



# TOWN OF BARRINGTON

## NEW HAMPSHIRE

CMA Engineers, Inc. Task Order

### **Pavement Management Program**

Task Order Number: 20

#### **A. Assignment Description/Background:**

- a. As described in the RFQ; CMA Engineers is submitting this engineering services agreement to assist the Town with a pavement management plan. The pavement management plan will be based on conventional asset management methodology for pavement that balances pavement expenditures on preservation, rehabilitation, and reconstruction.
- b. CMA Engineers will utilize the services of StreetScan of Burlington, MA to complete a pavement inventory. StreetScan's automated data collection methodologies, which include specialized vans with multiple data collection devices, obtain continuous specific pavement information and processes it to determine roadway characteristics or pavement condition index (PCI) on every length of roadway. PCI ranges from 100 (new pavement in excellent condition) down to 0 (complete failure). Streetscan's output includes a conceptual level pavement management plan.
- c. CMA Engineers will review the output from Streetscan's data collection, interview Town staff, and incorporate any pertinent information from Dubois and King's 2011 "Town-Wide Roadway Condition Assessment and Capital Improvement Plan" into a pavement management plan for the Town. The pavement management plan will include a breakdown of the Town's roadway network with recommended work and cost. The pavement management plan will include recommendations for pavement preservation, rehabilitation, and reconstruction to optimize the maintenance and improvements to the Town's roadway network within the Town's budget. The goal will be to maintain and improve the road network's overall PCI, distributing improvements among preservation, rehabilitation, and reconstruction. The plan will also include recommendations for the Town to optimize maintenance and improvements of the Town's roadway in a five-year plan to help the Town facilitate budget planning. (The planning horizon of 5 years is appropriate for these methods, with the renewal of pavement planning at that time.).
- d. CMA Engineers will review and update the plan annually, as needed, to add new data points, realign the plan with changing conditions, and realign with the Town's budget adjustments.
- e. The pavement management plan will be integrated with the Town's GIS-based asset management system being developed by Hoyle, Tanner, and Associates that utilizes the Google Docs platform.



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- f. Currently, the Town maintains 81 miles of roads (69 miles paved and 12 miles gravel). The pavement management plan will only address the paved roads. (The State highways in Barrington are not within the 69 miles and will not be addressed).
  - g. The annual budget for paving is \$700,000, with \$775,000 available in 2021. This budget is used for reclaiming, any partial reconstruction, and paving. Separate funds are used for ancillary road maintenance activities.
- B. Study and Design Phases:
  - a. Collect and review all existing available data.
  - b. Interview Road Agent/Highway Department Staff.
  - c. Utilizing StreetScan, complete automated pavement inventory of the Town's paved roadway network.
  - d. Perform subjective data review to complement StreetScans assessment.
  - e. Coordinate with StreetScan to determine appropriate pavement deterioration curve and pavement treatment costs.
  - f. Compile short-term and long-term recommendations based on current budgets and varying budget levels (increased or decreased) for comparison.
  - g. Prepare a Pavement Management Report based on our findings and optimization of Town-wide PCI and selected budgets.
- C. Annual Reassessment (not included in current scope/fee estimate):
  - a. Review program annually based on actual completed projects, (in comparison to planned projects) and re-assessment of priorities.
- D. Bidding Phase (not included in current scope/fee estimate)
  - a. CMA Engineers will provide professional opinions or guidance, at the Town's request, during the bidding phase of paving projects.
- E. Construction Phase (not included in current scope/fee estimate):
  - a. CMA Engineers will assist the Town in monitoring pavement activities.
- F. Schedule:
  - a. June: Kick-off meeting to finalize scope and task order items.
  - b. July-August: Data collection and processing.
  - c. September: Data analysis and development of professional opinion/recommendation.
  - d. October: Present preliminary findings in order to determine anticipated 2022 projects.
  - e. November: Present final five-year road improvement program in time to make/recommend any budget adjustments for 2022.



