WMATA – Request for Information (RFI)

Wayside Work Planning System

# Introduction

This is an introduction to the technical aspects of the Request for Information (RFI) starting on page 4 regarding vendor capabilities in developing and implementing a total business solution for Washington Metropolitan Area Transit Authority (WMATA) Metrorail wayside work planning, scheduling, and execution system. WMATA is seeking solutions for its enterprise-wide system for wayside work. WMATA’s primary objectives in pursuing this outsourcing is to benefit from the vendor's experience in designing, implementing, and supporting various planning and scheduling systems for maintenance and capital work on fixed, linear assets. Additionally, WMATA seeks to capitalize on existing software solutions that can be modified to support its needs.

The purpose of this RFI is to solicit information that will enable WMATA to determine industry participation in response to the release of a possible future Request for Proposal (RFP). This RFI will be posted online at <https://www.wmata.com/Business/procurement/solicitations/active-procurement-opportunities.cfm> and Federal Business Opportunities [www.fbo.gov](http://www.fbo.gov).

This is an RFI only and a vendor’s response is not an offer. This RFI does not commit WMATA to any incurred costs in preparation of any submission to this notice, or to contract for services and it is issued for WMATA market research purposes only.

# Instructions to Vendors

This is an RFI. No costs associated with your response shall be charged to WMATA for any reason. This document shall not be construed as a request or authorization to perform work at WMATA’s expense. Any work performed by a vendor will be at the vendor's own discretion and expense. This RFI does not represent a commitment to purchase or obligates WMATA in any manner. Submission of a response constitutes an acknowledgement that the vendor has read and agrees to be bound by such terms.

WMATA may release a formal RFP for the services described in this document prior to the end of December 2018. There is no guarantee that WMATA will publish an RFP. If published, the RFP will be publicly advertised on [www.wmata.com](http://www.wmata.com) and [www.fbo.gov](http://www.fbo.gov), and sent to vendors that have responded to this RFI. The information contained in this RFI is provided based upon the information gathered and/or known at this time. There are no guarantees as to the accuracy of this information.

## Point of Contact

All communication with WMATA must be directed to the single Point of Contact for this project:

**Katie Frost**

Manager, Strategic Initiatives

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## Vendor Questions

All interested parties may submit questions to WMATA by **March 14th 2018**. WMATA will respond to all questions in a single document, post it online, and distribute the response to all parties that submitted at least one question by **March 20th 2018**.

## Vendor Responses to the RFI

1. A response must be received by **April 11th 2018, sent by email to the point of contact named above**. The response shall include the RFI number and the POC name on the front of the package.
2. The response should include two components.
   * 1. Company Information (See Appendix A as a template)
     2. Technical Response

The template provided for the Company Information should serve as the first page of the response. The Technical Response should respond to all sections of this document as concisely as possible while providing all information necessary. Respondents may respond to any and/or all sections of this RFI. Proposed solutions do not need to respond to all sections, but responses should clearly identify sections or criteria their proposed solution does not address.

As a guide, vendors are recommended to limit the Technical Response component to twenty (20) pages, not including the Company Information. Supplemental materials may be provided but, for the purposes of this RFI, less is more.

1. Per the Company information template, responses must agree to the statement that the vendor understands the requirements of the RFI and accepts the terms and conditions. An authorized officer must sign the original response. The original response, including all supplementary literature, must be forwarded to the point of contact identified above.
2. Do not include any confidential or proprietary information in the response. All responses, once delivered, become the property of WMATA.

Reservation of Rights

WMATA reserves all rights (which rights shall be exercisable by WMATA in its sole discretion) available to it under applicable law, including without limitation, the following, with or without cause and with or without notice: the right to cancel, withdraw, postpone or extend the RFI in whole or in part at any time, without incurring any obligations or liabilities; the right to issue a new RFI; the right to modify all dates set or projected in this RFI; the right to suspend and terminate this RFI, at any time; the right to issue addenda, supplements, and modifications to this RFI; the right to permit submittal of addenda and supplements to data previously provided with any response to this RFI.

WMATA – Request for Information (RFI)

(Technical Aspects)

Wayside Work Planning System

# Purpose

The purpose of this RFI is to conduct market research on a new total business solution to plan, schedule, finalize, and execute Metrorail wayside work and facilities work for the Washington Metropolitan Area Transit Authority (WMATA).

Respondents may respond to any and/or all of the sections of this RFI and meet any/all of the established criteria. Respondents should clearly identify sections or criteria their proposed solution does not address.

