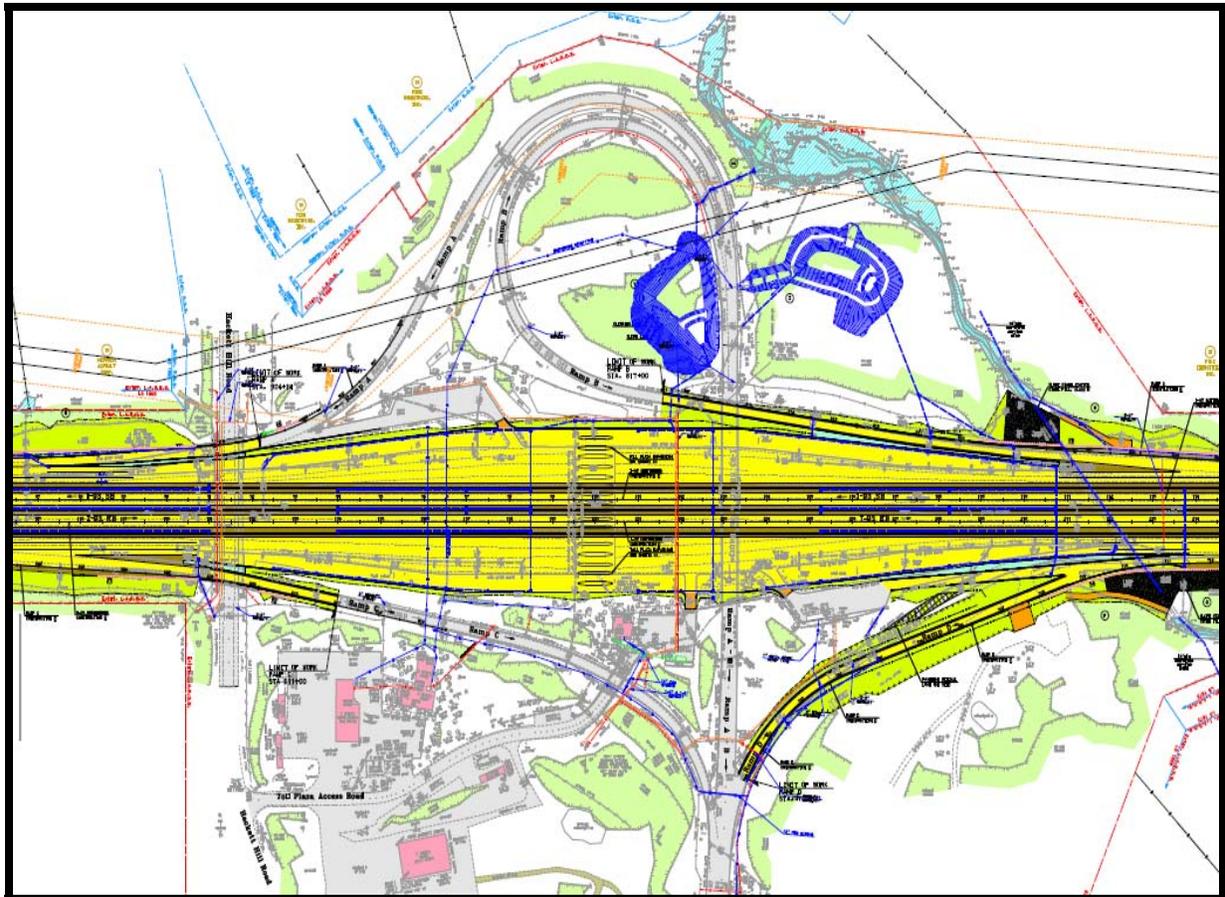


TIGER III DISCRETIONARY GRANTS

New Hampshire Department of Transportation
Bureau of Turnpikes
Hooksett Toll Plaza
Conversion to Open Road Tolling



Proposed Interstate 93 Open Road Toll Facility in Hooksett, NH

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Type of Project: Road and Bridge

Location of Project: Hooksett, NH, Merrimack County, NH; 1st Congressional District

Urban or Rural Area: Urban

TIGER Grant Request: \$10 million

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I. Project Description

The New Hampshire Department of Transportation (NHDOT) submits this application requesting \$10 million through the TIGER III Discretionary Grant Program (TIGER III). This grant application addresses a critical need to address traffic congestion and aging infrastructure at the Hooksett Toll Facility in Hooksett, New Hampshire.

The Hooksett Toll Plaza is located on the F. E. Everett Turnpike in the Town of Hooksett, New Hampshire, between the State's capital city, Concord and its largest city, Manchester. The stretch of highway between Manchester and Concord was also designated as I-93 when the highway was extended northward as part of the Interstate Highway System and co-joined with the existing F.E. Everett Turnpike. The safe and efficient operation of this facility is critical to the efficient movement of traffic, as I-93 forms the backbone of the State's transportation system providing connectivity to Massachusetts (the metro-Boston area), the major population centers of New Hampshire, and the tourist areas in central and northern regions of the state. The I-93 corridor is vital to the everyday commuter, freight transport and recreational travelers.

The Hooksett Toll Plaza averaged over 67,000 vehicles per day in fiscal year 2010 and is busiest from Memorial Day thru Columbus Day. On peak weekends, the 14-lane plaza serves over 80,000 vehicles per day and on Friday evenings when commuter traffic is mixing with recreational travel, daily travel routinely exceeds 95,000 vehicles per day. The Hooksett Toll Plaza has 2 reversible lanes in its middle, enabling it to devote up to 8 lanes to traffic in the peak direction. However, during weekends (particularly on Saturdays), traffic can be heavy in both directions during peak travel times. This condition at times negates the advantage of the flexibility afforded by reversible lanes. Converting the inner six toll lanes to four ORT lanes and adding two additional lanes in each direction on the outside of the plaza would improve the capacity of the toll facility by allowing vehicles equipped with electronic toll collection (E-ZPass) to pass through at highway speeds in the ORT lanes. Only cash-paying patrons would be required to pass through the barrier toll plaza to stop and pay their toll. As E-ZPass usage grows, the congestion reducing potential of these ORT improvements increase.

