Virginia Department of Transportation

Northern Region Operations (NRO)

FY–09 Year End Report

October 2009

Introduction and Overview

Virginia Department of Transportation (VDOT) Northern Region Operations (NRO) Year-End Report for the fiscal year ending June 30, 2009 (FY-09) summarizes the goals, objectives, successes and challenges for FY-09 and evaluates how well performance targets were attained during the course of FY-09.

Financial and Staffing Impacts

The event that most significantly impacted NRO during FY-09 was the downturn in the economy, and the subsequent reduction in tax revenue for VDOT. This economic downturn and concomitant reduction in tax revenues is expected to remain a challenge for VDOT and the Commonwealth of Virginia in the fiscal years to come.

In FY-09, NRO identified the need for about $163.7 million to manage its roadway operations system. The Region received a total allocation of $88.3 million in state and federal resources (604 and 603 funds) at the beginning of the fiscal year, and later lost several million dollars due to budget cuts. VDOT's Six Year Improvement Program's funding reduction was in the range of $1.9 to $2.4 billion over the six years of the program, and the funding reduction had a hefty impact on NRO's ability to construct meaningful capital improvement projects. ITS device upgrades and deployments had to be scaled back or canceled; thereby, reducing planned improvements to operational efficiency. The lack of funding for the installation of new traffic regulatory devices, signs and signal installations presented major safety implications. NRO put much of its hope on the American Recovery and Reinvestment Act (ARRA) of 2009 to provide funding for the much needed capital improvement projects such as upgrading ITS devices that are beyond their life spans, expanding ITS coverage to all interstate highways in the Northern Region, installing pavement marking, and implementing multiple small traffic improvement projects. Although Virginia received $694.5 million ARRA funds for highway program improvements, NRO's projects did not make it onto the statewide list of priorities.

VDOT Commissioner, David S. Ekern, said that "Budget shortfalls have significantly reduced the commonwealth's transportation budget, causing VDOT to focus state dollars on maintenance, operations and emergency response efforts." As might be expected, this budget crisis put a damper on Northern Region's operations program. In the fall of 2008, NRO experienced a $4 million cut in the state operating budget, which directly impacted NRO's ability to provide services such as safety service patrols, traffic engineering studies, signal modifications, traffic signal loop installations and rebuilds, pavement marking and highway lighting maintenance, and consultant services to provide technical support, etc.

In February, 2009, the Commissioner stated that VDOT was seeking to reduce its overall staffing levels by 1,000 fulltime employees and 450 wage, temporary and hourly staff over the next 18 months. On April 28th, Commissioner Ekern announced the layoff of 230 hourly employees. Subsequently, half of NRO's hourly employees were not authorized to work beyond 6/6/09. VDOT has been using hourly employees to fill the staffing gap, and in most cases, on a long-term basis. These hourly employees functioned similarly to classified employees and this staffing reduction resulted in another unexpected downturn in NRO's program.

Presidential Inauguration

On January 20th, 2009, Barack Hussein Obama was sworn in as the 44th president of the United States. The Inauguration drew much higher attention than those in previous years. The Presidential Inauguration event spanned five days from January 17th to 21st with the most significant traffic impact occurring on the 20th for the swearing-in ceremony. It was estimated that 1.8 million people were present on the National Mall for the swearing-in ceremony, which was the largest event in the history of the nation's capital.

Highways, arterials, public transit, and airports saw record traffic. To keep such traffic (vehicles and people) moving in a capacity-restricted infrastructure required significant advanced planning and coordination among all of the transportation agencies within a 600-mile radius of Washington, D.C. VDOT partnered with the Virginia State Police and Virginia's Department of Rail and Public Transportation in responding to this historical event, including developing detailed press releases of the many road and bridge restrictions in Northern Virginia during the Inaugural period.

On Inauguration Day, most bridges and major offices were closed, leaving the District devoid of its typical commuter traffic. To augment patrols and expedite emergency response along Interstates 95, 66 and 495, the Virginia State Police brought in several hundred troopers from around the state to the Northern Virginia region. NRO's Safety Service Patrol and many office staff were on the road to assist stranded motorists. There were minimal traffic problems and volume was well below expectations due to the advance warnings and high use of public transportation. This success did not come without meeting challenges; especially, the communication of road closure decisions made at the last minute. This experience clearly demonstrated the need for, and value of, proactive planning and cooperation across jurisdictions and agencies. It was also apparent that NRO lacked both sufficient real-time data and Safety Service Patrol personnel to support the event. Therefore, inexperienced office personnel were pressed into service for the patrolling activities.

Recognition

VDOT NRO submitted a number of projects for awards consideration during FY-09. Northern Region Operations Planning and Programming (NROPP) submitted the Planning and Program Delivery (PPD) business process to ITS America, under the Best Innovative Business Practice Category. It also submitted the ITS Decision Support Tool to ITE for a planning award consideration.

VDOT's Central Office also submitted projects and programs for awards consideration during FY-09. The Northern Region's Advanced Transportation Management System (ATMS) Deployment was one of the Central Office's five submittals to ITS America. Although none of NRO's nominations received an award, they represent some of the successes that NRO experienced, and they still deserve acknowledgement.

FY-09 Strategic Process and Project Highlights

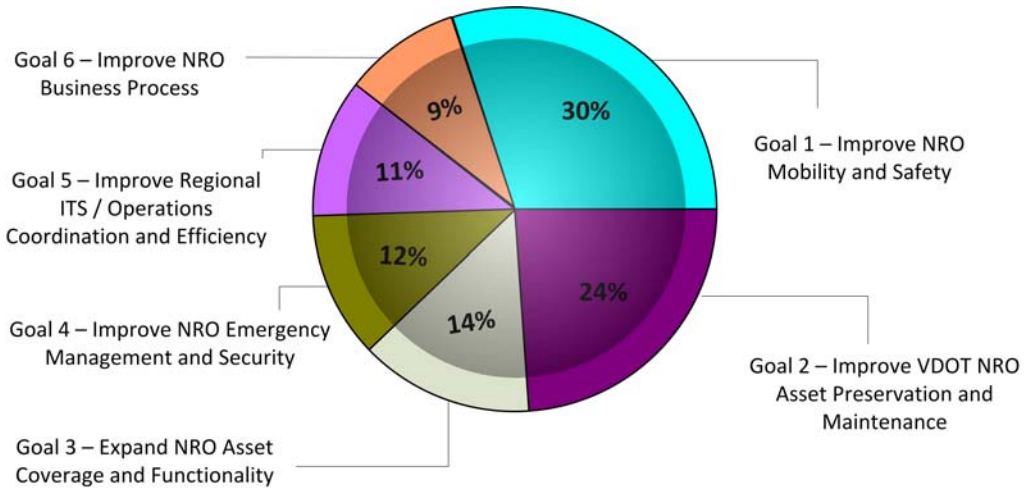
The Process

The VDOT NRO Planning and Program Delivery (PPD) Process consists of 5 cyclical steps: Planning, Program Development, Fiscal Programming, Program Delivery, and Program Evaluation. FY-09 began with the annual Program Development and concluded with the Program Evaluation, which this year-end report serves to document.

Although preparations started months earlier, the FY-09 PPD process was formally initiated on October 24, 2007 with NRO's first-ever strategic Planning Workshop. The Workshop brought together key NRO personnel to build consensus and understanding of the Strategic Focus that NRO was to pursue in FY-09. In addition to the consensus building, NRO identified the projects and initiatives that should be pursued, contingent upon funding receipt, to support that focus.

The process continued November 27 with the Core Workshop, where managers identified and quantified core funding needs. Core funding needs include labor and overhead, projects required by state or federal mandate, ongoing projects or contracts, and executive management priorities.