Technical Responses should include three sections:

1. Process: A centralized process to plan, schedule, finalize, and execute all work on the Metrorail right of way (ROW) and at WMATA facilities. The process should include a description and/or depiction of the full system from the initial identification of work required through execution.
2. Technology: The technological elements (software systems, applications, etc.) that support the process. Together, the process and technology should enable WMATA to plan, schedule, finalize, and execute work dynamically with a range of lead times, taking into consideration WMATA’s available resources.
3. Change Management Strategy: A high-level outline of how the respondent proposes implementing the process. This outline should include a timeline and describe the basic steps that a respondent will use to transition WMATA to the new system and support its use.

WMATA will rely on this system to complete critical work on the Metrorail ROW and at WMATA facilities. The new planning system will address urgent needs to execute looming large-scale capital projects and significantly improve WMATA’s Metrorail maintenance program.

WMATA seeks a system that will maintain or improve safety, reduce the number of required revenue service adjustments and shutdowns, mature the Authority’s planning environment, lengthen crews’ wrench times, schedule work farther in advance, reduce the impact of emergencies or unplanned work in disrupting other work events, and strengthen WMATA’s ability to measure and improve crew productivity. The planning system should also provide flexibility, enable communications, minimize staff time devoted to scheduling, minimize reliance on individual knowledge, manage congestion on the ROW, and ensure a smooth transfer of control.

# Background

WMATA is the transit provider for the National Capital Region, providing safe, clean, and reliable service to both residents and visitors. Our customers include more than a third of the federal government workforce and millions of tourists who visit the Nation’s Capital every year. Metro operates the second largest heavy rail transit system, sixth largest bus network, and fifth largest para-transit service in the United States.

## 2.1 WMATA ROW

This system must support the planning, scheduling, finalizing, and executing all work that requires ROW access to complete, including maintenance and capital work for all Metrorail fixed assets. The ROW is the land occupied by a railroad, the physical facilities, track, tunnels, surface and elevated structures through which Metrorail trains operate. These assets include, but are not limited to, 233 miles of revenue track; accompanying structures such as stations, vent shafts, and traction power substations; cabling along the ROW; communications equipment along the ROW; and Metrorail’s power infrastructure. The ROW includes 100 miles of tunnels, 19 miles of bridges, and 114 miles at grade, as well as pocket tracks, railyard leads, and railcar washes.

## 2.2 WMATA Facilities

The system must support the planning, scheduling, finalizing, and executing of work at WMATA facilities. These facilities include, but are not limited to, 91 Metrorail stations, 9 major rail yards, 9 bus garages, maintenance facilities, storage facilities, and office spaces.

## 2.3 WMATA Departments and Offices that Work on the ROW and on WMATA Facilities

The system must support all departments and offices that perform work and/or oversee contractors performing work on the Metrorail ROW and at WMATA facilities. WMATA executes approximately 10,000 work-crew events per year. The groups conducting this work include, but are not limited to:

| **Group** | **Description** | **Approx. Percent of ROW Work** |
| --- | --- | --- |
| Track and Structures | Responsible for comprehensive inspection, maintenance, and rehabilitation programs that enhance the condition of the tracks, guideways, and structures. | **31%** |
| Design and Construction | Responsible for delivering capital projects—including all capital projects impacting the ROW. | **22%** |
| Automated Train Control | Responsible for the maintenance, repair, replacement, and installation of Automated Train Control wayside equipment. | **17%** |
| Systems Maintenance | Responsible for low voltage electronic and electrical maintenance activities related to ROW operations and WMATA facilities, as well as communications system maintenance along the ROW. | **12%** |
| Traction Power | Responsible for operating and maintaining WMATA’s high voltage third-rail power distribution system. | **9%** |
| Plant Maintenance | Responsible for maintaining WMATA facilities and mechanical equipment systems—including rail stations, power sub-stations, and non-revenue facilities. | **5%** |
| Information Technology | Responsible for the design, installation, maintenance, and support of all voice and data communications used throughout the authority. | **4%** |

Both WMATA personnel and contractors conduct work on the ROW and on WMATA facilities. The vast majority of WMATA personnel who conduct this work are unionized. Their shift schedules are selected through the union pick. Shift schedules may vary by office, but for most WMATA personnel the midnight shift runs 10:00pm to 6:00am. The contractors who support work on the ROW have shift schedules arranged through their individual contracts, which vary.

## 2.4 Current Process

This RFI will use the generic phrase “planning system” to describe the full process, and supporting technologies, that develop and implement the work plan. A work plan is the document that describes what work is being conducted, by which team, at what time, and with which resources. There are four phases of a planning system:

| **Phase** | **Description** |
| --- | --- |
| Planning | Deciding what work needs to be accomplished and what resources are needed to support that work. |
| Scheduling | Aligning the work with resources available—including time. |
| Finalization | Incorporating previously unknown work and resources to set a final plan. |
| Execution | Implementing the plan and documenting what occurs. |

Proposed processes do not need to mimic the current process, but should seek to improve on it. WMATA seeks a new, centralized system that will enable the Authority to plan and schedule wayside work dynamically with a range of lead times, taking into consideration WMATA’s available resources.