Based on traffic simulation models completed by HNTB, Corporation (HNTB) (documented in the October 2011 report called "Hooksett Toll Plaza: Summary of Annual Reductions and Benefits-ORT vs. Conventional Toll Plaza") conversion of the Hooksett Toll Plaza to an ORT facility will:

- **Reduce traffic delays for all motorists.** With the implementation of the ORT lanes, traffic will be able to flow more efficiently through the plaza. Analysis shows that travel time through the plaza will be reduced by 14.4%, saving 268,695 hours on an annual basis.
- **Reduce fuel consumption.** Due to a reduction in the number of vehicles braking, slowing, stopping and accelerating at the barrier, analysis shows an estimated reduction of 465,640 gallons of fuel consumption on an annual basis.

- **Reduce vehicle emissions.** Resulting from a reduction in the number of vehicles braking, slowing, stopping and accelerating at the barrier, air quality will be improved. The reduction in vehicle delays and associated idling fumes at the barrier would in turn result in air contaminant reductions for VOC (29% to 35%), CO (30% to 35%), PM 2.5 (22% to 32%) and GNG emissions (18% to 24%), an approximate 3,300 kilogram reduction in emissions during summer weekdays and weekends.
- **Increase safety.** Accident histories at ORT facilities show a reduction of approximately 60% when converted from a conventional plaza. Additionally, separation of the higher speed vehicles using EZPass technology from the slowing cash paying patrons would be realized with the ORT improvements.

New Hampshire believes this application meets the criteria for the TIGER III Grant Program and further, that it represents the type of project envisioned. It is a unique and innovative application of technology to address congestion, the transportation needs served by commercial, tourists and residents New Hampshire and its regional users. Receipt of TIGER III Grant funds will allow the State to increase project delivery. Currently, the ORT improvements are an element of the Bureau of Turnpikes capital improvement program, however it is an unfunded project as there is no dedicated funding mechanism (i.e. toll increase or alternative additional revenue stream) to support this project. Receipt of the grant monies will allow the project to move forward. If no work is completed at the toll facility, traffic congestion will worsen as traffic volumes continue to grow as the economy recovers.

The proposed improvements to the Hooksett toll plaza encompass both rehabilitation/renewal aspects (roadway pavements, bridges and guardrail) and capacity (additional lane along I-93 southbound barrel and increased toll capacity) improvements. Due to funding constraints in the Bureau of Turnpikes Renewal and Replacement program, the construction of these projects would require that they be spread out over several years and advertised in three separate contracts. The three projects would total approximately \$5.44 million. Incorporating these into the Hooksett Open Road Tolling project will result in savings from the efficiencies in both project development and construction operations by simply combining these improvements into a single contract.

The purpose of this project is to install open road toll lanes at the Hooksett toll plaza. This project was initiated by the NHDOT to improve safety and increase capacity of the turnpike toll plaza. This project also involves required interstate widening associated with plaza conversion, bridge modifications and rehabilitation, pavement rehabilitation and guardrail replacement.

The proposed improvements extend from approximately 6,500 feet south of the toll plaza to 5,000 feet north of the plaza and will be accomplished by the construction of two additional conventional lanes in each direction to the outside of the plaza. The existing six middle toll lanes will be reconstructed to 4 ORT lanes, which will be separated from the conventional toll booths by concrete barrier to ensure that the high speed traffic utilizing the ORT lanes is separated from the cash paying patrons which are required to stop to complete a cash transaction. The existing tollbooth and canopy that remain will be rehabilitated to include concrete pad replacement,

treadle repairs and improved drainage. Additionally, the tunnel that provides safe access from the toll plaza administration building will be rehabilitated.

Based on the above-mentioned significant benefits and the relatively modest cost to complete the Hooksett I-93 Open Road Tolling Project, we estimate a very strong return on investment for this project. The estimated Benefit-Cost Ratio (BCR) is 5.3 at 7 percent discount rate and 8.2 at a 3 percent discount rate, with a combination of public and private benefits.

II. Project Parties

This project is being administered by the NH Department of Transportation in partnership with the local community and the support of state and local officials. This support will be more fully explained in the “Partnership” section of this application.

III. Grant Funds and Sources/Uses of Project Funds

This project addresses the deficiencies of the facility to provide long-term viability and reliability for the local transportation system. Although the critical need for TIGER III funds cannot be over-stated, it is important to note the significant amount of funds already committed to this effort by the State of New Hampshire-Bureau of Turnpikes.

The following tables reflect the contributing funding sources including TIGER III, and application of funding by improvement type.

Application Funding by Source and Category in Millions of Dollars

	TIGER III Funds	FHWA Funds	State of NH- Turnpikes Renewal and Replacement Program	State of NH- Turnpikes Capital Program	TOTAL
Funding Levels	\$10.0	\$0	\$3.0	\$13.1	\$26.1
Funding Percentages	38.3%	0%	11.5%	50.2%	100%

Use of Application Funding by Improvement Type in Millions

	Toll Plaza Modifications and ORT Implementation	Bridges	Roadway	TOTAL
Improvement Cost	\$6.7	\$1.9	\$17.5	\$26.1
Improvement Percentages	25.7%	7.3%	67.0%	100%

IV. Selection Criteria

a. Long-Term Outcomes

A strong transportation system promotes economic vitality and viability, and ultimately results in more livable communities utilizing that system. Transportation projects have the dual benefit of directly supporting jobs during construction, in addition to supporting the regional and local economics through improved movement of goods, services, and people. Deficient links in transportation system infrastructure restrict travel and can significantly impact a region's economic growth and safety. Ensuring that transportation infrastructure remains in a state of good repair is a critical element in providing opportunities for economic competitiveness and viable economic growth. The proposed improvements to the Hooksett Toll plaza helps sustain the ability of the surrounding communities to remain competitive and promote sustainable economic growth for the region.

i. State of Good Repair

The plaza, which is located within the Exit 11 (Hackett Hill Road, NH 3A) interchange and opened in August 1957 with 6 toll lanes, when the Everett Turnpike was extended northward into Concord from its previous terminus in Manchester. The Hooksett Toll Plaza was expanded to 12 lanes in 1977 with an additional two lanes in 2007, bringing the total number of lanes toll lanes to 14. The plaza was widened in order to better enable the facility to contend with the ever-growing volume of traffic, however traffic volumes continue to grow.

