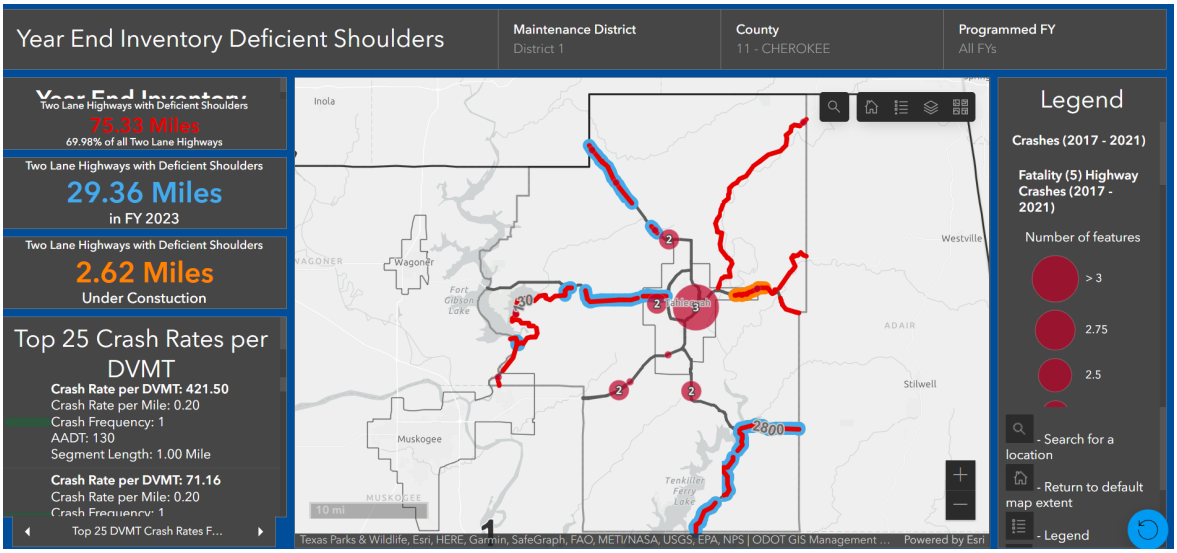
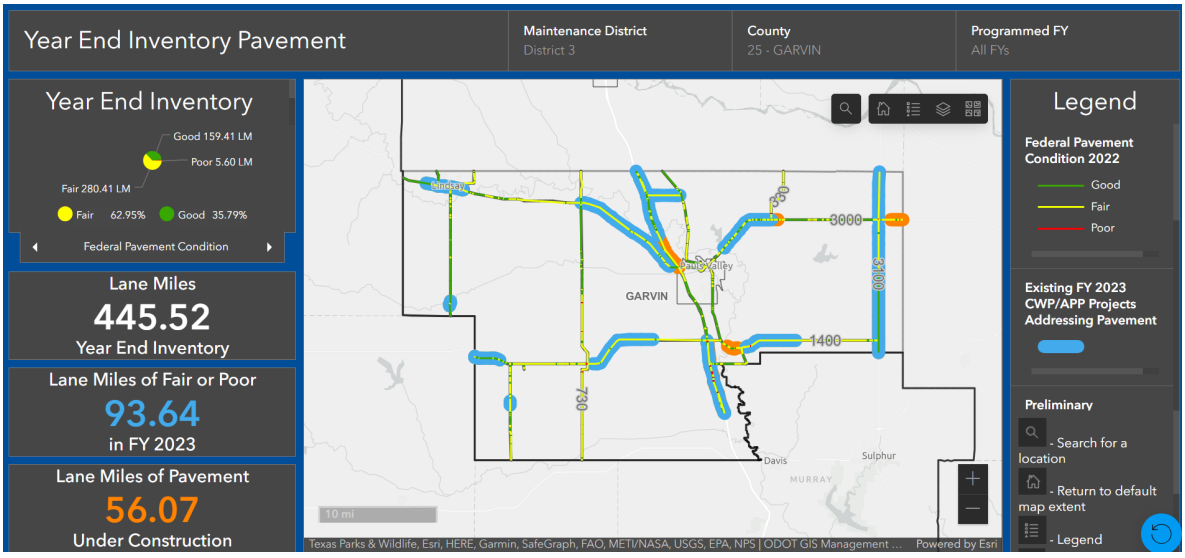