WMATA’s current system for planning and scheduling wayside work is de-centralized.

### 2.4.1 Planning

During the planning phase, individual departments and offices decide what work needs to be completed on the ROW. Some of these offices use data-driven approaches to develop inspection, testing, and preventative maintenance schedules, others rely on individuals with years of experience to establish priorities and plans. Most offices use Maximo or Optram as their asset management platform.

During the planning phase, offices also gather the information required to submit the site specific work plan (SSWP), which describes work, schedule, location, and other key details of the task. WMATA requires an SSWP for work conducted by contractors. All SSWPs must be approved before track rights for the associated task can be approved.

### 2.4.2 Scheduling

In the scheduling phase, the departments come together through a common technology and a series of meetings. Individual departments and offices use the General Orders & Track Rights System (GOTRS) to request ROW access for a specific date/time and location on the ROW. Through GOTRS, offices include other key components of ROW work, such as power requirements. They also use GOTRS-SSWP, a sub-system of GOTRS, to manage the approval of SSWPs, when necessary.

Although WMATA schedules larger-scale projects and some preventative maintenance work farther in advance, most offices enter their ROW requests about two weeks before the work is scheduled to begin. GOTRS stores these requests and the list of requests becomes the default interim plan—with about 25,000 individual GOTRS requests each year, there are always numerous conflicts and overlaps. WMATA personnel manually de-conflict them through a series of regular meetings. These meetings require managers from the individual offices to come together and prioritize on a case-by-case basis. The meetings produce a second interim plan that does not have any conflicts for planned work.

The SSWPs submitted through GOTRS-SSWP follow their own approval process that traces the chain of command for the office requesting ROW access.

### 2.4.3 Finalization

During the finalization phase, the Track Access for Maintenance and Construction (TAMC) group screens any new work requests that arise. Often this requires ad-hoc conversations and meetings to decipher priorities between the existing schedule and unplanned work needs. However, day-of requests often disrupt the work plan—so finalization does not finish until the day the work is scheduled to begin. TAMC and/or ROCC staff must decide between the final work plan and day-of requests. For the past two months, WMATA has granted an average of 2-3 requests per night that were generated within 72 hours of work.

For tasks that require an SSWP, SAFE and TAMC must approve the SSWP before the requesting office can execute the work.

### 2.4.4 Execution

For the execution phase, individual offices and crews prepare for their work using their own systems and experience. For example, each rail yard decides the sequencing and staging of support equipment. As the work begins, the ROCC personnel use GOTRS to document what occurs by tracking key milestones throughout the night (e.g., crew check-in call, power down, etc.) for each unique work crew. Most crews use Maximo at the end of each shift to track crew work completed on a given night.

## 2.5 Current Technology

Proposed technology solutions can include WMATA’s current technologies, new technologies, or a combination. WMATA seeks technology that best supports the proposed centralized system that will enable the Authority to plan and schedule wayside work dynamically with a range of lead times, taking into consideration WMATA’s available resources.

### 2.5.1 Maximo

Maximo is WMATA’s materials and maintenance management system for rail, bus, and support services.

Individual offices use Maximo to develop job plans, which detail what work is required and the frequency at which it needs to be conducted. Maximo will then incorporate the job plan into preventative and corrective maintenance models and automatically generate work orders—descriptions of specific tasks that need to be conducted. However, individual work teams vary in how they plan for spares and labor requirements—some use Maximo and others work outside of Maximo in an ad hoc fashion. This results in work planning split between the maintenance planning team and the maintenance department that carries out the work.

When situations arise that differ from the planned frequency, maintenance schedulers manually alter the settings within Maximo to cater for the event. This process often relies on ad hoc emails and phone calls to coordinate maintenance activities.

### 2.5.2 Optram

The Department of Track and Structures, with support from the Chief of Maintenance Way and Engineering, is increasingly using Optram to manage track and structure assets. Optram is a railways maintenance decision support system integrated with Maximo and many other data sources. Optram maintains an asset registry along with ongoing and historical asset condition history. Additionally, Optram can use analysis and forecasting functions to help WMATA automatically identify problem areas, anticipate failures, and prioritize work. All of this information is graphically displayed to facilitate root cause analysis and work planning.

### 2.5.3 Primavera

WMATA uses Primavera, P6, to assist with planning and scheduling shutdowns, rail service adjustments (RSAs), and preventative maintenance programs. An RSA is an event in which WMATA ends revenue service early or begins revenue service late to provide more work time. WMATA treats shutdowns and RSAs differently than other track work because they disrupt transportation service.

