| | Rochelle, IL<br>Pavement Condition Survey and ROW Asset Inventory | | | |
|---|---|---|---|---|
| **Task** | **Description** | **Units** | **Unit Cost** | **Fee** |
| 1 | Centerline Identification and Field Set-up (lump sum)[1] | 1 | $8,000 | $8,000 |
| 2 | Street Network Collection (test mile)[2] | 78 | $155 | $12,090 |
| 3 | Pavement Condition Index (test mile) Modified ASTM D6433 using AI | 78 | $120 | $9,360 |
| 4 | Pavement Width (centerline miles) | 73 | $20 | $1,460 |
| 5 | Curb and Guttter Inventory (lane miles) | 130 | $40 | $5,200 |
| 6 | Sidewalk Inventory (lane miles) | 130 | $40 | $5,200 |
| 7 | ADA Ramps Inventory (lane miles) | 130 | $30 | $3,900 |
| 8 | Traffic Signals Inventory (Per Intersection) | 14 | $125 | $1,750 |
| 9 | Pavement Report with multi-year Budget Scenarios (lump sum)[3] | 1 | $24,950 | $24,950 |
| | | | | |
| **Total Fee[4]** | | | | **$71,910** |

[1]Assumes centerline file will be provided in GIS. Initial review indicates 78 test miles of paved roads

[2] A best practice is to drive all minor arterial roads both directions and local roads one direction

[3]Summary Report includes PCI results (from Articifical Intellignece (AI) tool) and one round of budget scenarios with one set of revisions

[4]Bill monthly, lump sum based on percent complete for each task item.

# Attachment A

**City of Rochelle Pavement Condition Survey and ROW Asset Inventory**

## Pavement Condition Survey and ROW Asset Inventory Scope of Work Description:

RAS understands that the City of Rochelle, Illinois desires to conduct a field survey of the pavement conditions on all the City maintained roads in accordance with the ASTM Standard D6433 "Standard Practice for Roads and parking Lots Pavement Condition Index (PCI) Surveys." The PCI based pavement condition survey is to be conducted on approximately 78 test miles of paved roads in the City limits on each street segment which is typically a block and tagged with a unique ID on the feature-class layer in GIS.

The CONSULTANT (Roadway Asset Services, LLC.) shall provide the following services to the OWNER (Rochelle, IL):

- Annual mobile data collection of roadway imagery and pavement distress for approximately 78 test miles (assuming driving two directions for arterials and collectors, and one direction for local residential roads.)
- ASTM D6433 compliant annual pavement rating and assessment for approximately 78 test miles.
- Inventory the following items: pavement condition and pavement width.
- Provide data in a format compatible with the OWNER's Pavement Management System (VUEWorks).

### Task 1 - Project Initiation, GIS Centerline Import, and Project Management

Upon notice to proceed the CONSULTANT will arrange a kick-off meeting to confirm the project requirements and scheduling. The kick-off meeting will include proposed key personnel and the OWNER's project members. During the meeting, CONSULTANT will present the proposed Project Approach, which includes project equipment, software, methodology, schedules, and deliverables. The proposed approach will be finalized based on the OWNER requirements and decisions during the meeting. CONSULTANT will request that the OWNER provide any existing database, previous inventory of street conditions, road centerlines, Geographic Information System (GIS) layers, and aerial imagery for project use. Project communication protocol, documentation, accounting methodologies, data format, and will be confirmed during the meeting.

CONSULTANT will use the existing centerline data provided by the OWNER and create a pavement database based on the centerline layer. Each road segment record in the centerline layer will have a corresponding record in the pavement database. The OWNER represents that the City maintains approximately 73 centerline miles of roadways.

CONSULTANT will work with the OWNER to maintain the unique identifier of each of the road segments on the OWNER road network so that the pavement database will maintain a link to the GIS data.

CONSULTANT will communicate with the OWNER to gather required information to define all the distress types and treatment selections. Based on this information, a Pavement Condition Index (PCI) rating and treatment selection manual will be created to identify and define each distress type and its severity, extent, and treatment selection (based on the ASTM-D6433 testing methodology for roads and parking lots). Each collected GIS road segment will be populated with its respective PCI as well as any other derivative indices used to make up the PCI.

CONSULTANT will provide the OWNER with a GPS "breadcrumb" file of data collection routes and image locations.

CONSULTANT will provide project management for the duration of the project, including coordinating and attending meetings via web meetings or in person with OWNER, data research and collection efforts as required, preparing bi-weekly progress reports, and schedule updates. Bi-weekly progress

reports will include the miles collected for the current reporting period as well as cumulative totals. An exhibit displaying the roads collected and not yet collected will also be included.

