

NEW JERSEY HIGHWAY SAFETY IMPROVEMENT PROGRAM MANUAL

September 2016





U.S. Department
of Transportation
**Federal Highway
Administration**

New Jersey Division

September 28, 2016

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In Reply Refer To:
HDA-NJ

Richard T. Hammer
Commissioner
New Jersey Department of Transportation
1035 Parkway Avenue
Trenton, NJ 08625

Subject: New Jersey's 2016 Highway Safety Improvement Program Manual

Dear Commissioner Hammer:

It is my pleasure to endorse NJDOT's recent submission of the 2016 update to the New Jersey Highway Safety Improvement Program Manual.

NJ's HSIP performance has improved substantially since the development of the first NJ HSIP Manual. Authorizations for HSIP funded projects increased fivefold. Most importantly the authorized project investments reflect a balanced data driven safety program. NJ's use of state of the art data driven safety analysis (DDSA) tools, like AASHTO's Highway Safety Manual, along with inclusion of proven countermeasures has resulted in favorable national attention. In fact, NJDOT, along with its local partners, was recently featured by FHWA in two videos featuring NJ's successes with respect to HSIP delivery. If you haven't seen them already, I highly recommend viewing them. <https://www.youtube.com/watch?v=Lx7sJktkFVA>
<https://www.youtube.com/watch?v=cHv086TQ2LI>

The updated manual's addition of the local safety program delivery elements is a considerable advantage. The inclusion of DDSA tools for state as well as local projects optimizes the return of infrastructure investments with respect to safety performance. This is a tremendous advantage in the context of MAP-21 & the FAST ACT performance management requirements, especially with respect to safety performance measure target setting. The updated manual is a helpful roadmap for internal and external stakeholders as NJ advances the overall HSIP.

I would like to thank Assistant Commissioner Dave Kuhn along with his staff for their efforts updating this manual. Thanks to Dave's leadership, NJ's HSIP is recognized beyond NJ's borders as a program which maximizes the safety benefit associated with HSIP investments.

Sincerely,

Robert Clark
Division Administrator

cc: Dave Kuhn
RF

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- A NJDOT Policy 405
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LIST OF ABBREVIATIONS

B/C	Benefit/Cost
BTDS	Bureau of Transportation Data and Safety
CD	Concept Development
CMF	Crash Modification Factor
CPC	Capital Program Committee
CPSC	Capital Program Screening Committee
CRF	Crash Reduction Factor
EMS	Emergency Medical Services
FD	Final Design
FHWA	Federal Highway Administration
FY	Fiscal Year
HRRR	High Risk Rural Road
HSIP	Highway Safety Improvement Program
HSM	Highway Safety Manual
LSP	Local Safety Program
MPO	Metropolitan Planning Organization
NHPP	National Highway Performance Program
NJ	New Jersey
NJDOT	New Jersey Department of Transportation
PE	Preliminary Engineering
SHSP	Strategic Highway Safety Plan
SMS	Safety Management System
STBG	Surface Transportation Block Grant
STIP	Statewide Transportation Improvement Program
TRC	Technical Review Committee

Purpose

The primary goal of New Jersey (NJ)'s Highway Safety Improvement Program (HSIP) is to reduce serious injury and fatality crashes on all of NJ's public roads. NJ's vision is to achieve zero deaths on all public roads. This is to be accomplished through the development and implementation of Strategic Highway Safety Plans (SHSP). SHSPs are intended to drive states' HSIP investment decisions.



Safety Goal

To achieve the primary goal, NJ has established a 2.5 percent per year reduction in the 5-year rolling average of fatalities and serious injuries. Achievement of this goal would bring serious injuries and fatalities to fall below the 2012 level of 2,059 to 1,599 by the year 2022. HSIP projects are required to adhere to performance-based goals focusing resources on areas of greatest need and potential for the highest rate of return on the investment of HSIP funds on all public roads.

Administration

The New Jersey Department of Transportation (NJDOT) is responsible for the adoption and administration of the HSIP. The Bureau of Transportation Data and Safety (BTDS) is responsible for the development and implementation of NJ's HSIP and for annual reporting to Federal Highway Administration (FHWA) on NJ's HSIP.

This manual describes the process for advancing HSIP funded projects on all of NJ's public roads.

Federal Guidance

The HSIP is described in [23 CFR 924](#). HSIP projects are required to be consistent with the [NJ's SHSP](#), and are identified on the basis of crash experience, crash potential, crash rate, or other data-supported means. HSIP projects are required to adhere to performance-based goals focusing resources on areas of greatest need and potential for the highest rate of return on the investment of HSIP funds on all public roads.

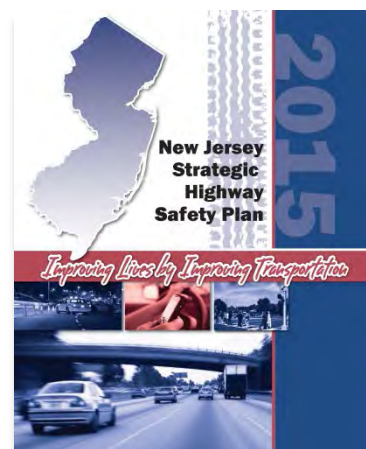


Another element of NJ's HSIP is the Rail Highway Grade Crossing Program. The Railway-Highway Grade Crossing Program is intended to reduce the number and severity of train collisions with vehicles and pedestrians at public highway-rail grade crossings. As with all federal aid projects, use of HSIP funds warrants compliance with all relevant law as described in [23 U.S.C.](#) and clarified in 23CFR.

Strategic Highway Safety Plan

NJ's SHSP is a statewide- coordinated safety plan that provides a comprehensive framework for reducing highway fatalities and serious injuries on all of public roads under state, county or local jurisdiction. This is a data-driven, comprehensive plan that establishes statewide goals, objectives, and key emphasis areas and strategies integrating the four Es - engineering, education, enforcement and emergency medical services (EMS). NJ's SHSP was developed by the NJDOT in a cooperative process with local, state, federal, and private sector safety stakeholders.

NJ's crash data was used to identify NJ's Safety Emphasis area as depicted below.



New Jersey's Safety Emphasis Areas by Fatalities and Serious Injuries – 2008 to 2012

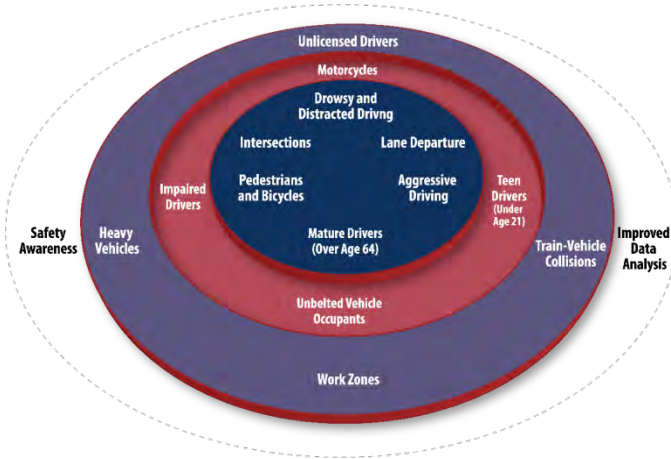
Safety Emphasis Area	National Fatalities Percentage	New Jersey			
		Fatalities		Fatalities + Serious Injuries	
		Percentage	Number ^c	Percentage	Number ^c
Statewide Totals		2,946		10,605	
Lane Departure	52% ^a	47%	1,386	45%	4,776
Drowsy and Distracted Driving	12% ^b	34%	1,002	42%	4,478
Aggressive Driving	36% ^b	32%	937	34%	3,600
Intersections	21% ^a	24%	700	30%	3,233
Pedestrians and Bicyclists	15% ^a	27%	798	23%	2,472
Impaired Driving	31% ^a	14%	420	18%	1,898
Mature Drivers (Over the Age of 64)	16% ^b	20%	591	17%	1,840
Unbelted Vehicle Occupants	34% ^a	18%	531	16%	1,740
Teen Drivers (Under the Age of 21)	8% ^b	11%	337	13%	1,395
Motorcycles	14% ^a	13%	375	12%	1,245
Heavy Vehicles	12% ^a	5%	162	3%	337
Unlicensed Drivers	16% ^b	1%	36	3%	337
Work Zones	2% ^b	3%	76	2%	183
Train-Vehicle Collisions	1% ^b	0%	9	0%	13
Improved Data Analysis	N/A				
Driver Safety Awareness	N/A				

Notes:

^a From *Towards Zero Deaths: A National Strategy on Highway Safety*, Draft, 2014

^b From *AASHTO Strategic Highway Safety Plan*, 2004

^c The numbers in the columns add to more than 100 percent because many crashes are assigned to more than one emphasis area. For example, a crash that occurred at an intersection, involving a teen driver that was unbelted would be assigned to three safety emphasis areas.



Examination of this data resulted in 3 levels of prioritization of identified emphasis areas.

Legend

1st Priority (>2,000 fatality and serious injury crashes)
2nd Priority (1,000 to 2,000 fatality and serious injury crashes)
3rd Priority (<1,000 fatality and serious injury crashes)

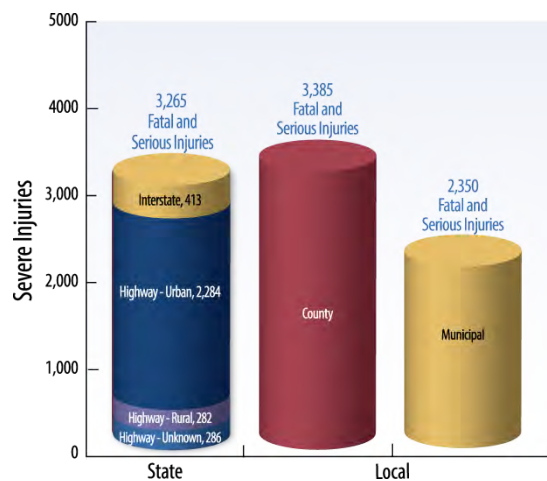
Note: Fatality and serious injury crashes are those crashes that result in one or more fatalities or serious injuries, or both.

Because of NJ’s high pedestrian fatality rate, FHWA has identified NJ as a Pedestrian Safety Focus State. NJ’s intersection fatality and severe injury rate, has also resulted in NJ being identified as an Intersection Focus State.

NJ’s current SHSP has identified Infrastructure Strategies to mitigate the indicated crashes within each emphasis area above. Examples of infrastructure strategies to be considered are available on Table 2-4 on Page 2-38.

NJ’s roadway system consists of approximately 40,000 centerline miles of public roads, of which approximately 2,800 miles (7 percent) are state highway facilities under the jurisdiction of the NJDOT. Another 36,000 miles (89 percent) of roadway are managed by counties (6,800 miles) and municipalities (29,000 miles).

Approximately 33 percent of fatal and serious injury crashes occur on state highways and 57 percent on local roads. The distribution of each crash type by state and local roadways is similar to the overall total with approximately one-third of each type occurring on state highways and two-



thirds on local roads. In each case, there are more crashes on county roads (34 percent) than city streets (23 percent).

HSIP Investment Plan

Under the most recent federal legislation, the [FAST Act](#), NJ is apportioned approximately \$57 million annually for HSIP Program. NJ has set annual targets for HSIP funding allocation based on the emphasis areas identified above and on the distribution of fatal and serious injury crashes among state and local jurisdictions.

This plan provides the following direction:

Infrastructure related (NJDOT)

- Focus approximately 40 percent of the annual HSIP funding on state highways and 60 percent on county and municipal network in line with the current distribution of serious injuries and fatalities.
- Better alignment of investments with crash data utilizing data driven safety analysis tools;
- Prioritization of investments to address FHWA identified for NJ's Focus Categories.
- Focus on lane departure, intersections, and pedestrians as a top priority.
- Periodically adjust the program so that funds are targeting the most pressing safety issues.
- Advance systemic infrastructure improvements that prove more effective in reducing fatalities and serious injuries. Examples are centerline and edge-line rumble strips and high-friction surfaces on curves.

The FAST Act includes consideration for High Risk Rural Roads (HRRR). HRRR is any roadway functionally classified as a rural major or minor collector or a rural local road on which the accident rate for fatalities and incapacitating injuries exceeds the statewide average for those functional classes of roadway. The Act stipulates that if the fatality rate on rural roads increase over the most recent two-year period for which data are available, in the next Fiscal Year (FY) the state is required to obligate for this purpose an amount equal to at least 200 percent of its FY 2009 HRRR set-aside.