Shutdowns and RSAs: Individual offices submit requests for shutdowns or RSAs to the Chief of Maintenance Way and Engineering (MOWE) planning department. MOWE uses P6 to aid in determining the next available time period on each line for work groups to perform their requested tasks. MOWE schedulers then meet with managers to resolve conflicts between shutdown and RSA requests. Additionally, P6 helps monitor and update these events and communicate the plan for these events to the individual offices.

Preventative maintenance: The MOWE planning department also uses P6 to plan and schedule preventative maintenance for six major programs. Each month, MOWE uses information from Maximo to update the schedule and report the status of the current plan.

WMATA does not currently use P6 for night-by-night maintenance on the ROW.

### 2.5.4 GOTRS

For the scheduling phase, individual departments and offices use the General Orders & Track Rights System (GOTRS) to request ROW access and other key components of ROW and/or facilities work, such as power outage. GOTRS is available 24/7 through WMATA’s intranet using standard Internet browsers. GOTRS stores these requests and routes them through an approval process. WMATA personnel hold a series of regular meetings to manually resolve conflicts, then make corresponding updates in GOTRS. See ***Figure 1*** for a series of GOTRS screenshots that provide context on this process.

**Figure 1: GOTRS screens used in the current wayside work planning and scheduling process.**

|  |  |  |  |
| --- | --- | --- | --- |
|  | |  | |
| *A GOTRS request for ROW access.* | | *A GOTRS visual of the ROW.* |

When executing the work, GOTRS supports ROCC controllers to document a crew’s progress through designated milestones while completing work on the ROW. For example, the ROCC uses GOTRS to document when individual crews check in to claim their track rights. ROCC staff use GOTRS milestones as a guide for completing the common stages of work—but ROCC personnel manage many tasks outside of the GOTRS system, such as plans for crew lineup, work site sequencing, and movement patterns.

GOTRS is a custom-code enterprise application. Originally built on Microsoft Silverlight, WMATA is currently re-writing GOTRS in AngularJS, with a delivery date of mid-2019. GOTRS processes approximately 24,000 ROW requests per year by more than 300 users across several WMATA departments and offices. GOTRS does not directly interface with other WMATA software systems, such as WMATA’s enterprise asset management software, Maximo, nor WMATA’s enterprise human resource management software, PeopleSoft. Although GOTRS does not directly interface with the Rockwell Collins developed ARINC Advanced Information Management (AIM®) platform for rail operations, the GOTRS process aligns and coordinates with existing AIM capabilities.

### 2.5.5 United Technologies’s developed ARINC Advanced Information Management (AIM®)

The ROCC uses AIM to monitor and manage the rail system, including managing wayside work during the execution phase. AIM displays rail system information to an ROCC controller in real-time, allowing the controller to regulate traffic flow, control movement, and govern communications. The ROCC can implement control strategies by pre-programming strategies that AIM will implement automatically in concert with the central control mainframe, or the ROCC can manually select and implement strategies. To implement manual control strategies, controllers can issue train to wayside communication commands, modify wayside signals and/or switches, or direct voice communication (radio calls) with train operators.

Three AIM consoles, subdivided into geographical areas by Metro-line color, are designated in the ROCC to monitor and control of train movements. Additional consoles allow ROCC personnel to manage other functional areas, including Maintenance Operation Control and Customer Operations.

### 2.5.6 Supporting Technologies and Information

WMATA’s IT infrastructure is based on the following technologies and assumptions. Modifying this suite may increase costs or operating risk.

* Virtualized server technologies using VMS;
* Enterprise operating systems are Oracle Linux (First preference) and Microsoft Windows;
* Exadata appliances are available for large scale databases;
* Preferred database platforms are Oracle or MS SQL;
* The Rail Control System (currently AIM), Maintenance and Materials Management System (currently Maximo), and schedule control system (currently GOTRS) must be in a high availability architecture with recovery times not to exceed four minutes.
* The scheduling and analysis systems (e.g., Optram) must be in a disaster recovery architecture that allows for recovery in not more than eight hours.
* WMATA uses IBM Jazz and the Atlassian suite (JIRA, Confluence, Bamboo, SVN, FishEye, Crucible, and Test Rail) for requirements and testing management, and as code vault and code promotion tool. The solution must permit continued use of these tools. Tool selection will be the decision of WMATA, but vendors may present reasoning for using one or the other of these tool sets.

## 2.6 Existing Norms for ROW and Facilities Work

The following norms provide detail on how the new planning and scheduling system can best fit within WMATA’s working environment and improve our current processes.

### 2.6.1 Safety

Safety is WMATA’s top priority. All work conducted on the ROW must comply with the Metrorail Safety Rules and Procedures Handbook and the Railroad Worker Protection guidelines.

