Agreement for Professional Services

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To:	Frank Jaromin, Director of Public Works	**Date:**	July 18, 2022
From:	Jim Tourek, Client Services Manager	**Project:**	Town of Prosper, TX
Subject:	2022-23 Pavement Data Collection	**Project No.:**	N/A

Thank you for taking the time to review the pavement and asset data collection services offered by IMS Infrastructure Management Services. IMS excels in pavement and asset management solutions and can provide a full suite of data collection and software services.

As we understand, the Town of Prosper currently maintains approximately 204 centerline miles of residential roadway (2 miles are divided so we'll survey both) and 32 centerline miles of arterial roadway. IMS has performed objective pavement data collection for similar agencies such as Hurst, Grand Prairie, Grapevine, Euless, Murphy, Weatherford, Flower Mound, Carollton, Denton, Denton County, Keller, Cleburne, TX, and others in the Region. To ensure adequate coverage across the network, the LCMS-2 RST (shown here) will survey each centerline mile of residential roadway once in each direction and each arterial lane in a single direction, resulting in a survey mileage of approximately **270 miles**.

IMS collects all data in accordance with the U.S. Army Corps of Engineers data protocols, commonly referred to as ASTM D6433. In addition, we deliver all data in industry standard formats such as Excel, Access, Geodatabases, shape files, and even Google Earth KMZ files. While IMS can implement and load data into any software application the Town chooses, IMS has also engineered a simple to use spreadsheet tool called Easy Street Analysis (ESA). We use this tool to incorporate cost benefit activities. We are confident that this tool can serve as an excellent pavement management tool for the Town.

Our approach, and key service differentiator, is based on three, time proven fundamentals:

Answer the questions that are being asked – don't over-engineer the system or make it needlessly complicated. Databases and the application of technology are meant to simplify asset management, not make it more difficult.

Service and quality are paramount to success – the right blend of technically correct data, condition rating, and reporting will provide the agency with a long-term, stable solution. Service to the client remains our top priority.

Local control and communications are key – it is important that all stakeholders understand the impacts of their decisions and have the system outputs react accordingly. We excel in making ourselves readily available.

Data Collection

IMS is unique to the industry, as an objective and repeatable data collection effort will be completed. The LCMS-2 RST will be used to perform a surface condition assessment of all Town streets. Instead of using the subjective feet on ground or windshield sampling method, all data will be collected continuously and recorded in 15-foot intervals in the form of a detailed database complete with GPS coordinates. The data will also be aggregated to the section level, following the sectioning and referencing methodology determined after IMS and Town review.

GIS and Pavement Management Linkage

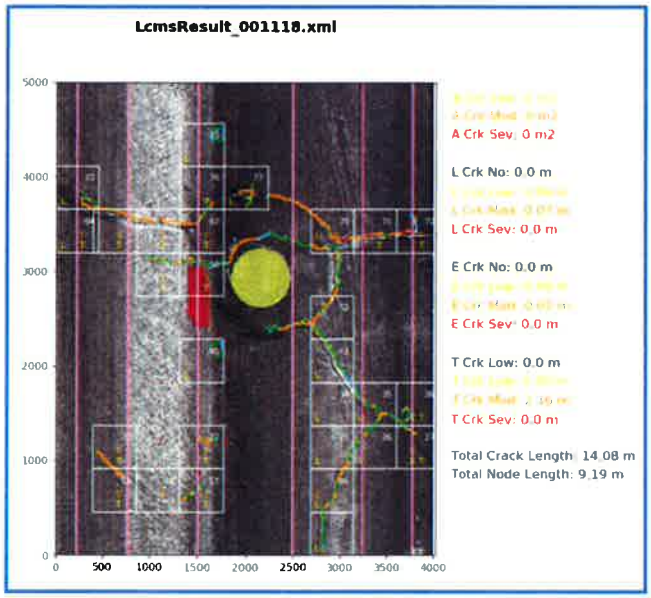
The role of GIS in pavement management cannot be overstated. It is a powerful tool that provides the capability to handle and present vast amounts of data in an efficient manner. IMS can provide a link between the Town's GIS environment and the pavement management data to enable the Town to display and generate color-coded maps based upon existing pavement conditions, street rehabilitation plans or most of the data in the pavement management program. An output of a 5-year maintenance prioritization program is illustrated in the above image.

Digital Imagery & ROW Asset Inventories

The LCMS2 RST utilizes up to four GPS-referenced HD camera views (4112x3008) for our QA/ QC program, ROW asset inventory development, virtual drives, and/or other supplemental image deliverables. For the Town of Prosper, IMS will utilize two HD cameras that will be proofed out prior to data collection and a single forward view can be processed as a deliverable to the Town. IMS can then utilize the HD imagery collected by the LCMS-2 RST to inventory many Right of Way assets that the Town maintains.

Objective Distress Identification & Quantification (ASTM D6433)

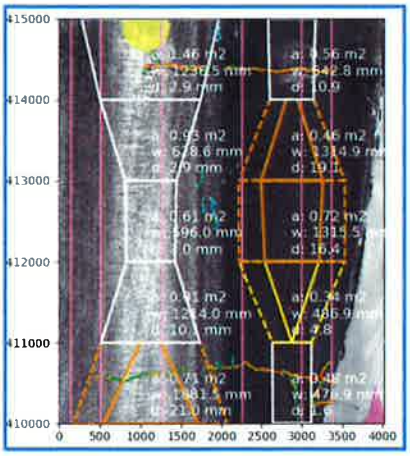
The IMS Laser Crack Measurement System (LCMS2) is one of the most technologically advanced devices available for pavement performance assessments. The 2-sensor array completes a 3D millimeter-level scanning of the pavement surfaces that pass below the laser array. With a high-speed 1-millimeter resolution, this means the LCMS2 device deploys a continuous scan of laser points (approximately 3,657) across a mere 12 feet of pavement, making it one of the highest resolution pavement laser scanners available. The onboard processing software further amplifies its capabilities by analyzing pavement elevation (range and intensity) and automatically identifying cracking, rutting, and roughness in the form of IRI, potholes, and bleeding.