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G. Fee:

| Task                                             | Fee             |
|--------------------------------------------------|-----------------|
| Collect & Review Existing Data                   | \$1,600         |
| Interview Dept Staff                             | \$1,600         |
| Streetscan Inventory and CMA Review              | \$20,200        |
| Pavement deterioration curve and treatment costs | \$3,700         |
| Short and long term budget planning              | \$6,600         |
| Pavement Management Report                       | \$7,900         |
| <b>Base Fee Total</b>                            | <b>\$41,600</b> |

| Optional Asset Integration             | Fee     |
|----------------------------------------|---------|
| Pavement Marking Inventory             | \$2,400 |
| Pavement Marking Inventory & Condition | \$5,200 |
| Traffic Signage Inventory              | \$2,100 |
| Traffic Signage Inventory & Condition  | \$5,100 |

## Optional Asset Integration Notes:

1. Cross out items to exclude from the task order.
2. The cost of traffic signage inventory is based on assumed traffic signs. Actual cost may vary, see StreetScan Scope of Work for details.

## Attachments

StreetScan Scope of Work



# TOWN OF BARRINGTON

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CMA Engineers, Inc. Task Order

ACCEPTED FOR:

OWNER:

TOWN OF BARRINGTON, NEW HAMPSHIRE

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Conner MacIver, Town Administrator [or designee]

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Date

ENGINEER:

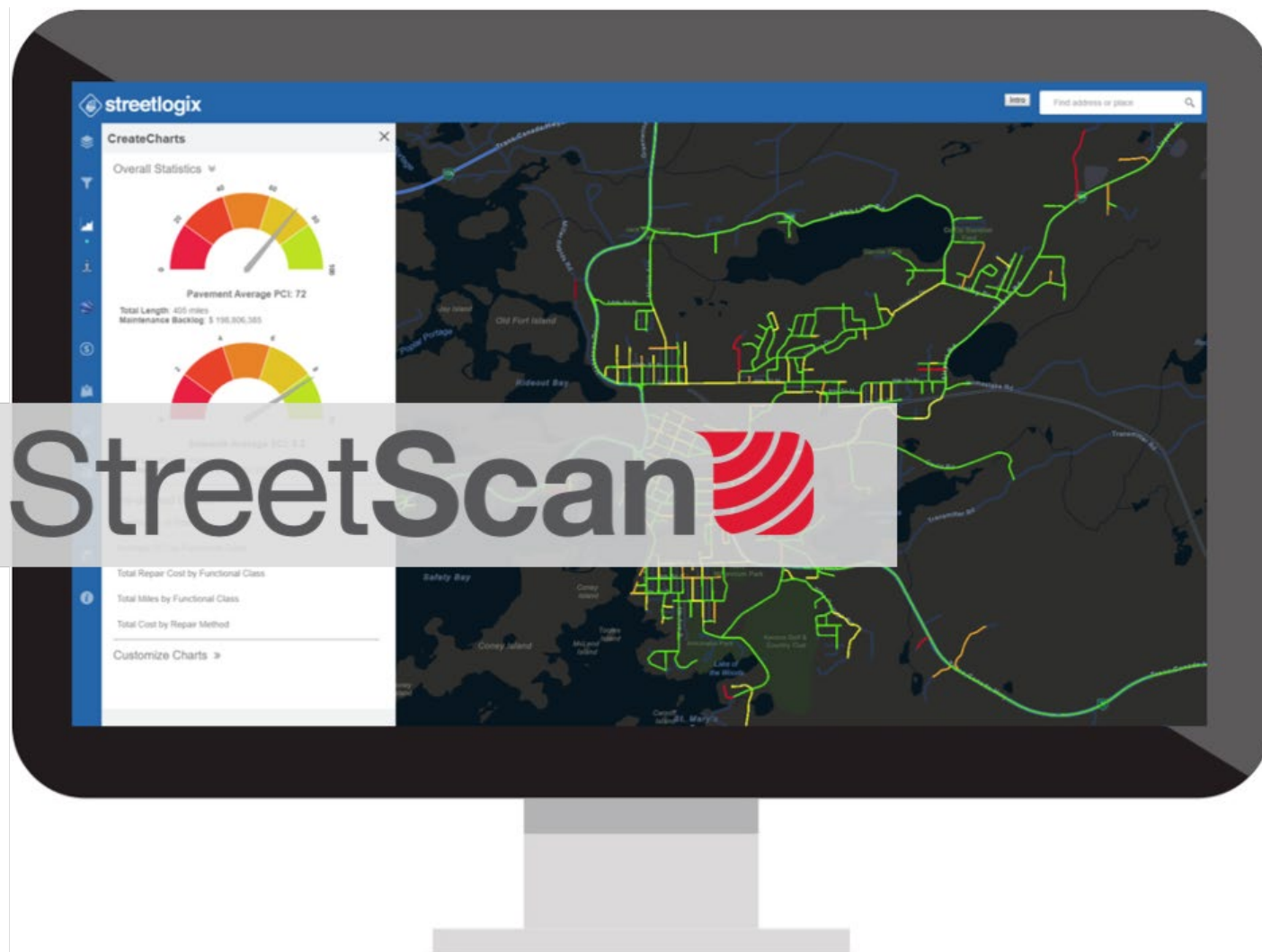
CMA ENGINEERS, INC.

