

NYC DEPARTMENT OF TRANSPORTATION



Request for Expressions of Interest

Repository for Asset Management (AM) of Pavement
Safety Markings (PSM) Integrated with Computer Aided
Design & Drafting (CADD), Inventory Validation, and
Workflow Automation

PIN: 84116MBAD965

2/17/2016

1 Purpose of RFEI

This Request for Expression of Interest (RFEI) is issued to invite interested vendors to submit information to the New York City Department of Transportation (NYCDOT) for overall information management related to Pavement Safety Markings (PSMs).

The purpose of this document is to describe NYC DOT's requirements to manage the citywide information on PSMs. The requirements have been grouped into following three discrete modules, based on the business needs.

Module 1: Repository for Asset Management (AM) of Pavement Safety Markings (PSMs) Integrated with Computer Aided Design & Drafting (CADD)

Module 2: PSM Asset Data Acquisition / Inventory Validation

Module 3: PSM Work Order Workflow Automation to Improve Efficiency and Data Quality

NYC DOT is aware that one single vendor might not be able to provide solutions to the requirements of all three modules described in this document. So, vendors may offer solutions to one or more modules based on their expertise on each module as specified below.

- Module 1 only
- Module 2 only
- Modules 1 and 2
- Modules 1 and 3
- Modules 2 and 3
- Modules 1, 2 and 3

Note: NYC DOT is not interested in submissions with solution to Module 3 alone

2 Background Overview

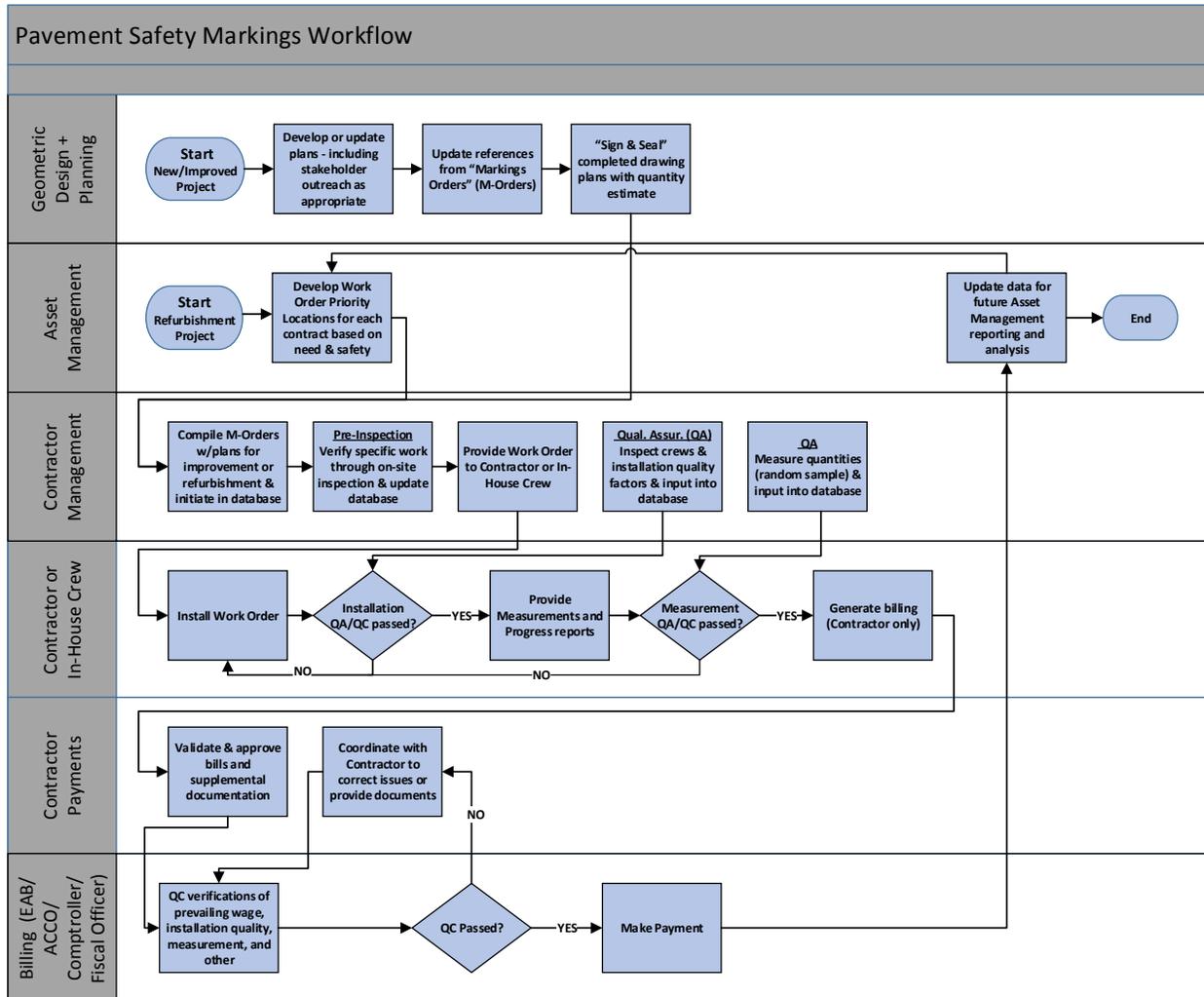
NYCDOT's Transportation & Planning Management Division (TP&M) contributes to transportation safety by enhancing and maintaining the Pavement Safety Markings – consisting of white and yellow lines, white symbols & letters. The streets are marked with various standardized lines and symbols to guide all users – whether driving, walking, or bicycling. The current inventory level of PSMs is more than 200 million linear feet (4" line equivalent) on 8,000 centerline miles of streets and 45,000 intersections.

