



Committee Report

To:	Deputy Warden McQueen and Members of Grey County Council
Committee Date:	May 26, 2022
Subject / Report No:	TR-CW-24-22
Title:	Sign and Pavement Condition Index Single Source Award
Prepared by:	Trevor Ireton, Project Planning Engineer
Reviewed by:	Pat Hoy, Director, Transportation Services
Lower Tier(s) Affected:	None
Status:	

Recommendation

1. That Report TR-CW-24-22 regarding the Sign and Pavement Condition Index Single Source Award be received; and
2. That the completion of the road sign data collection and Pavement Condition Index for all County owned roads be awarded to Iris R&D Group on a single source contract for \$93,303 + HST; and
3. That the project deficit be funded from any surplus realized in 2022, or if no surplus is realized, the funds be transferred from the Transportation Services General Reserve.

Executive Summary

Grey County Transportation would like to continue to enhance its Asset Management processes by using a new service to collect more accurate data. The solution uses an onboard camera to collect data by analyzing the road and right of way assets such as signs.

This alternative to the current manual process, provides a safer option for the collection of important data while reducing manpower requirements and greenhouse gas emissions. In addition, staff will have more detailed condition rating data to be able to target more proactive road maintenance work and maintain the County levels of service with less money spent.

Background and Discussion

Existing Road Sign Data

As an integral part of Transportation Services Asset Management process, the County continues to develop the CityWorks maintenance management software. Accurate asset data is

becoming vital to ensure work history and inspection information is collected against the assets themselves. This inventory is critical as information such as sign type, size, and location are mandated by the Ministry of Transportation.

The County of Grey currently owns and maintains more than 8,500 road signs located along the County Road network. The existing road sign inventory requires regular updates and is heavy on staff hours to maintain said updates. Staff have determined that conducting a full road sign data collection process will provide the most consistent and accurate inventory data for the department. Staff have investigated continuing to utilize staff to capture the road sign inventory data and determined that this was not a cost-effective approach and would result in a loss of manpower currently allocated to the summer maintenance program.

Current Pavement Condition Index (PCI) Data Collection

Each year, staff conduct PCI inspections on the entire County Road network, 1,738 lane km, for each respective road section to understand the current state of the County Road infrastructure. These inspections are utilized in several of the departments major decision-making processes including, but not limited to, the 10 Year Capital Plan, the Asset Management Plan, and the Capital Construction Budget.

The County has historically been completing these PCI inspections using internal staff. Although staff have been fully trained on the process for inspections and have extensive knowledge on the various road distresses and cracking patterns, inspections have a low degree of precision and can vary from inspector to inspector. This is because the manual inspections are subjective and prone to bias. Further, the County's roads are divided into engineering sections for assessment and reporting. The engineering sections are on average 1.6 km long (with the largest being 8 km). Inspections are generalized over these sections even when the conditions are not consistent.

Some of the subjectivity and bias that comes with manual inspections could be mitigated using a two-person team. This approach has been avoided due to the additional cost and loss of manpower associated with a second staff member participating in the inspection process.

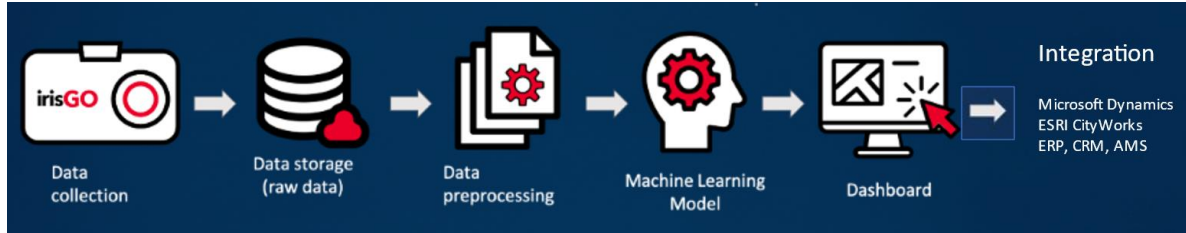
PCI inspections can be heavy on staff time as they typically require numerous trips back and forth over each road section. Safety concerns are also present as staff require time spent idling on the road shoulder as they complete the inspection documentation. This manual process results in considerable time loss and increased greenhouse gas emissions when compared to new digital data collection processes that can be completed within a single pass of the road without stopping.

A new service has been reviewed that will support the Asset Management process by using a scientific method of collecting data for both the road signs and the road network conditions.

IrisGO™ Solution

The IrisGO™ data collection device presents a solution that utilizes evidence-based data gathering through a machine learning and data processing system. This solution is ideal as it is the only product on the market that currently allows for the concurrent collection of both asset data information (road sign collection) and PCI inspection data. This information is collected as part of staff patrols via the IrisGO™ camera installed within a Grey County truck and uploaded directly to Iris R&D Group servers. From there, data processing and machine-based learning process the data and present it to staff via the IrisCITY™ dashboard as well as integrate directly

with County software including GIS, CityWorks and Asset Optimizer.