HSIP Process

NJDOT develops an annual safety investment strategy for all HSIP funded activities and projects. The annual investment strategy demonstrates the linkage between the objectives of the SHSP and the projects we are implementing to ensure we are focusing on the most effective safety improvements.

The investment strategy is a summary report submitted at the beginning of each federal fiscal year which contains the following:

- statements requesting FHWA review and concurrence of the proposed investment strategy,
- a summary of the number and costs anticipated for project authorizations for the following categories :
 - Planning Activities,
 - Local Safety Projects,
 - State Capital Program Projects and
 - Rail Highway Grade Crossing Projects.
- A listing of individual projects as an appendix to the one page report,
- Statements clarifying differences in what was proposed in the investment strategy in the prior federal fiscal year investment compared to what was obligated,

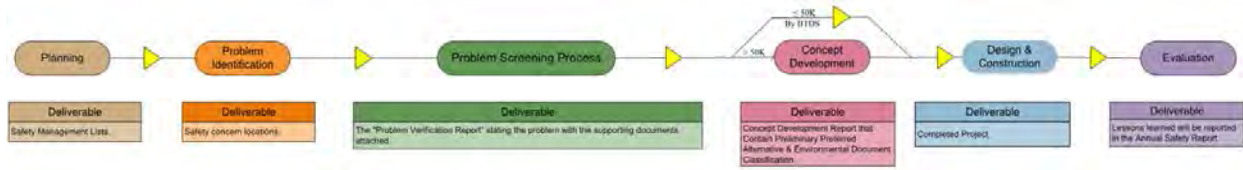
The obligation plan will be provided by the BTDS to the FHWA NJ's Division Office for concurrence.

The development of the Statewide Transportation Improvement Program (STIP) should reflect the elements of the investment strategy and obligation plan to the extent possible, but it is understood that fiscal constraints may impact programming to some degree.

HSIP Implementation

STATE HOT SPOT PROGRAM

It is important to optimize the safety performance with respect to infrastructure investments by applying the following elements. This should be done during the early stages of project development, ideally before or during Concept Development (CD).



Planning

Verify the identified location with any of the existing Safety Management System (SMS) lists described below:

- Intersection Improvement List
- Segment List
- Pedestrian List and
- Fixed Object List

Problem Identification

Identify the safety concerns once location is verified. In this step the following elements are to be addressed:

- Verify the crashes at that location are accurate and up to date with respect to the most recent three (3) years of crash reporting. In the case of the pedestrian focused project, five (5) years of crash history shall be examined.
- Verify status of locations with respect to other management system lists
- Verify if any other unit is including the location under the current Project Reporting System or any other active NJDOT project.

Problem Screening Process

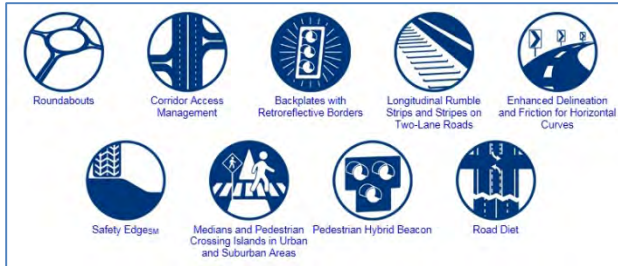
The goal of the problem screening process is to develop all of the data needed for consideration of the project by the Capital Programming Screening Committee (CPSC) and the Capital Program Committee (CPC). Problems identified on the SMS List, warrant additional requirements to be HSIP funding eligible. The following elements should be included in the overall package submitted to the CPSC specific to the HSIP:

- Prepare crash summaries
- Develop a crash diagram incorporating the actual individual crash reports and determining the predominant crash pattern.
- Identify the most effective infrastructure countermeasures correlated with the predominant crash types. The proposed countermeasures shall include a summary of the expected Crash Reduction Factors (CRF).
- Verify the recommended infrastructure countermeasures are consistent with NJ's most recent SHSP.
- Ensure package is complete with respect to the remaining elements normally included in the CPSC and CPC package as described in [NJDOT Policy 405](#) (Appendix A), CPSC/CPC Guidance.

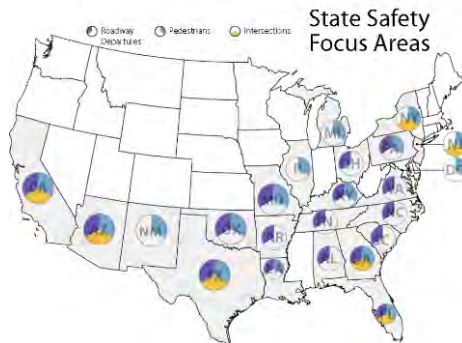
Concept Development

The following elements are to be completed as the project advances to CD:

- Verify that the project's purpose and need is consistent with the identified safety concern and NJ most current SHSP.
 - Investigate opportunities to apply substantive safety enhancements to the project location. At a minimum, alternatives incorporating the appropriate [FHWA Proven Countermeasures](#) shall be considered.



- NJ is a Pedestrian and Intersection [Focus State](#). Particular



attention should be paid to locations that reflect intersection or pedestrian crashes. Since NJ's Pedestrian Crashes are substantially over represented as compared to the nation; a Pedestrian Road Safety Audit shall be

conducted for each project addressing Pedestrian Crashes. The Pedestrian RSA should be done during CD phase and the identified pedestrian safety countermeasures should be included in the project's design alternatives.

- Prioritize treatments which yield the highest Crash Modification Factor (CMF) benefits correlated with the indicated crashes in the location's Crash Diagrams.
- Identify Safety Design Alternatives incorporating treatments associated with the above identified CMFs.
- Prepare an initial cost estimate for at least two of the top Safety Design Alternatives as described above.
- For projects less than \$250,000 complete the following:
 - List predominant crash types with correlated selected infrastructure countermeasures.
 - Apply CRFs to most recent three (3) year historical crash data to establish reduction of the listed crash types. Note for pedestrian crashes use most recent five (5) years historical crash data.

- For calculation of benefits, use the values provided by [Highway Safety Manual](#) (HSM) for 2001 crash costs as listed in the table below. These values should be adjusted to current year values.

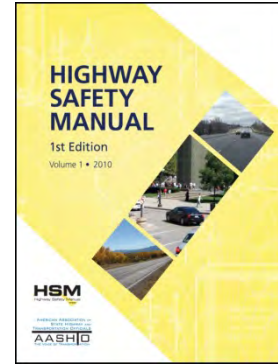


Table 4A-1. Crash Cost Estimates by Crash Severity

Crash Type	Human Capital Crash Costs	Comprehensive Crash Costs
Fatal (K)	\$1,245,600	\$4,008,900
Disabling Injury (A)	\$111,400	\$216,000
Evident Injury (B)	\$41,900	\$79,000
Possible Injury (C)	\$28,400	\$44,900
PDO (O)	\$6,400	\$7,400

Source: *Crash Cost Estimates by Maximum Police-Reported Injury Severity within Selected Crash Geometries*, FHWA-HRT-05-051, October 2005

- Calculate the Benefits/Project Costs (B/C), which include the design costs, right of way costs and construction costs for the above figures.
 - If $B/C > 1$, provide the results to BTDS for review and consideration of HSIP funds. Please note, when calculating B/C the entire costs of project should be considered.
 - If $B/C < 1$ project is no longer eligible for HSIP funding.
- If the identified infrastructure improvements are greater than \$250,000 in cost then a Predictive Safety Analysis using the (HSM) will be required in the CD Phase. This process requires the following elements:
 - Crash Diagram reflecting the individual crashes at the screened location.
 - Site Characteristics Data site characteristics data are needed for two types of sites— homogeneous roadway segments and intersections
 - Traffic Volume Data
 - Crash History Data- application of crash history data is limited to certain conditions and methodologies within the HSM.
 - Calculation of the benefits from the reduced crashes correlated with the Predicted Safety Performance for the proposed alternatives.

- For calculation of benefits, use the values provided by HSM for 2001 crash costs as listed in the table below. These values should be adjusted to current year values.

Table 4A-1. Crash Cost Estimates by Crash Severity

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Source: *Crash Cost Estimates by Maximum Police-Reported Injury Severity within Selected Crash Geometries*, FHWA-HRT-05-051, October 2005

- Calculate the B/C (design costs, right of way costs and construction costs) for the above figures.
 - Compare the B/C for the above design alternatives.
 - Select the preferred alternative. The selected alternative must have a B/C > 1 to be eligible for HSIP funds.
 - Provide the results to BTDS for review and HSIP consideration.
 - If B/C < 1 project is no longer eligible for HSIP funding.
- Additional Considerations:
 - Other Federal-aid funds are eligible to support and leverage the safety program. Improvements to safety features that are routinely provided as part of a broader Federal-aid project should be funded from the same source as the broader project. State should address the full scope of safety needs and opportunities on all roadway categories by using other funding sources such as [Surface Transportation Block Grant \(STBG\)](#), [National Highway Performance Program \(NHPP\)](#), in addition to HSIP funds.
 - HSIP projects require a holistic examination of the safety performance and needs at each site. When the purpose and need of a project is to address Safety Management System issues the project's scope will need to reflect all opportunities to mitigate for exhibited crashes. Projects may be eligible at any phase of project development for HSIP funds. When using HSIP funds the project's scope shall address the safety purpose and need.
 - Project locations may be prioritized for Special Designated Areas (Appendix B), since historically crash data correlates

with an over representation of injury and fatality crashes in these communities.

- Pedestrian Improvements safety benefits may be under represented in the HSM due to the limited current available safety data. Therefore, these projects may be considered on a case by case basis by BTDS. Justifications for advancement of Pedestrian Safety projects will include a data driven approach to identification and mitigation for improved safety performance. Some examples of data driven approach may include; identification of relevant Crash Reduction Values, Census Data, Transit Connectivity, over-representation of specific age groups in crashes, etc.

Design & Construction

- Any changes in the scope of an HSIP funded project must be coordinated and approved by BTDS in writing prior to advancement in design.
- As projects advance in from Preliminary Engineering (PE) to Final Design (FD) and finally to Construction, BTDS should be contacted so that the HSIP Spending Plan reflects the current investments and schedule.

Evaluation

The measure of success of this program is a significant reduction in NJ's fatalities and serious injuries.

BTDS will submit to the FHWA Division Administrator no later than August 31st of each year a report covering the state's HSIP during the previous July 1 through June 30 period. In the annual report, NJDOT shall report on the progress made in implementing the hazard elimination program and the grade crossing improvement program, and shall evaluate the effectiveness of completed highway safety improvement projects in these programs. NJDOT will be required to document safety performance targets beginning August of 2017 along with the basis for those targets and the progress to achieving those safety performance targets in future HSIP reports. NJDOT will report on the HSIP using FHWA's online reporting tool to submit to FHWA.

To establish the actual benefit associated with the safety improvements, every project which receives funding under the HSIP will be required to provide a three (3) year post analysis of safety performance for the location of the improvements. This data will be included in NJ's Annual Safety Report.

Common HSIP misconceptions:

- Performing an HSM analysis is a way to get HSIP funds.
 - Clarification – HSM analysis is a requirement for eligibility however HSM itself does not ensure the proposed improvements will be eligible for HSIP funds. The HSM analysis should reflect incorporation of infrastructure countermeasures which yield the greatest safety benefit.
- If a project is on a SMS list it qualifies for HSIP funds
 - Clarification – project locations must be included in network screening lists. However, simply selecting a location based on inclusion without mitigating for the indicated crashes at that location will not satisfy HSIP requirements. Once identified on a SMS list the project's purpose and need should be developed to align with resolution of indicated crashes.
- Safety concerns on roads, like rock fall, are eligible for HSIP
 - Clarification- HSIP funding eligibility correlates with NJDOT crash data as well as NJ's most recent SHSP. Therefore, SMS locations' improvement will be required to be consistent with the SHSP. Since NJ's fatality and serious injury crash data does not reflect incidences involving rock fall and is not included in the SHSP, mitigation for rock fall would not be considered eligible.