While any engineering firm could deploy the LCMS2 equipment for data collection, processing the information for distress quantification requires a complete understanding of automated technologies, GIS mapping, and distress measurement protocols found in standards such as ASTM D6433. Simply reviewing the LCMS cracking vectors (colored cracks) with the human eye dilutes the objectivity of the equipment.

IMS engineers and technologists have developed a computerized processing application that automatically applies an 18"x18" grid to the LCMS downward images (FIS files) and uses pre-programmed geometric algorithms to classify and quantity distresses by type. These automated processing routines result in an unparalleled level of objectivity and efficiency in distress pattern recognition analysis. The image above illustrates the quantity of several distresses as well as the presence of a manhole, which was automatically scrubbed from the dataset.

In addition to the auto-quantification and classification of ASTM D6433 distresses, the LCMS2 device also operates as a Class I profile device that collects longitudinal profile (in the form of the International Roughness Index) and transverse profile (rutting) using **advanced 3D profile laser scanning technology**. The system is not subject to vehicle wander like other automated technologies, and it compensates for variation in driver ability. The adjacent images show the processing software's ability to calculate rutting width and depth following the AASHTO Taut Wire methodology. The solid white lines indicate there was no rutting in the left wheel path and that rutting was detected and measured in the right wheel path. Filters can also be applied to account for rehabilitation activity overlap, which can be as much as a ¼ inch depending on the application.



Cracking, Faulting, Texture, Bleeding, & Potholes – The LCMS2 allows IMS to conduct an objective distress survey, thus increasing the accuracy of an otherwise subjective manual survey. High-speed lasers and an onboard processing computer accurately measure the surface profile of the road. Included in this profile are all cracks and faults as small as 1/8" (2 mm) wide that pass beneath the lasers. Processing software then reduces and filters this information to determine the *total number of cracks, crack width/depth, as well as the crack interval*, plus faulting information. From this information, quantified crack data can be determined at both the sample and summary intervals. Crack identification includes all cracking such as alligator, transverse, longitudinal, map, and edge cracking (where applicable).

The LCMS2 device is also capable of automatically collecting, identifying, and reporting supplemental distresses such as bleeding and potholes on asphalt roadways.

Rutting – The LCMS device collects continuous 3D transverse profile data at 1-millimeter resolution at highway speed. This configuration is far superior to other types of vehicles that utilize three lasers or sonic transducers to calculate "relative rutting." Even five sensor units are sensitive to driver error since it is essential in that case that the driver keep the data collection vehicle's wheel exactly in the rutted wheel tracks (assuming that they fit).

The Taut Wire method is used to calculate the rut depth in both the right and left wheel track on a continuous basis. Either the right or deeper of the two-wheel path ruts may be used for rut depth calculations with the average rut depth for that wheel path reported for each section. *Rut depth results, quantified by 3-4 severity thresholds (with break points at user-defined levels such as 0.25, 0.50 and 0.65 inches) and percentage of section will be provided for every segment.*

Roughness – International Roughness Index (IRI) data is calculated in real time from continuous longitudinal profile data collected by the LCMS2's 3D profile device. To determine the road profile, data is simultaneously obtained from three devices: a pulse transducer-based distance-measuring instrument (DMI), high-speed 3D laser sensors operating at 112 MHz, and an accelerometer in conformance with ASTM E 950. The LCMS2 unit conforms to a Class I profiling device, and it can also "pause" over non-valid roadway sections such as localized maintenance activities, railroad crossings, or brick inlays and not affect the overall IRI value.

Distortions, Raveling, Patching, & Other Custom Attributes – While the LCMS automatically collects the majority of ASTM D6433 distresses, the LCMS platform can be configured to collect the remaining distresses (raveling, distortions, and patching) using the integrated touchscreen. By means of a touchscreen-based tablet computer, highly trained IMS technicians input changes in observed distress severities and extents or identify specific roadway assets or attributes such as curb reveal or lip of gutter information. The touchscreen is integrated into the data flow through time code, GPS, DMI distance and inventory control. The data is then post-processed in the office to generate extent quantities for each observed distress severity level throughout every surveyed road section.

Sub-Surface Distress Investigations

Subsurface distress investigations are a valuable tool to assess the sub-grade condition of a roadway. If added to the scope, IMS can integrate the Structural Index (SI) as a component of each roadways final PCI score. To assess the subgrade strength of a roadway, a FastFWD Device would be utilized for Asphalt and Concrete roadways in accordance with **ASTM** standards.

While deflection testing can be conducted on all roadways, generally IMS recommends that network-level testing be completed on the high traffic routes such as arterials and collectors. Deflection testing is typically completed at least once in each direction on every street segment (every 300 - 500 feet) along the outside lanes of the roadway. Testing shall be altered to an inside lane when it appears to be in a worse condition than the outside lane of the segment based on site observations. IMS will record the readings of a series of geophones for inclusion in the overall pavement condition rating. These readings will then be used to determine the pavement strength, load transfer capabilities, and identify properties of the base and sub-grade.

Upon completion of the deflection survey a structural analysis is performed. FastFWDs apply a known load to the pavement and measure the pavements response to the load. The structural adequacy of a road is expressed as a 0 to 100 score with several key ranges: roadways with a Structural Index greater than 75 are deemed to be structurally adequate for the loading and may be treated with lightweight surface treatments or thin overlays. Those between 50 and 75 typically reflect roads that require additional pavement thickness; and scores below 50 typically require reconstruction and increased base and pavement thickness.

The adjacent graph presents a sample structural adequacy plot of a recent client's roadway network against its average pavement condition. The diagonal blue line separates roadways that are performing above expectations (above the line), from those that are not, (below the line). The small number of roadways falling below the diagonal line indicates this particular Town, Branson, Missouri, has a low percentage of roadways that are structurally inadequate for their design load. This is typically the result of insufficient base and structural materials during the original construction, or the application of overlays that were too thin during the lifetime of the roadway.

PCI Development, Analysis Configuration & Multi-Year Plan

Immediately following the completion of the field survey's IMS will begin processing the pavement distress severity and extent scores in an effort to develop a Pavement Condition Index (PCI) for each roadway segment. The condition results are analyzed by a team of IMS engineers, who then develop the Town's multi-year pavement management plan. This section provides a brief summary of the functionality of the IMS pavement analysis in order to emphasize our implementation expertise as well as the abilities and constraints within a pavement analysis.