What really makes this process powerful is that Iris R&D Group can extract any data the County would require from the single set of video recordings. Once the camera has recorded the entire County Road network, the data processing and machine learning models are able to extract any asset data the County would require for additional assets such as guide rails, streetlights, traffic signals, etc. Although not included in this scope of work, as the County continues to develop its Asset Management processes, IrisGO™ could provide the data and avoid the need for staff to manually collect the information in the field resulting in considerable cost savings and reduced greenhouse gas emissions.

Road Sign Data Collection

As part of the deliverables for the specified work, Iris R&D Group will provide the County with a full dataset of all County owned road signs along with required attribute data such as location coordinates, sign ID, sign type, sign size, etc. Further, an image of the sign can be accessed to allow staff to review and confirm details about the sign without having to leave the office.

Figure 1 - Road Sign Data Collection Sample

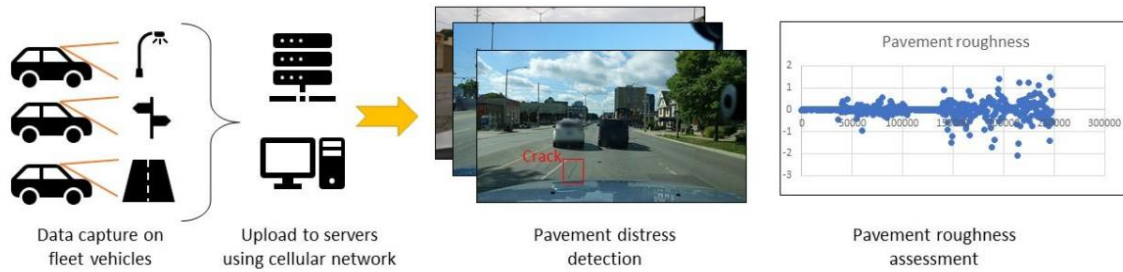


PCI Data Collection

PCI inspections will be completed using AI models to generate more accurate and reliable data for County staff. Road cracking and distresses are collected along with a Ride Condition Rating which is calculated using internal accelerometer and gyroscopic data contained within the IrisGO™ device. This provides a non-subjective, evidence-based solution that eliminates human bias and error from the PCI inspection process resulting in better and more trustworthy data.

Not only does this eliminate subjectivity and variation from human inspectors, it is also consistent and comparable when completed year over year.

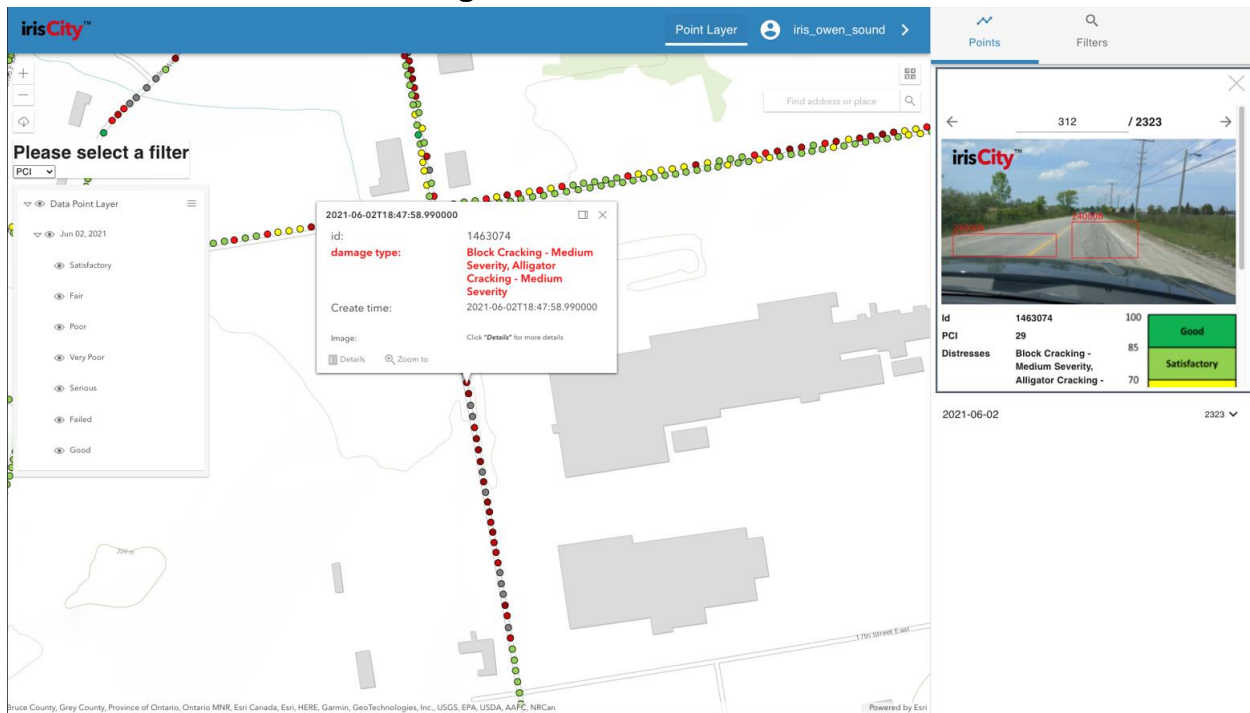
Figure 2 - PCI Data Collection Process



One considerable benefit to the IrisGO™ PCI inspections is that the inspections are calculated at user defined intervals. This allows staff to evaluate the PCI at a significantly more finite scale. For example, current staff process will result in a single PCI for each road section. As some of our road sections are kilometres long, this information can be quite misleading. In comparison, IrisGO™ allows staff to view the PCI at very small intervals. This helps to identify problem areas that could be addressed through smaller maintenance and minor capital work ultimately improving the estimated useful life for that road section at a much smaller overall unit cost.