Three existing bridges, I-93 over Cross Road, Hackett Hill and Ramp A-B, within the ORT improvement limits will be rehabilitated as part of the project. The ORT improvements were designed to avoid the need for widening these bridges, however all three require bridge deck rehabilitation as they have not received any improvements since 1977 at the I-93 Bridge over Cross Road, 1978 at the I-93 Bridge over Hackett Hill Road, and 1978 at the I-93 Bridge over Ramp A-B. The bridge over Ramp A-B being in worst condition with the bridge deck and superstructure rated in "fair" condition, placing the structure on the State's "Near-Red List" bridge inventory.

The ORT improvements will require widening of the existing pavement on the approaches to the plaza to accommodate the introduction of the ORT lanes, which require 94' of width (four 12-foot lanes, four 10-foot shoulders and three 2-foot barrier widths). In addition, the existing pavement that will remain is in need of rehabilitation as it has not been resurfaced since 2002 (due to the high volume of vehicles on this segment, resurfacing is required every 10-years). The remaining pavements will be cold planed to remove cracking and delaminated pavement sections and repaved with hot bituminous pavements.

The median thrie-beam guardrail to the south of the plaza has been in place since 1977. Significant portions of the rail have deteriorated requiring significant maintenance repairs. Beyond the maintenance repairs needed, the implementation of permanent concrete barrier will offer life cycle-cost benefits and avoid the need to have maintenance employees working along I-93 adjacent to high volume and high speed traffic resulting in significant enhancement of safety along this section of highway for both employees and the traveling public.

Once investments are complete, NHDOT inspects all aspects of its infrastructure to include the toll facility, bridge structures, pavement and guardrails on a bi-annual basis. The bridge inspections are completed as required for compliance with National Bridge Inspection Standards and are used to gauge project longevity. Similarly, asset management databases and strategies are utilized to assess the condition and ongoing needs of the remaining elements and will be used to coordinate future maintenance and preservation efforts as needed. The future success of these investments will be evaluated as part of this inspection, asset management, and future maintenance process. In addition, maintenance personnel engaged in day-to-day operations on each aspect of the infrastructure will also provide routine maintenance activities during their daily duties to keep the infrastructure in good working condition.

The Bureau of Turnpikes maintains a “Renewal and Replacement” (R&R) program specifically targeted to address pavement resurfacing, bridge rehabilitation, and guardrail replacement as well as toll plaza maintenance needs on the turnpike system. This program has secure funding levels to sustain the ongoing maintenance needs ensuring that the investments remain in good condition for the foreseeable future. The inspection and asset management process previously mentioned support the R&R program and ensure the proper prioritization of maintenance expenditures.

ii. Economic Competitiveness

Transportation projects have the dual benefit of directly supporting jobs during construction, in addition to supporting the regional and local economics through improved movement of goods, services, and people. Deficient links in transportation system infrastructure restrict travel and can significantly impact a region’s economic growth and safety. Ensuring that transportation infrastructure remains in a state of good repair is a critical element in providing opportunities for economic competitiveness and viable economic growth. The proposed improvements to the Hooksett Toll plaza helps to sustain the ability of the surrounding communities to remain competitive and promotes sustainable economic growth for the region.

For purposes of aligning the project with “long-term transportation benefits and outcomes” the following narrative discusses the *Energy Impacts* and *Vehicle Congestion*, which translate into long-term economic productivity benefits.

Energy Impacts

Vehicle idling is a concern for both motorists and air quality, as idling vehicles continue to burn fuel without the benefit of movement. An idling vehicle at a toll plaza can add needless fuel consumption over time, given that a typical motor vehicle uses about 0.026 gallons of gasoline every 10 minutes while idling, which costs approximately 5 cents. This also amounts to about 9.5 ounces of carbon dioxide emissions during those 10 minutes. See the Air Quality section for more information

The EPA’s Motor Vehicle Emission Simulator (MOVES) model measures energy consumption in million BTUs per hour. Results of the MOVES model utilized for this project are presented in the table below. The reduction in energy consumption ranges from 1% to 24% based on the

level of congestion with the existing barrier plaza configuration compared to the improvement with the ORT configuration. Since the average weekday has the lowest levels of existing congestion of the four time periods evaluated, the reduction in energy is also the least. As traffic volume increases between 2012 and 2022, the energy consumed will also increase. However, on the busiest days of the year, traffic using the ORT configuration will use less energy in 2022 than the barrier plaza configuration in 2012. These projected reductions are the result of less congestion through the plaza with the ORT configuration and government mandated new car and light truck greenhouse gas emissions standards affecting model years 2012 and later along with improved corporate average fuel economy standards affecting model years 2008-2011.

Total Energy Consumption, Million BTU/hr

Day	Peak Hour	Total Energy Consumption, Million BTU/hr					
		2012			2022		
		Existing	ORT	% Change	Existing	ORT	% Change
Friday	4:00 pm	254.9	208.6	-18.16	280.5	228.8	-18.43
Saturday	11:00 am	201.9	177.6	-12.04	245.3	189.0	-22.95
Sunday	3:00 pm	225.0	170.0	-24.44	212.3	161.0	-24.16
Avg. Weekday	4:00 pm	154.4	152.8	-1.04	169.0	162.8	-3.67

Annual Fuel Consumption Summary (gallons)

	Existing (14 conventional lanes)	ORT (4 ORT + 12 conventional lanes)	Reduction	% Reduction
Avg. Weekday	20,546,553	20,274,980	271,572	1.3%
Summer Weekday	3,847,477	3,714,806	132,671	3.4%
Summer Weekend	3,521,599	3,460,203	61,396	1.7%
Annual Total	27,915,628	27,449,989	465,640	1.7%

The ORT plaza is projected to result in 465,640 fewer gallons of fuel used annually by the motoring public traveling through the project area. In terms of fuel consumption economic benefit to drivers, if it is assumed that the average gas price is \$3.45, this equates to an aggregate savings of about **\$1.6 million annually**.

Vehicle Traffic Congestion

The existing toll plaza operates over-capacity, which causes long queues, especially during the summer months, and on weekends. The existing (2011) directional peak hour traffic volume

approaches 4,600 vph. This volume is projected to increase to approximately 5,400 vph by the year 2022, which would substantially increase traffic queuing if not addressed.