The purpose of pavement management is to produce cost effective maintenance programs that maximize available resources and roadway life. By incorporating key components of a cost benefit analysis into the analysis operating parameters, we can develop a game plan that is optimized to meet the needs of the Town of Prosper. In addition, the analysis operating parameters described within this section will be delivered in an easy-to-use Interactive Excel Spreadsheet (ESA) including the segment PCI data, pavement deterioration curves, triggers (priority weighting factors), and the prioritized multi-year rehabilitation plan. Everything is linked to GIS in the form of simple shape files or even a personal geodatabase.

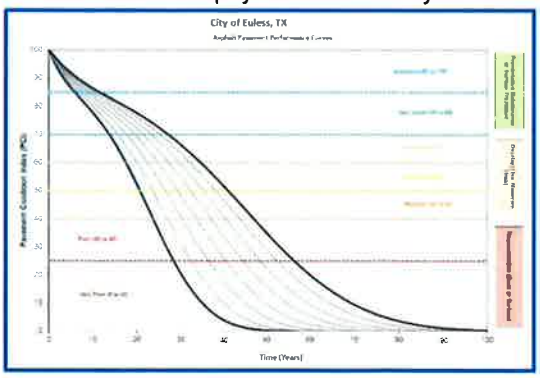
Field Inspection Data and Pavement Condition Index (PCI)

The IMS analysis allows you to store information regarding your pavements, including surface types, number of lanes, patching estimates, cross slopes, and sidewalk & curb types with replacement estimates. Pavement condition data including surface distress, roughness, and deflection results can be stored and analyzed. Using an in-house Pavement Manager Setup module, we can develop customized condition elements, distress types (load & non-load), Indices (SDI, RI, & SI), weightings, and overall PCI calculations.

In addition to the yearly programs, the net impact each budget scenario has on the expected condition of the road network over time can be determined. This budget impact can be illustrated both in terms of the yearly increase or decrease in the average network PCI score, PCI distribution, or % Backlog of roads that were not selected by the budgets. IMS converts the difficult to understand FHWA and ASTM D6433 data to a 0-10 distress rating scale with distress weighted factors (DWF), where DWF = {Area under D6433 deduct curves/3000}.

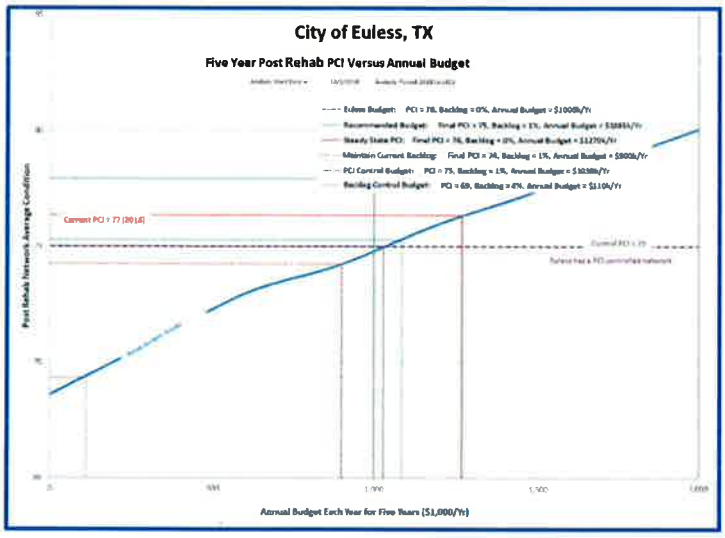
Modeling and Performance Curves

With an IMS analysis, you can forecast various budget scenarios to help you determine your ideal maintenance and rehabilitation schedule. The IMS approach will help you decide what rehab activities should be performed, when and where to perform them, and an ideal budget for your system to maintain it at a specific level of service.



IMS engineers use pavement deterioration models that can be customized to reflect the climatic conditions and structural characteristics of the Midlothian road network. As a result, performance curves can be developed on factors such as functional class, pavement type and sub-grade strength.

Rehabilitation Analysis



An unlimited number of pavement maintenance and rehabilitation strategies can be defined within our system. An analysis is then run, incorporating the performance curves, set points, filter criteria and rehab alternatives to identify the overall need in terms of rehab strategies and costs for the Town's road network, for today as well as year on year for the next 5 to 10 years.

The IMS approach allows you to input any number of "what if" budget scenarios and produce prioritized yearly rehab programs based on those funding levels over a 5-year analysis period. Typical budget scenarios include Budget $/Year, Unlimited Budget $, "Do Nothing" Budget, and a Target PCI Budget.

What is included in an IMS analysis & report?

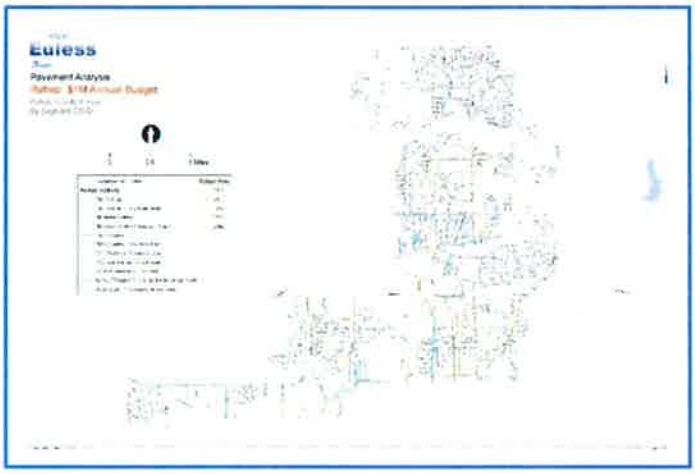
- *Street ownership and inventory/attribute report*
- *Present condition ranking* – detailed and summary condition data including; Good/Fair/Poor, Load Associated Distresses (LAD), Non-LAD, and Project reviews of each street in the network, as well as the network as a whole.
- *Fix all budget analysis* – this identifies the upper limit of spending by rehabilitating all streets assuming unlimited funding.
- *Do nothing analysis* – this identifies the effects of not performing roadway rehabilitation projects.
- *Steady state rehabilitation life cycle analysis* – this identifies the minimum amount of rehabilitation that must be completed in order to maintain the existing level of service over 3, 5, or 10 years.
- *PCI & funding levels* – what funding will be necessary to maintain a PCI of 75, 80, & 85.
- *Plus or minus 50% and other additional runs* – additional budget runs are completed at rates of +50% and -50% of the suggested steady state analysis. Up to 10 budget scenarios will be run.
- *Integration of capital projects and Master Plans* – ongoing and proposed projects that affect roadway rehabilitation planning will be incorporated into the analysis.
- *Draft multi-year rehabilitation and prioritized paving plans* – based on need, available budget and level of service constraints; a minimum of three budget runs will be completed.
- *Final prioritized paving plan* – incorporating feedback from stakeholder departments and utilities, complete with budget and level of service constraints.