The image below shows a sample of PCI data collected. The colour coded dots represent single PCI calculations along the roadway. Staff can utilize these maps to target work such as spot repairs and patches to better address potential issues before they get worse.

Figure 3 - PCI Data Review



Staff time and resources are better utilized with the IrisGO™ device as the camera can collect

all of the required data with a single drive of the road. This one data set can be used for any of Iris's products (PCI, asset inventories, compliance, etc.) removing the need for multiples passes on each road segment as well as any idling by staff to allow for documentation. Instead, this information can be collected as part of routine road patrols helping significantly reduce manpower and greenhouse gas emissions. The camera can also be easily installed in any County vehicle by our in-house mechanics within an hour or two.

Why Single Source

Staff have been investigating various competitors with similar abilities and technology for several years now and have determined that this solution represents the best fit for meeting the needs for required services at the best cost per kilometre.

Staff have found that there are two main technologies utilized for this type of work; camera-based data capture (similar to IrisGO™) and LiDAR data capture. LiDAR data capture is considered more accurate as it collects large point clouds of data through LiDAR systems installed on a vehicle. Due to the amount of data processing involved, LiDAR technology tends to be considerably more expensive. Staff feel that the additional accuracy benefits do not justify the larger costs.

When it comes to camera-based solutions, Iris R&D Group are preferred for a couple reasons. The main reason IrisGO™ is preferred is that they conduct PCI inspections utilizing the Ministry of Transportation's SP-024 Manual for Condition Rating of Flexible Pavements. This is the same document County staff follow for our current PCI inspections. Other camera-based competitors did not provide results in this format and instead utilized other methods of evaluation for condition. For this reason, IrisGO™ was preferred from a technical standpoint.

There is also the simple nature of the equipment. Other camera-based technologies require large units to be installed on top of a vehicle similar to what you may see on a Google maps vehicle. Not only are these large and more difficult to install, they also limit the use of the vehicle throughout the duration of the data capture.

Staff also recognize the abundance of additional potential future uses with the technology including Minimum Maintenance Standards compliance & record keeping as well as further right-of-way inventory and condition assessment capture to further support the Asset Management Plan. Although these options are not included in this report, staff will investigate these additional features to determine their benefits and potential savings in comparison with the departments current processes.

For example, the IrisGO device has the capabilities of checking for retro-reflectivity. This has not been included as part of the specified work but is a feature that the County will be evaluating in the future. Retro-reflectivity is evaluated by the camera during night driving and is given a pass/fail rating. Any signs that fail would then be checked manually by County staff using the retro-reflectometer to confirm if the sign requires replacement. This is an example of just one of the many manual checks completed by maintenance staff that could be automated as part of scheduled patrols.

Based on the above, staff recommend the use of IrisGO™ technology as it delivers all the requirements requested while doing so at a very competitive cost to the County.

Legal and Legislated Requirements

Privacy

The Iris R&D Group is a privacy-centric technology company who never capture private information, such as people's faces or license plate numbers, in any form as part of their video capture. They work in complete compliance with the Municipal Freedom of Information and Privacy Protection Act. All private data collected is redacted through patented AI technology.

Financial and Resource Implications

Item	Excluding HST	Net HST
2022 Roads Needs Study Budget	(\$49,135)	(\$50,000)
PCI Inspections	\$73,313	\$74,603
Road Sign Data Collection	\$10,557	\$10,743
IrisGO Camera deployment, installation, and setup	\$9,433	\$9,599
Total Project Costs	\$93,303	\$94,945
Project Deficit	(\$44,168)	(\$44,945)

The project deficit of \$44,168 (\$44,945 net HST) will be funded from any surplus realized in the Transportation Services 2022 budget. If no surplus is realized, it will be funded from the Transportation Services General Reserve.

Staff recommend Iris R&D Group be awarded a single source contract to compile a road sign data set of all County owned road signs and complete PCI inspections for all County roads for \$93,303 + HST. The company has provided a reasonable estimate for the work to be completed as specified. Staff wish to proceed with an award to ensure that the inspections are completed within the ideal summer window.

The intent of this pilot project is to capture the County wide data for the current state of Grey County roads and road sign data in a more streamlined and effective manner. Future data capturing costs will be considered upon receipt and evaluation of this data.

Relevant Consultation

- Internal - Financial Analyst, Purchasing, Director Transportation Services, Deputy CAO, CAO
- External – Iris R&D Group

Appendices and Attachments

None.