Travel Time Through Study Area (vehicle-hours)

	Existing (14 conventional lanes)	ORT (4 ORT + 12 conventional lanes)	Reduction	% Reduction
Avg. Weekday	1,339,486	1,178,486	160,999	12.0%
Summer Weekday	239,102	211,040	28,062	11.7%
Summer Weekend	287,784	208,150	79,634	27.7%
Annual Total	1,866,372	1,597,677	268,695	14.4%

Total travel time through the study area is expected to be reduced by over a quarter-million hours. The driver economic benefit can be calculated as follows:

- Mean hourly wage rate in NH: \$21.37 (http://www.bls.gov/oes/current/oes_nh.htm#00-0000)
- Value of travel time ~50% of mean hourly wage rate: \$10.68 per hour
- Value of travel time savings = \$10.68/hr X 268,695 hours = **\$2.87 million**

The combined annual benefit of fuel savings and travel time saving would be approximately **\$4.5 million** with the implementation of ORT, reflecting improved long-term efficiency, reliability and cost competitiveness in the movement of commuters and freight.

Understanding that the TIGER program strives to promote long-term economic growth in a manner that will be sustainable for generations to come, a robust assessment of “*Environmental Sustainability*” is provided further along in this application narrative providing evidence that the project will achieve the goals of this outcome in an environmentally sustainable manner.

iii. Livability

Livability investments are projects that not only deliver transportation benefits, but also are designed and planned in such a way that they have a positive impact on qualitative measures of community life. Investment in the Hooksett toll facility will provide measurable reductions in vehicle emissions, improve energy efficiency, and provide other environmental benefits. Below is a summary of the environmental impacts, as well as the environmental benefits of this project.

The incorporation of ORT by the Department will create affordable and convenient transportation choices. The ORT facilities utilize EZPass technology to seamlessly progress through the plaza.

The incorporation of ORT facility in Hampton has shown the use of EZPass to increase 3.8% on one year’s time. Applying the same increased EZPass growth to Hooksett traffic progressing through the toll and it relates to approximately 1,000,000 vehicles per year converting to a free

flow condition in the ORT lanes. Furthermore, a 30% savings in the toll fare is realized for New Hampshire EZPass account holders (non-commercial accounts). The benefits associated with congestion free travel is reaching destinations in a more timely and safer manner. The reduced delay, reduction in household expenses and ease of use associated with EZPass offers an opportunity for households to expanded access to housing choices north and south along the I-93 corridor for people of all ages, incomes, races and ethnicities simply as a result of this increase in mobility and lower costs of transportation.

The implementation of ORT will improve the existing transportation choices by enhancing points of modal connectivity along I-93 and potentially reducing high volumes of traffic on existing parallel facilities such as NH 3A. NH 3A parallels I-93 for almost the entire length of the 13-mile segment from Exit 10 to Exit 11 (I-89 interchange). Some motorists choose to travel NH 3A as an alternate route to I-93 resulting in increased congestion, noise and compromised safety along this secondary roadway. Enhancing travel along I-93 with ORT will offer motorists a more attractive option than travel on NH 3A.

From a fuel dependency perspective, the implementation of ORT will work to reduce our nation's dependence on foreign oil, improve air quality, reduce greenhouse gas emissions and promote public health. Specific data in this regard can be found under "*Sustainability*" and "*Results of the Benefit Cost Analysis*" sections.

iv. Sustainability

Promoting a more environmentally sustainable transportation system is an important goal of any infrastructure improvement program. Investment in the Hooksett toll facility will provide measurable reductions in vehicle emissions, improve energy efficiency, and provide other environmental benefits. Below is a summary of the environmental impacts, as well as the environmental benefits of this project. Currently, these issues are discussed in a State-level environmental document. However, once a grant is approved, the document is sufficient in content and format to be easily identified as "Categorical Exclusion" to satisfy the Federal Highway Administrations requirements under the National Environmental Policy Act.

Air Quality

The Town of Hooksett is currently located within an area that is in attainment for six (6) of the seven (7) criteria pollutants, and has been classified as being in nonattainment for the 8-hour ozone standard (Note: Hooksett is the only town within Merrimack County which is located within the 8-Hour ozone non-attainment area.).

The pollutant burden analysis indicates that during the busiest hours of the year the implementation of ORT by 2012 will result in substantial reductions in energy (18% – 24%), VOC (29% - 35%), CO (30% - 35%), PM2.5 (22% - 32%) and GNG emissions (12% - 24%) compared to the 2012 existing barrier plaza configuration under most scenarios. The 2022 ORT emissions are less than the 2022 existing barrier plaza configuration emissions with reductions in the same ranges compared to the 2012 reductions. NOx emissions for the busiest hours of the year will improve with the proposed ORT with reductions ranging from 9% - 12%. With shorter

queues on an average day, the improvements in NOx emissions from reducing the queues are offset by the slightly higher average operating speeds resulting in a 2% increase in NOx emissions over the existing barrier plaza configuration. In 2022 the ORT NOx emissions are projected to be 2% less than the emissions with the existing barrier plaza.

With the exception of the slight increase in NOx emissions in 2012, which is attributed to a slightly higher operating speed, conversion to an ORT facility will result in less energy consumption, reduced air emissions and improved air quality. Along with eliminating congestion for the traveling public, the air quality analysis completed for the proposed improvements indicates that this project will not delay the attainment of the ozone criterion nor will it cause or contribute to any violation of the NAAQS.

Wetlands

Wetlands were delineated in accordance with the 1987 US Army Corps of Engineers “Wetlands Delineation Manual,” Technical Report Y-87-1, as well as the “Interim Regional Supplement to the Corps of Engineers Wetlands Delineation Manual North Central and Northeast Region,” dated October 2009. A vernal pool assessment was completed in April 2010 in accordance with the NH Fish and Game Department’s “Identification and Documentation of Vernal Pools in New Hampshire,” dated 1997. Wetlands were classified according to the Classification of Wetlands and Deepwater Habitats of the United States FWS/OBS-79/31, by Cowardin, et. al.

Work associated with the proposed project involves dredge and fill activities within areas under the jurisdiction of the DES Wetlands Bureau and the Army Corps of Engineers (ACOE). Impacts include 5,217 sf of permanent impacts to accommodate widening of the roadway, and to facilitate drainage and water quality treatment. In addition, 3,881 sf of temporary impacts are necessary to safely and efficiently facilitate construction, while protecting adjacent wetland resources. Total wetland impacts are 9,098 sf.