State Systemic Safety Program

Subject to the above elements of the HSIP, identified by BTDS and coordinated with FHWA's NJ Division Office, certain projects may be advanced as Systemic Safety Improvements.

These projects utilize analyses focused on identified roadway risk factors associated with indicated system crashes. Similar to most common safety planning processes, the systemic approach involves problem identification, countermeasure selection, and project location prioritization. The systemic approach begins by looking at the system wide data to analyze and identify systemic safety problems on particular roadway types. The approach then moves to a micro-level analysis to conduct a risk assessment of

locations across the network. This leads to the selection of relevant mitigating strategies most appropriate for broad implementation across those locations. All applications for systemic safety improvements will be evaluated by BTDS and approved FHWA's Division Office prior to authorization submission.

The requirements above with respect to consistency with the SHSP, countermeasure selection, HSM analysis, B/C analysis and annual reporting apply to the Systemic Approach. The analysis will be focus on a particular roadway section which exhibits over represented crashes. This will be used as a model location for the application system wide.

Local Highway Safety Improvement Program

The Local Safety and HRRR Programs provide federal Highway Safety Improvement Program funding for design, construction and construction inspection of safety improvements on county and local roadways.

NJDOT has developed network screening lists for all of NJ's local roadways identifying and ranking high crash locations. Local governments and the Metropolitan Planning Organizations (MPO) identify potential locations for safety enhancement projects on non-state highway systems using these network screening lists.

The MPOs solicit local officials for submission of candidate projects annually. A sample Local Safety Project application is included in the attached appendix.

Upon receipt of applications, each MPO screens the applications to verify all required elements are included. The MPO then submits copies of the applications to the Technical Review Committee. NJ's HSIP Local Safety Program (LSP) Technical Review Committee (TRC) is made up of representatives from NJDOT's BTDS, Local Aid units, NJDOT's Environmental Resources and the respective MPO Safety Offices. The NJ FHWA Division Office, while not a member of the committee, serves in an advisory capacity on the committee. The LSP TRC provides assistance to local agencies throughout the process of identifying and developing local safety and HRRR projects on roadways under local jurisdiction. The TRC will evaluate each application and determine if it should be recommended for HSIP funding. The TRC will also determine the year best suited for construction authorization based on project complexity, size and/or level of design assistance needs.


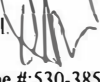
Selected projects are administered by county and municipal governments with oversight by NJDOT's Division of Local Aid.

APPENDIX A



DEPARTMENT OF TRANSPORTATION

POLICY/PROCEDURE

SUBJECT: Capital Program Screening Committee/ Capital Program Committee Guidance	Effective Date: 1-27-16	Commissioner Approval:  Sponsor Approval:  Contact Telephone #: 530-3855
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I. PURPOSE

This policy articulates the New Jersey Department of Transportation’s (NJDOT) requirements for inclusion on either the Capital Program Screening Committee (CPSC) or Capital Program Committee (CPC) agenda. The policy will provide the process for documentation and approval of the various changes that affect the scope and/or status of NJDOT proposed projects and projects. The policy will provide a uniform protocol to ensure that NJDOT management and staff, and local stakeholders, are notified of the changes.

This Policy and Procedure addresses projects; it does not address Problem Statements (refer to Policy and Procedure 404) or Change Control Board procedures and requirements (refer to BDC07PR-01; http://www.state.nj.us/transportation/eng/documents/CCB/CCB_Procedure.shtml). Changes control Board approval does not suffice for CPSC approval.

II. BACKGROUND

There is a need for clear and uniform guidance to document and obtain approval of project scope and/or phase change. This Policy documents required information for inclusion on CPSC or CPC agenda.

III. DEFINITIONS

Capital Program Committee (CPC): A committee composed of NJDOT senior management and chaired by the NJDOT Deputy Commissioner. The Federal Highway Administration (FHWA), NJ Transit, and representatives from New Jersey’s three Metropolitan Planning Organizations (North Jersey Transportation Planning Authority, South Jersey Transportation Organization, and Delaware Valley Regional Planning Commission) may attend in an advisory capacity. The CPC reviews and makes decisions concerning all aspects of the Department’s Capital Program. Voting members consist of the Deputy Commissioner and Assistant Commissioners.



**DEPARTMENT OF TRANSPORTATION
POLICY/PROCEDURE**

SUBJECT: Capital Program Screening Committee/ Capital Program Committee Guidance	Effective Date: 1-27-16	Commissioner Approval: Sponsor Approval: Contact Telephone #:530-3855
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Capital Program Screening Committee (CPSC): A committee composed of various NJDOT managerial staff that is chaired by the Director of Capital Investment Planning and Development. The committee also includes the (FHWA) and NJ Transit. Representatives from New Jersey’s three Metropolitan Planning Organizations also attend in an advisory capacity. Voting members consist of the Chairman and NJDOT Director-level staff.

Change Control Board (CCB): A committee established to review and approve changes and requests affecting design and construction in an effort to control costs, control scope changes, and provide historical data for quality assurance purposes. The CCB is composed of the Capital Program Management Directors. A representative from the Division of Capital Investment, Planning and Grant Administration and FHWA will attend meetings as appropriate.

Change in Scope: When the scope of a proposed project or project is changed significantly, such as downsizing, segmenting, adding work, or consolidating multiple projects to the point where funding levels, community support, or other issues may be impacted.

Change in Status: When a proposed project or project is moved from one phase of development to another. This may result in advancing the project to the next phase, withdrawing, downsizing, recycling, or placing on hold.

Downsize: A new alternative that addresses the original purpose and need, but is smaller than the original scope that was presented to local stakeholders.

Limited Scope: The Limited Scope Project Delivery Approach was developed to deliver small- scope projects that meet certain criteria. The purpose of these projects is to address deficiencies in order to extend the functional and structure life of the Department’s assets. The project scope is not intended to go beyond addressing the defined purpose and need of the project. Projects that involve Right-of-Way acquisition or easements, environmental impacts, or permanent utility relocations are not applicable, with minor exceptions at the discretion of FHWA.

On Hold: Work on a proposed project or project is halted in order to evaluate the scope and priority of the project.



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Other Business: CPC actions that do not require CPSC review.

Problem Statement: A written document (Form TP-1) that identifies and describes a potential deficiency or safety issue on the State Transportation System.

Project: The temporary endeavor undertaken to create a unique product, service, or result.

Project Scope: The clear limits of work and elements included in that work; the work to be accomplished to deliver a product that fixes the issue as documented in the Problem Statement; or as defined by the Limited Scope purpose and need.

Proposed Project: The possible outcome of a Problem Statement or generated by a management system list. A proposed project may graduate from the Concept Development Phase to become a project.

Project Phase(s): The current phases of a project are Problem Statement/Screening, Concept Development, Preliminary Engineering, Final Design, and Construction.

Recycle: Officially moving a proposed project or project back to a previous phase of work in order to determine the appropriate level of effort.

Segment/ Break Out: The separation of the original alternative into different projects in order to expedite necessary improvements, while proceeding with or re-evaluating the remaining portion or portions of the project.

Withdrawal: Official withdrawal of the project from the NJDOT Work Program.

IV. POLICY

Policy and Procedure 405 establishes a written process that identifies the various changes that affect the scope and status of NJDOT projects and provides a uniform protocol to ensure that Department management and staff, and local stakeholders, are notified of the changes.



**DEPARTMENT OF TRANSPORTATION
POLICY/PROCEDURE**

SUBJECT: Capital Program Screening Committee/ Capital Program Committee Guidance	Effective Date: 1-27-16	Commissioner Approval: Sponsor Approval: Contact Telephone #:530-3855
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NJDOT is responsible for improving New Jersey’s complex transportation system by developing, advancing, and delivering projects that are environmentally responsible, enhance safety, ease congestion, preserve infrastructure, integrate and support sustainable development, and ultimately promote a better quality of life and economic growth for New Jersey citizens. This process requires a commitment to communication with stakeholders and coordination with funding and oversight agencies. In addition, NJDOT will adhere to the core principles of quality, efficiency, cost-effectiveness, strategic capital investment, and asset management.

The CPSC evaluates requests to document changes to proposed projects or projects; and makes a recommendation for actions by the CPC. In order for a proposed project or project to advance through the Department’s Capital Project Delivery phases, CPC review of CPSC recommendations and/or Other Business is required.

V. PROCEDURE

1. Items which require review and recommendation by the CPSC include requests for advancement through the Capital Project Delivery phases, placing on hold, withdrawal, break out, recycling or downsizing a project. When a significant change to a project’s scope, schedule and/or budget is proposed, CPSC review is required. Significant changes are those that necessitate changes in programming of funds in the Statewide Transportation Improvement Program, including changes to costs, project descriptions and/or scheduled year of authorization.
2. For items that require review and recommendation by the CPSC, the unit with ownership of the project will be responsible for making a recommendation to the CPSC. The Director of the unit of ownership must approve the recommendation.
3. Items which may be placed on CPC agenda as Other Business are actions which do not require CPSC review. These actions include, but are not limited to, recommendations for advancement of Problem Statements to Concept Development, minor modifications to past CPC actions, actions which have had CPSC review and were tabled, or advancement of Limited Scope projects. Requests for inclusion as Other Business are reviewed by the CPSC Chair. The Director of the unit of ownership is advised of the recommendation.
4. Requests must be submitted to cpsc-cpc,dot@dot.nj.gov and identified as a request for CPSC, CPC and/or Other Business. For meeting dates, submission deadlines and



**DEPARTMENT OF TRANSPORTATION
POLICY/PROCEDURE**

SUBJECT: Capital Program Screening Committee/ Capital Program Committee Guidance	Effective Date: 1-27-16	Commissioner Approval: Sponsor Approval: Contact Telephone #:530-3855
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<http://njdotintranet.dot.state.nj.us/about/asset/cpsc.shtm>. For meeting dates, agendas and meeting minutes for CPC requests, please refer to <http://njdotintranet.dot.state.nj.us/about/asset/cpc.shtm>. Requests for placement of Other Business on CPC agendas must be submitted to cpsc-cpc,dot@dot.nj.gov two weeks prior to the meeting date.

- Information that is provided for inclusion in the CPSC/ CPC agenda should match the information found in PRS. The following documentation is required to be submitted with the request:

Header (*if applicable):

- Project Name (as it appears in PRS)
- DB and UPC #
- Initiating Unit
- County/(ies)
- Municipality/(ies)
- CIS Category
- Structure #*
- Project Status: (current)
- Estimated Project Cost: Broken out by phase
- Oversight (PODI/ Non PODI/ State/ Other)

Body of Memo (*if applicable):

- Requested CPSC or CPC action (CD, PE, FD or Constr.)
- Preliminary Preferred Alternative (PPA)/ Preferred Alternative (PA)
- Purpose and Need
- Background/History
- Management System input
- Federal safety funding eligibility
- Pedestrian/Bicycle/ADA compliance
- Coordination with Office of Community Relations and/or local stakeholders*



**DEPARTMENT OF TRANSPORTATION
 POLICY/PROCEDURE**

SUBJECT: Capital Program Screening Committee/ Capital Program Committee Guidance	Effective Date: 1-27-16	Commissioner Approval: Sponsor Approval: Contact Telephone #:530-3855
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Anticipated Impact (Environmental/Drainage/ROW)
 Road/ Bridge Closures/Detours*
 Breakout/ additional/ removed work (in reference to original project/ DB/ UPC)*
 Recommendations (detailed)
 Proposed new project name*

6. If withdrawal from the current program is the requested action, please refer to Policy and Procedure 707, Federal Funds Management, Section V11, Sub Section B-4, which provides guidance on the termination of projects involving FHWA funding.
7. If the CPSC, either by formal vote or general consensus, approves the recommendation, the subject project will be brought to the CPC for action.
8. Actions which require Change Control Board review should be evaluated to determine need for CPSC review. CCB approval does not suffice for CPSC review/ CPC approval.
9. The Division of Capital Investment, Planning and Development will document all actions.