The Engineers at NYCDOT Transportation & Planning division currently use AutoCAD to design and develop "Marking Plans" for lane markings. Once approved and finalized the marking drawings are signed and sealed as permanent record. "Marking Orders" (MOs) are used to provide a verbal description of work to be performed or point to Marking Plans used for a given segment of street. Historical records of MOs and Marking Plans are maintained, referenced, and revised by the Engineers. Work Orders (WOs) express specific work to be performed for Pavement Marking Crews and our Inspectors by assembling MOs with their referenced plans.

WOs are utilized as a basis for inspection and payment. NYC DOT issued nearly 2200 PSM WOs. This represented about 44.5 million lineal feet (MLF) of 4" line equivalent PSMs – expected to rise to near 65 MLF by FY 2017.

WOs are validated by the Field Inspectors to make sure that all the necessary field work is captured. Work is then assigned either to external contractors or an in-house crew based on the work's nature and priority. Once the work is complete, Quality Assurance and Quality Control checks and measurement are performed to ensure that the work has been completed as specified in the work order and quantities applied are correct for payment. Currently, most of the tasks involved in the process are manual and paper based.

Shown below is the diagrammatic representation of the PSM business process.



It has to be noted that the diagram depicted above is to assist vendors understand the current process for pavement markings Work Order implementation and **does not** represent or serve as a means to guide the expected outcome of this RFEI.

3 Project Overview

NYC DOT's objective is to implement a solution that offers data acquisition and data management of all PSM assets in NYC.

The PSM needs are split into three main categories based on their functional needs as follows:

Module 1: Repository for Asset Management (AM) of Pavement Safety Markings (PSM) Integrated with Computer Aided Design & Drafting (CADD)

Module 2: PSM Asset Data Acquisition / Inventory Validation

Module 3: PSM Work Order Workflow Automation to Improve Efficiency and Data Quality

3.1 Module 1: Repository for Asset Management (AM) of Pavement Safety Markings (PSM) Integrated with Computer Aided Design & Drafting (CADD)

The project proposal for this module should address the following business needs:

- Two way integration between the CADD system and the PSM data repository described in Module 2, i.e. the ability for the CADD system to open and allow edit of the design of PSMs stored in the PSMs data repository, and then save the design back into the PSM data repository;
- Support spatially correct marking drawings in CADD environment;
- Capability to create and maintain citywide "As-Built" drawings reflecting current condition on field installation of the pavement safety markings;
- Capability to query and view the CADD drawings in macro and micro level;
- Derive scope and cost estimate for WOs based on CADD drawing elements;
- Electronically sign and seal a completed drawing designs and their associated elements;
- Prevent unauthorized changes to professionally sealed drawing elements;
- Audit trails of changes made to drawings including editor, modified date and elements obsoleted;
- Streamlined automation for signed and sealed quantity estimates for each drawing element with WO totals;
- Clash detection to know that every CADD element represents a unique asset;
- Version control for pavement marking master CADD file revisions for complete street designs; and
- Archive of changed drawing elements (i.e. lines and shapes) with associated work order and inspection metadata;

3.2 Module 2: PSM Asset Data Acquisition / Inventory Validation

This work consists of the following steps (subject to change based on vendor technology presented):