The project was reviewed by the ACOE, DES Wetlands Bureau, NH Fish and Game Department (NHFG), USF&WS, and US Environmental Protection Agency (EPA), among others at monthly Natural Resource Agency Coordination Meetings on January 20, 2010 and March 16, 2011. No one in attendance objected to the project as proposed and it was determined that the project would qualify for an ACOE State Programmatic General Permit (SPGP).

Water Quality/ Surface Water

Every two years the Federal Clean Water Act (CWA), as last reauthorized by the Water Quality Act of 1987, requires each State to submit a document typically called the “303(d) List,” which is so named because it is a requirement of Section 303(d) of the CWA. The 303(d) List includes surface waters that meet the following criteria:

1. Impaired or threatened by a pollutant or pollutant(s).
2. Not expected to meet water quality standards within a reasonable time even after application of best available technology standards for point sources or best management practices for nonpoint sources.

3. Require development and implementation of a comprehensive water quality study (a Total Maximum Daily Load (TMDL) study), which is designed to meet water quality standards.

In accordance with Section 303(d) of the CWA, the NH Department of Environmental Services has designated Merrimack River as impaired for several parameters, aluminum, dissolved oxygen and E. coli. Merrimack River lies within one mile of the project area; therefore the project is subject to water quality regulations if a permit is required pursuant to NH RSA 482-A. The criteria pollutants listed above are not highway driven, and the drainage modifications are designed to accommodate the expansion of the turnpike and will provide equivalent or improved levels of stormwater treatment from what is currently in place.

The proposed project will increase impervious surfaces in the corridor by approximately 3.4 acres. However, the micropool extended detention basins incorporated into the design will provide treatment for 9.4 acres of roadway, a factor of 2.7 times the increase in impervious surfaces. Moreover, the basins will address an area that currently receives no treatment through formal best management practices.

v. Safety

Research on ORT facilities shows actual crash reduction rates realized in converting from traditional toll plaza to ORT. Conversion to ORT can reduce crashes by approximately 60% or more depending upon crash history and plaza. Specific data compiled from the Florida Turnpike System provided additional insight into overall crash reduction, as well as property damage and fatal injury rates. This is summarized below:

Average Crash Frequency Reduction						
Toll Plaza	State Road	ORT Opening Day	Turnpike Milepost	All Crash Types	PDO (Property Damage Only)	Fatal + Injury
Homestead	SR-821	12/21/2007	10.424	49%	47%	53%
Bird Rd	SR-821	11/13/2007	23	28%	11%	43%
Cypress	SR-91	2/4/2008	64.274	64%	69%	56%
Lantana	SR-91	3/17/2008	89.356	86%	89%	77%
Sunrise	SR-869	4/28/2008	2.048	42%	22%	53%
Beachline West	SR-528	8/13/2008	6.17	79%	69%	87%
Deerfield	SR-869	3/24/2009	20.452	78%	79%	93%
Average				61%	55%	66%

A 5-year crash history compiled at the Hooksett toll plaza, from approximately 2,500 feet north and south of the plaza, showed 133 accidents from 2006 to 2010 (accidents for the current year

have not yet been compiled, however it should be noted that there was a motorist fatality at the plaza in the spring of 2011).

ACCIDENT SEVERITY BY TYPE	Actual 2006 to 2010 Totals	Projected 2014 to 2018 Totals with ORT*
Incapacitating	3	1.83
Non-Incapacitating	11	6.71
Possible Injury	4	2.44
Property Damage Only	115	70.15
FY Total	133	81.13

*2014 year is identified as start of realized safety timeframe, as the construction will be ongoing from the spring of 2012 through the fall of 2013.

Applying the 61% crash reduction rate to the crash history at the plaza yields a reduction of almost 52 accidents over the 5-year period subsequent to the completion of construction. For further discussion regarding the monetized aspect of the reduction in crashes, see the “*Results of the Benefit Cost Analysis*” section.

b. Job Creation and Near Term Economic Activity

The White House Council of Economic Advisors (CEA) provides an estimate of one job created or saved per \$92,136 of government spending from American Reinvestment and Recovery Act (ARRA) funds. Sixty-four percent of the job-year estimate represents direct and indirect jobs, while thirty-six percent are induced, according to the guidance.

Using the CEA method and assuming an overall project expenditure of \$27.3 million (including preliminary engineering and construction), it is estimated that 296 job-years will be created by the construction investment in the Hooksett I-93 Open Road Tolling Project. For this project, that translates to 189 job years that would be generated directly and indirectly with the remaining 107 job years induced.

c. Innovation

Open Road Tolling (ORT) is the future of toll collection. ORT utilizes innovative technology which transacts fees for road users while driving through the ORT lanes at highway speeds of 65 mph. ORT systems have overhead gantries at predetermined points which deduct tolls based only on predetermined rates specific for each type of vehicle. This approach eliminates vehicle queuing at toll booths, provides free flowing traffic at highway speeds, and significantly improves quality of life for travelers and communities.



ORT is the collection of tolls on toll roads without the use of toll booths. An electronic toll collection system is usually used instead. The major advantage to ORT is that users are able to

drive through the toll plaza at highway speeds without having to slow down to pay the toll.

Collection of tolls on open toll roads is usually conducted through either the use of transponders or license plate recognition. Both methods aim to eliminate the delay on toll roads by collecting tolls electronically by electronically debiting the accounts of registered car owners without requiring them to stop. Overhead cameras are used to capture license plates for those vehicles that do not have EZPass transponders.

Transponders are a receiver-transmitter that will generate a reply signal upon proper electronic interrogation. Transponders are an adaptation of military identification friend or foe technology. Most current Automatic Vehicle Identification (AVI) systems rely on radio-frequency identification (RFID), where an antenna at the toll gate communicates with a transponder on the vehicle via dedicated short-range communications (DSRC). RFID tags have proved to have excellent accuracy, and can be read at highway speeds.



The proposed Hooksett ORT improvements would be the second toll plaza in the state of New Hampshire to utilize ORT strategy and technology to address traffic congestion at toll facilities. The initial implementation of an ORT facility is in Hampton, NH along I-95 and was opened in June 2010. The Hampton ORT conversion was the first in the New England region and eliminated the significant congestion at this plaza, while providing for all the additional benefits as noted within this document for the Hooksett location.