VI. CPSC Voting Members

Director, Capital Investment, Planning and Development (Chair)
 Director, Bridge Engineering and Infrastructure Management
 Director, Capital Program Support
 Director, Mobility Systems and Engineering
 Director, Highway and Traffic Design
 Director, Project Management
 Director, Regional Operations
 Director, Statewide Planning
 Director, Traffic Operations

VII. CPC Voting Members

Deputy Commissioner, Chair
 Assistant Commissioner Capital Investment, Planning and Grant Administration
 Assistant Commissioner Capital Program Management
 Assistant Commissioner Operations
 Assistant Commissioner Transportation Systems Management

APPENDIX B

**Special Designation Chart
as of July 26, 2011**

COUNTY	MUNICIPALITY	COUNTY	MUNICIPALITY	COUNTY	MUNICIPALITY	COUNTY	MUNICIPALITY
ATLANTIC	Atlantic City	CAPE MAY	Avlon Boro	MERCER	Hightstown Boro	PASSAIC	Haledon Boro
ATLANTIC	Buena Boro	CAPE MAY	Cape May Point Boro	MERCER	Hopewell Boro	PASSAIC	Paterson City
ATLANTIC	Buena Vista Twp	CAPE MAY	Dennis Twp	MERCER	Lawrence Twp	PASSAIC	Totowa Boro
ATLANTIC	Egg Harbor City	CAPE MAY	North Wildwood City	MERCER	Princeton Boro	SALEM	Salem City
ATLANTIC	Estell Manor City	CAPE MAY	Ocean City	MERCER	Princeton Twp	SALEM	Woodstown Boro
ATLANTIC	Folsom Boro	CAPE MAY	Stone Harbor Boro	MERCER	Robbinsville Twp	SOMERSET	Bound Brook Boro
ATLANTIC	Galloway Twp	CAPE MAY	Upper Twp	MERCER	Trenton City	SOMERSET	Bridgewater
ATLANTIC	Hamilton Twp	CAPE MAY	West Cape May Boro	MERCER	West Windsor Twp	SOMERSET	Franklin Twp
ATLANTIC	Hammonton	CAPE MAY	West Wildwood	MIDDLESEX	Cranbury Twp	SOMERSET	Manville Boro
ATLANTIC	Linwood City	CAPE MAY	Wildwood City	MIDDLESEX	East Brunswick	SOMERSET	North Plainfield Boro
ATLANTIC	Mullica Twp	CAPE MAY	Wildwood Crest	MIDDLESEX	Jamesburg Borough	SOMERSET	Raritan
ATLANTIC	Pleasantville	CAPE MAY	Woodbine Boro	MIDDLESEX	Metuchen Boro	SOMERSET	Rocky Hill Boro
ATLANTIC	Port Republic City	CUMBERLAND	Bridgeton City	MIDDLESEX	Milltown Boro	SOMERSET	Somerville
ATLANTIC	Weymouth Twp	CUMBERLAND	Commercial Twp	MIDDLESEX	New Brunswick City	SOMERSET	South Bound Brook Boro
BERGEN	Emerson Boro	CUMBERLAND	Lawrence Twp	MIDDLESEX	Perth Amboy	SOMERSET	Warren Twp
BERGEN	Maywood	CUMBERLAND	Maurice River Twp	MIDDLESEX	Plainsboro Twp	SOMERSET	Watchung Boro
BERGEN	Ridgefield Boro	CUMBERLAND	Millville City	MIDDLESEX	South Amboy	SUSSEX	Branchville
BERGEN	Ridgewood Village	CUMBERLAND	Vineland City	MIDDLESEX	South Brunswick Twp	SUSSEX	Hamburg Borough
BERGEN	Rutherford	ESSEX	Bloomfield	MONMOUTH	Allentown Boro	SUSSEX	Newton Town
BURLINGTON	Bass River Twp	ESSEX	Irvington	MONMOUTH	Asbury Park City	UNION	Cranford
BURLINGTON	Beverly	ESSEX	Montclair	MONMOUTH	Atlantic Highlands Boro	UNION	Elizabeth City
BURLINGTON	Burlington City	ESSEX	Newark City	MONMOUTH	Belmar	UNION	Linden
BURLINGTON	Chesterfield Twp	ESSEX	Orange Twp	MONMOUTH	Englishtown Boro	UNION	Plainfield
BURLINGTON	Cinnaminson	ESSEX	South Orange	MONMOUTH	Freehold Boro	UNION	Rahway
BURLINGTON	Delanco	GLOUCESTER	Swedesboro Borough	MONMOUTH	Long Branch City	UNION	Winfield Borough
BURLINGTON	Delran Twp	GLOUCESTER	Woolwich Twp	MONMOUTH	Manasquan Boro	WARREN	Alpha Borough
BURLINGTON	Edgewater Park Twp	HUDSON	Bayonne	MONMOUTH	Matawan		
BURLINGTON	Florence Twp	HUDSON	East Newark	MONMOUTH	Neptune Twp		
BURLINGTON	Medford Lakes Boro	HUDSON	Guttenberg	MONMOUTH	Red Bank Boro		
BURLINGTON	Palmyra	HUDSON	Harrison	MONMOUTH	Shrewsbury Township		
BURLINGTON	Pemberton Twp	HUDSON	Hoboken	MORRIS	Denville Twp		
BURLINGTON	Riverside Twp	HUDSON	Jersey City	MORRIS	Lincoln Park Boro		
BURLINGTON	Riverton	HUDSON	Kearny	MORRIS	Morristown		
BURLINGTON	Shamong Twp	HUDSON	North Bergen	MORRIS	Netcong		
BURLINGTON	Southampton Twp	HUDSON	Secaucus	MORRIS	Victory Garden Borough		
BURLINGTON	Tabernacle Twp	HUDSON	Union City	OCEAN	Barneget Twp		
BURLINGTON	Washington Twp	HUDSON	Weehawken	OCEAN	Brick Twp		
BURLINGTON	Willingboro Twp	HUDSON	West New York	OCEAN	Eagleswood Twp		
BURLINGTON	Woodland Twp	HUNTERDON	Califon Borough	OCEAN	Jackson Twp		
BURLINGTON	Wrightstown Borough	HUNTERDON	Flemington Boro	OCEAN	Lacey Twp		
CAMDEN	Berlin Boro	HUNTERDON	Frenchtown Borough	OCEAN	Lakehurst Boro		
CAMDEN	Berlin Twp	HUNTERDON	Hampton Borough	OCEAN	Little Egg Harbor Twp		
CAMDEN	Camden City	HUNTERDON	High Bridge Borough	OCEAN	Manchester Twp		
CAMDEN	Collingswood	HUNTERDON	Lambertville City	OCEAN	Ocean Twp		
CAMDEN	Gloucester City			OCEAN	Plumsted Twp		
CAMDEN	Waterford Twp			OCEAN	Point Pleasant Borough		
CAMDEN	Winslow Twp			OCEAN	Seaside Heights Boro		
				OCEAN	Stafford Twp		
				OCEAN	Tuckerton Boro		

APPENDIX C



Peter S. Palmer, Chair
Mary K. Murphy, Executive Director

June 9, 2016

RE: FY 2017 - 2018 Local Safety & High Risk Rural Roads Program Solicitation

Dear Subregional Engineer (*via email only*):

The NJTPA invites its subregions to submit proposals for the FY 2017 -2018 Local Safety and High Risk Rural Roads programs. The **Local Safety Program (LSP)** was established by the NJTPA, in conjunction with the New Jersey Department of Transportation in 2005, in order to advance safety improvements on county and eligible local roadway facilities within the region. Since its inception, **over \$80 million in projects** have been selected for the program. Projects have included new and upgraded traffic signals and signage, striping, and other improvements to increase the safety of drivers, bicyclists and pedestrians. The **High Risk Rural Roads Program (HRRRP)** provides the region with funds to advance safety improvements on rural roadways that have been identified as high risk. These roadways are functionally classified as a rural major or minor collector or as a local rural road and have crash rates that exceed the NJTPA region's average for those functional classes of roadways. Since its inception in 2009, **over \$17 million in projects** have been selected for the program. Both programs use funds from the Federal Highway Administration's Highway Safety Improvements Program (HSIP). New Jersey must obligate at least \$3.3 million of HSIP funds in FY 2017 for the HRRR program.

A few highlights of the two programs include:

- Only NJTPA member subregions are eligible to submit applications to the NJTPA for these programs. Municipalities located within the subregions may recommend a project to their respective county. If the project is advanced, the subregion agrees to be the project sponsor and responsible charge for the federal funds, and thus responsible for managing the federal process.
- Each subregion may submit two (2) applications for consideration for the LSP. There is no limitation on the number of applications that can be submitted for the HRRRP.
- The technical review committee will evaluate the complexity of each application submitted for both programs and determine the year best suited for project advancement. For projects to be advanced in FY 2017, all environmental approvals, local approval, and right-of-way acquisition must be completed and a full set of plans, specifications, and cost estimate (PS&E) documents submitted to the Local Aid office no later than **May 15, 2017**, and federal authorization to construct must be obtained no later than **September 1, 2017**. For projects to be advanced in FY 2018 all environmental approvals, local approval, and right-of-way acquisition must be completed and a full set of PS&E documents submitted to the Local Aid office no later than **May 15, 2018** and federal authorization to construct must be obtained no later than **September 1, 2018**.
- Both programs fund the construction phase of work; projects selected to either program will also have the option of using federal funds to cover the cost of a consultant for construction inspection.
- The following types of projects are NOT eligible for either program: routine maintenance/ replacement projects (including general resurfacing projects); congestion management/ roadway

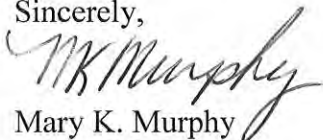
capacity enhancements (road widening); improvements involving State, U.S. and Interstate highways including any improvements at intersections with such facilities; and aesthetic improvements along the rights-of-way.

- Project sponsors must complete Highway Safety Manual calculations, crash diagrams and a benefit/cost analysis (systemic improvement projects are excluded from this requirement). The NJTPA will host a workshop in late July to assist with the HSM and cost/benefit analysis for each application.
- Project sponsors must give consideration to modern roundabouts for all new intersection and intersection upgrade projects.
- The federal National Environmental Policy Act (NEPA) regulations must be followed. As such, projects must have minimal or no environmental and cultural resource impacts.
- Public outreach during the development of the project must take place (more detail regarding this effort can be found in the guidelines).
- Projects must be advertised for construction within 60 days of receiving notification for federal construction authorization.
- Projects must be completed within 24 months of receiving federal authorization.

In 2013, the NJTPA initiated design assistance, now known as the Local Preliminary Engineering Assistance Program, which provides consultant support for the development of PS&E documents for projects selected for either program. This support will continue for projects in FY 2017 -2018.

The attached guidelines and application are for both programs. These materials can also be found on the NJTPA website at <http://www.njtpa.org/Project-Programs/Project-Development/Local-Safety>. **The deadline for submitting all proposals is Wednesday, August 31, 2016 at 5 pm.** Should you have any questions, please contact Christine Mittman at (973) 639-8448 /cmittman@njtpa.org or Sascha Frimpong at (973) 639-8422/ sfrimpong@njtpa.org.

Sincerely,



Mary K. Murphy
Executive Director

- c: NJTPA Board of Trustees Member
- NJTPA Board Alternate
- NJTPA RTAC Member
- Caroline Trueman, FHWA NJ Division
- Shukri M. Abuhuzeima, NJDOT Local Aid
- Sophia Azam, Bureau of Safety Programs
- Bhushan Pathare, NJDOT Local Aid
- NJDOT Local Aid District Managers
- Martin Hofler, NJTPA
- Mary Ameen, NJTPA
- Amy Magnuson, NJTPA

North Jersey Transportation Planning Authority Guidelines for the FY 2017 and FY 2018 Local Safety and High Risk Rural Roads Programs and the Local Preliminary Engineering Assistance Program (LPEAP)

I. Introduction

The North Jersey Transportation Planning Authority (NJTPA) Board of Trustees is working with the Federal Highway Administration (FHWA), New Jersey Department of Transportation (NJDOT), subregions and other state and local agencies to make travel a safer and more reliable experience. Since 2005, the NJTPA has provided federal funds annually to address documented safety problems within its region utilizing the Highway Safety Improvement Program (HSIP).

Moving Ahead for Progress in the 21st Century Act (MAP-21) continues the Highway Safety Improvement Program as a core Federal-aid program with the purpose of achieving a significant reduction in fatalities and serious injuries on all public roads, including non-State-owned public roads. Highway Safety Improvement projects must be consistent with the State's Strategic Highway Safety Plan (SHSP) and are selected on the basis of supportive crash data. Highway safety improvement projects intend to correct or improve a hazardous location or feature or to address a safety problem.