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William Straub, P.E., P.G., Principal [or designee]

June 9, 2021  
Date



## Automated Asset Management Proposal

CMA ENGINEERS, NH

June 3<sup>rd</sup>, 2021

## **Proposal for CMA Engineers**

**Prepared for:**

**William Straub**

**VP, Chief Engineer**

**CMA Engineers**

35 Bow Street

Portsmouth, NH, 03801

603-431-6196

**Prepared by:**

**StreetScan Inc.**

603 Salem Street

Wakefield, MA 01880

617.399.8236

TABLE OF CONTENTS

1. ABOUT US 5

2. OUR TEAM 6

3. THE STREETSCAN SYSTEM 7

4. STREETLOGIX SOFTWARE 8

4.1 ASSET MANAGEMENT SOFTWARE..... 8

5. PRICING OVERVIEW 9

5.1 OPTIONAL SERVICES AND ASSETS..... 10

APPENDIX A – SCOPE OF WORK AND DELIVERABLES 12

APPENDIX B – OPTIONAL SERVICES AND ASSET COLLECTION 16

June 3<sup>rd</sup> , 2021

William Straub, VP, Chief Engineer  
CMA Engineers  
35 Bow Street  
Portsmouth, NH 03801

Thank you for your interest in StreetScan. Municipalities worldwide are faced with aging infrastructure and limited budget resources to repair and maintain them. Having the ability to monitor the health of your street network through an abundance of data collected via multiple vehicle-mounted sensors allows your staff to properly allocate repair and maintenance budgets. This is now made possible in an affordable, objective way utilizing StreetScan's advanced mobile sensing vehicle and online web-based app.

Our service offering includes:

- Data Collection: vehicle survey of paved lane miles.
- Data Processing of pavement condition and assets.
- Data Visualization: pavement monitoring system including StreetScan's Pavement Rating (SPR) Report.
- Pavement Management Plan: maintenance and budget options, suggestions and scenarios; optional cloud-based access with robust interactive planning and budgeting tools.

Also available (see Appendices for more details):

- 360° imagery Viewer
- Optional asset extractions including pavement markings, traffic signs

On behalf of the team at StreetScan, we are pleased to submit this proposal for your review. We strive to be as accurate as possible in our initial projections and cost estimates, and look forward to meeting with you soon to discuss any questions you may have.

Yours truly,



Stan Karlin  
Manager, Sales and Marketing

## 1.ABOUT US

At StreetScan, we come to work each day because we want to solve our clients' biggest problems when it comes to monitoring their street assets. We have a Smart City Mobile Sensing Service Offering targeted at providing clients with an intelligent, objective and affordable way to manage those assets.

Throughout the history of business, people have used data to make more informed decisions. StreetScan enables exactly this for our municipal clients.

Municipalities no longer have to send inspectors into the field for pavement surveys. Now, they can leverage the power of data to improve their decision-making abilities.