As a result of the Hampton ORT improvement projects aggressive method of project delivery (design developed in 6-months from initiation to construction) and ability to remain within the allotted budget, the project was selected as the regional winner in the 2011 America's Transportation Awards competition under the "On Time Small Project" category. The America's Transportation Awards were created to celebrate transportation improvements delivered by state departments of transportation "On Time and Under Budget" and with "Innovative Management." As a regional winner, the ORT project was also selected to be in the "Top Ten" projects in a national competition for the "People's Choice Award" which was determined by popular vote and a Grand Prize Award, which was determined by a panel of judges. Although the Hampton ORT project did not win one of these top two awards, selection for these prestigious awards confirms both the "innovative" and "technological" nature of the improvements.

d. Partnership

i. Jurisdictional and Stakeholder Collaboration

This project has the backing of many government and industry leaders who have submitted letters of support as part of this application. They include:

- John Lynch, Governor, State of New Hampshire
- NH Congressional Delegation:

- U.S. Senator Jeanne Shaheen
- U.S. Senator Kelly Ayotte
- Congressman Charlie Bass, NH-02
- Congressman Frank Guinta, NH-01
- Raymond J. Wiczorek, Executive Councilor
- State Legislature Delegation
 - Senator Jim Rausch, Chairman, Senate Transportation Committee
 - Senator David Boutin, Vice Chairman, Senate Transportation Committee
 - State Representative David W. Hess, NH House of Representatives
 - State Representative Frank R. Kotowski, NH House of Representatives
 - State Representative Molly Sanborn, NH House of Representatives
 - State Representative Todd P. Smith, NH House of Representatives
- David J. Preece, Executive Director, Southern New Hampshire Planning Commission
- William N. Sirak, Chairman, Hooksett Town Council
- Dean E. Shankle, Jr., Town, Administrator, Town of Hooksett, NH
- Robin A. Comstock, Executive Director, Greater Manchester Chamber of Commerce

Please find attached and on the web page a PDF file of all of the letters of support.

ii. Disciplinary Integration

While this project enjoys the support of state and local officials, NHDOT’s Turnpike Bureau is responsible for funding and managing this project.

e. Results of Cost-Benefit Analysis

Using the TIGER III guidance recommended discount rate of 7 percent for the Benefit-Cost Analysis (BCA) and a 3 percent rate as a sensitivity analysis, the Hooksett I-93 Open Road Tolling Project will result in a very strong return on investment.

Summary of Benefit Cost Analysis

Benefit-Cost Results - Discount Rate: 7%		Benefit-Cost Results - Discount Rate: 3%	
Category	Millions \$	Category	Millions \$
Present Value of Total Costs	\$ 13.0	Present Value of Total Costs	\$ 15.8
Present Value of Total Benefits	\$ 70.5	Present Value of Total Benefits	\$ 134.5
Net Present Value	\$ 57.5	Net Present Value	\$ 118.7
Benefit-Cost Ratio	5.4	Benefit-Cost Ratio	8.5

The New Hampshire DOT conducted the BCA for the Hooksett I-93 Open Road Tolling Project using methods and parameters consistent with US Department of Transportation guidelines. All benefits in the analysis are estimated in 2011 dollars. The valuation of benefits uses a number of assumptions that are required to produce monetized values for non-pecuniary benefits. The different components of time, for instance, are monetized by using a “value of time” that is assumed to be equivalent to the user’s willingness to pay for “time savings” in transit.

Specifically, the BCA expresses benefits and costs monetarily in “present value” (PV) capturing the flows of benefits and costs over the project horizon. The most common metrics of benefit-cost analysis are the Net Present Value (NPV) and Benefit Cost Ratio (BCR). The NPV is the sum of the present value of future cash flows less the present value of the project’s cost including operations and maintenance expenditures. The BCR is expressed as the ratio of benefits of a project relative to its costs, both expressed in present-value terms. A BCR above 1.0 suggests that benefits exceed costs, in which case the projects create a positive return on investment. These, as with all other values used in the analysis, are taken from the United States Department of Transportation (USDOT) guidance on the preparation of TIGER applications. Where USDOT has not provided valuation guidance or a reference to guidance, standard industry practice has been applied.

Project Benefits

The benefit-cost analysis for the Hooksett I-93 Open Road Tolling Project measures three primary categories of benefits: time savings; fuel savings; and accident reduction.

Time Saving Benefits

The ORT project will greatly reduce the amount of time it takes vehicles to pass through the Tolls. HNTB Corporation (HNTB) estimated the reduction in travel time associated with the implementation of the ORT. Total travel time through the Hooksett Toll is expected to be reduced by over a quarter-million hours. Using half of the mean hourly wage rate in New Hampshire of \$10.68/hr (\$21.37/hr x 50 percent), the value of travel time savings is estimated at \$2.87 million beginning in FY 2015. Utilizing CPI data, the New Hampshire Department of Transportation estimated the cumulative time saving benefits to be \$134.64 million over a 30-year period.

Fuel Saving Benefits

This project will result in a significant savings in the consumption of fuel. Using 2011 traffic volumes and current E-ZPass usage, HNTB estimated that fuel consumption would be reduced by approximately a half-million gallons. In terms of the general economic benefit to drivers, assuming an average gas price of \$3.45 in FY 2011 and inflating the price on a yearly basis utilizing CPI, this would equate to an aggregate savings of approximately \$1.80 million beginning in FY 2015. Relief of vehicular congestion due to the implementation of the ORT is estimated to save a total of \$85.64 million in fuel over a 30-year period.

Accident Reduction

The ORT Project will also decrease the likelihood and cost of accidents. HNTB researched existing toll operations that tracked the number of crashes before and after the implementation of an ORT project. When analyzing the reduction at seven locations, the average decrease in crashes was 61%. Utilizing six years of crash data at the Hooksett, New Hampshire tolls, the NHDOT applied the 61% average decrease of crashes and monetized the crash ratios by using the average cost of each type of accident from figures provided by USDOT. In the benefit-cost

analysis conducted for this application, cumulative accident reduction benefits are estimated to be \$18.96 million over a 30-year period.