### 2.6.2 Timing

The overwhelming majority of work on the ROW and at WMATA facilities is conducted overnight, during Metrorail’s non-revenue service hours. However, large-scale projects may include RSAs, in which WMATA ends revenue service early or begins revenue service late to provide more work time, or single-tracking/shutdown events, in which WMATA closes one or both tracks in an area to provide extended work periods. Additionally, WMATA conducts some minor work and emergency-related work during revenue service. The current revenue-service hours are as follows:

* + - Monday-Thursday 5:00am – 11:30pm
    - Friday 5:00am – 1:00am
    - Saturday 7:00am – 1:00am
    - Sunday 8:00am – 11:00pm

WMATA seeks to reduce the number of required RSAs and shutdowns. Although this may not be possible for the foreseeable future, due to the large amount of capital work on the horizon, a stronger planning and scheduling process can also help capture as much useful work time as possible during non-revenue hours.

### 2.6.3 Maturity of the Planning Environment

WMATA’s current planning environment favors flexibility over standardization. It allows individual offices to use their own methods to plan, schedule, finalize, and execute work to a significant extent. As an organization, WMATA has a strong cultural tie to this flexibility and has often resisted various efforts to standardize processes in the past.

Critically, WMATA does not have a standard definition of work or a list of all defined tasks completed on the ROW or at WMATA facilities. Most departments have internal lists of their tasks at various stages of completeness. Departments vary in how they use their lists to define or reference tasks while planning, scheduling, finalizing, and executing their work.

Transitioning to a dynamic, intelligent planning system would likely require a significant cultural change as well as developing supporting materials, such as a list of defined tasks. WMATA seeks to make the necessary changes to mature the Authority’s planning environment.

### 2.6.4 Wrench Time

WMATA personnel must collectively accomplish several tasks before a crew can begin work on the ROW—such as clearing the ROW of revenue trains, moving the crew and its equipment into location, de-energizing the third rail, and conducting safety checks. These tasks can take a significant portion of the non-revenue service window and reduce the amount of time a crew can actually accomplish work (what we call “wrench time” in this document).

WMATA seeks to lengthen crews’ wrench times during overnight work windows. WMATA has several ongoing initiatives addressing this challenge, but a stronger planning and scheduling process can help ensure a smooth and standardized approach to work crew setup. For example, due to the linear nature of the ROW, the sequencing and ordering of crews and materials are critical to ensuring an efficient setup process. A system that can establish that sequence would provide a significant advantage.

### 2.6.5 Timeline for Work Planning

ROW and WMATA facility access needs include both planned work, such as preventative maintenance and capital programs, as well as unplanned work, such as corrective maintenance and re-scheduling work that did not occur as planned (e.g., weather delay). The new system must include options for both types of planning. This means the system should accommodate scheduling work with longer-lead times (planned work) and shorter lead times (unplanned work)—including same-day requests to fix emergency conditions on the ROW or at WMATA facilities.

The current system requires manual de-confliction for all work. Nearly half of all work on the ROW is scheduled less than two weeks before the work is set to occur. This requires significant manpower to manually de-conflict a large number of work events in a short period of time.

|  |  |
| --- | --- |
| **When Work is Added to the Schedule** | **Percentage of Work** |
| More than two weeks | **55%** |
| Two days – two weeks | **20%** |
| Less than two days | **25%** |

WMATA seeks to strengthen its planning capability and reduce the amount of work planned/scheduled shortly before the work is set to occur. WMATA also seeks a planning and scheduling system in which unplanned work has a smaller impact on planned work.

### 2.6.6 Efficiency

In WMATA’s environment of fiscal austerity, the Authority is seeking productivity gains and improvements wherever possible. The current system has limited capability to track spending and productivity of crews working on the ROW. WMATA seeks to strengthen this ability to measure and improve crew productivity.

## 2.7 Industry Challenges and Trade-Offs

Across the industry, several challenges force transit providers to make difficult trade-offs when planning, scheduling, finalizing, and executing work across the system. The new system should seek to address these challenges:

### 2.7.1 Rigid Planning Framework

Most planning systems are rigid, meaning that the system does not automatically or easily update to include new information. However, most railroads have unplanned work needs that arise on short notice (e.g., day of). Thus, when new needs arise personnel must often manually update the plan. This rigid framework leads to a number of challenges, such as:

1. Unplanned work often disrupts planned work. For example, if Office A finds a critical repair is needed on the ROW, they will seek to make the repair that day. If Office B was already planning to conduct preventative maintenance work on the same section of the ROW the same evening, Office B will be “bumped” from the spot. Office B must then work swiftly to find another section of the ROW where they can perform work that evening. Sometimes Office B is unable to find another available section and thus cannot conduct work on the ROW that evening. “Bumps” also contribute to offices missing their preventative maintenance goals.

The ideal system will minimize the number of “bumps” and/or make each “bump” less disruptive.