This all came about as a result of a 2009 groundbreaking project at Northeastern University that received more than \$18 million in funding over a 5-year period. This stamp of approval was due to the power of the project to end localized pavement inspections and enable continuous network-wide health monitoring of roadways.

What kind of technology made this possible? Versatile Onboard Traffic Embedded Roaming Sensors (VOTERS). A framework, prototype and blueprint were successfully designed and developed, and in 2015, StreetScan was launched as a spin-off of the project. It is our comprehensive, advanced hardware and software turn-key solution that distinguishes us from the competition. More importantly, it provides street asset monitoring at a reasonable cost for our clients.

2017 saw the emergence of our current Smart City Service Offering and we have combined this service with our pavement management offering. Clients save time, money and no longer require additional field surveys. Our ScanCars can enable municipalities and other clients to extract and monitor critical assets such as pavement condition, traffic signage, pavement markings, streetlights and other transportation infrastructure assets.

We embrace progress. In 2018, StreetScan launched Streetlogix. This extensively customizable, web-based GIS asset management software has changed the landscape for municipalities. Municipalities can now optimize their budget within a user-friendly GIS environment. The system provides objective information on the current state of their infrastructure and makes maintenance and repair recommendations, including the prioritization of roadway projects. Using unprecedented data visualization and budget optimization tools, our clients have been creating defensible data-driven Capital Improvement Plans while successfully justifying their budgeting requests.

The most important thing you need to know about StreetScan is our data-driven approach. It will change the way you monitor your street assets – for the better and for the future.



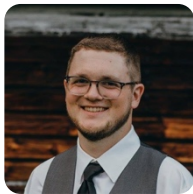
**Powered by AI**



## 2. OUR TEAM



**Stanley Karlin – Manager, Sales & Marketing** – As the Manager of Sales & Marketing at StreetScan, Stan brings over 25 years of experience in selling & marketing exclusively to the public sector. Stan came to StreetScan after selling his municipal software company where he served as the Chief Marketing Officer, and is eager to promote StreetScan's new technologies and solutions to local governments. He received his M.Ed. From Temple University in Instructional Design & has used this knowledge to help better explain complex solutions in marketing.



**Rob Craig – Customer Success Manager, StreetScan** – As primary point of contact, Rob brings his GIS and operations expertise to guide our municipal clients from project kickoff to delivery. He originally joined StreetScan as a field technician after completing his B.S. in Fisheries and Wildlife Science with a minor in GIS, and later became StreetScan's Operations Manager where he was responsible for all aspects of the pavement management collection. Prior to joining StreetScan, he worked on hyperspectral research with the University of Arizona at the Rocky Mountain Biological Laboratory, and as a tutor in GIS and Statistics. His interests include wildlife research, outdoor recreation, and green communities.



**Kathy Zarrehparvar – Sr. Implementation Project Manager** – Kathy works closely with Streetlogix customers to successfully implement our software products. She manages projects from initiation to delivery and ensures that Streetlogix users are properly onboarded. Kathy brings 10 years' experience in project management, software implementation, and process improvements skills. She is well versed in understanding customers' needs and goals to help tailor solutions that optimize their operations and workflows. A Certified Project Management Professional, Kathy received her B.S. in Civil Engineering from the Eastern Mediterranean University in Northern Cyprus, and an Associate Certificate in Applied Web Development from the British Columbia Institute of Technology.



**Ivano Teti – Customer Success Manager, Streetlogix** – Ivano provides ongoing support to our customers from their onboarding of Streetlogix through the long term, ensuring they reach their goals for integrating asset management technologies to enhance their daily operations. He brings over 13 years' experience in sales and management, with a strong knowledge of the traffic, transit signal and detection industry. Prior to joining Streetlogix, Ivano managed accounts and inside sales at Electromega Ltd. where he provided adaptable and cost-efficient traffic solutions to Ontario municipalities alongside external partners such as Leotek, Siemens, and others. Ivano has completed management courses at Concordia University's John Molson School of Business in Montreal, QC.

### 3.THE STREETSCAN SYSTEM

StreetScan's automated data collection and algorithm-based roads prioritization software can help optimize your road budget and provide user-friendly analytics about the status of your roads and sidewalks.