The **Local Safety Program (LSP)** was established by the NJTPA in 2005 in conjunction with NJDOT as a competitive program. The purpose of this program is to advance quick-fix safety improvements on county and local roadway facilities within its region. To date, over **\$80 million** in projects have been selected for the program.

The **High Risk Rural Roads Program (HRRRP)** provides the NJTPA region with funds to advance quick-fix safety improvements on rural roadways that have been identified as high risk. These roadways are functionally classified as a rural major or minor collector or as a rural local roads and have crash rates that exceed the NJTPA region's average for those functional classes of roadways. Since its inception in 2009, over **\$17 million** in projects have been selected for the program.

Projects for both programs are recommended to the NJTPA Board of Trustees by the Technical Review Committee (TRC). Approval of the program is anticipated in January 2017. The TRC is comprised of NJTPA and NJDOT Staff including Local Aid, Bureau of Transportation Data and Safety, and the Bureau of Environmental Programmatic Resources. The TRC will evaluate the complexity of each application submitted for each program and determine the year best suited for each project to advance.

Projects selected into the program will be available for PE & FD design assistance through the NJTPA FY 2017-2018 Local Preliminary Engineering Assistance Program. In 2013, the NJTPA initiated the LPEAP which provides consultant support for project selected for both programs with the completion of the requisite plans, specifications and estimates (PS&E) documents and preparation of the environmental document.

Eligibility requirements for both programs:

- Only NJTPA member subregions are eligible to submit applications to the NJTPA for this program (the 13 member counties and the cities of Newark and Jersey City). Municipalities located within the subregions may make a request through their respective county to sponsor an application. **The project sponsor will become the responsible charge and is thus responsible for managing the federal funding process.**

- Each subregion may submit two (2) applications for consideration for the Local Safety program. There is no limitation on the number of applications that can be submitted for the High Risk Rural Roads program;
- Project construction cost is limited to \$3 million for both programs;
- The technical review committee will evaluate the complexity of each application submitted for each program and determine the year best suited for project advancement. For projects to be advanced in the FY 2017 fiscal year, all environmental approvals, local approval, and right-of-way acquisition must be completed and a full set of plans, specifications, and cost estimate (PS&E) documents submitted to the Local Aid office no later than **May 15, 2017** and federal authorization to construct must be obtained no later than **September 1, 2017**. For projects to be advanced in the FY 2018 fiscal year all environmental approvals, local approval, and right-of-way acquisition must be completed and a full set of PS&E documents submitted to the Local Aid office no later than **May 15, 2018** and federal authorization to construct must be obtained no later than **September 1, 2018**;
- Both programs continue to fund the construction phase of work; projects selected to either program will also have the option of using federal funds to cover the cost of construction inspection. Full time inspection is required for federally funded projects. If a subregion chooses construction inspection assistance, an RFP for consultant selection in accordance with the federal Brooks Act will need to be prepared by the Subregion and a final negotiated cost proposal included with the final PS&E package submitted to Local Aid for construction authorization;
- The following types of projects are NOT eligible for either program: Routine maintenance/ replacement projects (including general resurfacing projects), congestion management/roadway capacity enhancements (road widening), improvements involving State, U.S. and Interstate highways including any improvements at intersections with such facilities and aesthetic improvements along the right-of-ways;
- Project sponsors must complete Highway Safety Manual (HSM) calculations. More details regarding the HSM are in the **Attachment C**.
- Project sponsors must give consideration to modern roundabouts for all new intersection and intersection upgrade projects (see the application for more details). In 2016, the NJTPA initiated a Pilot Roundabout Program seeking potential roundabout projects. If a Subregion has not submitted a request to consider a potential location, it can be done during this solicitation in addition to the two applications allowed for the LSP.
- The federal National Environmental Policy Act (NEPA) regulations must be followed. As such, projects must have minimal or no environmental and cultural resource impacts and be eligible for a NEPA categorical exclusion (CE) document approval (see **Attachments E & F** for details);
- Public Outreach during the development of the project must take place prior to developing the final PS&Es for construction authorization. Once a concept plan has been developed, it must be presented to the public for comment. For projects utilizing design assistance, the public outreach and presentation will be coordinated with the design consultant and NJTPA project manager. See Section IX for more details.
- Projects must be advertised for construction within 60 days of receiving federal construction authorization;
- Projects must be completed within 24 months of receiving federal authorization;

II. Local Safety Program

Local Safety Program projects address high priority crash locations. Proposals must demonstrate a location's crash history using multi-year data with a crash diagram (see **Attachment B** for sample) and clearly show a relationship between the types of crashes and the proposed improvements (e.g., pedestrian signals and high visibility crosswalks will address a history of pedestrian crashes along an identified high crash pedestrian corridor).

Program Examples

- Pedestrian or bicyclist safety improvements such as textured pavement crosswalks, crosswalk striping and ADA compliant curb ramps;
- Intersection improvements including traffic signal upgrades, modified signal operations, left-turn bays, striping and pedestrian countdown signal heads;
- Improvements to roadway signage and pavement markings including reflective pavement markings;
- Installation or upgrade of traffic control or other warning devices to improve a documented safety hazard including traffic signals, pedestrian countdown signals, overhead vehicle detectors and signage
- Installation of warning devices such as rumble strips/rumble stripes along high frequency crossover and/or roadway departure locations;
- Installation of a skid-resistant surface treatment at intersections or locations with a high frequency of crashes;
- Roundabout
- Road diets

Eligible improvements also include any of the FHWA Proven Safety Countermeasures (See **Attachment D** for details).

Program Schedule

Projects selected for the FY 2017-2018 LSP/HRRRP program will follow one of three possible schedules for federal authorization to construct which will be determined by the TRC based on size, complexity and/or need for design assistance.

- 2017 authorization – projects already designed or to be designed by the Subregion or their selected consultant and determined to be short term projects (1 year projects)
- 2018 authorization – projects seeking NJTPA design assistance and determined to be short term projects (1 year projects with assistance)
- 2019 authorization – projects seeking NJTPA LPEAP assistance and determined to be long term projects (2 year projects with assistance that require further study)

As previously mentioned, projects for both programs are recommended to the NJTPA Board of Trustees by the TRC. Approval of the program is anticipated in January 2017. For projects selected for the FY 2017-2018 program, the schedule for federal authorization and construction will depend on whether design assistance through the LPEAP is requested.

For projects **not** seeking assistance and selected for advancement in FY 2017, a set of plans that is roughly 60% complete along with a detailed project description shall be submitted to NJDOT Local Aid and BEPR by no later than **March 30, 2017** in order to begin the CED review and approval process.

Environmental approvals, any required local approvals, and right-of-way acquisition must be completed and a full set of plans, specifications, and cost estimate (PS&E) documents submitted to the Local Aid office no later than **May 15, 2017**. Federal authorization to construct must be obtained no later than **September 1, 2017**.

For projects seeking design assistance and selected for advancement in FY 2017 or FY 2018, see **Attachment H** for the proposed schedule.

Priority Locations/Methodology for Network Screening

Crash prone locations within the NJTPA region have been identified with the assistance of NJDOT and Rutgers CAIT Plan4Safety network screening tool. Network screening is an accepted practice among national and state agencies for identifying roadway locations that present safety concerns. Sites that experience high crash frequencies or produce severe crash injuries are of special interest, but screenings can also be conducted to examine specific crash types, such as right-angle or roadway departure, or evaluate specific road facilities, such as intersections or expressway ramps. Screening is primarily used because it is a low-cost method that identifies sites of interest prior to a more in depth study. This enables the identification process to be both time and cost effective.

The weighting system is based on average crash costs associated with varied levels of severity. Both the raw crash costs and a calculated weight ratio, based on current best practices and discussions with NJTPA, is shown in the table on the following page. Note that fatal crashes and incapacitating crashes are weighted equally, and PDO crashes are weighted as having zero, or no value.

The lists being used are the same lists from last year's solicitation. Pedestrian network screenings use five years of crash data (2009 – 2013) and intersection network screenings use three years of crash data (2011 – 2013). Additionally, because the state has its own ranking system, only municipal and county roads were screened. NJTPA regionwide top 25 lists have been created as well as individual lists for each Subregion (see **Attachment A**). Each list is ranked by crash weights where the highest weighted sites have a higher ranking. To calculate this, severity level of crashes is considered at each site. In the example below, the crashes occurring at *Intersections A and B are compared*. Though *Intersection A* has more crashes and a fatal crash, it carries less weight than *Intersection B*. Thus *Intersection B* ranks higher than *Intersection A*.

Intersection A:

1 fatal crash + 1 incapacitating crash + 10 pain crashes + 50 PDO crashes = 62 total crashes
 $(1 \times 4.81) + (1 \times 4.81) + (10 \times 1.00) + (50 \times 0.00) = 19.62$ weight

\

Intersection B:

7 moderate crashes + 12 complaint of pain crashes + 10 PDO crashes = 29 total crashes
 $(7 \times 1.76) + (12 \times 1.00) + (10 \times 0.00) = 24.32$ weight

The screening lists include:

Top 25 Intersections: This list screens all crashes in Plan4Safety occurring at an intersection of two or more roads. Minimum threshold weight is 8.0.

Top 25 Pedestrian Intersections: This list screens all crashes in Plan4Safety occurring at an intersection of two or more roads and included a pedestrian. Minimum threshold weight is 5.0.

□ Top Pedestrian Corridors: This list scans Plan4Safety for crashes that involve pedestrians, whether they occur at an intersection or not. The screening identifies mile-long clusters of pedestrian crashes and ranks the roadways accordingly. Minimum threshold weight is 10.0.

Lists are ranked assuming the weight of a fatal crash is the same as an incapacitating injury crash and using the value of a Complaint of Pain injury as the base value (K=A, no Property Damage only (PDO)).

		HSM (FHWA-HRT-05-051)		Weighting Factors		
		2001 dollars	2012 dollars (KABCO)	KABCO Weight	K=A Weight	K=A No PDO Weight
K	Fatal	\$ 4,008,900	\$ 5,197,200	89.30	4.81	2.73
ABC	ALL INJURY	\$ 82,600	\$ 107,100			
A	Incapacitating	\$ 216,000	\$ 280,000	4.81	4.81	2.73
B	Moderate	\$ 79,000	\$ 102,400	1.76	1.76	1.00
C	Complaint of Pain	\$ 44,900	\$ 58,200	1.00	1.00	0.57
O	PDO	\$ 7,400	\$ 9,600	0.16	0.16	0.00

These lists are available on the NJTPA website at: <http://www.njtpa.org/Project-Programs/Project-Development/Local-Safety.aspx>

Improvements along State, U.S. and/or Interstate highways are not eligible and have been excluded from these lists. In addition, if a roadway segment listed in **Attachment A** includes an intersection or intersections with such facilities, improvements at these specific intersections are also **NOT** eligible for funding. If a project location from this list is being considered that does not have a high EPDO ranking (within the top 10 locations of a Subregion's lists), further justification for prioritizing the selection should be included in the application.

For more detail and information regarding a particular roadway segment, see NJDOT's straight line diagrams at <http://www.state.nj.us/transportation/refdata/sldiag/>.

Plan4Safety

Plan4Safety syncs with NJDOT's release of crash data. The database has crash data from January 1, 2005 to the current release (most of 2015 is now available). The program is free to use and all public agency engineers, planners, researchers, and police officers can obtain full access. Go to <http://cait.rutgers.edu/tsrc/plan4safety> for more information. If you need assistance downloading crash data for a specific location, contact Christine Mittman at NJTPA.