An IMS pavement management program is comprehensive, from the data collection process to the implementation of software, and ensures that the Agency will have the capability to utilize the pavement condition data for the implementation of real-world maintenance and construction programs.

GIS Integration & Mapping

The role of GIS in asset management cannot be overstated. It is a powerful tool that provides the ability to handle and present vast amounts of data in an efficient manner. Not only does GIS allow an agency to visually plot textural data, it also establishes an easy access portal to the data through an efficient integration with many 3rd party asset management applications.

IMS kicks off every project by completing a brief review of the agency's GIS environment to assess suitability for network referencing, survey map preparation, and pavement management purposes. Our team will consume the Town's existing GIS files and use the GIS as the basis for developing the network segmentation on a logical block-to-block or intersection-to-intersection basis. If the Town retains an existing pavement inventory linked to an asset management system, no changes will be made unless approved by Town staff.



The data collected by IMS is linked to the existing GIS environment and is supplied as a personal geodatabase, spatial database engine, Auto CAD files, or a series of shape files. IMS collects XY coordinates for all data elements using GPS technology coupled with inertial navigation and integrates with most 3rd party GIS applications, including ESRI.

At a minimum, the GIS supplied by the Town should have an ownership attribute, functional classifications, contiguous line work, and be in a digital format such as shape files and/or personal/file geodatabases. As a supplemental task, IMS also offers full service "GIS Clean-Up" and "Functional Class Review" activities for agencies that require additional GIS development above and beyond standard network referencing activities. IMS can also compare the existing roadway inventory within any current asset management system to the Town's GIS environment. If they do not match and a one-to-one relationship is required, IMS has the team available to develop the correct referencing information. This remains an optional activity to be conducted at the discretion of Town staff.

For this assignment, GIS will be used in four key areas of work:

1. GIS will be used to verify the streets to be surveyed and to create the routing maps for use during the field surveys.
2. The survey productivity will be tracked through the plotting of the GPS data collected during the field surveys. This will allow IMS to review all streets that have been covered, identify anomalies in the referencing, and spot missed streets.
3. GIS will be used in processing the distress and inventory data. By plotting the data, we can QA the data and identify data exceptions in addition to proofing out the GIS.
4. Personal geodatabases, spatial database engines, shape and/or KML files, can be created for the visual presentation of condition data and analysis results.

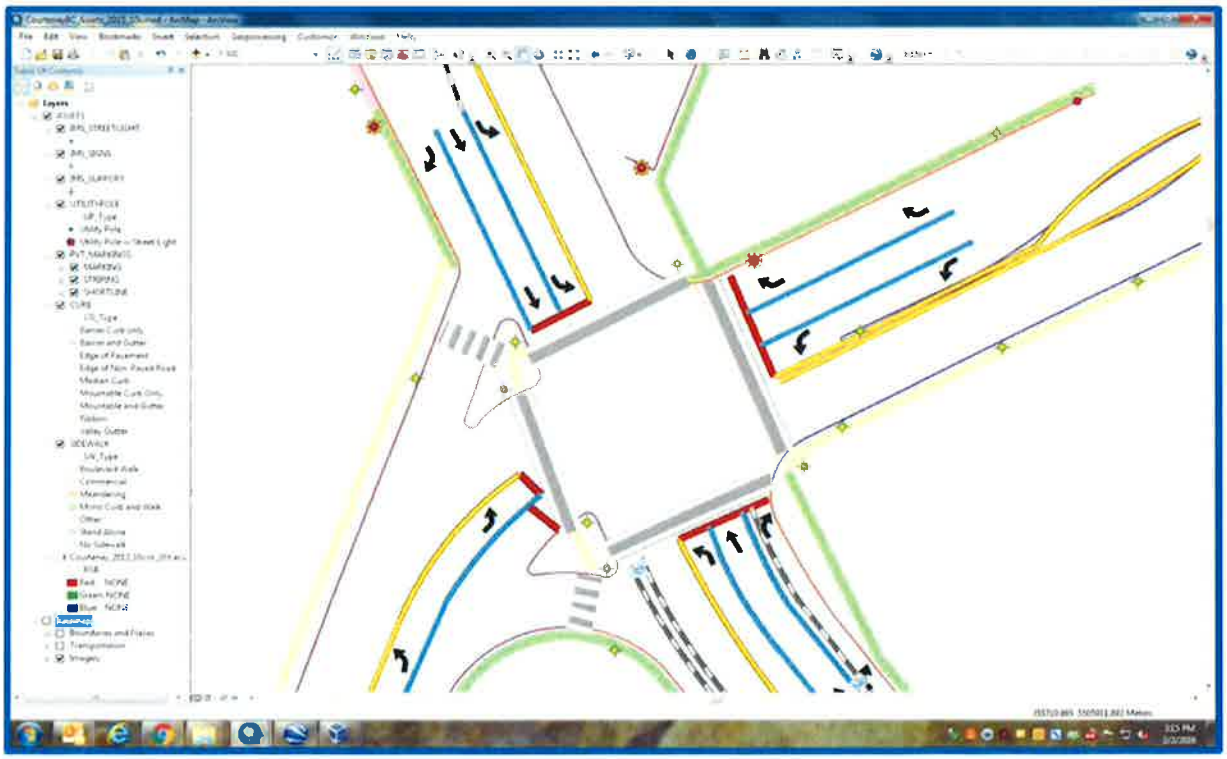
Right-of-Way Asset Inventories (Sidewalks; others?)