#### Data Collection

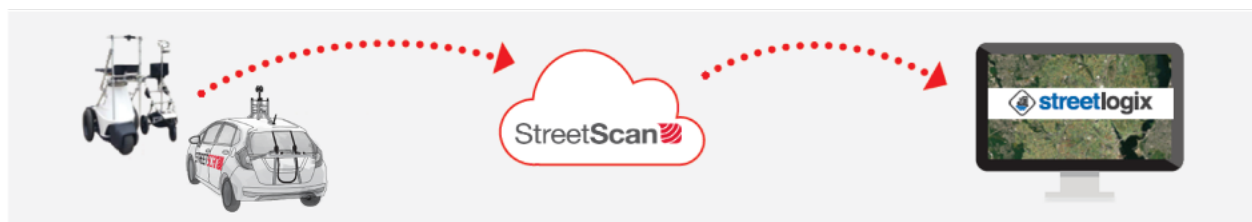
StreetScan's vehicles equipped with multi-sensor systems detect pavement & sidewalk surface distresses without interrupting traffic flow.

#### Data Processing

Optimized algorithms evaluate and prioritize repairs of assets, including pavement, sidewalks, traffic signs, and more.

#### GIS Analytics

Collected data goes into Streetlogix, our unique **cloud-based application**, allowing municipalities to visualize and manage road assets in order to schedule maintenance within a user-friendly GIS environment.



## 4. STREETLOGIX SOFTWARE

### 4.1 ASSET MANAGEMENT SOFTWARE

Streetlogix's **Asset Management Module** is a cloud-based mapping, analysis, and decision-making tool for the public sector. Use it to create maps, analyze data and plan road repairs, sidewalk projects, traffic signs and right-of-way budgeting decisions. Your data and maps are stored in a secure and private infrastructure and can be configured to meet your mapping and IT requirements.

#### Asset Management Key Features:



## 5. PRICING OVERVIEW

| PAVEMENT MANAGEMENT                                                                                  |                         |                  |         |          |
|------------------------------------------------------------------------------------------------------|-------------------------|------------------|---------|----------|
|                                                                                                      | SERVICES INCLUDED       | CENTERLINE MILES | \$/CL   | TOTAL    |
| <br>DATA COLLECTION | ScanCar Data Collection | 69 mi            | \$140   | \$9,660  |
|                                                                                                      | Data Processing         |                  |         |          |
|                                                                                                      | Processed Data Results  |                  |         |          |
| Mobilization and Setup Cost                                                                          |                         |                  |         | \$361    |
| StreetScan Data Collection Subtotal                                                                  |                         |                  |         | \$10,021 |
| STREETLOGIX SOFTWARE MODULE PRICING (Year 1)                                                         |                         |                  |         |          |
|                                                                                                      | ASSET MANAGEMENT MODULE |                  | TOTAL   |          |
|                   | Annual License          |                  | \$2,500 |          |
|                                                                                                      | Annual Data             |                  | \$500   |          |
|                                                                                                      | Implementation Fee      |                  | \$1,500 |          |
| Streetlogix Software Subtotal (1 year)                                                               |                         |                  | \$4,500 |          |

|                                                  |                 |
|--------------------------------------------------|-----------------|
| <b>Streetscan and Streetlogix Total (1 year)</b> | <b>\$14,521</b> |
|--------------------------------------------------|-----------------|

| STREETLOGIX SOFTWARE MODULE ANNUAL PRICING AFTER YEAR<br>(TO BE INCLUDED IN A SEPARATE CONTRACT) |                         |                |
|--------------------------------------------------------------------------------------------------|-------------------------|----------------|
|                                                                                                  | ASSET MANAGEMENT MODULE | TOTAL          |
|               | Annual License          | \$2,500        |
|                                                                                                  | Annual Data             | \$500          |
| <b>Streetlogix Software Subtotal (annual cost after Year 1)</b>                                  |                         | <b>\$3,000</b> |