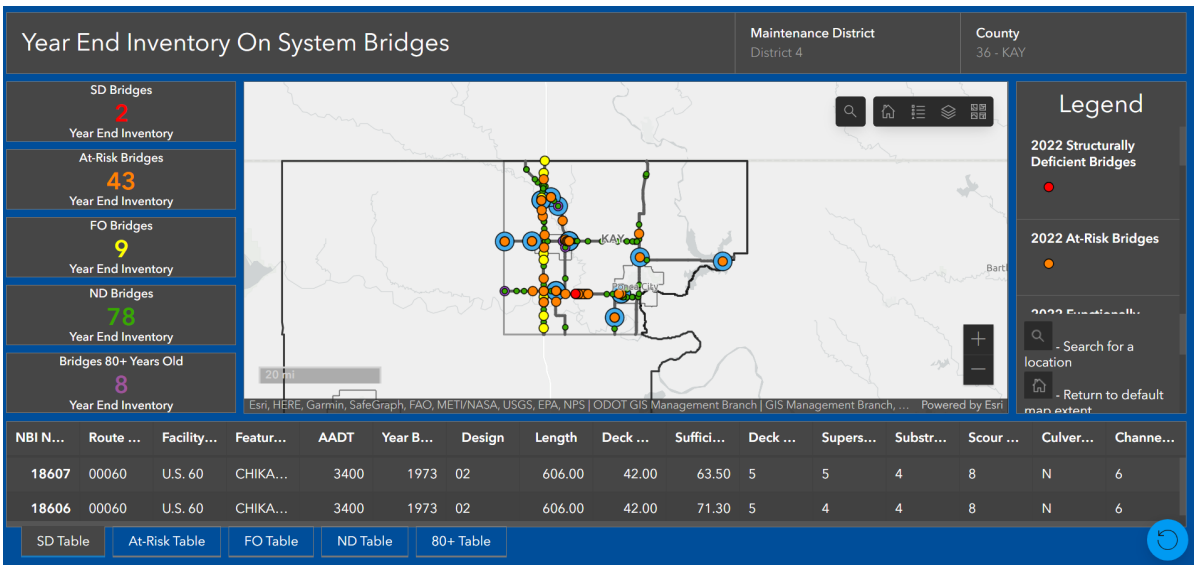
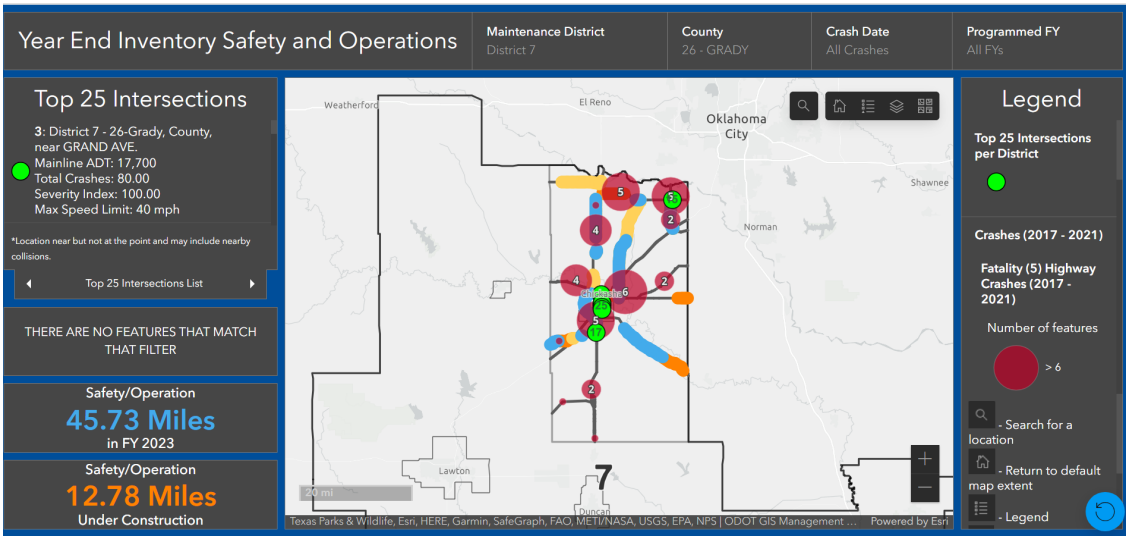