Programmatic Improvements

Proposals can be submitted with a single type of improvement applied to multiple locations, with supportive crash data and are encouraged under both programs. An example would be pedestrian countdown signals proposed at multiple intersections identified as having high frequency of crashes involving pedestrians. Another example would be rumble strips applied along roadway segments in multiple corridors where centerline crossover crashes are occurring. While projects may be programmatic, all projects must identify documented safety concerns at specific locations in order to be eligible. **See Section IV and Attachment D for details regarding FHWA Proven Safety Countermeasures.**

Proposal Evaluation

A Technical Review Committee, consisting of NJTPA and NJDOT Staff including Local Aid, Bureau of Transportation Data and Safety, and Bureau of Environmental Resources determines project eligibility and then evaluates proposals on a competitive basis including:

- Identified crash prone locations and the safety issues that need to be addressed
- Type of improvements proposed and the potential safety benefits
- Completion of HSM calculations
- Completion of a cost benefit analysis
- Construction readiness, scope and feasibility

The technical review committee will evaluate the complexity of each application submitted for each program and determine the year best suited for project advancement. For projects that are not seeking design assistance and are to be advanced in the FY 2017 fiscal year, all environmental approvals, local approval, and right-of-way acquisition must be completed and a full set of plans, specifications, and cost estimate (PS&E) documents submitted to the Local Aid office no later than May 15, 2017 and federal authorization to construct must be obtained no later than September 1, 2017. For projects seeking design assistance and selected for advancement in FY 2017 or FY 2018, see **Attachment H** for the schedule. Federal regulations require improvements be evaluated after implementation to determine whether crashes have been reduced, therefore proposals that can reasonably be expected to have an impact on reducing the number and/or severity of crashes will be considered.

It is important for applicants to document specific safety issues with the most recent available crash data, even when the location of the proposed project is identified as a high priority, and to explain exactly how the proposed improvement will reduce the quantity and/or severity of crashes. Extra consideration will be given to proposals that clearly demonstrate the location's crash history (using multiple-year data) and show the relationship between the crashes and the proposed improvements. An accident location diagram to demonstrate accident patterns (See **Attachment B** for a sample diagram). Other documentation of a significant safety problem by the applicant may be acceptable at the discretion of the Technical Review Committee.

Construction readiness includes minimal or no environmental, cultural resource and/or Right of Way impacts. Projects should be eligible for a programmatic/certified Categorical Exclusion (CE). **Attachment E** provides a list of CE Categories and **Attachment F** provides a list of useful websites for Environmental Screenings.

Systemic Improvements

Proposals can be submitted with a single type of improvements applied to multiple locations, with supportive crash data. For example, reflective pavement markings, high friction surface treatment (HFST), rumble strips and/or rumble stripes along multiple segments. See Section IV and **Attachment G** for details regarding Systemic Improvements.

III. High Risk Rural Roads Program

The **High Risk Rural Roads Program** (HRRRP) provides federal funds for construction improvements to address safety problems and opportunities on county and local roadways that are functionally classified as a rural major or minor collector or as rural local roads with a crash rate that exceeds the NJTPA region's average for those functional classes of roadways. **Only road segments identified in Attachment A are eligible for HRRRP funding.** In addition, comprehensive crash lists

have been created for each Subregion with HRRR segments. These lists are available on the NJTPA website at: <http://www.njtpa.org/Project-Programs/Project-Development/Local-Safety.aspx>

A High Risk Rural Road continues to be defined as any roadway functionally classified as a rural major or minor or rural local road -

- on which the accident rate for fatalities and incapacitating injuries exceeds the statewide average for those functional classes of roadway; or
- that will likely have increases in traffic volume that are likely to create an accident rate for fatalities and incapacitating injuries that exceeds the statewide average for those functional classes of roadway

MAP 21 established a High Risk Rural Roads (HRRR) Special Rule and New Jersey is one of eight States which had an increase in the fatality rate over the 5 year averages in 2011 and 2013. So similar to previous years, the amount that is required to be obligated for HRRR by the NJDOT in FY 2017 is \$3,333,210. This rule remains in place with the FAST Act.

While the list of HRRRP road segments provides the basic eligibility parameters, project sponsors must complete the entire application and all projects must identify documented safety concerns at specific locations in order to be considered. HRRRP proposals undergo the same Technical Review Committee evaluation process as LSP candidate projects. It is possible that a project location is identified on both the HRRR segments list and the LSP crash-prone locations. If this is the case, it will be considered for the HRRR program first.

Program Examples

Some examples of improvements previously selected for the High Risk Rural Roads Program include:

- High friction surface treatment, enhanced signage, pavement markings, guiderails w/reflectors
- High reflectivity pavement markings and signage, safety edge, rumble strips
- Microsurfacing, pavement markings, striping, flexible delineators, regulatory warning signs, bicycle safety grates

Eligible improvements also include any of the FHWA Proven Safety Countermeasures (See Attachment D for details).

Systemic Improvements

Proposals can be submitted with a single type of improvements applied to multiple locations, with supportive crash data. For example, reflective pavement markings, high friction surface treatment, rumble strips and/or rumble stripes along multiple HRRR segments. See Section V and **Attachment G** for details regarding Systemic Improvements.

Proposal Evaluation

The Technical Review Committee evaluates the type of improvements proposed and the potential safety benefits.

Program Schedule

For projects **not** seeking LPEAP assistance and selected for advancement in FY 2017, a set of plans that is roughly 60% complete along with a detailed project description shall be submitted to NJDOT Local Aid and BEPR by no later than **March 30, 2017** in order to begin the CED review and approval

process. All environmental approvals, local approval, and right-of-way acquisition must be completed and a full set of plans, specifications, and cost estimate (PS&E) documents submitted to the Local Aid office no later than **May 15, 2017**. Federal authorization to construct must be obtained no later than **September 1, 2017**.

For projects seeking LPEAP assistance and selected for advancement in **FY 2017** or **FY 2018**, see **Attachment H** for the schedule.

IV. FHWA Office of Safety

The FHWA Office of Safety has a Safety Website replete with information:

<http://safety.fhwa.dot.gov/>

This website includes information on the HSIP as well as many safety topics including:

- Local safety and rural roads
- Intersections
- Pedestrian and bicycles
- Roadway departures
- Speed Management
- Proven Safety Countermeasures
- Focused Approach to Safety
- Road Safety Audits
- Links to research and partners (such as NTSA)

The Office of Safety has also developed several manuals for Local Rural Road Owners (http://safety.fhwa.dot.gov/local_rural/training/) including:

- Local Rural Road Owner's Manual
- Roadway Departure Safety
- Intersection Safety
- Speed Management
- Non-Motorized User Safety

V. Consideration of FHWA Proven Safety Countermeasures

In January 2012, FHWA issued a "Guidance Memorandum on Promoting the implementation of Proven Safety Countermeasures". This guidance takes into consideration the latest safety research to advance a group of countermeasures that have shown great effectiveness in improving safety. Applicants are encouraged to consider incorporating these improvements in project proposals where crash types relate to these countermeasures. Several have been utilized and/or proposed in previously selected LS & HRRR projects, while others should be considered where appropriate. (See **ATTACHMENT D** for more detailed information regarding these measures).

VI. The Highway Safety Manual (AASHTO)

The Highway Safety Manual (HSM) provides tools and techniques for transportation professionals to quantify the safety-related effects of proposed improvements. The 1st edition of the HSM was released in 2010 and includes the following four parts:

- Part A – Introduction, Human Factors and Fundamentals
- Part B – Roadway Safety Management Process
- Part C – Predictive Method

Part D – Crash Modification Factors

The HSM can assist in selecting countermeasures and quantifying effectiveness for projects in the Local Safety and High Risk Rural Roads programs and the NJTPA is encouraging the use of the manual in selecting treatment types in project applications. HSM tools include:

- Methods for evaluating safety effectiveness proposed locations and countermeasures
- Predictive average crash frequency as a function of traffic volume and roadway characteristics
- Crash Modification factors (CMF) that quantify the average crash frequency of geometrical or operational modifications

Requirements for applicants:

- For projects with estimated construction costs between \$50K - \$250K construction cost*: a benefit/cost analysis (apply CMFs only) will be required.
- For projects with estimated construction costs greater than \$250K construction cost*: HSM calculations are required and the benefit/cost analysis must be greater than 1
- Systemic improvement projects will not be required to do an HSM or benefit/cost analysis.

*Construction cost excluding the cost of ADA compliance

Attachment C includes An Introduction to the Highway Safety Manual from AASHTO. The NJTPA will host an HSM workshop in during this program solicitation (in late July). The workshop format will be scheduled timeslots for Subregional engineers to present the HSM calculations for the proposed projects to representatives from FHWA, NJDOT Bureau of Safety and NJTPA to review for accuracy prior to the submission of the applications.

In cases where federal rules or existing local ordinances require inclusion of specific provisions which are not the part of the safety improvements, the costs for those required elements may be excluded from the benefit/cost analysis so as to not negatively skew the results. Each situation must be evaluated individually to ensure consideration of the required elements. Examples include ADA compliance, or use of higher grade materials such as Belgian block in lieu of standard concrete curb or special traffic signal poles to be consistent with existing streetscape materials and/or municipal master plans.

Samples of HSM calculations, benefit/cost analysis and HSM summary of results are provided in **Attachment C**.

VI. Application Process

The following is a tentative schedule for the FY 2017 & FY 2018 LSP & HRRRP program solicitation:

- Solicitation for both programs (LSP & HRRRP) sent to subregions: **June 7, 2016**
- Applicants deadline for both programs: **September 1, 2016**
- TRC review: **September-October**
- TRC recommendation to the NJTPA Project Prioritization Committee: **December 12, 2016**
- NJTPA Board of Trustees approval of the FY 2017-2018 program: **January 9, 2017**

Applicants will be informed by letter if the submitted project(s) will or will not be recommended by the Technical Review Committee to the NJTPA Project Prioritization Committee and full Board of Trustees for inclusion in the programs. **Approval by the NJTPA Board does not constitute an authorization to proceed with project construction.**

VII. Public Outreach Process

Subregions must include public outreach as part of the development and construction authorization of these projects. Once a concept plan has been developed, it needs to be presented to the public for comment. This can be accomplished through a public information center or a presentation at a local municipal council meeting. The meeting needs to be publically advertised. Attendees should be recorded as well as comments regarding the proposed improvements. **Attachment I** has sample documents regarding this effort.

VIII. ROW Process

All federally funded projects include upgrades to sidewalks, curb ramps and driveway aprons to meet ADA compliance. Often this results in the need for temporary in-lieu of easements from private property owners for upgrades to these existing facilities. Occasionally they are permanent easements that are required for certain elements in a safety project such as drainage improvements or a retaining wall. Subregions are responsible for obtaining all required easements even if design assistance services are being provided by the NJTPA. Subregions should review their ROW procedures with NJDOT Local Aid prior to making contact with property owners.

IX. Federal Authorization Process

Once Local Safety Program and High Risk Rural Roads Program projects are selected and approved for funding by the NJTPA Board of Trustees, applicants must work directly with NJDOT, Division of Local Aid and Economic Development, to fulfill all requirements for federal authorization.

Projects will have environmental documents, engineering documents, plans, specifications and estimates prepared and submitted to NJDOT Local Aid for their review and approval. A Professional Engineer licensed to practice in New Jersey must prepare the plans and specifications. The State shall review the engineering documents, plans and specifications for conformance to program requirements and design standards. All design work shall conform to the applicable American Association of State Highway and Transportation Officials (AASHTO) design criteria, the current Manual on Uniform Traffic Control Devices (MUTCD), and the New Jersey Department of Transportation Bicycle Compatible Roadway and Bikeways Planning and Design Guideline. However, the design of traffic barriers and drainage systems shall conform to the New Jersey Department of Transportation Roadway Design Manual. All workmanship and materials shall conform to the current New Jersey Department of Transportation Standard Specification for Road and Bridge Construction as amended for Federal Aid. If the design cannot conform to the minimum standards as set forth, a design exception will be required.

Once a project has received federal authorization to construct, NJDOT Local Aid will notify program recipients when the project is acceptable for bidding. Advertising and construction cannot commence until federal authorization is obtained. Project sponsors must also follow federal regulations for a competitive bid process. Funds may be forfeited if construction occurs prior to federal authorization. Projects must be fully constructed within two (2) years of receiving this construction authorization

X. Local Preliminary Engineering Assistance Program (LPEAP)

Projects selected into the program will be eligible for assistance through the NJTPA FY 2017-2018 Local Preliminary Engineering Assistance Program. The intent of the program is to assist subregions

in the preparation of construction plans, specifications and estimates (PS&E) for safety improvement projects selected under the Local Safety and High Risk Rural Roads Programs. The consultant work for these projects will be co-managed by the NJTPA and the subregions. The contracts will be between the selected firms and the NJTPA, who will be responsible for administering the consultant contracts and providing oversight on all projects to be developed under the LPEAP. Technical direction, supervision and reviews for the development of each project's PS&E will be provided by the NJTPA subregion (Project Sponsor). The PS&E for each project shall be developed in coordination with the NJTPA and the Project Sponsor, and reviewed by NJDOT Bureau of Local Aid (NJDOT-LA), NJDOT Bureau of Environmental Program Resources (NJDOT-BEPR), where applicable, and FHWA. The consultants shall provide professional surveying, engineering, design and permitting services as necessary to prepare PS&Es. In addition, consultant support services may be required with design related questions during construction. The consultants shall be responsible for preparing full engineering plans, specifications and estimates on most of the projects under this program.