## 5.1 OPTIONAL SERVICES AND ASSETS

One of our unique advantages is the ability for our clients to extract, assess and obtain actionable data from other Municipal assets utilizing the same data collected for the Pavement Management Survey. Below is a list of additional assets we can process from the collected data. This is set up as an a-la-carte menu so you can pick and choose the assets to meet your asset management needs.

| Assets                                                                       | Unit<br>L=Lane<br>CL=Centerline | QTY<br>(est.) | Price<br>(\$/Unit) | PRICE ADDER<br>(est.) |
|------------------------------------------------------------------------------|---------------------------------|---------------|--------------------|-----------------------|
|                                                                              |                                 |               |                    | STANDARD              |
| Assets Extracted from ScanCar Dataset (Pavement Management Service Required) |                                 |               |                    |                       |
| Pavement Markings (2 Attributes)                                             | CL-M                            | 69            | \$20               | \$1,380               |
| Pavement Markings (3 Attributes)                                             |                                 |               | \$50               | \$3,450               |
| Traffic Signage (3 Attributes)                                               | Signs                           | 1,101         | \$1                | \$1,101               |
| Traffic Signage (4 Attributes)                                               |                                 |               | \$3                | \$3,303               |

### **Assumptions:**

All asset quantities are estimated based on lane or centerline miles except for:

- Traffic Signs are estimated at 1/8 of the municipal population

# Annex

## APPENDIX A – SCOPE OF WORK AND DELIVERABLES

### ROAD ASSESSMENT SERVICE

StreetScan offers a technology-based Pavement Management approach for continuous health monitoring of your road network. Combining years of R&D at Northeastern University, StreetScan's vehicles and web-based app Streetlogix save you time and make your repair dollars go further. We have developed a 4-step process to effectively Scan, Process and Manage your Road data.

### STEP 1: DATA COLLECTION

#### Roads

Vehicle Deployed: ScanCar

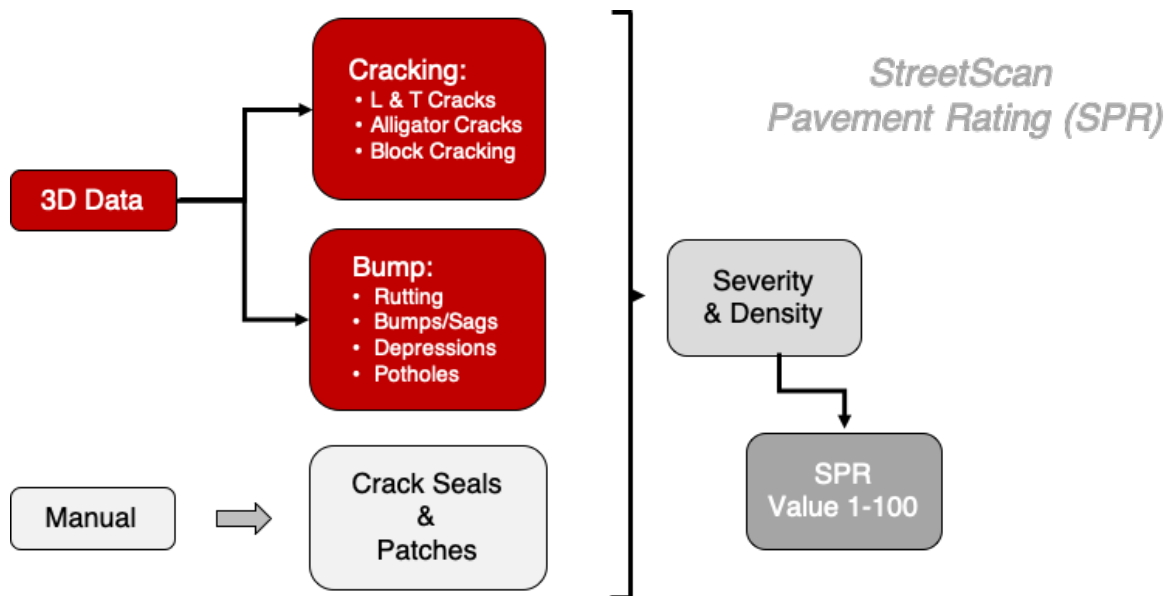


StreetScan utilizes 3D imaging technology to measure road defects, such as cracking and bumps. The 3D imaging cameras provide a 8' (2.4m) of lateral road coverage and seamless road coverage in the direction of travel at speeds up to 65 mph (72kph). A 360 degree camera system provides imagery of the road surface and ROW. An Inertial Measurement Unit (IMU) enabled GNSS position system provides position location, even in the event of intermittent GPS satellite coverage.