Year End Inventory Deficient Shoulders
Maintenance District
District 1
County
11 - CHEROKEE
Programmed FY
All FYs
Two Lane Highways with Deficient Shoulders
75.33 Miles
69.98% of all Two Lane Highways
Two Lane Highways with Deficient Shoulders
29.36 Miles
in FY 2023
Two Lane Highways with Deficient Shoulders
2.62 Miles
Under Constuction
Top 25 Crash Rates per DVMT
Crash Rate per DVMT: 421.50
Crash Rate per Mile: 0.20
Crash Frequency: 1
AADT: 130
Segment Length: 1.00 Mile
Crash Rate per DVMT: 71.16
Crash Rate per Mile: 0.20
Top 25 DVMT Crash Rates F...
Inola
Wagoner
Fort Gibson Lake
Tahlequah
Westville
ADAIR
Stilwell
Muskogee
Tenkiller Ferry Lake
10 mi
Texas Parks & Wildlife, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS | ODOT GIS Management ...
Powered by Esri
Legend
Crashes (2017 - 2021)
Fatality (5) Highway Crashes (2017 - 2021)
Number of features
> 3
2.75
2.5
- Search for a location
- Return to default map extent
- Legend


Year End Inventory Pavement
Maintenance District
District 3
County
25 - GARVIN
Programmed FY
All FYs
Year End Inventory
Good 159.41 LM
Poor 5.60 LM
Fair 280.41 LM
Fair 62.95%
Good 35.79%
Federal Pavement Condition
Lane Miles
445.52
Year End Inventory
Lane Miles of Fair or Poor
93.64
in FY 2023
Lane Miles of Pavement
56.07
Under Construction
GARVIN
Pauls Valley
Davis
Sulphur
MURRAY
3000
1400
10 mi
Texas Parks & Wildlife, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS | ODOT GIS Management ... Powered by Esri
Legend
Federal Pavement Condition 2022
Good
Fair
Poor
Existing FY 2023 CWP/APP Projects Addressing Pavement
Preliminary
- Search for a location
- Return to default map extent
- Legend


Year End Inventory On System Bridges
Maintenance District
District 4
County
36 - KAY
SD Bridges
2
Year End Inventory
At-Risk Bridges
43
Year End Inventory
FO Bridges
9
Year End Inventory
ND Bridges
78
Year End Inventory
Bridges 80+ Years Old
8
Year End Inventory
KAY
Ponca City
20 mi
Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS | ODOT GIS Management Branch | GIS Management Branch, ... Powered by Esri
Legend
2022 Structurally Deficient Bridges
2022 At-Risk Bridges
- Search for a location
- Return to default map extent
NBI N... Route ... Facility... Featur... AADT Year B... Design Length Deck ... Suffici... Deck ... Supers... Substr... Scour ... Culver... Channe...
18607 00060 U.S. 60 CHIKA... 3400 1973 02 606.00 42.00 63.50 5 5 4 8 N 6
18606 00060 U.S. 60 CHIKA... 3400 1973 02 606.00 42.00 71.30 5 4 4 8 N 6
SD Table
At-Risk Table
FO Table
ND Table
80+ Table


Year End Inventory Safety and Operations
Maintenance District
District 7
County
26 - GRADY
Crash Date
All Crashes
Programmed FY
All FYs
Top 25 Intersections
3: District 7 - 26-Grady, County, near GRAND AVE.
Mainline ADT: 17,700
Total Crashes: 80.00
Severity Index: 100.00
Max Speed Limit: 40 mph
*Location near but not at the point and may include nearby collisions.
Top 25 Intersections List
THERE ARE NO FEATURES THAT MATCH THAT FILTER
Safety/Operation
45.73 Miles
in FY 2023
Safety/Operation
12.78 Miles
Under Construction
Weatherford
El Reno
Oklahoma City
Shawnee
Norman
Lawton
Duncan
7
20 mi
Texas Parks & Wildlife, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS | ODOT GIS Management ...
Powered by Esri
Legend
Top 25 Intersections per District
Crashes (2017 - 2021)
Fatality (5) Highway Crashes (2017 - 2021)
Number of features
> 6
- Search for a location
- Return to default map extent
- Legend

## State of Development (40 points)

Innovations must be successfully deployed in at least one State DOT. The AII selection process will favor innovations that have advanced beyond the research stage, at least to the pilot deployment stage, and preferably into routine use.