The CONSULTANT will collect roadway data and images for the 78 test miles of roadway using a Roadway Asset Collection (RAC) vehicle.

CONSULTANT will work with the OWNER to review and verify that the data is ready to proceed.

**Task 1 Deliverables:**
1. The CONSULTANT will deliver bi-weekly progress reports and schedule updates.
2. The CONSULTANT will provide the OWNER with a centerline assessment document for review and approval.

## *Task 2 – Street Network Collection and Image Capture for Paved Roads*

The RAS team consists of a driver and operator (CONSULTANT) who will systematically drive the automated data collection vehicle on the road segment listings provided by the OWNER. The CONSULTANT will collect pavement data with two passes on arterial, collector, and striped local roads and one pass collection on residential local roadways. CONSULTANT proposes to use its collection vehicle line scan camera with laser illumination and right-of-way cameras to capture pavement and ROW images to be used during the pavement rating process. Unpaved roads will not be surveyed.

CONSULTANT will record all ROW assets by collecting images at 15-ft maximum intervals with an automated data collection survey vehicle equipped with a Laser Crack Measurement System (LCMS) for automated pavement data acquisition, Ladybug 360 camera system for capturing right-of-way imagery and a laser profiler which includes at minimum two-line lasers for capturing roughness and ride data.

Roadway Asset Services (RAS) will perform data field collection on paved roads using a state-of-the-art Roadway Asset Collection (RAC) vehicle with following systems mounted:

- Right-of-way georeferenced images with Ladybug 5+ camera: Forward, Left, Right, and 360-degree spherical images.

- LCMS-2 pavement 2D/3D imaging.

- Longitudinal profile with 2-line lasers (left and right wheel paths) Distance measuring instrument (DMI) with an accuracy of +/- 0.1%.

- Differentially corrected GPS (DGPS) with an accuracy of +/- 2 feet.

- Applanix POS/LV 220 to compensate for difficult GPS conditions in urban environments.

The RAS system collects all pavement and right-of-way images, IMU, DMI and profiler data concurrently.



*A RAS automated data collection vehicle*

The International Roughness Index (IRI) will be collected using a class 1 road surface profiler manufactured by International Cybernetics Corporation (ICC). The road surface profiler meets all ASTM E-950 standards for evaluating the smoothness of pavement.



*Example imagery from Ladybug 360 camera*

**Task 2 Deliverables:**
1. CONSULTANT will provide Right-of-Way imagery for all segments collected.
2. CONSULTANT will provide downward-facing Pavement Imagery for all segments collected.