The IMS Laser RST uses high-end GPS coordinate data and digital cameras positioned so that all assets/attributes requiring data capture are visible with the front, side, and rear cameras. For the Town of Murphy, IMS has the capability to collect information for sidewalks, ADA Ramps, Curbs/Gutters and other assets for location verification and condition assessment. IMS can also complete ADA compliance surveys on sidewalks, trails and paths utilizing the Sidewalk Surface Tester (SST). *The right-of-way asset inventories are supplemented with air photos and GIS to ensure positional accuracy.*

The IMS technology is an open architecture system that allows virtually any type of asset to be defined for collection of location, attribute, and condition data. Once an asset is observed, the operator toggles to the individual record input screen and proceeds to input the appropriate attribute and associated information. Wherever possible, "pick lists" are employed to streamline the data entry function and provide uniform, high quality data. IMS confirms the feature attributes to be collected with the client.

The images and GPS data are merged on a frame-by-frame basis. The images are then post-processed using a specialty piece of GIS and image viewing software. Using RST imagery, the existing centerline GIS, and aerial photography, IMS spatially plots each right-of-way asset in its real-world location.

Prior to commencing each asset inventory, a document called the **Master Asset List** (MAL) will be developed, using each applicable exhibit as a starting point. The MAL defines what assets or inventory items are to be logged and what attributes will be extracted. The MAL also defines the methodology for condition rating each asset. Essentially the MAL is the direct equivalent of a "data dictionary" as it sets the rules for right-of-way asset data collection. The GIS screenshot below depicts an IMS asset inventory of sidewalks, ADA ramps, pavement striping and markings, curb & gutter and signs.

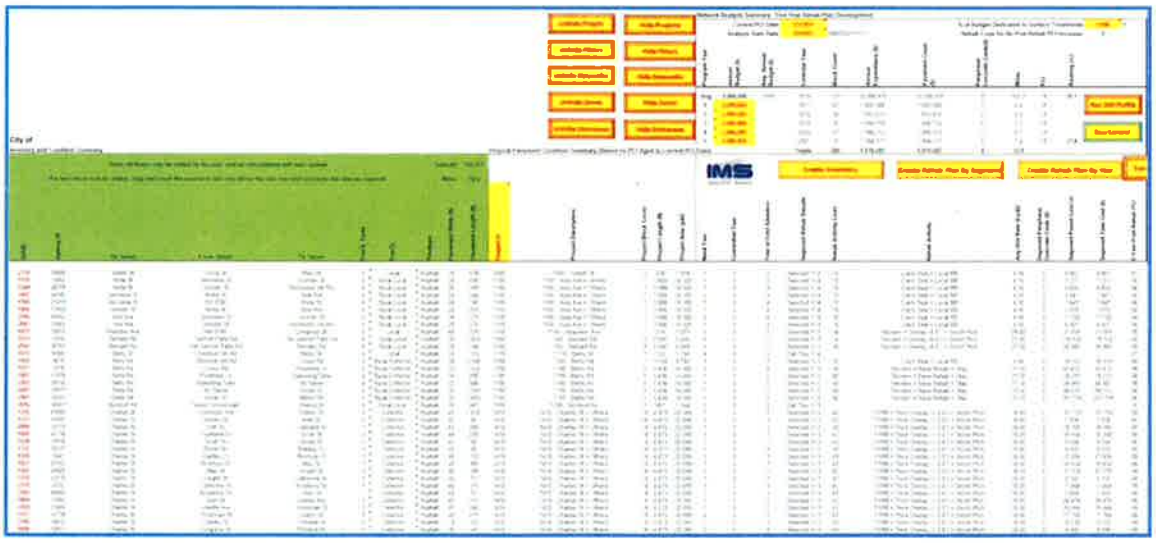


Easy Street Analysis (ESA) Spreadsheet

While the results of the survey will certainly be documented and bound into a final report that illustrates the findings of the survey, it is imperative that Town staff have access to the pavement condition and analysis results without having to become software experts. While IMS is a leading expert with most 3rd party pavement management applications as mentioned in the previous section, we have engineered a simple, and easy to use Excel spreadsheet that utilizes the core metrics of any great pavement management system such as the ability to prioritize and optimize the multi-year plans.

The Easy street Analysis (ESA) spreadsheet will be programmed to develop a multi-year maintenance and rehabilitation plan using "cost of deferral" as a rehabilitation candidate selection constraint in an effort to introduce cost-benefit techniques into the Town's pavement management plan. This will allow Midlothian to provide and demonstrate the most effective use of available funds. In addition, the ESA spreadsheet will have referenced deterioration curves for each functional classification, pavement type, and even pavement strength rating. The power of having the data in such an open architecture fashion allows the Town to utilize 3rd party software in the future if desired. The spreadsheet will also contain a full suite of maintenance and rehabilitation techniques, unit rates, and associated PCI resets. The parameters of the analysis (Priority Weighting Factors) can also be modified and reprioritized on the fly, as well as being able to prioritize the top ten streets needing reconstruction or major rehabilitation. This will allow the Town's data to evolve with the priorities of elected officials and department staff. Programmed priority weighting factors include functional classification, pavement type, and pavement strength while actual candidate selection is based on the incremental cost of deferral.

As seen in the image below, the analysis data in the spreadsheet is supplemented with many cells highlighted in yellow. The yellow highlighted cells simply indicate that they are "HOT" and can be modified by the end user. Two of the yellow cells shown below represent the Annual Budget and the Project ID. The Annual Budget cell can be modified with a new budget and the 5-year plan will automatically re-prioritize on the fly. While IMS will have already aggregated the Town's segments (intersection-to-intersection) into viable projects (multiple segments strung together to form a logical project), the user has the ability to aggregate additional segments into a project or even remove a segment from a project without having to become a software expert.