9. How ready is this innovation for implementation in an operational environment? Please select from the following options. Please describe.

☐ Prototype is fully functional and yet to be piloted

☐ Prototype has been piloted successfully in an operational environment

☒ Technology has been deployed multiple times in an operational environment

☐ Technology is ready for full-scale implementation

This has been fully functions al for the last 3 years.

10. What additional development is necessary to enable implementation of the innovation for routine use?

No additional development is needed.

11. Are other organizations using, currently developing, or have they shown interest in this innovation or of similar technology?? ☐ Yes ☒ No Though no specific state has reached out to us, several states have interactive GIS mapping tools tied to various asset management and project data.

If so, please list organization names and contacts. Please identify the source of this information.

| Organization | Name | Phone | Email |
|---|---|---|---|
| Click or tap here to enter text. | Click or tap here to enter text. | Click or tap here to enter text. | Click or tap here to enter text. |

| | | | |
|---|---|---|---|
| Click or tap here to enter text. | Click or tap here to enter text. | Click or tap here to enter text. | Click or tap here to enter text. |
| Click or tap here to enter text. | Click or tap here to enter text. | Click or tap here to enter text. | Click or tap here to enter text. |

## Potential Payoff (30 points)

Payoff is defined as the combination of broad applicability and significant benefit or advantage over baseline practice .

12. How does the innovation meet customer or stakeholder needs in your State DOT or other organizations that have used it?

This information helps DOTs select projects based on all available data and prioritize their spending.

13. Identify the top three benefit types your DOT has realized from using this innovation. Describe the type and scale of benefits of using this innovation over baseline practice. Provide additional information, if available, using quantitative metrics, to describe the benefits.

| Benefit Types | Please describe: |
|---|---|
| Organizational Efficiency | The Field District Engineers work with the Project Managers to select projects based on the need and the available funding. The GIS Dashboard for project selection developed by ODOT's GIS Division allows the users to get all the information for a highway or bridge by clicking at any point on a highway or map. |
| Cost Savings | This helps DOTs identify projects which are most needed. |
| Choose an item. | Click or tap here to enter text. |

Provide any additional description, if necessary:

Click or tap here to enter text.

14 How broadly might this innovation be deployed for other applications. in the transportation industry (including other disciplines of a DOT, other transportation modes, and private industry)?

All states have the asset management data and most have GIS mapping tools available. Having all the data readily available will help the DOTs make efficient decisions.

# Market Readiness (20 points)

The AII selection process will favor innovations that can be adopted with a reasonable amount of effort and cost, commensurate with the payoff potential.

15. What specific actions would another organization need to take along each of the following dimensions to adopt this innovation?

| Check boxes that apply | Dimensions | Please describe: |
|---|---|---|
| ☒ | Gaining executive leadership support | Leadership support in setting policies requiring data based decision is important. |
| ☒ | Communicating benefits | The information is already available with DOTs. Getting it all in the same place would make it most efficient. |
| ☐ | Overcoming funding constraints | Click or tap here to enter text. |
| ☒ | Acquiring in-house capabilities | As most data is inhouse, it is important to have the inhouse capabilities. |
| ☐ | Addressing legal issues (if applicable) (e.g., liability and intellectual property) | Click or tap here to enter text. |
| ☐ | Resolving conflicts with existing national/state regulations and standards | Click or tap here to enter text. |
| ☐ | Other challenges | Click or tap here to enter text. |

16. Please provide details of cost, effort, and length of time expended to deploy the innovation in your organization.

**Cost**: In house staff do this.

**Level of Effort**: Once the first GIS data book is set up, updating it each year is minimal effort. The initial setup took several months toto get the correct interactivity and data elements shown with conversations going back and forth. Now It take a couple of days to set up a brand new Notebook. Because we want to keep the historic notebooks a copy is created and it takes a few days to update all the interactivity with the new data.

**Time**: Less than 2 weeks

17. To what extent might implementation of this innovation require the involvement of third parties, including vendors, contractors, and consultants? If so, please describe. List the type of expertise required for implementation.

All the data is available with DOTs and most states have GIS capabilities.