Project Costs Include the Following:

Construction Costs

Construction costs include design, engineering, and estimated construction costs. The total construction cost allocated to the capital program is \$26.1 million with an additional \$1.21 million having been expended on engineering and design. The New Hampshire Turnpike system's "Renewal and Replacement" program will be contributing approximately \$3 million to this project; therefore the total amount of bonding required for this project would need to be approximately \$13.1 million when factoring in the requested TIGER III Grant of \$10 million. Resultant annual debt service of \$667,642 through year 2042, is therefore included in the construction costs analysis.

Future Rehabilitation Projects

There are three future rehabilitation projects that will not have to be undertaken due to the implementation of the ORT. These future costs are applied as a reduction to the total project cost.

As part of the ORT project, included in the construction contract is an estimated cost of \$1.36 million to complete the rehabilitation of 8 plaza lanes. Without the ORT project, this rehabilitation effort would have needed to be completed on the entire 14 lanes within the next five-year period. This future rehabilitation effort would not be required under the ORT project resulting in a savings of $\$1.35 \text{ million} \times 14/8 \times 1.03^5$ or \$2.76M in FY 2017.

The remaining rehabilitation projects would have included I-93 resurfacing, median guardrail replacement, and I-93 bridge rehabilitation work, which the New Hampshire DOT would have incurred over the next five years. These improvements are currently being progressed under the ORT project. As a result the New Hampshire DOT will realize a savings resulting from the "Economies of Scale" in completing these efforts within a larger single contract, as well as, increased efficiencies in operations resulting from the reduction in multiple design (such as advertising efforts, contract document development, etc.) and construction operations (such as mobilization, bidding operations, etc.). The estimated future cost would be $\$5.44 \text{ million} \times 1.03^4$ or \$6.12 million. NHDOT does not anticipate to undertake any other major rehabilitation efforts at the plaza within the 30-year period once the Hooksett ORT work is completed.

Operating and Maintenance Costs

The Hooksett I-93 Open Road Tolling Project will realize a net reduction in operating and maintenance costs due to the ORT project. Although the new ORT system will have an annual maintenance cost of approximately \$110,000, the removal of two toll booths will realize a reduction of approximately \$39,000 associated with the TRMI Annual Lane Maintenance contract with the NH Turnpike. Additionally, Hooksett toll operational expenditures are estimated to be reduced by 12.9% with the combined impact of ORT and related lean staffing

initiatives. Extrapolating these savings on an annual basis, by using actual expenditures from FY 2011, results in an annual savings of approximately \$199,000 in FY 2015. Applying an inflation factor of 2% to all three operating costs, referenced above, during the 30 year period, results in a net decrease of \$5.19 million. The 2 percent operating cost inflation factor is currently used by New Hampshire DOT within its long-term capital model.

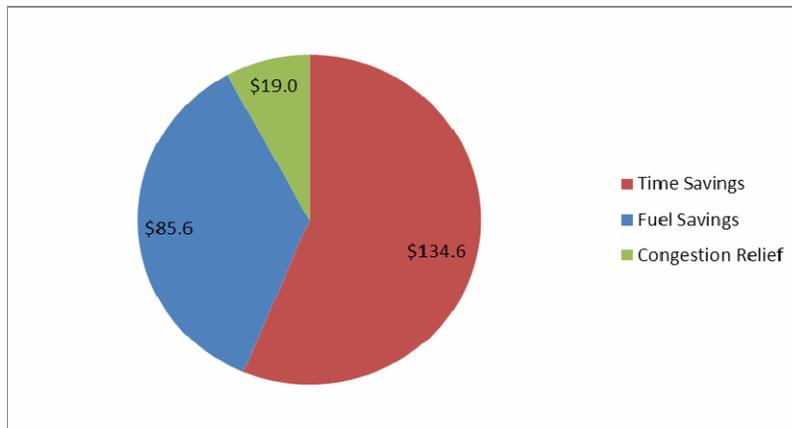
Summary of Benefit-Cost Results

The Hooksett I-93 Open Road Tolling Project will result in total benefits of approximately \$239.23 million over a 30-year period. When discounted by 7 percent, the Present Value of these total benefits is \$70.51 million. The Present Value of the total costs associated with this project is \$12.99 million; therefore the Net Present Value is \$57.52 million. The Benefit Cost Ratio is 5.4 at 7 percent discount rate. The Sensitivity Benefit-Cost Analysis resulted in a Benefit-Cost Ratio of 8.5 using a 3 percent discount rate. See Appendix 1 & 2 for benefits and costs on a per year basis. Summary tables of the benefits and costs associated with the Hooksett I-93 Open Road Tolling Project are provided below.

Summary Table of Benefits and Costs

Benefit-Cost Results Discount Rate: 7%	
Category	Millions \$
Construction Costs	\$ 34.2
Rehabilitation of Existing Toll Plaza,	\$ (8.9)
Operations & Maint. Cost	\$ (5.2)
Total Costs	\$ 20.2
Present Value of Total Costs	\$ 13.0
Time Savings	\$ 134.6
Fuel Savings	\$ 85.6
Accident Reduction	\$ 19.0
Total Benefits	\$ 239.2
Present Value of Total Benefits	\$ 70.5
Net Present Value	\$ 57.5
Benefit-Cost Ratio	5.4

Benefit-Cost Results Discount Rate: 3%	
Category	Millions \$
Construction Costs	\$ 34.2
Rehabilitation of Existing Toll Plaza,	\$ (8.9)
Operations & Maint. Cost	\$ (5.2)
Total Costs	\$ 20.2
Present Value of Total Costs	\$ 15.8
Time Savings	\$ 134.6
Fuel Savings	\$ 85.6
Accident Reduction	\$ 19.0
Total Benefits	\$ 239.2
Present Value of Total Benefits	\$ 134.5
Net Present Value	\$ 118.7
Benefit-Cost Ratio	8.5



A full copy of the NHDOT's benefit-cost analysis report is attached and also available on the web page.