ESA Functionality: Project Completion and PCI Overrides

The spreadsheet also allows the Town to refresh the 5-year plan by entering the maintenance and rehabilitation work completed. As seen in the image below, the spreadsheet is supplemented with "PCI Override" functionality. When work is completed on a particular segment, the user simply inserts the override PCI value along with a date. The spreadsheet then removes the segment from the 5-year plan and updates all referenced network PCI averages.

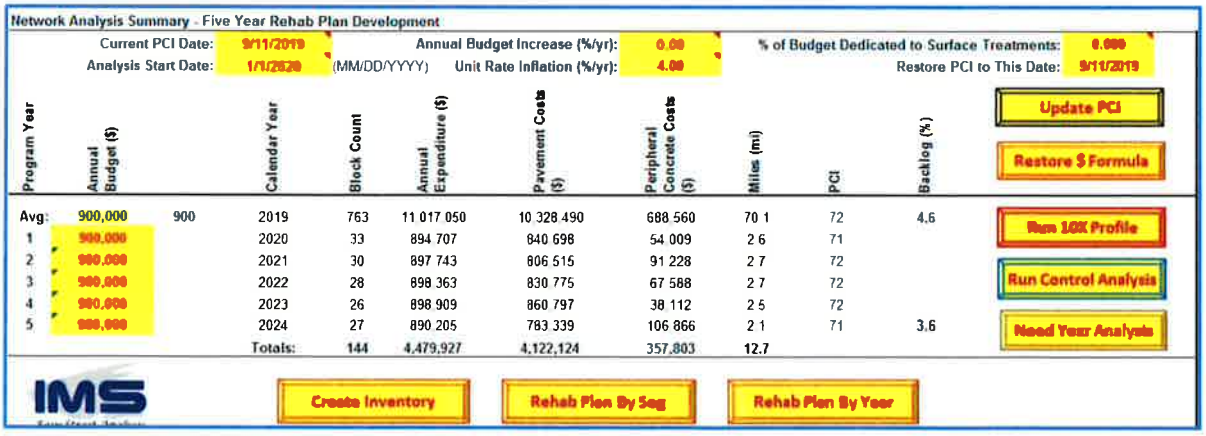
Other features of the IMS Easy Street Analysis spreadsheet are as follows:

- Red triangle tips that trigger a dialogue box explaining cell contents.
- Ability to add new road segments and attributes on the fly.
- Modifiable distress indices for Midlothian field inspections.
- Input work completed and override segment level PCI scores.
- Prioritize by neighborhoods, zones, or districts.
- Ability to modify project lengths – includes aggregating and splits.
- Commit projects and force "Must Do's" or "Must Never Do".
- Program varying annual budgets over a 5-year horizon.
- Commit a percentage of the budget to surface treatments if desired.
- Automated rehab plan prioritization and optimization.
- Macros that automatically sort and filter simple rehab and inventory lists.
- Ability to sync the spreadsheet with the Data Viewer though a .CSV file export.

While the spreadsheet is not meant to replace pavement management systems, it is an alternative for agencies that do not want to maintain the resources or staff to maintain a dedicated application. If a dedicated system is still desired, IMS will assess all other available 3rd party solutions. The ESA data integrates with GIS and is also easily exportable to be tied into PAVER, RoadManager, Lucity, Cartegraph, BeeHive, Cityworks or other software solutions.

Additional Sample Images of the ESA Interactive Spreadsheet Functionality:

Running a budget model within ESA is as easy as typing in your annual budget each year for the next 5-years. After doing so the application will automatically run the model and develop an optimized 5-year rehabilitation plan that identifies the selected rehab candidates, their year of selection, and their cost.



Program Year	Annual Budget ($)		Calendar Year	Block Count	Annual Expenditure ($)	Pavement Costs ($)	Peripheral Concrete Costs ($)	Miles (mi)	PCI	Backlog (%)
Avg:	900,000	900	2019	763	11,017,050	10,328,490	688,560	70.1	72	4.6
1	900,000		2020	33	894,707	840,698	54,009	2.6	71	
2	900,000		2021	30	897,743	806,515	91,228	2.7	72	
3	900,000		2022	28	898,363	830,775	67,588	2.7	72	
4	900,000		2023	26	898,909	860,797	38,112	2.5	72	
5	900,000		2024	27	890,205	783,339	106,866	2.1	71	3.6
			Totals:	144	4,479,927	4,122,124	357,803	12.7		

Projects are multiple segments/blocks that have been aggregated together to form a logical project within the pavement management system. While changing the limits or size of a project is often difficult in many pavement management applications, doing so in ESA is as simple as entering in a new "Project ID". Nothing more is necessary.

Projects Pavement Condition Summary (Based on PCI Aged to Current PCI Date)

Project ID	Project Description	ject Block Count	Project Length (ft)	Project Area (yd2)	Project PCI (PCI)	Project Cndtn Rating	ject Strength Code	ject FunCl Code	ject Pavetype Code
3700	3700 - Village Rd + Others	11	4,268	15,672	83	V Good	2	3	1
1360	1360 - Highland Dr + Others	3	1,418	4,001	56	Fair	2	3	1
3440	3440 - Andover Rd + Others	5	2,680	21,801	80	V Good	2	1	2
3700	3700 - Village Rd + Others	11	4,268	15,672	83	V Good	2	3	1
1500	1500 - Minneha Ave + Others	4	1,341	5,228	80	V Good	2	2	1
3820	3820 - Westview Cir + Others	2	1,490	4,444	53	Fair	2	3	1

The ESA application is configured with the Town's appropriate rehabilitation activities and represents a very comprehensive pavement management program in the form of an Excel Spreadsheet. A full demo of the ESA application can be scheduled with Town staff if desired.

2022-23 Proposed Project Schedule

- Contract Executed/ P.O.: July 2022
- GIS Acquisition/ Clean-up & Validation: July-August 2022
- Review Map Iterations & Approval: August 2022
- LCMS-2 & FastFWD Pavement Surveys: September 2022
- QA/ QC for Data Collected: September – November 2022
- Pavement Condition Data/ Client Review: late- November 2022
- Commence "ESA" Analysis with Client Input: December 2022
- Final Deliverables: Written Report, Analysis Maps: January 2023

2022 Pavement Data Collection Project – Fee Schedule

The detailed budget presented on the following page is based on the IMS work plan and deliverables. The detailed budget presented below is based on the IMS work plan and deliverables and conforms to the 2016 negotiated pricing through the North Central Texas Council of Governments (effective thru 12/30/2022). Note: "Lane Miles" (NCTCOG/ TX SHARE rates) and "T-Mi.", or test miles (aka survey miles) are synonymous and are defined as miles driven by the IMS van equipped with LCMS-2 tech.