The FY-09 Prioritization Workshop took place on January 10, 2008 and allowed NRO leaders to join together in a candid way and collaboratively prioritize the unfunded projects that best support the Region's strategic focus. To the extent possible, projects were funded based on the prioritization results. During the Prioritization Workshop, NRO managers analyzed and prioritized projects according to their projected impact on the Region's strategic focus. A Project Prioritization Model (PPM) was developed and used to reduce subjectivity and facilitate fiscally responsible and objective funding decisions. One can refer to the FY-09 NRO Strategic Investment Program Plan (SIPP) for details on the prioritization model. NRO managers determined the importance of six strategic goals and the outcome is as follows:

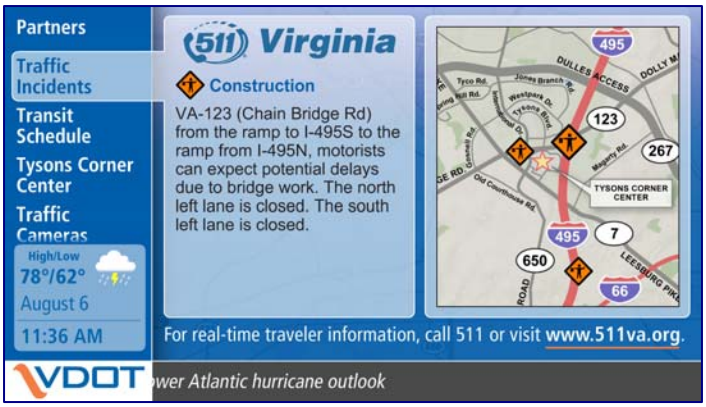


Project Highlights

Goal #1 – Improve NRO Mobility and Safety

The following strategies were implemented or attempted in FY-09 to improve roadway operation, reduce incidents, decrease incident clearance time, reduce work zone crashes, increase the availability of traveler information, reduce accidents, and improve transit service.

- Mitigate Tysons Corner Traffic Impact: *NRO planners continuously worked on providing customized traveler information to serve the Tysons Corner community to mitigate the upcoming impact of two major construction projects: I-495 HOT Lanes and Dulles Rail. At an Executive Business Briefing in March 2009, NRO promoted 511 traveler information services and a proposed Traveler information Display at the Tysons Corner shopping mall. NRO's planners partnered with the Mega Project office, Public Affairs, Central Office, and other agencies such as Fairfax County, TYTRAN, Tysons Corner Mall, DRPT, Dulles Transit Partners to complete the design and prototype display at Tysons Corner shopping mall. In the spring of 2009, at Gallows Road, Route 123, and on I-495; NRO's planner and the Mega Project staff installed three portable cameras to monitor traffic conditions, verify incidents, and monitor construction activities. NRO also worked to obtain approval for the procurement of portable cameras and changeable message signs to be used, respectively, in monitoring conditions and sharing information with commuters traveling to and within Tysons Corner.*



- Provide Enhanced Traveler Information: *Northern Virginia received an ITS earmark in FY-03 for the purpose of providing enhanced travel information. Subsequently, a proposal for deploying DMS Travel Time was submitted. Since that submission, VDOT has gone through several research iterations, seeking the best way to deliver the most accurate travel time information. In FY-08, NRO completed a comprehensive feasibility review of the DMS Travel Time program and proceeded to develop a pilot project plan for deployment in FY-09. This was the right time to provide this service since the data was available to VDOT for free and the ATMS software was newly developed to accommodate a non-manual operation. The detailed deployment plan included using travel time data from Inrix to automatically post travel time information onto pre-selected DMS signs, when no higher-priority messages were queued ahead of the travel time information. This plan was a product of close coordination with Central Office, University of Virginia, RITIS developer, NRO's ATMS developer, NRO operations staff, and Inrix. Unfortunately, this effort was not supported by VDOT's management.*

- Optimize Traffic Signal Timing: *NRO has an ongoing effort to optimize traffic signal timing plans on a two-year cycle. In FY-09, NRO implemented new timings for 777 signals in 13 traffic signal networks. Benefits of the signal timing optimization efforts include reductions in the number of stops at traffic signals, reduced delay, and reduced fuel consumption for an estimated savings of $71 M per year.*

- Improve Safety at Bike-Ped Trail / Highway Intersections: *NRO is constantly looking for new ways to increase drivers' awareness of pedestrians and bicyclists. In April, 2009, NRO partnered with the Virginia Transportation Research Council (VTRC) to begin testing "zigzag" pavement markings in Loudoun County where the Washington and Old Dominion Trail has crossings of Sterling Boulevard and Belmont Ridge Road. Zigzag markings are thought to be a method of improving bike-ped safety that is worthy of receiving further consideration. Data will be gathered to evaluate the effectiveness for future deployments.*

- Tysons Corner CCTV Camera System: *In October 2008, Systems Engineering (SE) commissioned an audit of the Tysons Corner CCTV Camera System. The primary focus of the audit was to evaluate the wireless communications network and to develop recommendations for restoring the functionality and increasing the reliability of the wireless network. In June 2009, a project was launched to implement the findings of the audit.*

- Leased Line/Cellular Tower CCTV Camera Locations: *In July 2008, SE began to research migration of the 10 CCTV cameras that are located on cellular towers from leased T-1 lines to the IP network. In October 2008, SE determined that Cox Communications could offer service to the camera locations, and that monthly outlays for service at each location would be nearly two-thirds of existing costs (approximately $290 per location vs. an average of $508.00 per location). In addition, entering into a working relationship with Cox would create the possibility of installing CCTV cameras at other locations within Fairfax County because the Cox cable network is widely available and accessible in the County. In May 2009, Sole Source Procurement Authorization to use Cox Communications for this service was granted. Equipment installation activities began in early FY-10.*

Goal #2 – Improve NRO Asset Preservation and Maintenance

The following strategies were implemented to increase availability of critical NRO field and operations center assets, and ensure that NRO repairs and replaces top priority overhead sign structures and high mast poles.

- Infrastructure Maintenance Management System (IMMS): *NRO developed and implemented the IMMS software to improve the effectiveness of asset tracking and management.*

- DMS Refurbishment: *NRO made a major strategy modification regarding DMS signs. With very limited resources available, NRO, in an effort to do more with less, re-allocated a portion of the funds intended for the purchase of new DMS sign funds to the refurbishment of thirty-some existing DMS signs. Refurbishing the old signs will hopefully extend their life spans for many years to come. The old DMS signs have been very ineffective in communicating messages to drivers, not to mention the high maintenance costs associated with older signs.*

- Preventative Maintenance for ITS Devices: *It has been NRO's desire to be more proactive in the ITS device maintenance program in addition to the reactive repair program. NRO was able to receive federal funds and award a contract in FY-09 and is looking forward to the implementation in FY-10.*

- Overhead Sign Structure and High Mast Poles: *VDOT NoVA's Structure and Bridge team conducted an assessment of overhead sign structures and high mast poles that had been constructed with rusticated steel, prioritized the list of "unsafe" structures, and advanced the list in May 2008 to NRO, so that NRO could begin the replacement process. During FY-09, NRO completed the scope and construction plans, and submitted the plans for approval. An environmental review certified the proposed replacements as a programmatic categorical exclusion. It is anticipated that replacement of the unsafe structures will begin in FY-10.*

Goal #3 – Expand NRO Asset Coverage and Functionality

Planning to increase NRO's ITS asset coverage on interstates and arterials was completed in FY-09:

- DMS Upgrade Phase I on I-66: A *constant fluctuation in the funding level for this project resulted in major delays in funding authorization and project delivery. A misguided approach to implement this project as a design-build project resulted in NRO and NoVA staff spending much time preparing for a federal authorization that was doomed to be denied - design-build is not an acceptable approach, when federal funds are to be used. When NRO re-started the federal authorization process for the PE phase following the traditional design-advertise-build approach, the funding level was reduced and then restored. Moreover, this project was further delayed when NRO was advised to put a hold on the project while ARRA funds were sought for this project. When the dust settled, NRO realized that the available funds did not meet the original project scope. Consequently, some funding was transferred to DMS refurbishment using a new technology approach – for the same amount of funding, refurbishment of existing non-working / under-performing signs will result in more working signs than purchasing and installing new signs. The project scope for the Phase I DMS upgrade was reduced to equal the funding remaining on the project. Toward the end of FY-09, the PE phase was authorized and NRO finally began the design.*

- DMS Upgrade Phase 1 (Primary highways leading to I-66): S*imilar to the Phase I I-66 DMS project, the PE phase was authorized in early FY-10 and the design began shortly thereafter.*

- I-66 Shoulder Lane Control System (SLCS) Upgrade: *The project planning phase was completed towards the end of FY-08, and the project was transitioned to the engineering phase in August, 2008. Since the available funding was only sufficient for design of the proposed project, the original strategy was to complete 100% of design and wait for the allocation of additional funds in upcoming fiscal years for a staged implementation. When ARRA funds became a potential option, NRO was advised to put a hold on the design and wait for the ARRA funds. When no ARRA funds or new 603 funds were made available to NRO, NRO was required to reduce the project scope so that it equaled the available funding, or risk loosing the funds, altogether. Once again, NRO went back to the drawing board and modified the scope to an upgrade of the existing SLCS signal heads at existing locations and an installation of five more CCTVs to enhance the operation. This project was voted NRO's top priority for FY-09 and was actually advanced to FY-08 to begin the planning work. NRO will begin the design of the smaller scope in early FY-10 and is hopeful that, one day, it will be able to implement the original project scope; thereby, enhancing the safety, mobility, and operational efficiency of I-66 between I-495 and Route 50.*

- IP Migration Phase 2: *In November 2008, SE began to install devices (Ethernet switches, serial to IP converters) and reconfigured the fiber optic cable network to connect data rings to the 10G telecommunications backbone. This was done to facilitate the migration of non-HOV Gate-related DMS from the analog network (and communications to PSTOC via ASSIST) to Open TMS. In June 2009, SE transitioned the execution of the migration of DMS to ATMS.*

- Technology Research and Evaluation: *In October 2008, SE began to evaluate CCTV cameras in light of recurring camera failures. Thirty-nine characteristics and capabilities of cameras from four manufacturers were compared, and all four cameras were installed on a pole at the I-66 and Business 234 Interchange in Prince William County. Video from all cameras were transmitted back to PSTOC for further evaluation. At the end of the evaluation period, one vendor's camera was selected as the camera that should be specified for new project installations and ultimately phased in as the current camera inventory is exhausted.*

Goal #4 – Improve NRO Emergency Mgt. and Security

- Emergency Management Plan: *NRO planned to complete the NRO emergency management plan by December 2008 and reduce NRO critical asset vulnerability. In FY-08, NRO initiated a project to analyze NoVA's arterial system regarding emergency route evacuation planning and management. The budget was significantly reduced from $1 million to $250 K, and, therefore, only a limited assessment was conducted and completed in FY-09. Although it is unfinished business, the emergency management plan provides a solid framework for emergency management, and, hopefully, one day, the emergency management plan will be expanded to include a "workable" evacuation plan.*

- IP Migration Phase 1: *In October 2008, network management equipment (Layer 3 Ethernet Switches) was installed in the Traffic Field Operations (TFO) Building. This installation will allow the TFO Building to serve as a backup facility to PSTOC.*

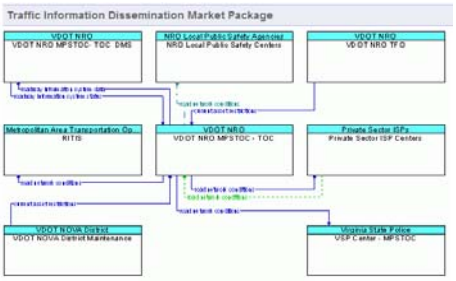
Goal #5 – Improve ITS / Operations Coordination and Efficiency

NRO implemented the following strategies to ensure that ITS considerations are included in relevant construction projects, maintain and improve internal and external communications, ensure all relevant ITS projects are included in the NRO ITS Architecture, develop NRO performance measures, and coordinate Traffic Engineering and ITS solutions.

- Coordinate with construction projects: *NRO invested much time and knowledge in working with I-495 HOT Lanes partners to ensure ITS devices are planned and designed to maximize operational efficiency for both HOT Lanes and the general purpose (GP) lanes. NRO tirelessly worked with the project personnel and FHWA to secured approval to include, within the HOT Lanes project, general purpose DMS signs for VDOT's use. NRO also coordinated internally and with Central Office to develop "must-have" concept of operations for the I-395 HOT Lanes and worked with the I-66 Pavement Rehabilitation project team to include detector upgrades for the detectors that will be impacted by the rehab project. NRO had a fleeting success in establishing an ITS project to restore and upgrade ITS devices that were impacted by the I-66 Gainesville construction project. Unfortunately, due to the agency's budget issue, this project was later terminated.*

- Improve communications: *NRO staff actively participated in Metropolitan Planning Organization (MPO) coordination at both MWCOG and FAMPO, and NRO staff also participated in statewide coordination through committees and statewide projects in VDOT's Central Office.*

- Update ITS Architecture: *One of the most outreach-dependent efforts is the update of NRO's ITS Architecture. NRO orchestrated and conducted extensive outreach with many stakeholders to reach consensus in identifying which regional ITS systems should exchange what types of information with each other.*



- Telecommunications Master Plan-Phase 1: *In June 2009, SE produced and provided limited distribution of a document that chronicles the development and field implementation of Phase 1 of the Telecommunications Master Plan. It is anticipated that the Phase 2 Plan will be developed in FY-10.*

- Event Coordination: *NRO continuously engaged stakeholders in other coordination efforts to mitigate traffic impacts due to Mega Projects and manage special events such as those associated with the 4th of July celebration, the presidential inauguration, and other events that are typical for the nation's capital.*

Goal #6 – Improve the NRO Business Process

NRO strives to ensure that all NRO investments follow the Planning and Program Delivery business process, utilize SWAM vendors for procurements when possible, ensure that NRO contracts are on time and within budget, and improve NRO work force technical skills. More specifically:

- 100% Prompt Pay and Time Entry: *NRO, under Operations Administration's oversight, maintained 100% compliance with the prompt pay and time entry goals. These are agency-wide performance requirements.*

- Planning and Program Delivery Process: Prior to FY-09, *NRO's Planning and Programming Team had developed a unique business process and methodology for planning and delivery of its program. The process was refined again for FY-09, unifying strategic and tactical planning, project development, investment analysis, budgeting, and performance tracking. The process also conforms to FHWA's Rule 940 requirement, emphasizing the Systems Engineering Process. This business and technical process is a way to ensure that NRO maximizes the utility of its limited fiscal resources and directs them to its most important investment needs.*

- Staff Realignment: *In December 2008, two employees from Operations Maintenance were assigned to SE to be responsible for: configuration, testing and deployment of ITS devices in field cabinets; monitoring the operational status of devices (from central and field locations) and working with Operations Maintenance personnel to troubleshoot and address/resolve device malfunctions and operational issues; testing/evaluating technologies/devices; and maintaining*

asset documentation. In addition, a new focus on operations engineering emerged in FY-09 with an emphasis on analyzing and establishing real-time operational strategies.

- Lab Testing Prior to Field Deployment: *In April 2009, SE was provided space within the TFO Building to create a laboratory. The laboratory will be used for technology/equipment evaluation and testing, and will be a place at which external parties can provide presentations/demonstrations to NRO staff members.*

Performance Measurement

Performance measurement is the use of data to evaluate progress towards strategic goals and objectives. NRO used performance data as one of the factors to prioritize projects and relies on performance data to ascertain how well expected goals and objectives are being achieved. Currently, NRO depends on the VDOT Dashboard for measuring safety, mobility, reliability, and customer satisfaction.