3. CONSULTANT will provide International Roughness Index (IRI) values for each delivered road segment.

### Task 3 - Pavement Condition Index, Modified ASTM D6433 using AI

CONSULTANT will evaluate the PCI survey results in accordance with ASTM D6433. CONSULTANT will provide 100% survey of all lanes driven using RAS' pavement analysis tool, Technical Rating Intelligence Program (Road TRIP™) to evaluate the pavement condition using automated techniques per the ASTM D6433 pavement distress rating process including the following distresses: alligator cracking, longitudinal cracking, transverse cracking, block cracking, rutting, weathering, raveling, potholes, and patching. Experienced pavement engineers will review the resultant output for accuracy and make any corrections that may be needed. Road TRIP™ software allows the pavement and right of way imagery to be synced and the distress data to be displayed geospatially to provide another layer of quality assurance.
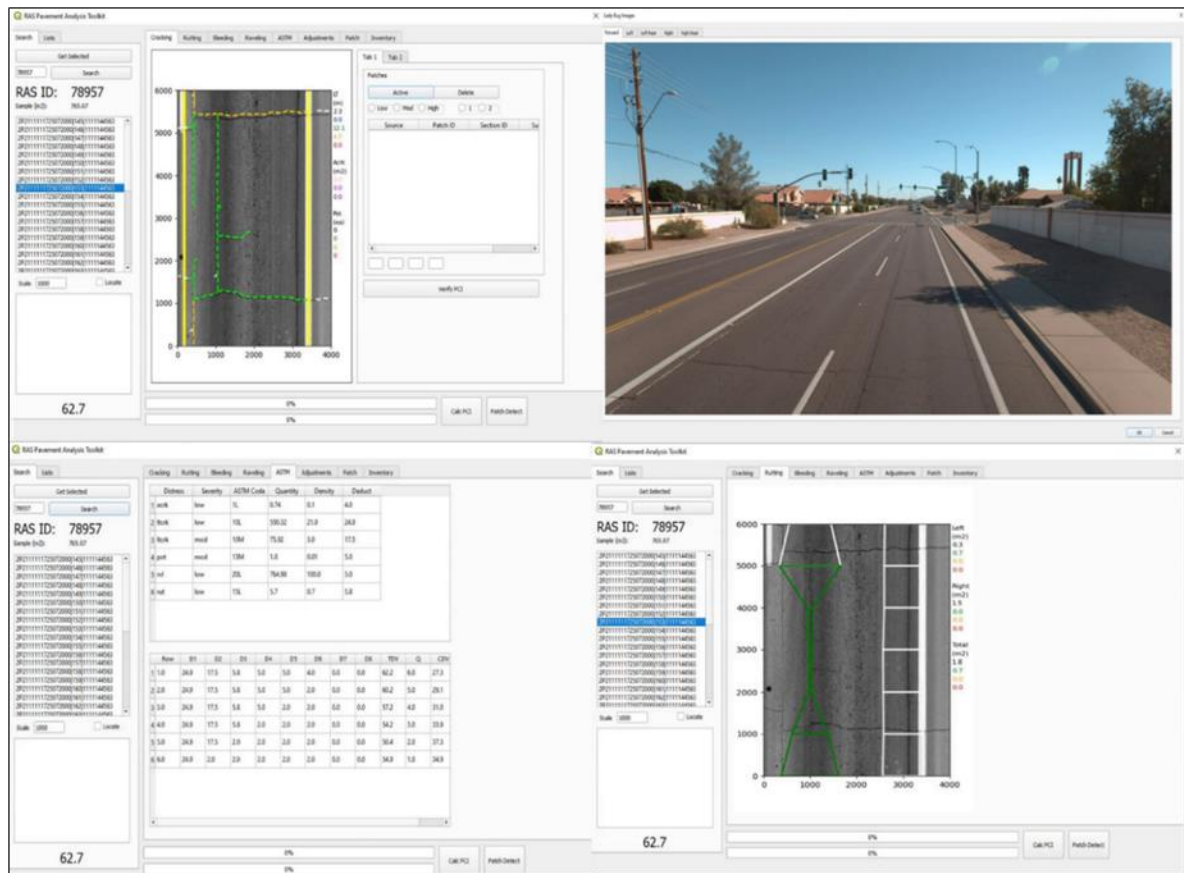


*Pavement Condition Evaluation within* Road TRIP™

CONSULTANT will provide final PCI and Distress data in a format compatible with the Client's Pavement Management System (VUEWorks).

### Task 4 - Pavement Width

The CONSULTANT will use the images from the Ladybug 360 camera system to capture the width of pavement for each street segment to compare with the existing database information. CONSULTATNT will provide the widths for roads with width changes by noting locations of changes by stations and measuring each section of change, and the addition of lanes or turn lanes.

**Task 3 and 4 Deliverables:**

1. CONSULTANT will deliver a final GIS file geodatabase containing collected pavement data (containing the Type, Severity and Extent of distresses along the road segment as defined by the ASTM D6433 methodology), widths, distresses, and PCI value.
2. CONSULTANT will deliver a final VUEWorks import database file for implementation into software.

*Task 5 - Curb and Gutter Inventory and Assessment*

The CONSULTANT's RAC collection vehicles will collect right-of-way asset inventories at the same time that data is collected for the pavement condition survey. The vehicles will capture images at an interval of approximately 15 feet from the Ladybug 360 camera system to identify the type of curb and gutter along each road segment and provide a very good/good/fair/poor/very poor condition rating. Right-of-Way assets will be inventoried on City maintained paved streets but not on alleys.

CONSULTANT will collect the curb and gutter with the following attributes:

**Curb and Gutter Attributes (Linear Feature):**

- Asset ID
- Location (Street Name asset located on)
- Photo Image link
- Physical Condition Rating
  - Very Good
  - Good
  - Fair
  - Poor
  - Very Poor
- Painted Color
  - None
  - Yellow
  - Red
  - Green
  - Blue
  - Other
- Material type
  - PCC Standard Curb and Gutter
  - PCC Median Curb and Gutter
  - PCC Pinned Curb
  - PCC Other
  - Granite Curb
  - Valley Curb and Gutter
  - None
- Comments

**Task 5 Deliverables:**

1. CONSULTANT will deliver a Curb and Gutter Inventory with attributes identified above in a linear GIS file geodatabase

*Task 6 - Sidewalk Inventory*

CONSULTANT's Pavement and ROW collection vehicles will collect right-of-way asset inventories at the same time that data is collected for the pavement condition survey. The vehicles will capture images at an interval of approximately 10 to 15 feet for both forward and side-facing directions and geo-referenced to the pavement inventory by segment. Right-of-Way assets will be inventoried on City maintained paved streets but not on alleys. CONSULTANT will collect the following for the sidewalk inventory:

1. The collection of sidewalk imagery.
2. The extraction of sidewalks from the imagery (GIS Line features).
3. The attribution required for each sidewalk feature

**Sidewalk Attributes (Linear Feature):**

- AssetID
- Street Name
- Photo Image
- Physical Condition Rating
  - Very Good
  - Good
  - Fair
  - Poor
  - Very Poor
- Width
- Material
  - Asphalt
  - Concrete
  - Brick

- o Other
- Comments
- Length



### Task 6 Deliverables:

1. CONSULTANT will deliver a sidewalk inventory and sidewalk obstruction with attributes identified above in a GIS file geodatabase. CONSULTANT is only able to identify obstruction information visible in the imagery collected and OWNER acknowledge this data capture will not include all sidewalk obstructions.

### *Task 7 - ADA Curb Ramps Inventory*

CONSULTANT's Pavement and ROW collection vehicles will collect right-of-way asset inventories at the same time that data is collected for the pavement condition survey. The vehicles will capture images at an interval of approximately 10 to 15 feet for both forward and side-facing directions and geo-referenced to the pavement inventory by segment. Right-of-Way assets will be inventoried on City maintained paved streets but not on alleys. CONSULTANT will collect the following for the curb ramp inventory:

**Ramps Attributes (Point Feature):**

- Asset ID
- X, Y Location
- Photo Image link
- Physical Condition Rating
    - o Very Good = ramp is in new condition with truncated dome
    - o Good = ramp is level with no uprooting or cracking
    - o Fair = ramp has minimal uprooting or cracking
    - o Poor = ramp has major uprooting or cracking and poses a hazard to pedestrians
    - o Very Poor = ramp is severely broken up and is not usable to pedestrians

- Truncated Dome
  - Yes
  - No
- Comments



**Task 7 Deliverables:**

1. CONSULTANT will deliver a Ramp Inventory with attributes identified above in a GIS Point file geodatabase.

*Task 8 - Traffic Sign Inventory and Support*

CONSULTANT's Pavement and ROW collection vehicles will collect right-of-way asset inventories at the same time that data is collected for the pavement condition survey. The vehicles will capture images at an interval of approximately 10 to 15 feet for both forward and side-facing directions and geo-referenced to the pavement inventory by segment. CONSULTANT will collect the following:

**Sign Attributes (Point Feature):**

- AssetID
- X, Y Location
- MUTCD Code
- Sign Text
- Photo Image link
- Physical Condition Rating
  - Good: sign is visible, not faded, straight/upright, legible, no graffiti
  - Fair: sign has minor to no visual defects with good reflectivity, not faded, straight/upright, legible, no graffiti = sign that may need replacement after 5 or more years

- o Poor: sign has many visual defects with poor reflectivity faded, bent, or pushed over (sign panel or post), heavy graffiti; obstructed; not visible or legible = sign needs immediate replacement
- Location (Street Name asset located on)
- Post Total
- Sign Face Direction
  - o E
  - o W
  - o N
  - o S
  - o NW
  - o NE
  - o SW
  - o SE
  - o EW
  - o NS
- Travel Direction
  - o E
  - o N
  - o NE
  - o NW
  - o S
  - o SE
  - o SW
  - o W
- Comments
- Obstructed
  - o Yes
  - o No
- Legend Color
- Back Color
- Hump Case
  - o Yes
  - o No
  - o N/A
- Support structure type
  - o Wood Pole
  - o Bridge
  - o U-Channel
  - o Utility Pole
  - o Mast Arm
  - o Pipe
  - o Steel Square
  - o Streetlight
  - o Traffic Signal
  - o Other

**Task 8 Deliverables:**

1. CONSULTANT will deliver a traffic sign inventory including supports with attributes identified above in a GIS file geodatabase

*Task 9 - Pavement Report with multi-year Budget Scenarios*

CONSULTANT will deliver a Final Pavement Condition Index Report for the project including:
- Executive Summary.
- Project methodology and pavement data.
- Street segment PCI.
- Exhibits showing PCI and street segment length, lanes, and pavement type.

**Task 9 Deliverables:**

1. CONSULTANT will deliver a Final Pavement Report.
2. CONSULTANT will provide consultation with the OWNER to set the analysis operating parameters within VUEWorks and assist the OWNER in performing internal budget scenarios with VUEWorks.
3. CONSULTANT will deliver one round of budget scenarios based upon OWNER's criteria and budget, with one round of revisions upon OWNER review. CONSULTANT will provide a recorded

video conference training session in addition to documents developed for the establishment of the parameters set for the budget scenarios so that the OWNER can run additional scenarios as needed.