XI. Federal Funds Reporting Requirements

There are additional administrative requirements that accompany the use of federal funds. Project sponsors are required to report progress to the NJDOT on a quarterly basis. Quarterly reports shall be in writing (by letter or e-mail to the program manager(s) specified at the time) and include technical and financial progress. The NJTPA project manager shall be copied on all formal communications regarding these products. For more details on the federal aid process, see the NJDOT web page on Federal Aid - <http://www.state.nj.us/transportation/business/localaid/fedaid.shtm>.

XII. To Apply for Funding

Subregions must submit **six (6) copies** of the completed application with all supplementary material to the address below.. A copy of completed application **should also be submitted** by e-mail (pdf preferred) to cmittman@njtpa.org. The application, guidelines and attachments can be downloaded from the Local Safety Program & High Risk Rural Roads Program page of the NJTPA Website at:

http://www.njtpa.org/Project/Devel/local_safety/default.aspx

NJTPA Local Safety Program & High Risk Rural Roads Program
North Jersey Transportation Planning Authority
1 Newark Center, 17th floor
Newark, NJ 07102
Attention: Christine Mittman

APPLICATION DEADLINE: Wednesday, August 31, 2016

Questions or comments may be directed to:

Christine Mittman, Project Manager
(973) 639-8448
cmittman@njtpa.org

or

Sascha Frimpong, Manager, Local Programs and Project Development
(973) 639-8422
sfrimpong@njtpa.org

**NORTH JERSEY TRANSPORTATION PLANNING AUTHORITY
LOCAL SAFETY AND HIGH RISK RURAL ROADS PROGRAMS
FY 2017-2018 APPLICATION**

This application is for the FY 2017 and FY 2018 NJTPA Local Safety and High Risk Rural Roads Programs. A technical review committee (TRC) will evaluate each application and determine if it should be recommended for Highway Safety Improvement Program (HSIP) funding under one of these two programs. The TRC will also determine the year best suited for construction authorization based on project complexity, size and/or level of design assistance needs. The Local Safety and High Risk Rural Roads Programs provide federal Highway Safety Improvement Program funding for design, construction and construction inspection of safety improvements on county and local roadways. See the Program Guidelines for more details on eligibility for both programs, including changes for the FY 2017 and FY 2018 solicitation.

APPLICATION DEADLINE: Wednesday, August 31, 2016

SECTION 1: PROJECT LOCATION AND ROADWAY INFORMATION

Project Name:

Project Location (County, Municipality):

SRI Route and Street Name:
(Include NJDOT's straight Line diagram)

Milepost or milepost limits:

Cross-streets (if applicable):

Jurisdiction of the roadway and sidewalks (if applicable):

Width of the roadway and ROW:

AADT (Major):

AADT (Minor) (if applicable);

SECTION 2: SPONSORING AGENCY

Project Sponsor:

Project Manager's Name and Title:

Project Sponsor's Contact Information (Address, telephone, e-mail):

SECTION 3: PROJECT ELIGIBILITY

- Is the project eligible for High Risk Rural Roads Program funding (See **ATTACHMENT A**)?
Yes No
- If submitting more than one proposal for the Local Safety Program, what is the Sponsor's priority of **this** proposal? **Priority # _____ of 2 proposals**
- In order to be eligible for HSIP funding, the project must be within identified within the limits of the segments and/or intersections on one of the network screening lists provided in the solicitation. Identify the Network Screening Lists and Ranks that make this project eligible for HSIP funding:
 - Include a crash diagram or diagrams (if the project includes multiple intersections)
 - Include HSM calculations if the project's construction cost exceeds \$250,000
- If the project is located within a segment or intersection that does not fall within the top 10 on any of the network screening lists, provide an explanation as to why this location was selected over other, more severe locations:

SECTION 4: PROJECT DESCRIPTION

- Provide a description of the project location, safety issues, types of crashes that are occurring and the deficiencies that need to be addressed. Include a summary of crashes occurring at this location or within the segment. A sample has been provided in **Attachment C**.

- Provide a description of the proposed improvements and the expected safety benefits.
(For instance, a strong proposal for a dedicated left turn signal would document recent left turn crashes at the intersection in question and explain how the proposed improvement would reduce the number and/or severity of these types of crashes)

- If the project is based on recommendations from a Road Safety Audit, please include the recommendations section from the RSA. Is the Sponsor committing to all of the recommendations in the RSA. If not, which elements are not being considered and why?

- Briefly summarize the results of the HSM calculations. A sample has been provided as an **Attachment C**.

SECTION 5: PROJECT IMPLEMENTATION

- **Estimated Construction Cost: \$**
(Attach a line item cost estimate)

- Is the Sponsor seeking Design Assistance through the NJTPA? Yes No
- Is the Sponsor seeking federal funds for construction inspection? Yes No

- **Estimated cost for Construction Inspection: \$**

- If the applicant is not seeking design assistance, will the design be prepared in-house or by a consultant and when does the Sponsor anticipate having the PSE package ready for submission to NJDOT-Local Aid?

- If plans are already complete, please include them with the application.

- List below all permits and approvals that may be required for this project:

SECTION 6: ENVIRONMENTAL SCREENING

Please answer Yes or No to the following questions. A "List of Useful Websites for Environmental Screening" is included for your reference at the conclusion of this section. NO field testing or sampling of any kind is needed in order to answer the following questions.

ADDITIONAL PROJECT INFORMATION

YES

NO

- Is this project one of the activities that qualify for a Programmatic Categorical Exclusion in the NEPA process? (See **Attachment E** for list of these project types)

If Yes, Project Type: _____

- Will right-of-way be acquired?
- Acquisition
- Easement
- Will the project result in residential or business displacement?
If yes, approximately how many?
_____ Residential _____ Business

- Will public facilities, schools, churches, emergency services, be affected by the project? (If yes list in comment section)

- Will new drainage facilities be installed/extended?

- Will retention/detention basins be constructed?

- Have any environmental studies (Cultural Resource, Hazardous Waste, Air, Noise, Soil borings studies etc.) been undertaken previously within or adjacent to the project area? (If yes list in comment section)

- Is there any potential impact for federal and state rare, threatened or endangered species or their habitat within the project study area? (If yes list in comment section)

ECOLOGY

- Are there any environmentally sensitive areas within project limits? Yes/No

If yes, please describe:

- Describe the land use/ecology of the project area:
_____ Urban _____ Residential _____ School

Rural Agricultural Forested
 Grassland/Field Coastal Open Waters (lake, stream, river)

- Are there any of the following within project limits?
 Wetlands Floodplains Sole source Aquifers
 Stream crossings Vernal Pools Wildlife Habitat
- Are there any of the following within the project limits? (Identify bodies of water by type and name in the comment section)
 Category One Waters Trout Maintenance Streams
 Wild & Scenic Rivers Trout Production Streams
 Essential Fish Habitat or Shellfish Habitat

STREAM ENCROACHMENT

YES

NO

- If the project area contains a stream, does it drain more than 50 acres? (Identify the stream)
- Can it be anticipated at this time that fill will be placed in The 100-yr floodplain? (Identify the floodplain)
- Is it likely that more than ¼ acre of new impervious surface will be constructed? (If so, NJDEP Stormwater Mgt. Rules apply)
- Is it likely that one acre or more will be disturbed by the proposed construction? (If so, NJDEP Stormwater Mgt. Rules apply)

CULTURAL RESOURCES

YES

NO

- Are there known buildings or structures listed on, or eligible for listing on, the NJ and/or National Registers of Historic Places in the project study area? (If yes list in comments section)
- Are any properties included in a local county/ municipal listing of historic properties? (If yes list in comment section)
- Is the project located in a known or potential Historic District(s)? (If yes list in comments section)
- Are there any 50+ year old buildings in the project area? (If yes list in comments section)
- Will the project impact a 50+ year old bridge or culvert? (If yes list in comment section)

- Will the project impact a 50+ year old railroad line?
(If yes list in comment section) _____
- Are there any old foundations, piles of building rubble,
unusual depressions or old wells within the project limits?
(If yes list in comment section) _____
- Are there any known archeological sites within the project
limits? _____

SECTION 4(f) PROPERTIES

YES **NO**

- Will there be any use of land from the following
(If yes list in comment section)
- Historic Sites _____
- Publicly owned Parkland _____
- Publicly owned recreation areas _____
- Publicly owned wildlife or waterfowl refuges _____
- Federal Lands _____

HAZARDOUS WASTE

YES **NO**

- Are there any known or suspected hazardous
waste sites (underground storage tank (UST), landfills,
known NJDEP Case, Environment Cleanup Responsibility
Act (ECRA Case) within the project study area? _____
- Are there active or abandoned industries,
service stations or repair shops within the
project study area? _____
- Is there evidence of potential contamination
(monitoring wells, stained soils, etc.)? _____
- Are railroads or railyards located in the
project study area? _____

RAILROAD CROSSINGS

NJDOT's Railroad Engineering and Safety Unit is responsible for all reviews and programs involving changes and improvements to all public rail crossings in New Jersey that are designed in compliance with Federal Railroad Administration guidelines.

The Unit conducts a Diagnostic Team Review on

- Any Local Aid project within 1,000 feet of an at-grade crossing on the approach roadway.
- Any project that is parallel to a railroad within 200 feet.

Is there are railroad crossing within the 1,000 ft. radius of the project's limits? Yes/No

COMMUNITY IMPACTS AND INVOLVEMENT

Does the project have the potential to introduce any Title VI and/or Environmental Justice Issues? Yes/No (If Yes, describe below)

List any local or regional groups, organizations and/or individuals who may have an interest in the project because they are known to be knowledgeable about or interested in historic properties and/or may have an interest in the improvements proposed in this project:

Please attach a USGS MAP showing the project location, limits, and all environmental parameters (e.g., wetlands, historic properties) relevant to your project, based on the checklist above. Please also include route/street names and mileposts. (NJDEP maps are acceptable; please refer to the "List of Useful Websites for Environmental Screening" in **ATTACHMENT F** for the website link to NJDEP GIS and NJDEP I-MapNJ.)