In general, there are two types of performance measures – outcome and output. Outcomes describe the intended result, and outputs are the goods and services produced by a program. Examples of outcomes are congestion level, travel time, and incident duration. Examples of output are number of 511 data entries and number of stops safety service patrol made to assist motorists. NRO believes that outcome measures are more meaningful to the public; however on some occasions, outputs are better able to provide one with the context and scale of an issue.

Safety

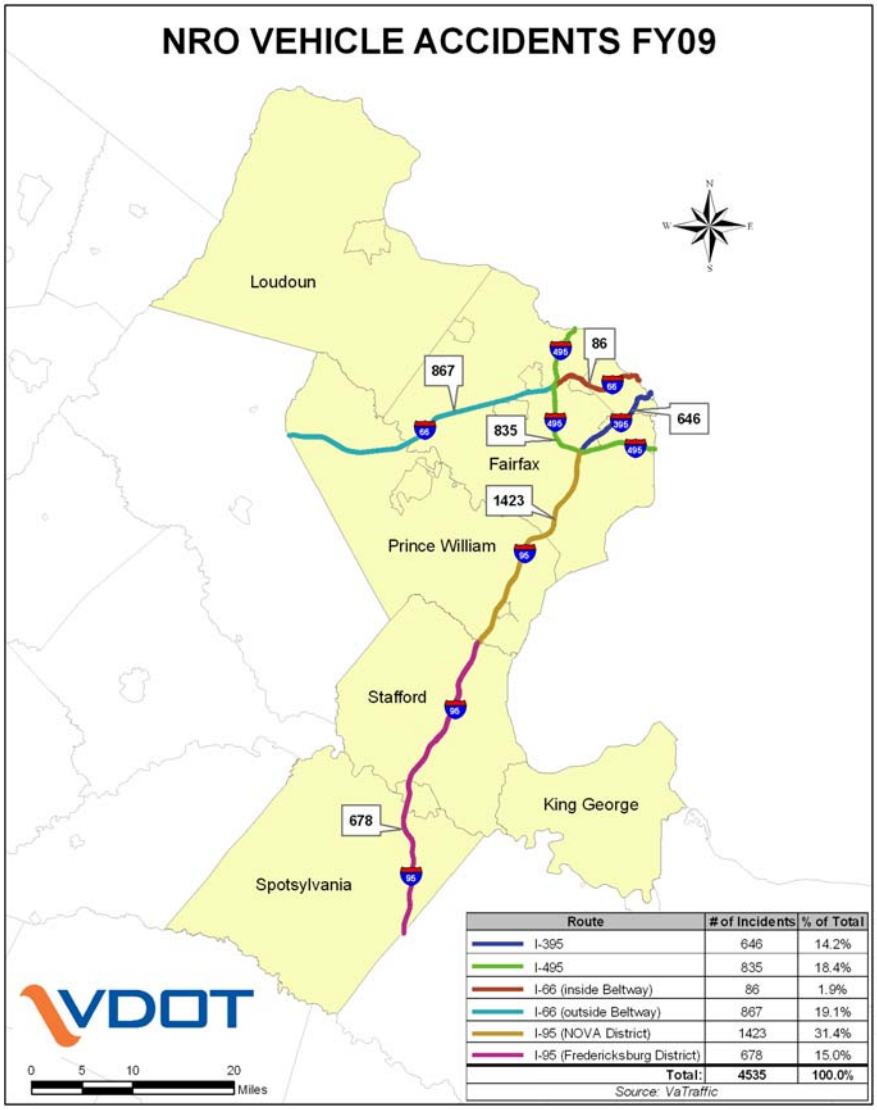
NRO operators enter almost all of NRO's incident data into the VaTraffic system. The VaTraffic system is the data source for VDOT's statewide traveler information website and 511 phone service. The number of 511 entries[1] is an indication of the volume of mobility-inhibiting activities on NRO's roadways. While the data shown in the table below reflects accidents only on interstates (I-66, I-395, I-95, and I-495) between August 20, 2008 and June 30, 2009; the total number of actual incidents in NRO is much higher. There were a total of 16,081 entries to the 511 system on NRO roads in FY-09; including interstates, primary routes, and secondary routes.

	NRO Data		Statewide Data	NRO / Statewide
Category	**Number**	**Percent**	**Number**	**Percent**
Congestion/Delay	4,452	28%	9,984	45%
Disabled Vehicle	5,287	33%	9,484	56%
Multi-Vehicle Accident	872	5%	1,854	47%
Tractor Trailer Accident	185	1%	933	20%
Vehicle Accident	4,473	28%	13,623	33%
Vehicle Fire	155	1%	480	32%
Other	657	4%	2,347	28%
Total	16,081		38,705	42%

[1] Source: VaTraffic

Note that NRO's entry represented nearly half of the statewide 511 entries (42%) despite the fact that NRO is the smallest region in the state. This simply reflects the reality that Northern Virginia is the most congested region in the Commonwealth.

A national traffic scorecard published by Inrix[2] indicated that, in the first half of 2009 (second half of FY-09), the Washington D.C. metropolitan area ranked as the fourth most congested metro area in the nation, behind Los Angeles, New York, and Chicago; even though, metropolitan DC's population ranked eighth in the nation. The worst travel hour is on Thursday between five and six PM, and the top bottleneck location is I-66 eastbound approaching the merge with the Dulles Toll Road. Travel speeds at this bottleneck can be as low as 13 MPH. In FY-09, NRO implemented a low cost improvement at this location to change the pavement marking; resulting in a slight improvement in travel speeds. To further improve the merge, NRO developed and evaluated an active traffic management strategy on eastbound I-66 from west of the Dulles Toll Road junction to the exit for Lee Highway - Estimated cost $10 M. Unfortunately, funding constraints prohibited NRO from implementing this infrastructure-heavy strategy.



[2] Source: Inrix, National Traffic Scorecard (http://scorecard.inrix.com/scorecard/)

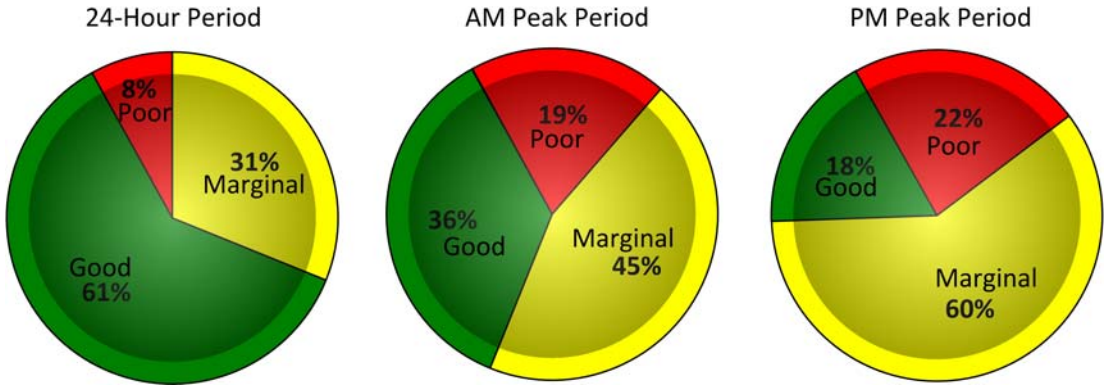
A total of 4535 vehicle accidents[3] were recorded on the interstate system in the Northern Region, and the majority (31.4%) occurred on I-95 in the Northern Virginia District. The least amount of accidents (1.9%) occurred on I-66 inside the Beltway.