IMS/ North Texas SHARE Rates: 2016-2022

Item #	Description	Quantity	Unit	Lane Mile Unit Cost	Unit Rate	Total
1	Automatically and continuously measure pavement cracking, texture, rutting, width, and pavement type	270	Lane Mile	$117.00	N/A	$31,590.00
2	Collect pavement surface distress through automated means	270	Lane Mile	$1.00	N/A	$270.00
3	Provide a digital condition rating system to collect user defined severity/extent based pavement distresses and pertinent roadway attributes to accommodate a standardized approach to collecting data	1	Lump Sum	N/A	$1,250.00	$1,250.00
4	Collect dual-wheel path roughness data to International Roughness Index standards	270	Lane Mile	$1.00	N/A	$270.00
5	Roadway information that shall be collected and provided to the Participant at a minimum includes items a. through i. in Section 5 of the Overview in this bid. (Page 5)	270	Lane Mile	$1.00	N/A	$270.00
6	Collect digital images at 25-foot intervals of the road surface condition and link to a geodatabase (minimum forward facing imagery)	270	Lane Mile	$12.00	N/A	$3,240.00
7	Collect sidewalk data to include location, length, width and condition and create shape (.shp) files for incorporation into the Participant's GIS system, if applicable		Lane Mile	$45.00	N/A	
8	Collect sidewalk ADA ramp data to include location, configuration, presence of truncated domes or other detectable warning feature, and condition and create shape (.shp) files for incorporation into the Participant's GIS system, if applicable.		Each	$5.00	N/A	
9	Collect roadway sign data to include type and location and create shape (.shp) files for incorporation into the Participant's GIS system, if applicable		Each	$2.50	N/A	
10	Collect photos of ADA ramps, sidewalks, and/or roadway signs inventoried under items 7, 8, and 9 above.		Each	$0.50	N/A	
11	Collect location of curb and gutter and create shape (.shp) files for incorporation into the Participant's GIS system, if applicable		Linear Feet	$0.01	N/A	
12	Collect location and type of visible in-pavement features such as valves, manhole covers, etc., and create shape (.shp) files for incorporation into the Participant's GIS system, if applicable		Each	$1.00	N/A	
13	Load assessment data for all Participant-maintained pavements into a pavement management software system required by local government Participant(s), if applicable. Cost includes base cost plus lane mile unit cost.	270	Each Participant Plus Lane Mile Cost	$5.00	$3,750.00	$5,100.00
14	Implement map module so that pavement condition and other data can be integrated, displayed, and accessed through the map interface in a format consistent with the Participant's horizontal and vertical control network system, if applicable. Cost includes base cost plus lane mile unit cost.	270	Each Participant Plus Lane Mile Cost	$5.00	$6,000.00	
15	Provide to the Participant the pavement condition data in a pavement management system database approved by Participant. Coordinate with the Participant's IT department to provide pavement condition data in a format compatible with the Participant's Environmental Systems Research Institute (ESRI) GIS database, if applicable. Cost includes base cost plus lane mile unit cost	270	Each Participant Plus Lane Mile Cost	$12.00	$1,250.00	$4,490.00
16	Calculate a Pavement Condition Index (PCI) score for each road segment using an approved pavement management system and in accordance with ASTM D6433. Provide results compatible with the Participant's GIS database, if applicable	270	Lane Mile	$15.00	N/A	$4,050.00
17	Calculate the International Roughness Index for each road segment in accordance with ASTM E1926. Provide results compatible with the Participant's GIS database, if applicable	270	Lane Mile	$1.00	N/A	$270.00
18	With input from Participant's staff, devise a weighing system taking into account PCI, IRI, average daily traffic for thoroughfares (traffic count raw data provided by Participant), and public safety emergency routes; and apply this 0-100 numeric index to the roadway information collected for the entire jurisdiction. Cost includes base cost plus lane mile unit cost	270	Each Participant Plus Lane Mile Cost	$1.00	$1,550.00	$1,820.00
19	Estimate the annual budget required to meet the long term goals regarding desired pavement condition levels. Cost includes base cost plus lane mile unit cost.	270	Each Participant Plus Lane Mile Cost	$1.00	$4,250.00	$4,520.00
20	Create a five year and ten year pavement rehabilitation plan with input from Participant's staff. Cost includes base cost plus lane mile unit cost.	270	Each Participant Plus Lane Mile Cost	$1.00	$2,750.00	$3,020.00
21	Recommend the computer hardware and software needed for successful implementation, potentially including recommendations for licenses of pavement management system software and other geodatabase software as needed		Each Participant		$1,500.00	
22	Train Participant staff and provide assistance to the Public Works and IT Department as needed for the use of data collected through the fully automated system (20 person maximum per class)		Day		$3,250.00	
23	Collect and analyze pavement structural condition information through the use of a Dynaflect device in accordance with industry standards on designated participant-owned roadways	64	Lane Mile Cost	$145.00	$3,000.00	$12,280.00
24	Collect and analyze pavement structural condition information through the use of Ground Penetrating Radar (GPR) in accordance with industry standards on designated participant-owned roadways		**		N/A	
25	Collect and analyze pavement structural condition information through the use of pavement cores in accordance with industry standards on designated participant-owned roadways (traffic control included) 2		**		N/A	
					Sub-Total:	**$72,440.00**
26	Additional Requested Fees:					
26a.	Collection of GPS, Crossfall, & Grade	270	Lane Mile	$20.00	N/A	$5,400.00
26b.	Final Report	1	Each		$ 5,000.00	$5,000.00
26c.	Cityworks Sync: ESA Spreadsheet <>GIS (Need Constant 1-to-1 Relationship)	1	Each		$ 9,375.00	$9,375.00
26d.	Pavement Markings & Striping Database from Imagery Collected	270	Lane Mile	$60.00	N/A	$16,200.00
					Project Total:	**$108,415.00**