V. Project Readiness and NEPA

a. Project Schedule

The anticipated project schedule for the improvements, pending successful award of the TIGER III grant funding is as follows:

- February 2012 – Receive notification of Approval of TIGER III Grant Program funds
- Late February 2012 – Advertise for Construction Bids
- Mid March 2012 – Identify Successful Contractor Based Upon Low Bid Process
- Mid May 2012 – Legislative Award of Contract and Initiation of Construction
- Mid June 2013 – ORT Complete and Open to Public (ORT Benefits realized)
- October 2013 – Project completion

b. Environmental Approvals

The project was fully permitted through the State of New Hampshire-Department of Environmental Services-Wetlands Bureau (permit #2011-00521) in October 2011 and Shoreland Bureau permit. NHDOT is in the process of finalizing documentation to achieve a Class II (Categorical Exclusion), pursuant to the National Environmental Policy Act (NEPA) of 1969 for this effort. Completion of the NEPA process to allow the contract to be advertised with federal grant funds is anticipated in November 2011. The NEPA documents are attached and available on the web page.

c. Legislative Approvals

The Legislature supports the project given the significant positive impacts that it will have on the State's economy, livability and congestion. The Hooksett ORT improvement project was legislatively authorized under HB 391 (2009 Legislative Session).

d. State and Local Planning

This project is included in the New Hampshire Department of Transportation's (NHDOT) current "Ten Year Transportation Improvement Plan", as well as the State's Transportation Improvement Plan (STIP) for 2011 to 2014. Both plans identify critical infrastructure needs for short and long term futures.

The State's Ten-Year Plan is revised every two years based on input from the Regional Planning Commissions, numerous public meetings throughout the State, and with the approval by the Governor, Governors Council and State Legislature. State of New Hampshire Governor Lynch signed the current Ten Year Plan into law on June 28, 2010. Currently, this project is on the State's "on-shelf" advertising schedule for January 3, 2012. However, due to the current lack of

funding for the project, it remains as a project that is ready for construction while the Department strives to solve the funding challenges.

Similarly, the project is in the State Transportation Improvement Program (STIP) however has been moved out to fiscal year 2014 due to uncertain funding for the project. Grant funding under the TIGER III program would allow the project to move forward for construction and an “administrative modification” would be processed with the local FHWA office to move the project into FY 2012 within the STIP. The project reference number in the STIP is 7384.

e. Technical Feasibility

The project development phase for these improvements is nearly complete. The project design and presentation to the public will be complete by February 2012 in anticipation of notification of TIGER III grant funding. Upon confirmation of the potential funding through the TIGER III program, the Department would be able to advertise the project for construction. Subsequent to the advertising, contractor’s bid period and contract approval processes, construction would be able to commence subsequent to approval by the Governor’s Executive Council anticipated in mid-May 2012.

f. Financial Feasibility

The project improvements are proposed to be multi-funded from two sources within the Bureau of Turnpikes. The “Renewal and Replacement” program will fund nearly \$3.0 million for rehabilitation of the bridges and toll facility. There is committed construction funding, as well as future funding for maintenance and modernization under this contract. The funding levels for the Renewal and Replacement program for FY 12 to FY 19 are shown in the table below. The Legislature authorizes the funding levels for each biennium. Presently, \$19.0 million is legislatively authorized for the FY 12 and 13 biennium.

Renewal and Replacement Funding Levels								
FY	12	13	14	15	16	17	18	19
Funding Level	\$9.20	\$9.80	\$10.50	\$10.80	\$11.60	\$11.50	\$11.80	\$12.20

The “Capital Program” is intended to fund the roadway capacity and ORT infrastructure improvements at a \$23.1 million level. The capital program does not currently have a sufficient revenue stream or an additional dedicated funding source to support the \$23.1 million in costs required to construct the project. However, in evaluating the Bureau of Turnpikes financial models, the \$10 million in TIGER III grant funding would make the project financially feasible. The Bureau of Turnpikes collected \$116.7 million in FY 11 and estimates to collect \$116.7 million in FY 12. Toll revenue is used to pay for operations and maintenance cost on the Turnpike System, debt service on bonds used to finance improvements on the system, Renewal and Replacement work and the Capital Program.

The current Turnpike Capital Program includes capital improvement projects that are considered priorities to address nineteen (19) red-list bridges, improve safety and reduce congestion, to include those projects authorized by House Bill 391. The capital projects are listed as follows:

▪ Rochester 10620G thru L (Turnpike Expansion, Exits 11-16)	\$129.2M
▪ Merrimack 12105 (Souhegan River Bridge Rehabilitation)	\$ 16.0M
▪ Hampton Falls-Hampton 13408B (Taylor River Bridge Replacement)	\$ 10.8M
▪ Bow-Concord 13742 A, B & C (I-93 Bridges at I-89, Exit 12 and 14)	\$ 25.7M
▪ Manchester 14966 (Exit 4 Interchange Bridge Replacements)	\$ 37.8M
▪ Bedford 13527 (US 3 Bridge Replacement over F. E. Everett Tpk)	\$ 12.6M
▪ Newington-Dover 11238 (PE & ROW)	\$ 32.8M
▪ Newington-Dover 11238 (LBB & Newington Construction)	\$153.5M
▪ *Newington-Dover 11238 (GSB & Dover Construction)	\$ 73.2M
▪ Hampton-North Hampton 15678A thru D (ORT Conversion)	\$ 17.6M
▪ *Hooksett 15803 (ORT Conversion)	\$ 24.6M
▪ *Bedford (ORT Conversion)	\$ 18.7M
▪ Seabrook 15769 (NH 107 Road and Bridge Improvements at Exit 1)	\$ 3.1M
▪ Portsmouth 15760 (I-95 Soundwall adjacent to Atlantic Heights)	\$ 2.7M
	Total - \$558.3M

* The HB 391 projects that are not funded under the current toll rate structure.

Please find attached a letter from NHDOT committing to the use of NHDOT funding for the match; the letter is also available on the web page.

VI. Federal Wage Rate Certification

Please see attached letters from the NHDOT-Bureau of Construction committing to comply with the Federal wage rate requirements in Subchapter IV of Chapter 31 of Title 40, United States Code; the letters are also available on the web page.

VII. Any Changes from the Pre-Application

In the pre-application for this project, we estimated the total cost of this project to be \$26.5 million with a TIGER Grant request of \$10 million with a \$16.5 million match by NHDOT. The total project cost has been revised to \$26.1 million with a TIGER Grant request of \$10 million with a match of \$16.1 million by NHDOT.

VIII. List of Attachments (Also Available on Web Page)

- Benefit-Cost Analysis Report
- NEPA Documents
- Letters of Support
- Financial Commitment Letter
- Federal Wage Rate Certification Letter