1. Offices make multiple “contingency plans” that cause noise in the planning process. In an effort to protect against weather delays or getting “bumped,” several offices will reserve multiple sections of the ROW for a single crew in a single night and/or request the same section of the ROW for multiple nights to conduct a one-night job. These “contingency plans” give the office a backup option, but they can also block another office from using that section of the ROW to conduct necessary maintenance, leading to noise in the planning process.

The ideal system will eliminate the need to create night-specific contingency plans and/or create a method to distinguish between them, so the scheduling and finalizing phases can appropriately prioritize.

### 2.7.2 Communications

From planning to execution, ensuring the right people have the right information at the right time is critical to a smooth and efficient system. The sheer size and scope of personnel involved make communication a constant challenge that is often managed in an ad-hoc fashion, requiring significant staff time. Additionally, when key personnel are not informed of decisions or changes, it can lead to additional unplanned work needs.

The ideal system will have a central location where all key stakeholders can easily look up the information most relevant to them.

### 2.7.3 Staff Time Required

Many systems require significant staff time to manually support the planning, scheduling, and finalizing phases. This requires dozens, perhaps hundreds, of individual ad hoc reports, emails, phone calls, and meetings that absorb significant staff time.

The ideal system will automate or otherwise reduce the staff time required for the planning, scheduling, and finalizing phases. The system will routinize these processes so they reduce the burden on staff.

### 2.7.4 Reliant on Individual Knowledge

Many planning systems require individual users to have detailed knowledge and rely on personal communications to plan, schedule, finalize, and execute work. For example, many systems have specific challenges in accessing certain work sites. If these challenges are not systematically stored and/or distributed to all relevant people, the challenges can only be addressed in an ad-hoc fashion. This leaves transit agencies at risk of losing important knowledge when personnel leave. Additionally, when critical knowledge is not accessible and systematically incorporated into the system (but is instead incorporated ad hoc by individuals), transit authorities cannot reliably use that information to improve their work planning.

The ideal system will include storing and methodically incorporating key knowledge that can support an efficient planning system.

### **2.7.5** Congestion Management

The more unique work locations on the ROW each night, the more difficult they are to manage. This is especially true when many work locations are concentrated on a single line (or a single “ops”) or based out of a single rail yard. Maximizing the number of crews in a specific, available work location, is key to providing as much ROW access as possible.

There are two approaches to managing congestion, the first is limiting the number of crews working on a specific night and the second is finding opportunities for two or more crews to work together in the same location. The second option is preferable because it does not reduce the total work conducted on the ROW, but it does manage the number of unique work locations. However, not all crews can work with one another in the same location due to competing needs (e.g., power testing cannot be conducted with another crew that requires power off).

The ideal system will reduce the number of unique work locations.

### 2.7.6 Transfer of Control

Maintaining positive control of the entire ROW at all times is critical for safety. Most of the time, the ROCC maintains control of the ROW, but the local crew takes control of a section of the ROW while conducting work. Transferring control from the ROCC to the local crew requires a simple, clear, and extremely reliable process.

The ideal system will responsibly manage the transfer of control for work on the ROW.

# Scope of Work

The following sections describe the considerations that WMATA seeks for a new system to plan, schedule, finalize, and execute Metrorail wayside work and work at WMATA facilities. They are presented as high-level business needs or statements for soliciting information.

Responses should address any or all components of the scope of work through three sections: process, technology, and change management.

## Process

* If respondents choose to not respond to this section, please indicate “no process response”.
* Recommended length: 5-15 pages.

The proposed process should clearly explain how WMATA will plan, schedule, finalize, and execute wayside work. The process will walk through the primary stakeholders and key actions from the early planning stage through execution. It will include an approximate timeline. The process will describe both the human components (e.g., WMATA departments and offices, consultants, specialists, etc.) and the technological components (e.g., application, software systems, etc.).

Proposed processes can include existing WMATA teams and WMATA-owned technologies and/or proposed processes can introduce new teams and technologies.

The fundamental challenge of planning, scheduling, finalizing, and executing wayside work is pairing the demand from departments and offices seeking to conduct work on the ROW and at WMATA facilities with the limited supply of WMATA’s resources. Key components of the system include:

### 3.1.1 Demand for Work

Every department and office that conducts work on the ROW or at WMATA facilities is responsible for either maintaining critical resources or completing an important project. To accomplish these feats, the offices all have a certain demand for ROW and/or facility access. For example, an Office may be responsible for maintaining a series of widgets along the ROW that require testing each widget twice per year and scheduling corrective maintenance for any identified deficiencies. Many maintenance and/or project requirements are known, but several are not yet established.