Accident locations and 511 entries are output measures that indicate the volume of mobility-inhibiting activities on our roadways. Baselines for accident locations are being developed so that trends can be analyzed and remedial actions taken.

Mobility

Congestion[4], expressed in terms of Levels of Service, is a mobility measure that relates to a vehicle's speed, freedom to maneuver, and proximity to other vehicles, and its best indicator is traffic density expressed in terms of the number of passenger cars (pc) per mile per lane. As the number of passenger cars per lane per mile increases, the freedom to maneuver decreases, speed decreases, and the space surrounding each vehicle decreases.

The following figures and table show the percent of traffic moving in the good, marginal, and poor (congested) categories, as expressed in the terms of Levels of Service (LOS), on NRO's intestates. LOS are computed based on standard traffic engineering procedures. In the following figures and table, LOS A-C is identified as good/green, LOS D&E as marginal/yellow, and LOS F as poor/red, based on density of traffic. The sources of the data are detectors located at count stations on key interstate segments.

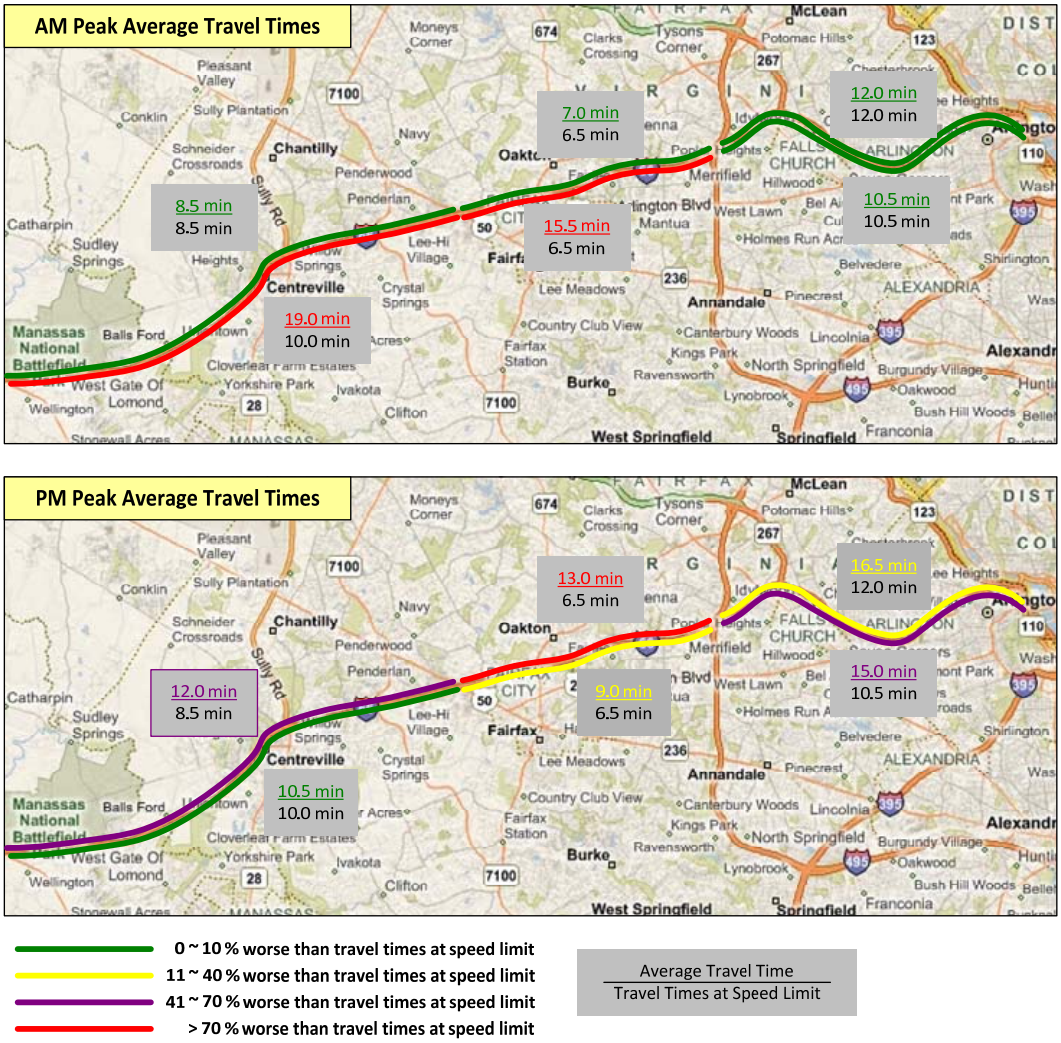


Comparing FY-08's 24-hour period to FY-09's, there are nearly no changes. From FY-08 to FY-09 in the AM peak period, there was a slight shift from good or marginal congestion levels to poor. In the PM peak period, there was a significant increase - from 50% to 60% - in interstate segments experiencing marginal congestion conditions, while segments experiencing either good or poor level of congestion declined:

	24-Hour Period		AM Peak Period		PM Peak Period	
	FY-08	FY-09	FY-08	FY-09	FY-08	FY-09
Good	61%	61%	39%	36%	22%	18%
Marginal	30%	31%	46%	45%	50%	60%
Poor	9%	8%	15%	19%	28%	22%

[3] Source: VaTraffic from August 20, 2008 to June 30, 2009
[4] Source: VDOT Dashboard

Travel time and various travel-time related measures continue to gain favor as effective quantifiers for measuring roadway performance. Travel time[5] is an emerging measure at VDOT. Using NRO's point detectors, NRO has calculated annual average travel times for eastbound and westbound segments of I-66 during peak travel hours. The following figures compare the average travel times for 3 segments of I-66 in the AM and PM peaks to the travel time if one were traveling at the posted speed limit. One would expect the travel times for the same segment of I-66 at the same travel speed (the speed limit) to be the same in both the eastbound and westbound directions. Per the figure, this is not the case for the westernmost and easternmost segments of I-66 – Why? The differences in the EB and WB, free-flow travel times are attributable to detector placement; the detectors are not at the same locations in the EB and WB directions.



No surprise that, in the AM peak period, traffic on I-66 eastbound (EB) outside the beltway experiences nearly double the travel times that one would've experienced, if one were able to drive the speed limit (free flow speed). In the AM peak, EB traffic, inside the beltway, can travel at the speed limit due to the HOV restrictions that result in lower traffic volumes on this segment of I-66. The improvement in travel times is one of the major selling points for implementation of HOV lanes.

[5] Source: VDOT Dashboard.

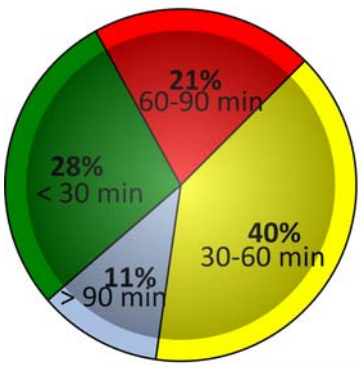
During the PM peak, I-66 travel conditions are much worse than the morning peak, not only for the westbound (WB) traffic, but also for EB traffic inside the beltway. The bottleneck on EB I-66 at its junction with the Dulles Access Road has consistently been a location with high levels of congestion. One can expect traffic conditions on EB I-66 to be exacerbated when the I-495 HOT Lanes' construction progresses to the point that it closes the right-side ramp from EB I-66 to the Inner Loop of I-495. Traffic conditions will further deteriorate on I-495 and on I-66 when Dulles Rail's construction moves forward around the same time. It is highly unlikely that traffic conditions on I-66 in the vicinity of the Beltway will improve in FY-10.