## STEP 2: DATA EXTRACTION

### Roads

The collected data (TBs/day) is uploaded to the StreetScan server, where automated software processes the raw sensor data. Using advanced processing algorithms, the sensors' raw data is converted into meaningful parameters representing different aspects of pavement condition. Several of our key indicators are fused to determine the **StreetScan Pavement Rating (SPR)** for each road segment. StreetScan's GIS specialists segment the pavement evaluation data from intersection to intersection and populate the database allocated to the segment.



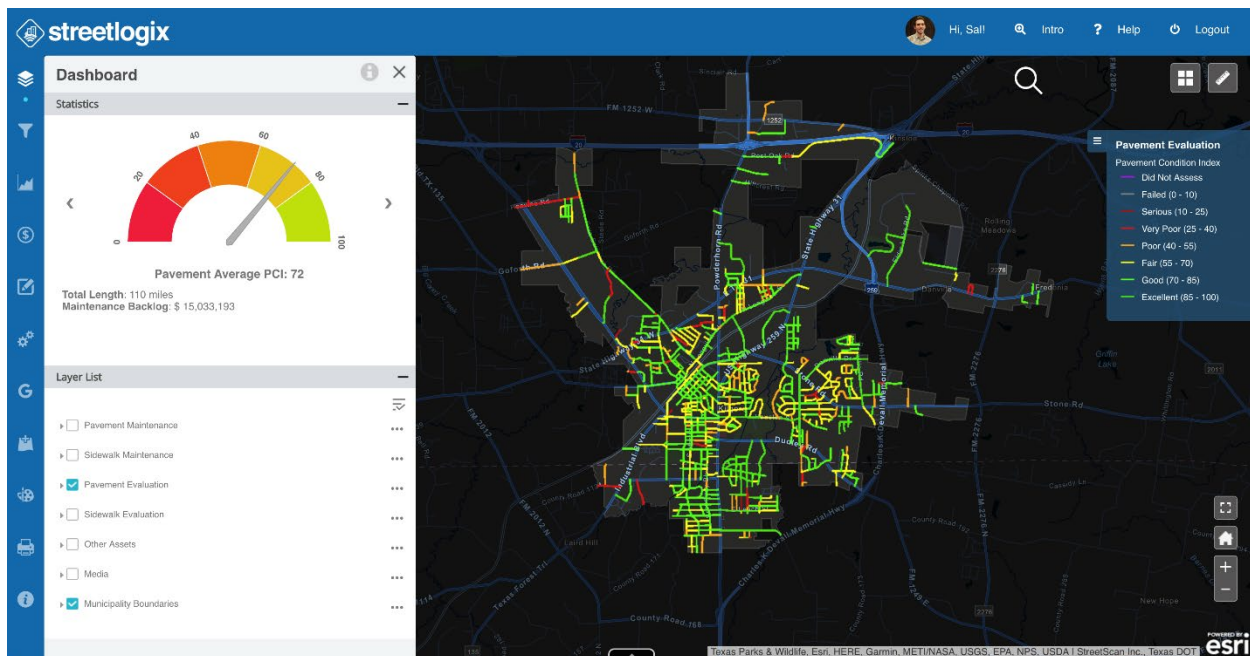
## STEP 3: DATA VISUALIZATION AND ANALYTICS

### Roads

Municipal staff will be given access to Streetlogix, our GIS web-based application, in order to view and analyze all collected survey data in addition to data from other sources to assist in decision making.