### 3.1.2 Supply of Resources

The most critical resources are time and ROW access. Both of these resources are static in that they are known and fixed (revenue service hours are unlikely to change in the near future). Additional static resources include crew schedules (how many personnel are available on each night, what capabilities those staff have) and Revenue service hours (how much time is available each night. Static resources also have unchanging characteristics that must be taken into account, such as:

* Particulars of the ROW (such as the locations of interlockings, pocket tracks, vent shafts, no clearance zones, etc.);
* Particulars of the ROW’s power systems (such as how sections of track are powered, gap locations, and the relation of traction power sub-stations to specific locations on the ROW); and
* Particulars of WMATA facilities (such as location of key areas (vent shafts, power information, etc.).

In additional to these static resources, there are dynamic resources that often change. The more resources a system can include in the planning process, the fewer that need to be managed ad-hoc. These resources include:

* Escorts (WMATA personnel who accompany contractors while on the ROW);
* Vehicles (prime movers and other diesel-powered, track-traveling vehicles that carry equipment, materials, and personnel to the work locations);
* Equipment and materials (used to conduct track work);

Dynamic resources also have unchanging characteristics that must be taken into account, such as utility provider availability and weather.

### 3.1.3 Process Scope

|  |  |
| --- | --- |
| 1 | The process solution should include a description of the full planning system from the planning stage through execution. It should explain how any proposed personnel, application(s), or software program(s) fit into and support the system. |
| 2 | The process shall include a proposed timeline or cycle for the four phases: planning, scheduling, finalizing, and executing work. |
| 3 | The process shall be used for all ROW work and work at WMATA facilities. |
| 4 | The process shall be used for pairing ROW and facility access needs with WMATA resources. The system must be capable of pairing access needs to static resources, such as time slots and fixed locations on the ROW or facilities. The ideal process will also incorporate dynamic resources, such as personnel and equipment. |
| 5 | The process shall support execution of work on the ROW by guiding key actors (e.g., work crews and the ROCC) through major milestones the night the work is completed. |
| 6 | The process shall maintain or improve WMATA safety in conducting work on the ROW and in WMATA facilities. |
| 7 | The process shall make it possible to eventually reduce the number of revenue-service adjustments and shutdowns that WMATA requires to accomplish the necessary work on the ROW and at WMATA facilities. |
| 8 | The process shall take into account the transitional steps to reach a centralized, intelligent planning system from WMATA’s current planning environment. Where possible, the process should reduce the need to broad-scale cultural change and/or present ideas to support WMATA through organizational change. |
| 9 | The process shall help to maintain or lengthen wrench time. |
| 10 | The process shall maintain or strengthen WMATA’s planning capability and reduce the amount of unplanned work. Ideally the process will support WMATA planning the majority of work several months in advance. |
| 11 | The process shall maintain or strengthen WMATA’s ability to measure and improve crew productivity working on the ROW and at WMATA facilities. |
| 12 | The process shall be capable of planning and scheduling both planned and unplanned work. The ideal process will dynamically adjust plans/schedules to accommodate unplanned work with minimal disruption to planned work. For example if one office is “bumped”, the process should automatically or easily re-schedule the bumped work crew for the night in question to another location and re-schedule the planned work in that location for the next available window. |
| 13 | The process shall be capable of distinguishing ROW and facility access needs of varying priorities and maintain, reduce, or eliminate the need for contingency planning. |
| 14 | The process will maintain or reduce the amount of staff time required for the planning, scheduling, and finalizing phases of work planning. |
| 15 | The process will decrease reliance on individual knowledge by centralizing storage of critical information and methodically incorporating the information into the planning system. |
| 16 | The process shall manage congestion on the railroad and in rail yards to promote efficiency. |
| 17 | The process shall maintain or enhance the clarity around transferring control between ROCC and work crews. |
| 18 | The ideal process shall be capable of learning about prior plans and previous outcomes to continually improve the scheduling capabilities. |
| 19 | The process shall have a method for recording and storing all data in an accessible database so it can be queried and used for evaluation and other purposes. |
| 20 | The ideal process shall be capable of supporting new functionalities in the future (flexibility). |

## Technology

* If respondents choose to not respond to this section, please indicate “no technology response”.
* Recommended length: 5-15 pages.

The technology supporting the proposed process. The technology solution can include WMATA’s current technologies, new technologies, or a combination. Together, the process and technology should create a total business solution that enables WMATA to plan, schedule, and execute work dynamically with a range of lead times, taking into consideration WMATA’s available resources. The technology should also support work execution by guiding personnel through a series of key milestones. The technology should be accessible and secure.

Proposed processes do not need to incorporate existing technologies, although they can. Respondents do not need to describe any existing technologies incorporated into the proposed process in detail unless they propose using the technology for a different or enhanced purpose and/or the technology requires additional plug-ins, version changes, or other add-ons.