1. Create PSM data base where each row in the database corresponds to a PSM line or area in CADD based on WOs installed in the past 10 years.
 2. Acquire field data within an agreed timeframe to determine geo-location, presence, and reflectivity (optional) for all PSMs.
 3. Reconcile and validate the WO data and field-acquired data to produce an accurate “As-Built” condition database where each row in the database corresponds to a PSM line or area in CADD with meta-data reflecting state of repair as of the data acquisition dates.
- Assets to be assessed include (but may not be inclusive of) the following:
 - Long lines,
 - Short lines,
 - Hatching,
 - Letters,
 - Symbols,
 - Pavement colors,
 - Grooving (pavement depression to protect markings from snowplows),
 - Wet-reflective beads,
 - Speed humps,
 - Curbs,
 - Flexile delineators,
 - Tactile pavement treatments,
 - Ramps,
 - Bollards,
 - Tree pits and planters,
 - Crash attenuators, and
 - Guiderails
 - PSM-related asset CADD attributes include (but may not be inclusive of) the following:
 - Geometry coordinates,
 - Line length,
 - Line width,
 - Line style per MUTCD (solid, broken, short dotted etc.), and
 - Line color.
 - WO category (long-line, short-line, markings removal, markings after resurfacing, etc.)
 - Type of marking material (paint, thermoplastic, polyurea, epoxy, etc.)
 - Material PSM was installed on (concrete or asphalt)
 - Associated drawings and Markings Orders
 - PSM asset data captured should be geometrically editable by CADD software. On GIS software, CADD-designed elements should be readable – with associated metadata (installation data, inspection data, marking material, etc.) being readable and editable.

3.3 Module 3: PSM Work Order Workflow Automation to Improve Efficiency and Data Quality

The PSM work order workflow automation module requirements are described below (subject to change based on vendor technology presented):

- Utilize “Repository for Asset Management” developed in Module 1 and refined in Module 2 as a foundation for automating the WO development process – encompassing plan development, work order assembly, inspection, payment, quality assurance, and future WO prioritization.
- Introduce mobile device(s) and mobile app(s) to perform field inspections for payment, quality assurance, and quality control;
- Create forms for mobile devices and/or office computers suitable for pre-inspection, work order development, post-inspection, punch list, billing, reports, etc.;
- Create workflow and assign WO to either in-house staff or external contractors;
- Store and retrieve documents using appropriate structure, metadata for search, and strong security;
- Provide work status and related correspondence;
- Document Quality Assurance (QA) and Quality Control (QC) tasks based on WO specifications – tying field data collection and photos to individual elements installed;
- Provide a method for contractors to provide independent WO measurement claims for completed work;
- Generate “punch list” if necessary to complete or correct a WO – with the ability to reassign such work to another contractor and close out for payment immediately; and
- Provide a billing module to create and validate contractor payments based on NYCDOT requirements.

4 The Role of this RFEI and Points of Interest to NYCDOT

This RFEI will allow NYCDOT to engage with companies who are developing products or systems offering solution components or comprehensive solution for asset management and work order management for Pavement Safety Markings (PSMs). NYCDOT’s interaction with respondents will be iterative – including the written responses to this RFEI, follow up interviews and meetings, and opportunities for product demonstration. This process will have an overall focus on:

- Introducing software and hardware products available on the market to NYCDOT in order to compile a desired business solution for PSMs; and
- Evaluating available products suiting the needs of NYCDOT’s Transportation Planning & Management (TP&M) Division for PSMs asset management.

Respondents are asked to provide a concept-level diagram of key system components, and description of how the components work together – highlighting challenges to integration.

Based on the RFEI responses, NYCDOT may offer some of the respondents the opportunity to demonstrate their product to show the effectiveness of the products or systems submitted by respondents. The date, time, location and other terms and conditions as respondent’s product scope and possibility of NYCDOT’s compensation for the product demonstration will be later determined by NYCDOT as per a future demonstration agreement.

4.1 Questions and Response Guidelines for Respondents

General

- 4.1.1 Have you implemented similar systems for PSM asset management?
- 4.1.2 Provide details on the proposed solution's integration with CADD system of your choice.
- 4.1.3 How will your system manage the "officially approved" PSM assets & ensure Work Orders are derived from a single consistent source?
- 4.1.4 Explain how CADD assets are reference-able from external systems.
- 4.1.5 Explain how migration to future releases of CADD will be handled.
- 4.1.6 Please list the technologies that will be used in developing the proposed solution – including CADD integration and field data collection.
- 4.1.7 What are the infrastructure needs (database, hosting, CADD, etc.) for the proposed solution?
- 4.1.8 Will the proposed solution provide API for other external systems to interface with?

PSM Asset Data Acquisition

- 4.1.9 Describe technologies that can assist with geo-referenced collection of existing pavement markings assets in CADD format readable or exportable to GIS.
- 4.1.10 List any municipalities that have utilized the proposed system for collection of their pavement marking assets.