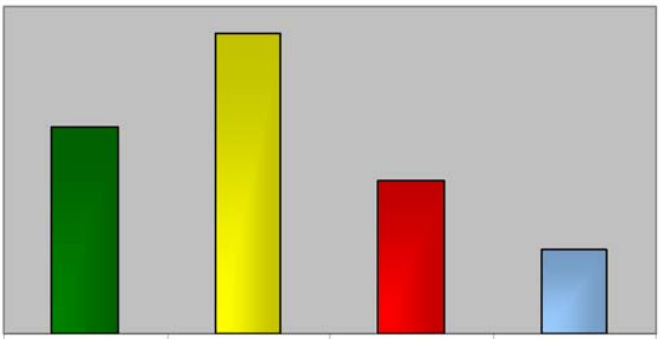
Increased travel times on key commuter routes are indicative of the recurring delays that motorists experience due to congestion and accidents. Travel time is an emerging measure that NRO will increasingly use to describe travel conditions and to identify locations that need improvements, either operational or capital. Baseline travel times will continue to be developed for comparison purposes.

Reliability

Incident duration / incident clearance time has a direct effect on both reliability and mobility. NRO strives to reduce incident duration / improve incident clearance time so as to improve the reliability and mobility on its highway network. If an incident is in place, it often means that traffic flow is reduced because a lane(s) may be blocked, drivers are slowing down as a precaution or to take a look, etc.

This measure reflects the duration of vehicle and truck accidents on NRO's interstates. In FY-09, 4,535 accidents were recorded on NRO's interstate roadways. On average, it took 52 minutes to clear an incident.





	<30 mins.	30-60 mins.	60-90 mins.	>90 mins.
Number of Incidents	1258	1835	931	511

Incident clearance times in FY-09 were still well below the goal of clearing 70% of all incidents within 30 minutes; an indication of the need for better coordination within the first responder community. In FY-09, NRO did not include the "disabled vehicle" category as an incident when calculating this measure. This change makes the comparison to FY-08, where disabled vehicles were included, difficult.

Customer Satisfaction

In FY-09, NRO received and responded to approximately 3,500 customer requests. These requests generated various levels of traffic studies related to signs, pavement markings, traffic signals, speed, safety and operations, etc. NRO established an internal standard on response time, and over 70% of the studies were completed and responded back to customers within that standard. In FY-08, NRO responded to nearly 4,200 requests, with 69% of the study requests were completed within the internal

standard response time. This small improvement is actually significant given that Traffic Engineering lost their consultants and hourly employees due to budget cuts during the first half of FY-09. The following table provides a summary of NRO's responses to customer requests.

Studies Team Type Request	*Number Requests Closed*	*Average Response Time (Calendar Days)*	*Standard Response Time (Calendar Days)*	*Percent Closed Within Standard Response Time*
Sign and Pavement Marking	2,204	20	***30 days***	83%
Traffic Signal	257	45	***45 days***	69%
Speed Study	89	54	***60 days***	63%
Safety & Operations	368	32	***30 days***	76%
All Other / Misc.	213	11	***N/A***	N/A
Internal Assistance	341	13	***N/A***	N/A
TOTAL	***3,472***			73% (average)

One of the most popular customer services that NRO provides is the Safety Service Patrol (SSP). SSP's main mission is to clear incidents and guide traffic during incident clearance. A very well-received secondary function, is SSP's provision of assistance to stranded motorists. NRO's SSP receives hundreds of thank-you letters every year. The following are a few quotes from the thank you letters that the SSP has received, and the quotes illustrate the quality of direct service that NRO provides:

> *"This morning at about 4:30 am, I broke down on 1-95 at milepost 145 in a Virginia Railway Express Ford Explorer. When I attempted to order a tow truck, I was advised that it would be two hours before arrival. Within 10 minutes of the breakdown, a VDOT safety patrol truck driven by Mr. Edward Beverly arrived to provide assistance. He ordered a tow truck, which arrived in 20 minutes. I am writing to commend not only Mr. Beverly's professionalism and courtesy while assisting me, but also this valuable and responsive VDOT program. Unfortunately, Virginia citizens and interstate travelers are likely unaware of this service until, like me, they need it and sincerely appreciate its impact.[6]"*

> *"I can't tell you how grateful I am considering how frightening it is to have my car break down on 495 in rush hour and being 8 months pregnant. Thank you for pushing my car to the side away from traffic and waiting with me for my car to cool down. I'm glad you followed me to my exit too because you noticed my car smoking….. I'm glad you came as quickly as you did, I thought I was going to have a panic attack. Thanks for being so kind and saving the day![7]"*

> *"My husband and I were driving through Virginia on 4/10/09 on our way from CT to NC. We were stuck in traffic in VA for over 3.5 hours, and, just as traffic started to move, we had a blow-out ….. Ronald Butler happened by and stopped to see if he could assist us….. He changed our tire, and discovered our donut was flat in the process. He then used his compressor to take air from his own tires to fill our donut….. Ronald went out of his way to help us. We are so grateful to him, and wanted to be sure his efforts were recognized. It happened to be our 10 year wedding anniversary that day, and he really made our day.[8]"*

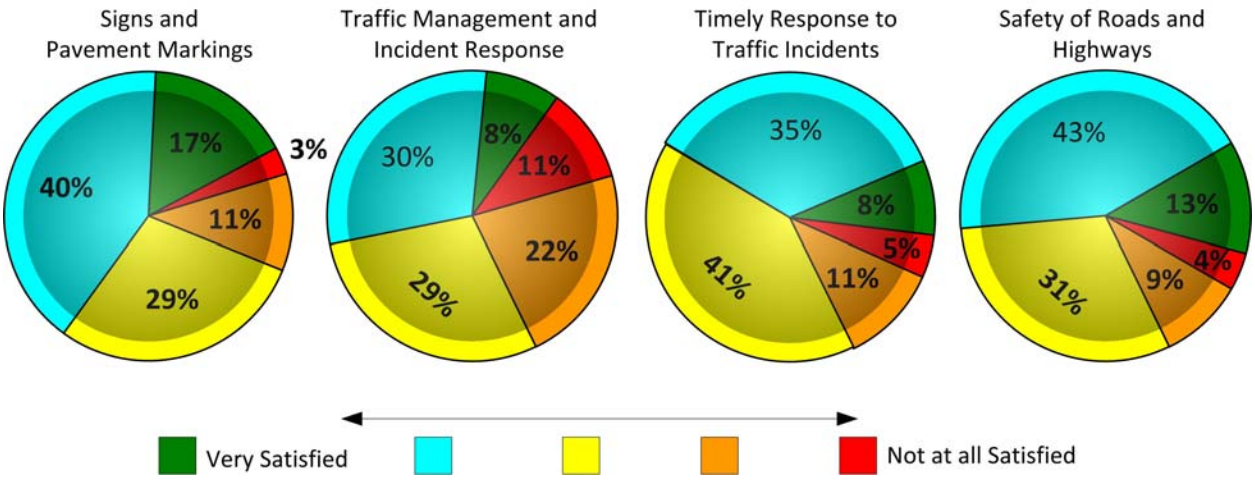
[6] Letter from Zehner in Alexandria Virginia to Fredericksburg DA, June 10, 2009
[7] Email from Anna, May 31, 2009
[8] Email from Henderson in New Haven, Connecticut to VDOT, May 6, 2009

"I would just like to recognize Mr. Yarrington for his outstanding professionalism, courtesy, and responsiveness. On March 28 2009, I had a flat tire on I 95 around exit 133. The VDOT Safety patrol was there within 10 minutes of me making the call notifying the highway service of a disabled vehicle. Mr. Yarrington ensured the safety of myself and my family quickly and efficiently. I spend over 4 hours a day on the road commuting and it is a comfort to know that the safety patrol team is there to assist.[9]"

"I am sending you this e-mail to make you aware of the outstanding safety and service that Steve Wojtyna and Mo Peebles gave to me when I needed emergency assistance on I95 on Sunday (January 18, 2009)….. Steve and Mo's actions demonstrated to me that they are, or at the least, should be, very highly valued employees within the VDOT Safety Patrol. They worked as a team and they were very familiar with the area and appropriate procedures. In addition, they were extremely professional, smart and quick thinking with their actions, alert, helpful, informed, courteous, knowledgeable, reassuring, good listeners, empathetic and sincere, and they knew how to communicate with and calm an individual in distress….. They truly represented themselves, your Dept./ Management, and the VDOT Safety Patrol in an outstanding way with their stellar performance….. They not only showed a high respect for themselves, but they showed that they have a high regard for the safety and well being of others.[10]"

The following are partial results from a statewide citizen survey[11] conducted in July 2008. The four categories presented here: signs and pavement markings, traffic management and incident management, timely response to traffic incidents, and safety of roads and highways, represent areas in which NRO provides customer service.