This provides staff an easy-to-use tool to quickly review SPR results, distress data and 360 images along with pavement history and other data that the municipality wants to be integrated. All data is hosted in the cloud, allowing users to login from anywhere on any computer to view the results. Streetlogix has many data import and export features making it compatible with any existing GIS solution concerning asset management. Streetlogix provides powerful data visualization and management tools including 360 viewer and extensive charts and dashboards (example below).

#### Portal view: Overall stats and available layers



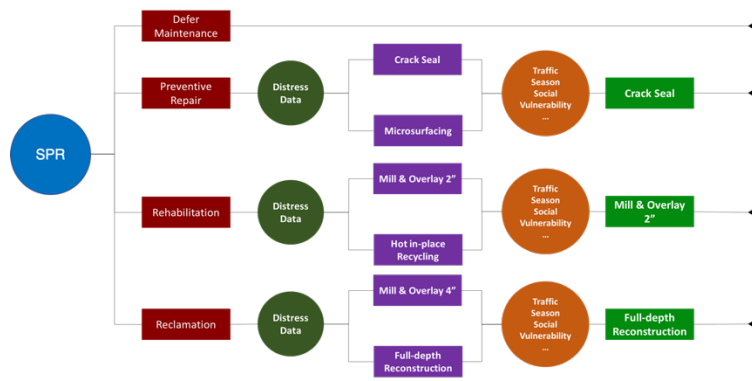
## STEP 4: MAINTENANCE PLANNING

### Roads

Once the inventory condition database and GIS web-app have been finalized, the work on implementing the pavement management side of the software begins. While pavement condition indicators are concerned with the current condition of the network, the management side of the process concerns itself with the analysis of condition, prediction of future condition, generation of maintenance options and pavement management scenarios. At this stage, the Client's preferred repair methods and associated costs are used to customize our road management modules. The results are compiled and reported to the client in our Streetlogix software and as a pdf document.

Our decision-trees are highly customizable and we work with staff to tailor it to ensure our AI will provide the necessary maintenance and repair suggestions. All decision trees & underlying data will be editable by staff.

#### Roads:



## APPENDIX B – OPTIONAL SERVICES AND ASSET COLLECTION

StreetScan leverages AI with Semantic Segmentation in order to process the attributes which are included as part of the Work Order Module. As a result we guarantee over 80% accuracy of detecting all assets within the right of way but is subject to error due to obstructions or miss classifying the asset. 360 Imagery has the lowest margin of error and therefore is reliant on the imagery processed to obtain the assets.

### Paving Markings

Through StreetScan's existing collected data, our geospatial engineering team can extract pavement markings and insert them into a separate GIS layer. All data is accessible through Streetlogix. A visual review of the markings determine their current condition and whether maintenance is required.

| Attributes       | Description                                                                                                                                                                                                                    |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Category*</b> | Left Turn, Right Turn, Crosswalk etc.                                                                                                                                                                                          |
| <b>Location*</b> | Global Positioning System (GPS) location (+/- 5 meters)                                                                                                                                                                        |
| <b>Condition</b> | The analysis will be conducted from intersection to intersection and given a rating of either Good, Fair or Critical. If the length of the road is longer than 1,000 ft, the analysis will be broken up into 1,000 ft segments |

\*Attributes included for the basic Pavement Marking inventory

### Traffic Signage

StreetScan's traffic sign asset management service provides a simple solution for the Municipality to quickly and efficiently manage its traffic signs. StreetScan utilizes an algorithm to automatically locate traffic signs saving you time and money. Our geospatial engineering team then undergoes a rigorous Q&A process and collects multiple unique attributes.

| Attributes                       | Description                                                                    |
|----------------------------------|--------------------------------------------------------------------------------|
| <b>Sign Category*</b>            | Regulatory, Warning, Guide, School, Recreation, Information, General           |
| <b>Sign Name*</b>                | Federal or State MUTCD designation or custom designation for specialized signs |
| <b>GPS Location*</b>             | Global Positioning System (GPS) location (+/- 5 meters)                        |
| <b>Sign &amp; Post Condition</b> | Good, Fair, Critical rating assessed through review of daytime digital images  |

\*Attributes included for the basic sign inventory