Geospatial Technology

- 4.1.11 How will your solution handle geo-referencing of pavement marking assets?
- 4.1.12 Please explain how the pavement marking assets can be viewed accurately in GIS software such as Google Earth, ArcGIS etc.
- 4.1.13 Explain how CAD level accuracy are preserved in GIS-readable file formats
- 4.1.14 Is it possible to automate the linking of pavement marking assets to GIS links and nodes?

CADD Integration with PSM asset data repository

- 4.1.15 Explain how your solution will provide two way integration with CADD system and an external database.
- 4.1.16 How do you propose documenting changes to citywide "As-Built" pavement markings to reflect final field installation condition?
- 4.1.17 How will your solution archive and protect "As-Built" CADD drawings?
- 4.1.18 How do you propose to extract citywide pavement marking drawings and database into Work Orders?

Electronic Signature of CADD Drawings

- 4.1.19 Explain how you plan on ensuring changes to sealed signed CADD files in your workflow will trigger re-sealing and signing.

Field Data Collection Technology

- 4.1.20 Explain how the field system handles data transaction with or without internet connection.
- 4.1.21 Do you have a preferred mobile device platform for field data collection?
- 4.1.22 Do you have any special technology considerations for the NYC PSM field data collection module?

5 Submission Requirements

5.1 Content

The RFEI response must be provided in PDF format not exceeding 50 pages.

The RFEI response shall contain:

- Contact information, including the legal name of the respondent, business address, name of contact, telephone number and email address.
- A summary of respondent's background and experiences related to the development and deployment of similar products (not more than 5 pages).
- Responses to the questions listed in Section 4 and any other information that would be informative and responsive to this RFEI.

5.2 Submission Details

Any inquiries related to this RFEI should be directed by e-mail, with the subject line "Pavement Markings System RFEI Q&A", to nrahman@dot.nyc.gov.

The deadline for submission of written requests for clarification is April 15, 2016 at 2:00 p.m. EST. NYCDOT will circulate questions and answers to respondents who provide e-mail addresses no later than April 4, 2016 and will also post answers to all submitted questions on the NYCDOT webpage at:

<http://www.nyc.gov/html/dot/html/about/doing-business.shtml>

RFEI responses are due by May 6, 2016 at 2:00 p.m. EST. PDF format of the response shall be submitted via email to nrahman@dot.nyc.gov

6 Additional Information

- 6.1 This RFEI is not intended as a formal offering for the award of a contract and participation by a respondent is not a requirement for participation in any future solicitation that NYCDOT may undertake.
- 6.2 NYCDOT does not intend to grant or issue any agreements on the basis of this RFEI.
- 6.3 NYCDOT, the City and their officials, officers, agents and employees make no representation or warranty and assume no responsibility for the accuracy of the information set forth in this RFEI.
- 6.4 Neither NYCDOT nor the City shall be liable for any costs incurred by any Respondent in the preparation, submittal, presentation, clarification or revision of its submission.
- 6.5 Neither NYCDOT nor the City shall be obligated to pay and shall not pay any costs in connection with the preparation of such **submissions**.
- 6.6 All submissions shall become the property of NYCDOT and the City and shall not be returned. Respondents acknowledge and understand that none of the information contained in the submissions shall be deemed confidential. Furthermore, information in the submissions will likely be shared with other governmental entities. Therefore, Respondents should not submit any information deemed to be proprietary information.
- 6.7 NYCDOT at its sole discretion reserves, without limitation, the right to:

- 6.7.1. Withdraw the RFEI at any time;
 - 6.7.2. To discuss various approaches with one or more Respondents (including parties not responding to the RFEI);
 - 6.7.3. Use the ideas and/or submissions in any manner deemed to be in the best interests of NYCDOT and the City, including but not limited to soliciting competitive submissions relating to such ideas or proposals and/or undertake the prescribed work in a manner other than that which is set forth herein; and
 - 6.7.4. Change any terms of the RFEI.
- 6.8 NYCDOT is subject to the New York State Freedom of Information Law, which governs the process for the public disclosure of certain records maintained by NYCDOT. (See: Public Officers Law, Sections 87 and 89). Individuals or firms that submit materials to NYCDOT may request that NYCDOT except all or part of such materials from public disclosure, on the grounds that the materials contains trade secrets, proprietary information, or that the information, if disclosed, would cause substantial injury to the competitive position of the individual or firm submitting the information. Such exception may extend to information contained in the request itself, if public disclosure would defeat the purpose for which the exception is sought. The request for such an exception must be in writing and state, in detail, the specific reasons for the requested exception. It must also specify the materials or portions thereof for which the exception is requested. If NYCDOT grants the request for exception from disclosure, NYCDOT shall keep such materials or portions thereof in secure facilities.