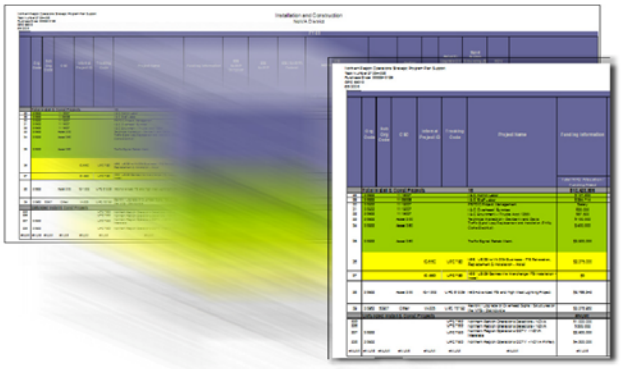
Although NRO manages one the most congested geographic areas in the country, VDOT's citizen survey shows that the majority of the traveling public are generally satisfied with NRO's activities in responding to incidents, maintaining signs and pavement markings, and promoting the safety of the traveling public.



[9] Email from Bayer to VDOT, April 2, 2009
[10] Email from Johnson, January 20, 2009
[11] Source: VDOT Dashboard

Financial Assessment

Prior to the start of every fiscal year, NRO follows the Planning and Program Delivery (PPD) process and develops a Strategic Investment Program Plan (SIPP) to provide a framework for the effective management and operation of the Region's roadway systems. FY-09 was no exception; an investment plan was developed to kick-off the fiscal year. NRO has two major sources of funding - the Six Year Improvement Program (603 Funding), and systems operations and maintenance funds (604 Funding). In general, 603 funds are for capital improvement and 604 funds are for routine operations and maintenance. Due to reductions in the 603 funds, some 604 funds (mainly federal funds) were allocated to specific capital improvement projects such as the ATMS system development and new signal installations. The following provides a summary of NRO's financial status for these two major funding categories:



603 Funding

As a result of the Planning and Prioritization Workshops, NRO submitted 28 candidate projects[12] for consideration. Projects included sign inventory and condition assessment, Dynamic Message Sign (DMS) upgrade and expansion, and the installation and timing optimization of traffic signals. FY-09 proved to be a year of economic challenges with the 603 funding. In the past, Districtwide funding pots had been the source of funds for various programs (e.g. new signals, new signs, new pavement marking, new guardrail, and new ITS device, etc.) At the Commissioner' direction, VDOT moved to sunset the Districtwide funding allocations. Consequently, none of the Districts, including Northern Virginia and Fredericksburg, received any new allocations. Moreover, $8.84 million in unauthorized funds were eliminated from the Districtwide funding pots in FY-09:

- System Operations Improvements - $1.25 million
- Various Northern Virginia Interstate Districtwide funds - $2.85 million
- Various Fredericksburg Interstate Districtwide funds - $3.54 million
- Various Fredericksburg Primary Districtwide funds - $1.20 million.

Unfortunately, there was no / is no alternative sources of funding to meet these needs, either.

Systems Operations Improvement (SOI) interstate funds, allocated and managed by the Central Office, was a potential alternative funding source. However, the level of funds was only sufficient to meet a fraction of the statewide interstate needs, and there was no comparable source of funds for the primary systems. The hope that NRO would receive a portion of the $12.2 Million statewide SOI funds evaporated when the allocation was eliminated to meet VDOT's budget shortfall.

To add insult to injury, access management funds, newly created as a statewide fund to improve traffic flow, were completely eliminated in FY-09 and NRO did not have another source of funding to supplement this loss.

[12] Source: VDOT NRO FY-09 Strategic Investment Program Plan, July 2008

NRO, however, did receive $8.4 million in additional 603 funds on existing projects or programs in FY-09.

District	*UPC*	*Project*	*FY-09 Allocation*	*FY-09 Spending*
NoVA	61247	ATMS System Maintenance & Integration	$500,000	$513,500
NoVA	72835	HOV Lane Enforcement (Transfer to VSP)	$450,000	$450,000
NoVA	80089	Metro Area Transportation Operations Coordination (MATOC) Program	$360,317	$466,935
NoVA	90113	DMS Upgrade Phase I	$2,500,000	$516
NoVA	T6527	Safety Improvement at High Crash Locations (HSIP)	$3,509,000	$0
NoVA	86659	Improvement to High Risk Rural Roads (HSIP)	$108,098	$0
Fred.	T6523	HSIP Fredericksburg	$806,000	$0
Fred.	86620	HSIP Fredericksburg High Risk Rural Roads	$166,196	$0
Total			$8,399,611	$1,430,951

One should note that of the $8.4 million allocation, about $800,000 was transferred to the VSP and to COG's regional MATOC program, and $4.6 million was in Highway Safety Improvement Program (HSIP) funds. HSIP funds require a lengthy process to be followed before these funds can be applied to a specific project. Extensive traffic analysis is one of the requirements before the request to use the funds can be approved. Needless to say, HSIP funds cannot be used to quickly meet urgent safety needs, and there was no expenditure of HSIP funds in FY-09, even when needs existed.

In late FY-09, twelve projects to install roadway lighting on various roadways in Northern Virginia were established, and they received a total of $3,880,282 in funding. Overall, NRO was allocated approximately $12.7 million in 603 funds in FY-09. Of the 28 top priority capital improvement projects that NRO submitted for 603 funding, only DMS Upgrade Phase I received an allocation in FY-09.

Late in FY-09, several NRO projects were eliminated due to the statewide budget cut:

- I-66 Gainesville ITS
- Guardrail Needs Assessment Study & Install I-66 WB from Nutley Street to Rte 123
- I-66 @ Rte 234 – Signal & Lane Use Sign Modifications
- I-66 EB Off-Ramp @ Rte. 7 – Signal Rebuild
- I-66 Rumble Strip Installation, various locations, Fauquier County Line to VA 28
- I-495 Outer Loop Off-Ramp @ Gallows Road – Signal Rebuild

Unfortunately, the elimination of these projects came as a surprise to NRO. Planning work had begun for these projects when these projects were unexpectedly removed from the SYIP. As the needs for these projects remain, NRO must seek alternative funding sources to complete them.

604 Funding

NRO's FY-09 Program 604 budget experienced several periods of turbulence. At the beginning of the fiscal year, NRO received $42.8 Million in state funds. The first pocket of turbulence came when the FY-08 budget overrun of $1.3 Million was deducted from FY-09's allocation. The second hit was a 10% budget cut of nearly $4 million that occurred in October, 2008. The final fiscal turbulence bump came as an additional budget cut of 3% in March, 2009. The budget reductions severely impacted the following programs:

- Safety Service Patrol
- Operations Planning and Programming Services
- Traffic Engineering Studies
- Traffic Signal Modifications and Rebuilds
- Traffic Loop Installations
- Pavement Markings
- Highway Lighting
- Management Overhead

On top of these cuts, the Region also had to fund three, major unfunded mandates: inclusion of the New Woodrow Wilson Bridge into Operations, Operations' portion of the TAMS contract, and Inauguration related expenditures. To stay within the budget that was squeezed from two sides - reduced allocations due to major budget cuts and unexpected funding obligations attributable to unfunded mandates, the work in Maintenance and in Installation was limited to emergency response work only, and all staff augmentation was eliminated. Because these strict measures were put in place, NRO was able to finish the year $1.2 M under their reduced allocation. This "surplus" will be carried into FY-10.

