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): Colorado (CDOT)

2. Name and Title: Gary Vansuch, Director of the Office of Improvement Intern

Organization: CDOT

Street Address: 2829 W Howard Pl

City: Denver

State: CO

Zip Code: 80204

Email: gary.vansuch@state.co.us

Phone: Click or tap here to enter text.

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 Potholes Field Map & GeoHub Layer

4. Please describe the innovation.

The problem at hand was to quickly and efficiently take inventory of Region 4's road conditions, particularly potholes. This innovation allows known and new pothole information to be easily captured,

stored, pictured, and shared in CDOT's Geohub (online GIS system). Maintenance personnel capture data from their phone or tablet in the Field Map application whenever they see a pothole on a CDOT highway. Once pothole data is captured, the data is automatically uploaded from Field Maps to CDOT's GeoHub online GIS system on the Pothole Layer. The Pothole GeoHub layer can be referenced for real time data about the conditions of CDOT's highways. Maintenance, the Region Leadership Team, and even project managers can use this information to better plan CDOT's resources to repair highway conditions. Once a pothole(s) are repaired, any information (material, cost, type of repair) is also saved to the GeoHub layer. This data can be used for future planning purposes and to track CDOT accomplishments.

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

Pothole data was previously captured through work orders and a Google Form. Maintenance had to quickly react to dangerous pothole issues versus having a database of known problems. Pulling information, costs, and organizing resources for potholes was cumbersome and time consuming.

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

With the GIS Pothole Field Map and GeoHub layer, now the data can be viewed spatially to better help coordinate resources, it is updated in real-time, and all data is stored in 1 convenient location for easy access, reference, and documentation. Pothole reports can be quickly generated for leadership, project managers, and constituents. It allows maintenance to be proactive about potholes on state highways and better plan resources – personnel, materials, and funding.

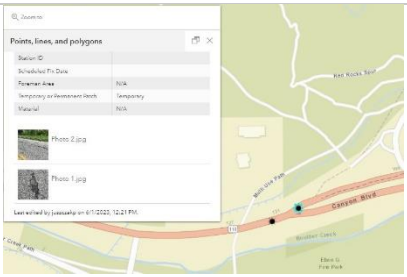
7. Briefly describe the history of its development.

The Region Transportation Director for CDOT Region 4 asked maintenance for a better way to track pothole locations and repairs. The Region 4 Maintenance Project Manager, Bradley Myers, developed a Google Form to start tracking pothole information, but wanted to take it a step further and be able to spatially map the data. Myers coordinated with Region 4 GIS team, Paul Juszczak and Kalli Wegren, to develop a GIS Pothole Layer. Juszczak also developed a Field Map application to collect pothole data in the field. The field map informs the GIS Pothole layer. A workflow and training video was developed and rolled out to maintenance personnel. Maintenance has been collecting data in the field and the GeoHub Pothole layer is now the ultimate database of Region 4 pothole data and pictures.

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 GeoHub Pothole Layer and Field Map is internal to CDOT only however screen-shots are included on the next page. The workflow and video used for training maintenance is attached.

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



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

Region 4 maintenance personnel is currently collecting data, so the Pothole layer and field map is live. Training is ongoing as sometimes 1-on-1 assistance is required. This innovation is still fairly new, so the team is also continuing to promote this tool and resource.

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

Training has not been 100% completed yet, so this innovation is not yet being utilized at 100% capacity. Training and technical support is ongoing.

11. Are other organizations using, currently developing, or have they shown interest in this innovation or of similar technology?? ☒ Yes ☐ No

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

The same Region 4 team is also using this technology to help track and manage other assets.

Organization	Name	Phone	Email
CDOT	Bradley Myers, Paul Juszczak, Kalli Wegren	970-302-2368, 970-350-2237, 970-652-5855	Bradley.Myers@state.co.us, Paul.Juszczak@state.co.us, Kalli.Wegren@state.co.us
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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 innovation streamlines the pothole data collection workflow, allows easier access to real time pothole data (location, pictures, conditions), and is a convenient storage to keep historical records. This tool benefits CDOT maintenance, leadership, project engineers in addition to external stakeholders, local agencies, and the traveling public.

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:
Improved Operation Performance	This tool is an easy way for maintenance to capture pothole data. Pothole data can be updated easily, quickly, and efficiently. The innovation streamlines the data collection process.
Improved Asset Performance	The Pothole layer creates historical data to identify problem areas and potential project areas. Road conditions can be tracked region-wide and resources can more effectively utilized.
Improved Customer Service	Any time the traveling public or maintenance reports a pothole, resources can be more effectively utilized to fix dangerous potholes. CDOT leadership can also quickly have pothole data reports to help plan resources and projects. The safety of the traveling public greatly benefits from this innovation.

Provide any additional description, if necessary:

N/A

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)?

This innovation has inspired similar products to help track CDOT assets within CDOT regions. CDOT specialty units are also utilizing this technology to streamline their workflows.

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 to change in the typical pothole data collection workflow.
☒	Communicating benefits	Communication and training to promote the use of the innovation (the innovation is as only good as the data).
☒	Overcoming funding constraints	Developing this innovation takes time, knowledge, and funding for GIS (ESRI) applications.
☒	Acquiring in-house capabilities	Training is required for personnel to use the Field Maps application and others to be familiar with interacting with a GIS interface.
☐	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: CDOT is fortunate to have access to ESRI products including GIS online (GeoHub) and the Field Maps application. The cost would include the cost of obtaining licenses for these products.

Level of Effort: Level of effort for those with GIS experience already is low. For those with not any GIS experience, it will be a higher level of effort to create the GIS layer and field map. For training

maintenance personnel level of effort would be medium since it is time consuming for group and 1-on-1 training.

Time: From start to finish (creating GIS layers and field map to training) it is about a 3-4 month effort.

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.

ESRI (GIS) is the only external vendor that was used for this innovation. All other work was completed at CDOT in-house.