### 3.2.1 Technology Scope

|  |  |
| --- | --- |
| 1 | The technology shall be available 24/7 to all relevant WMATA employees. See section 2.5.6 for expected recovery time from failures. |
| 2 | The response to this RFI shall explain how individuals will access the technology, including any required hardware, software, and connectivity. |
| 3 | If existing WMATA technologies are preserved, new technologies should integrate with them for key functions. |
| 4 | Technology components shall have three separate environments designated as Development, Test, QA/Training, and Production. |
| 5 | All requirements, testing activities, code, and code promotion activities will be carried out using either IBM Jazz or the Atlassian suite, unless WMATA chooses to migrate to a different too. |
| 6 | Any technical components of the system shall generate statistical data for reporting to management for the purpose of evaluating usage, efficiency, and other key indicators. |
| 7 | The response to this RFI shall describe the procedure for installing new software releases for the technology into a production environment. |
| 8 | The response to this RFI shall explain if the technology is a hosted solution, an on-site system, or a hybrid. Describe the technology’s architecture.  If on-site resources are necessary, identify the hardware and software requirements for implementing the technology. Include architectural diagrams which describe graphically (logically and physical) hardware system and software layers and architecture. Bear in mind the supporting technologies described in 2.5.6. |
| 9 | The response to this RFI shall include if any proposed technology is proprietary or an open system. If it is proprietary, what is the process for requesting enhancements or the ability to customize a requirement? How does this impact future upgrades and what are the skill-sets required by in-house staff if the customizations are done onsite? |
| 10 | The response to this RFI shall include an indication of which technical components are out of the box solutions, which are custom code, and which are a combination. For any combination, provide details on which functionalities are built-in and which are not. |
| 11 | The response to this RFI shall explain the approach and procedures for backup and disaster recovery. See section 2.5.6 for high availability and disaster recovery time frames. |
| 12 | The response to this RFI shall provide the technical skillsets that are required for administering this system and any associated plans. |
| 13 | The response to this RFI may include screen shots and/or high-level diagrams of these processes. |
| 14 | The technology shall provide appropriate security. The response to the RFI shall provide the security features available. |
| 15 | The RFI shall describe how the data is to be protected either at rest or while in transmission. WMATA considers all of this data to be confidential. Encryption, role based access, and other tools to be applied should be completely discussed. |
| 16 | The response to the RFI shall describe how administrative access is controlled. |
| 17 | The response to the RFI shall describe how database passwords are set up, maintained and changed. The response should clearly specify when these processes vary from standard Oracle processes. |

## Change Management Strategy

* If respondents choose to not respond to this section, please indicate “no change management response”.
* Recommended length: 1 page.

Organizational change is difficult. The Change Management solution should outline a high-level plan of support to move WMATA to the new system. This should only provide the basic recommended steps—respondents do not need to include intricate details.

### 3.3.1 Change Management Scope

|  |  |
| --- | --- |
| 1 | The response to this RFI shall provide an outline of your proposed system’s implementation plan, including timeline. |
| 2 | The response to this RFI shall include an indication of how the knowledge transfer of information about WMATA’s ROW, facilities, and fixed resources would proceed, as well as how that information would be stored and used. |
| 3 | The response to this RFI shall include proposed training resources to support WMATA staff through the transition to the new system and continual use of the new system. |
| 4 | The response to this RFI shall include information on how the change management plan will include key personnel, including: night-shift personnel, personnel who do not regularly use email to communicate, and personnel who work at distributed facilities throughout the Metro Transit Zone. |
| 5 | The response to this RFI shall include if the vendor will demo or pilot the system to determine its fitness for WMATA? If so, what resources are needed from WMATA? |
| 6 | The response to this RFI shall include what support is available for vendor after system has been implemented? |

# APPENDIX A: Template for Company Information

Please use the template to provide information about your company:

|  |  |  |
| --- | --- | --- |
| **Company Information** | | |
| **1** | Company name |  |
| **2** | Company address |  |
| **3** | Company website |  |
| **4** | Main products and services |  |
| **5** | Description of established capabilities comparable to requested in this RFI |  |
| **6** | POC for this RFI (Name) |  |
| Title |  |
| Email |  |
| Phone |  |
| Address |  |
| **7** | Relevant current customers |  |

|  |  |  |
| --- | --- | --- |
| **References (Current or former customers)** | | |
| **Reference 1** | POC (Name, Email, Phone) |  |
| Company/Agency |  |
| Description of products & services provided |  |
| **Reference 2** | POC (Name, Email, Phone) |  |
| Company/Agency |  |
| Description of products & services provided |  |
| **Reference 3** | POC (Name, Email, Phone) |  |
| Company/Agency |  |
| Description of products & services provided |  |

|  |  |
| --- | --- |
| **Terms and Conditions** | |
| 🞏 Yes  🞏 No | [Name of company] understands the requirements of the RFI and accepts the terms and conditions under which the RFI was issued to the vendor |