In addition to state funds, NRO also received federal 604 funds that were allocated to specific projects or programs. A total of $14.8 million in federal funds were allocated to NRO in FY-09 and NRO spent a little over 50%. Projects that use these federal 604 funds are multi-year or on-going projects such as funding the state forces labor for the SSP and Traffic Operation Center, ATMS replacement, DMS sign refurbishment, ITS device preventative maintenance, UPS installation, and signal installation. The unspent funds, $7.3 Million, were carried forward to FY-10 to complete or continue these efforts.

Other Funds

With traditional funding sources severely reduced, NROPP members actively researched and applied for grants to increase revenue. For example, NROPP led the Washington D.C. regional effort to obtain a $3.5 million Homeland Security Grant for Phase II of the Regional Evacuation Traffic Monitoring and Management Tool (primarily traffic detector deployment). The region was notified of the award in early FY-10 and VDOT will receive at least $1.5 million to extend the installation of traffic detectors along primary evacuation corridors such as I-495, I-95, I-66, and VA 110.

In early 2009, NRO identified and developed project documentation for $43 million in ITS capital improvement projects and another $40 million in operational improvement projects such as pavement marking, signals, signs, and guardrail for consideration for the allocation of economic stimulus funds. Unfortunately, NRO did not benefit from the ARRA allocation. Two of the most important ITS projects were put on hold during FY-09 in the hope of receiving sufficient

economic stimulus funds to implement 100% of the project scope; specifically, the I-66 Shoulder Lane Control System (SLCS) Upgrade and I-66 DMS Upgrade and Expansion Phase I. The delay and lack of full funding forced NRO to reduce the scopes of both projects significantly. Instead of upgrading the SLCS system to a state-of-the-practice system, existing signal heads will be upgraded with LED signals. And, instead of upgrading and adding a total of 12 DMS signs, NRO chose to scale down to 3 new signs while transferring funds to the maintenance program to refurbish approximately 30 existing DMS signs.

NRO had not had success in obtaining grants or other sources of funding, such as Statewide Planning and Research (SPR) funds in recent years, and FY-09 continued this string of hard luck.

In Summary

Fiscal Year 2009 was full of challenges – budget reductions, loss of personnel, and the management of traffic during the presidential inauguration. NRO managers, however, continued to hold up high hopes heading into FY-10, as they participated in the development of NRO's FY-10 priorities.

Despite all the challenges, NRO successfully moved the operations' center from the Arlington facility to McConnell Public Safety and Transportation Operations Center (MPSTOC) in the fall of 2008 and launched the new ATMS software, Open-TMS. People, hardware, and technology transition involved many countless working hours among many devoted NRO employees.

NRO completed the 10-gig telecommunications IP network deployment and the transition of CCTVs onto the IP network in FY-09. This effort will continue into FY-10 as the remaining ITS devices, such as DMS signs and detectors, are transitioned onto this IP network. Completion of this effort will increase network reliability, result in more efficient data dissemination, and allow for the easy inclusion of additional ITS devices.

Flexibility has been NRO's strength. NRO launched the major initiative to refurbish many old DMS signs which are well beyond their life spans and for which manufacturer's support no longer exists. Although this is not as ideal as a major upgrade, DMS refurbishment will extend the life span of these important ITS communication devices for several more years.

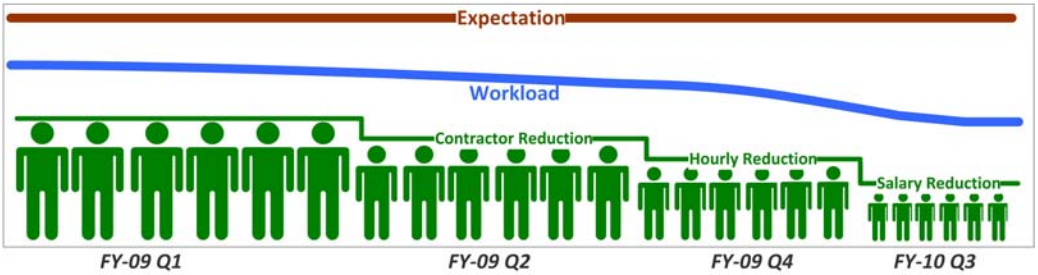
Although consultant support was reduced in the middle of the fiscal year, NRO was able to complete several safety and mobility corridor studies in Northern Virginia and Fredericksburg. In addition, NRO completed eleven comprehensive operations traffic analyses in FY-09, and the findings have been used to support Traffic Operation Center's decision making regarding HOV operations, lane closures, etc.

NRO's comprehensive stakeholder facilitation and involvement paid off for developing traffic management plan (TMP) for mitigating traffic congestion caused by major construction projects, Mega Projects. The strong support from many stakeholders validated NRO planners' effort and TMP plan. While the plans were completed in FY-09 and are pending on the approval of VDOT's leadership, it is NRO's expectation that the TMP's will start to come to fruition in FY-10.

Special event planning and management has become routine business for NRO. NRO developed and implemented special signal timing plans to facilitate traffic movement during the Christmas and Thanksgiving holiday season, on Election Day (November, 2008), and for the 4th of July celebration (July, 2008). One major event that cannot be overlooked is the team work and resourceful planning that NRO put in place for effective traffic management during the presidential inauguration event. Coordination took place, not only within VDOT, but also with many agencies in Virginia and the Washington D.C. area. Extensive coordination, communication, and planning were all factors that contributed to the success of the transportation management plan for the inauguration. For example, VDOT engaged in pre-event traffic assessments to identify traffic operations challenges for the adequate preparedness. NRO engaged personnel across the functional area for the week during the Inauguration event demonstrated NRO's determination to successfully prevent all possible traffic problems prior, during, and after the Inauguration day.

Finally, NRO completed major revision of its Strategic Plan and ITS Architecture in FY-09. NRO organization and personnel may not be the same due to the impacts of the Blueprint in FY-10 and onwards; however, these plans will be a legacy and should provide a solid framework for NRO to continue moving strategically forward to enhance mobility, safety, and reliability for our customers.

Looking forward to FY-10, the challenge is even greater than FY-09. Funding continues to decline; NRO's work force will reduce in size and its functional focus will change; and thanks to Workforce Transition Act (WTA) retirements / substitutions, many years of experience will walk out the door. The VDOT agency-wide Blueprint re-organization will result in a loss of 31% of NRO's current full-time work force. Two functions will be centralized – Operations Planning and Programming and Systems Engineering. NRO's administrative function will be aligned with the new concept of a statewide service center, and the administrative function will no longer be a part of NRO's organization; implying that it may be less responsive. NRO's current organization and Planning and Program Delivery process facilitate the following of the Systems Engineering process for ITS project development and deployment and maximize funding resource. There may be no counterpart in the future organization to fulfill these functions.



The new organization will focus on Traffic Engineering services, Operations, and Maintenance. Therefore, NRO has to adapt and implement a very different tactic for work force management and program focus shift. It is expected that work productivity will decrease in FY-10 when many NRO employees will be impacted by the Blueprint from December, 2009 to spring 2010. Since the NRO's FY-11 program development process normally would start in FY-10, the team that leads this effort will no longer be part of NRO, and it is unclear what the future organization will ultimately become, it is expected that NRO will loose its momentum in FY-11 as well. It is hopeful that NRO will re-gain impetus in FY-12 with the new organization and focus to deliver the service to our customers.

Northern Region Operations

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