= **Prosper Applicable Line Items**

Prosper, TX: 2022 IMS Pavement Management System Update [Reflects NCTCOG Schedule]

Task	Activity	Quant	Units	Unit Rate	Total
	Project Initiation				
1	Project Initiation	1	LS	$3,000.00	$3,000.00
2	Network Referencing & GIS Linkage	270	T-Mi	$12.00	$3,240.00
3	Network Inventory Checks & Survey Map Development	270	T-Mi	$6.00	$1,620.00
	Field Surveys				
4	LCMS-2 Mobilization/Calibration	1	LS	$3,000.00	$3,000.00
5	LCMS-2 RST Field Data Collection	270	T-Mi	$105.00	$28,350.00
	a. Right of Way Assets Data Collection (GPS & Camera Configuration: Select Once w/Any Asset Below)				$0.00
6	FastFWD Mobilization for Deflection Testing (2-pass Arterials only)	1	LS	$3,000.00	$3,000.00
	a. Arterial & Collector Deflection Testing	64	T-Mi	$175.00	$11,200.00
	b. Safety Vehicle & Operator (If needed, Town to Provide; IMS Est. 144 Hrs.)	0	HR	$135.00	$0.00
	Data Management				
7	Surface Condition Data QA/QC, Processing, & Format	270	T-Mi	$25.00	$6,750.00
8	Delivery of Digital Images @ 15' Intervals (Per View)	270	T-Mi	$12.00	$3,240.00
9	Easy Street Pavement Analysis & Budget Development	1	LS	$4,500.00	$4,500.00
	a. "ESA - Easy Street Analysis" Pavement Management Spreadsheet Software			Included in Base Activities	
	b. Customizable Prioritization & Cost-Benefit Analysis			Included in Base Activities	
	c. Unlimited Access - Training Library			Included in Base Activities	
10	Pavement Markings & Striping Database Development	270	T-Mi	$60.00	$16,200.00
11	Project Management	1	LS	$4,540.00	$4,540.00
12	City Contingency - IMS Must Obtain Written Authorization (Added 25% Contract):		NTE	$22,160.00	
	a. IMS Full Written Report	1	LS	$5,000.00	$5,000.00
	b. Collect GPS, Crossfall & Grade	270	T-Mi	$20.00	$5,400.00
	c. Cityworks Sync: ESA Spreadsheet <>GIS (Need Constant 1-to-1 Relationship)	1	LV	$9,375.00	$9,375.00
				Project Total:	**$108,415.00**

Signatures

The parties have caused this Professional Services Agreement to be executed in duplicate counterparts, each of which shall be considered as an original by their duly authorized offices.

IMS Infrastructure Management Services, LLC

By: _____ **President**

Signature — Title

Kurt Keifer 18 July 2022

Printed Name — Date

Town of Prosper, Texas

By: _____ **Town Manager**

Signature — Title

Harlan Jefferson

Printed Name — Date

Thank you for considering IMS as a viable solution to your pavement management needs. We will strive to become an asset and extension of the Town staff and team. If any questions arise, please do not hesitate to contact me at (480) 462-4030 or jtourek@imsanalysis.com.

IMS Infrastructure Management Services

Jim Tourek, West Region Manager of Client Services

Below highlights other value-added services:

	Value-Added Service Items and Activities				
13	Enhanced Cityworks Sync to include Work Order (Initiate & Close via APIs)	1	LS	$24,500.00	$24,500.00
14	Right of Way Assets Data Collection (GPS & Camera Configuration: Select Once w/Any Asset Below)				Included in Base Activities
	a. Sign & Support Database Development	270	T-Mi	$100.00	$27,000.00
	a1. Sign and Support Database (Arterials Only)	64	T-Mi	$100.00	$6,400.00
	b. Markings & Striping Database Development	270	T-Mi	$60.00	$16,200.00
	c. Speed Humps Database Development	270	T-Mi	$20.00	$5,400.00
	d. ADA Ramp & Compliance Survey	270	T-Mi	$60.00	$16,200.00
	e. Curb & Gutter Database Development	270	T-Mi	$50.00	$13,500.00
	f. Traffic Signals/ Flashers. Controllers Database Development	270	T-Mi	$40.00	$10,800.00
	g. Street Lights Database Development	270	T-Mi	$70.00	$18,900.00
	h. Drop Inlets Database Development	270	T-Mi	$60.00	$16,200.00
	i. Drivepads Database Development	270	T-Mi	$120.00	$32,400.00
	j. Bridges Database Development	270	T-Mi	$20.00	$5,400.00
	k. Street Furniture Database Development	270	T-Mi	$16.00	$4,320.00
	l. Cattle Guards Database Development	270	T-Mi	$30.00	$8,100.00
	m. Guardrails & Roadside Pedestrian Fence Database Development	270	T-Mi	$40.00	$10,800.00
	n. Catch Basins/ Drainage Inlets *from Master Drainage Plan*	1	LS	TBD	
	o. 3% Discount for >2 New ROW Assets Selected (If >5, 6% Discount)	270	T-Mi	TBD	
15	IMS Story Map of City's Pavement Condition (Ext. Portal or for Internal Staff)	1	EA	$7,500.00	$7,500.00
	a. Years 2 & 3 Annual Updates of Rehabs; Update	2	EA	$2,000.00	$4,000.00
16	GIS Clean-up Services	8	HR	$175.00	$1,400.00
17	GIS Remote Training Sessions w/GIS Mgr./ Expert (3 Sep. 2-Hr. Sessions)	6	HR	$150.00	$900.00
18	Town Council Presentation	1	LS	$3,500.00	$3,500.00
19	Additional or Specialty Maps for Reporting (Beyond Typical 2 Sets)	1	EA	$150.00	$150.00
20	Additional Onsite Meetings	1	EA	$3,000.00	$3,000.00
21	Additional Hard Copies of the Final Report (>3 Sets Included)	1	EA	$175.00	$175.00
22	Functional Classification Review	270	T-Mi	$12.00	$3,240.00