INSTRUCTIONS FOR SUBMITTING APPLICATION:

Submit *eight (8)* hard copies to:

NJTPA Local Safety Program/ High Risk Rural Roads Program
North Jersey Transportation Planning Authority
1085 Raymond Blvd.
One Newark Center, 17th floor
Newark, NJ 07102
Attention: Christine Mittman

If possible, please submit an electronic copy of the completed application via email to: cmittman@njtpa.org. **CDs are not needed.**

This application, program guidelines, and attachments are available on the Local Safety Program & High Risk Rural Roads Program page of the *NJTPA Website* at:

<http://www.njtpa.org/Project-Programs/Project-Development/Local-Safety.aspx>

APPLICATION DEADLINE: Wednesday, August 31, 2016

ATTACHMENT A

LOCAL SAFETY PROGRAM

- **TOP 25 CRASH PRONE LOCATIONS IN THE NJTPA REGION For Intersections, Pedestrian Corridors, and Pedestrian Hot Spots**
- **Comprehensive list of HSIP eligible intersections and segments in each Subregion for Intersections, Pedestrian Corridors, and Pedestrian Hot Spots**
- **High Risk Rural Segments in the NJTPA Region**

All available on the NJTPA website at:

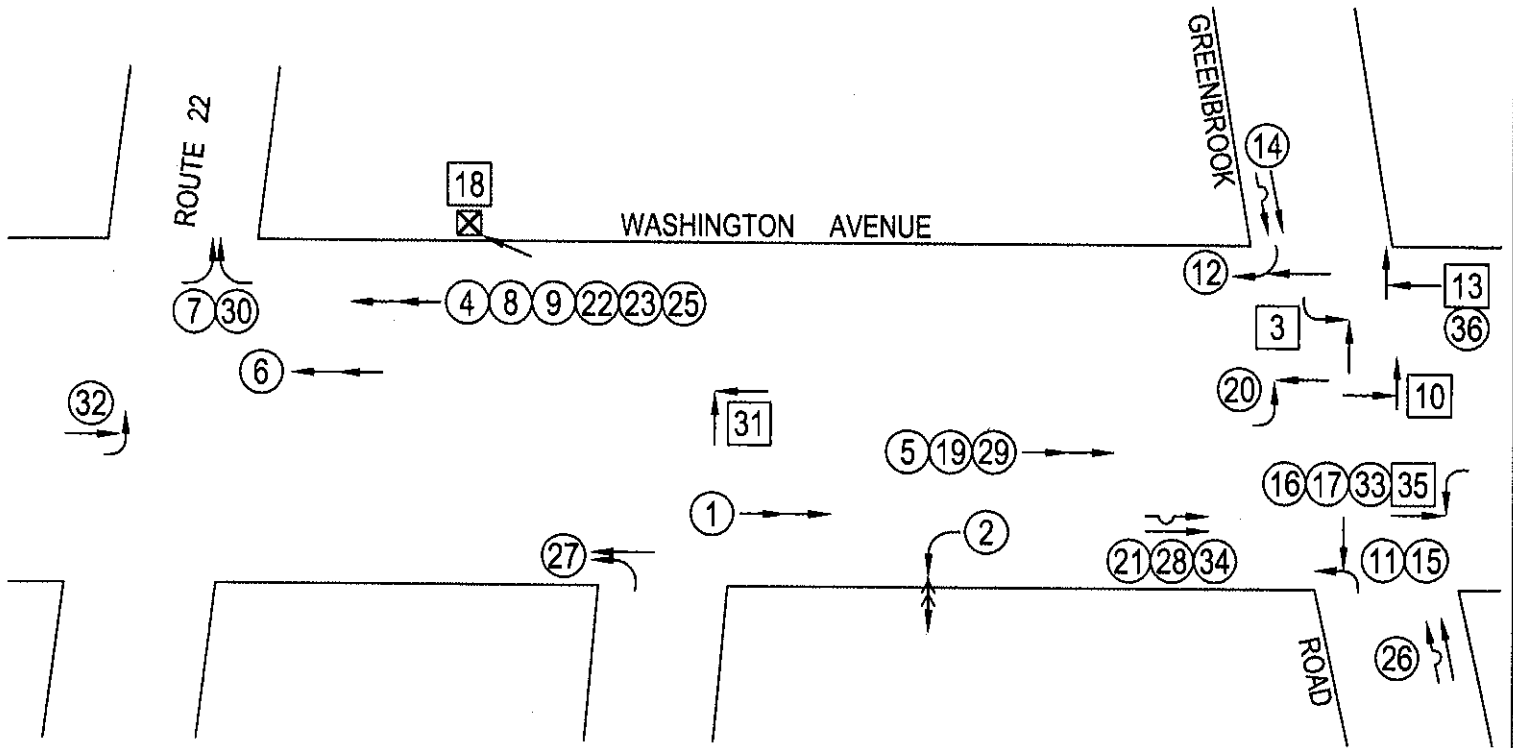
<http://www.njtpa.org/Project-Programs/Project-Development/Local-Safety.aspx>

ATTACHMENT B
SAMPLE CRASH DIAGRAM

In the five years (2009-2013) of data examined there were 307 crashes recorded on Mt. Ephraim Avenue. Below, relevant collision type distributions are noted:

- 25% of crashes were same direction rear end
- 17% of crashes included a right angle turning movement
- 11% of crashes were same direction side swipes
- 6% of crashes involved pedestrians
- 5% of crashes involved bicyclists

CRASH HISTORY, WASHINGTON AVE. (C.R. 529) AND GREEN BROOK RD. (C.R. 634) GREEN BROOK, SOMERSET COUNTY



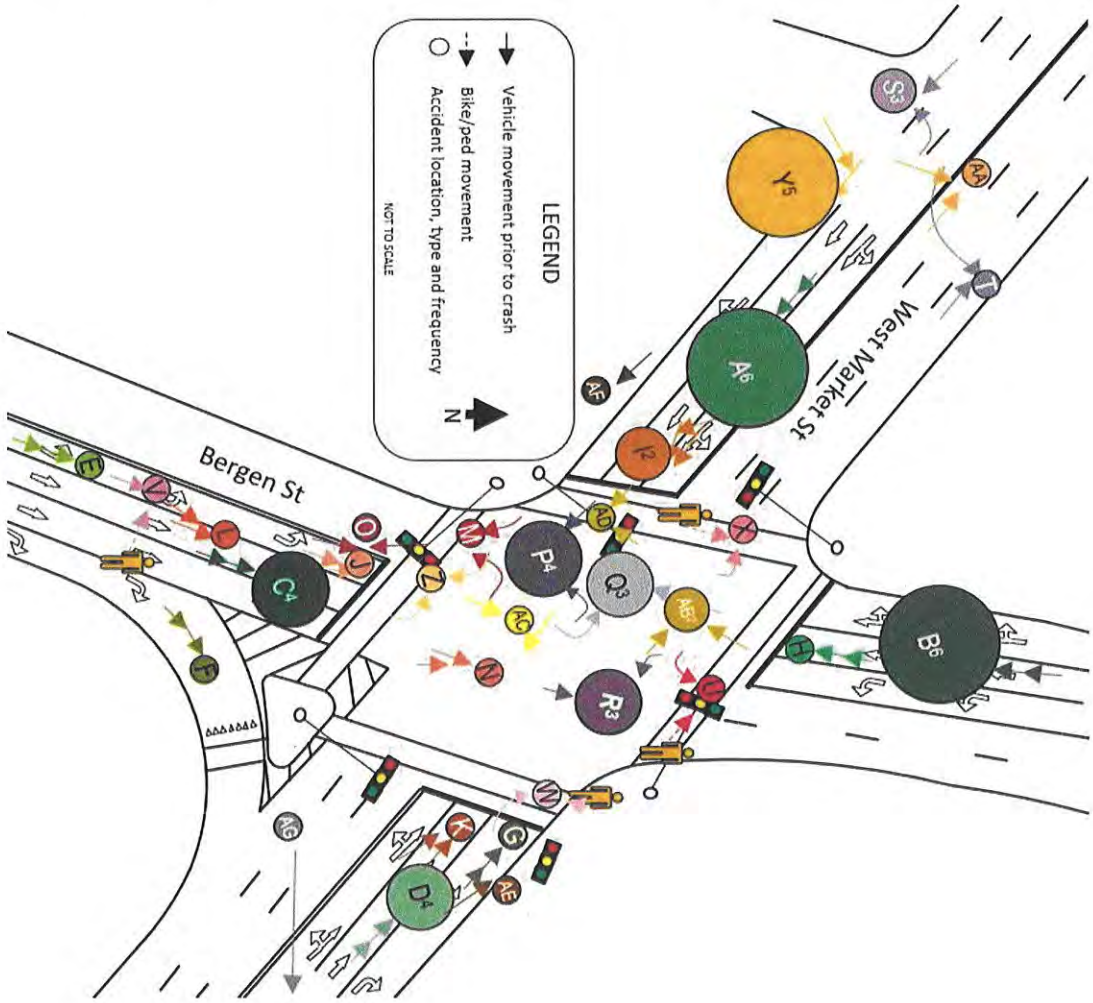
ACCIDENT NO. 24 IS OUTSIDE OF STUDY AREA.

LEGEND

- 3 INJURY/INJURIES
- 36 PROPERTY DAMAGE
- \longrightarrow REAR-END CRASH
- \curvearrowright DUAL TURN CRASH
- \curvearrowleft ANGULAR CRASH
- $\longrightarrow \downarrow$ RIGHT-ANGLE CRASH
- $\longrightarrow \curvearrowright$ TURNING CRASH
- $\longleftarrow \curvearrowright$ CAR BACKED INTO FORWARD-MOVING CAR
- $\sim \longrightarrow$ SIDESWIPE
- $\longrightarrow \boxtimes$ IMPACT WITH FIXED OBJECT

West Market Street & Bergen Street

Same Direction - Rear End		Left Turn / U Turn	
A 2/6/09	9:49 AM	O	
A 5/28/09	11:45 AM	O	
A 6/9/09	5:20 PM	B	
A 6/28/09	2:41 AM	B	
A 3/12/10		O	
A 1/17/09	9:35 PM	O	Struck vehicle had stopped for EMS
B 2/19/09	10:10 AM	O	
B 3/31/10	10:57 AM	O	
B 8/14/10	8:45 PM	O	Ice inhibited stop
B 1/18/11	8:20 AM	O	Ice inhibited stop
B 10/25/11	12:05 PM	O	Striking vehicle was being pursued by police
B 4/4/09	5:35 PM	B	
C 1/20/09	6:15 PM	O	Ice inhibited stop
C 1/21/09	2:13 PM	O	
C 3/6/09	10:26 AM	O	
C 7/12/10	4:45 PM	O	
D 8/30/09	2:30 AM	B	
D 12/10/09	4:22 PM	O	
D 4/20/11	5:27 PM	O	Struck vehicle had stopped for EMS
D 5/13/09	2:10 PM	B	
E 11/11/11	5:18 PM	O	
F 9/8/09	8:36 AM	B	
G 5/16/09	12:00 PM	O	
H 4/13/09	5:25 PM	O	
Same Direction - Side Swipe			
I 5/10/10	12:50 PM	O	
I 2/17/11	10:00 PM	O	Bus involved
J 9/26/09	8:30 AM	O	
K 1/11/11	3:03 PM	O	Striking vehicle was being pursued by police
L 1/30/10	9:00 PM	O	
M 7/30/10	1:20 AM	B	
Opposite Direction - Head On/Angle			
N 7/14/10	9:57 AM	O	Bus involved
O 1/14/09	3:15 PM	O	
P 11/12/09	6:35 AM	B	
P 6/25/10	7:10 PM	B	
P 8/3/10	1:21 PM	B	
P 3/16/11	4:48 PM	B	
Q 7/1/09	3:26 PM	B	
Q 2/18/11	5:34 PM	B	
Q 12/9/11	2:50 PM	O	
R 2/13/09	7:56 PM	O	
R 7/11/09	11:50 PM	B	
R 9/28/11	7:00 AM	B	Labelled as "right angle" in report
S 4/16/10	8:30 AM	O	
S 10/3/11	2:26 PM	B	Labelled as "right angle" in report
S 6/15/09	8:57 AM	B	
T 12/9/10	7:10 AM	O	
Pedestrian			
U 9/16/11	4:40 PM	B	2 girls ran across street to catch bus
V 12/15/10		B	Pad ran across street to catch bus
W 5/28/09	4:55 PM	B	speed to catch bus
X 12/12/11	4:43 PM	B	
Right Angle			
Y 1/29/09	4:20 PM	B	
Y 5/5/09	4:30 PM	B	
Y 8/21/09	5:05 PM	O	Crash due to width
Y 11/20/09	11:31 AM	B	
Y 1/5/11	11:45 AM	O	
Z 4/27/10	10:00 PM	O	
AA 4/15/11	2:59 PM	B	McDonald's parking lot being received
AB 6/1/09	12:05 AM	O	
AB 10/27/10	5:14 PM	B	Emergency vehicle struck car that failed to stop
AC 5/4/09	3:22 PM	O	Striking vehicle was emergency vehicle and bus had blocked view
AD 4/7/09	8:00 AM	B	



*Crash severity uses KABCO scale: K- Fatal, A- Incapacitating Injury, B- Non-incapacitating Injury, C- Possible Injury, O- Property damage only

ATTACHMENT C

HIGHWAY SAFETY MANUAL

- HSM SPREADSHEETS

Available on the NJTPA website at:

<http://www.njtpa.org/Project-Programs/Project-Development/Local-Safety.aspx>

- Urban & Suburban Arterial Intersections
- Rural 2-Lane, 2-way Roadway
- Rural Intersection
- SAMPLE HSM CALCULATIONS
- SAMPLE HSM SUMMARY OF RESULTS
- SAMPLE BENEFIT/COST ANALYSIS

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	RC	Roadway	CR 516 (Leonardville Rd) - EXISTING
Agency or Company	Monmouth County	Intersection	Intersection with East Rd (MP 16.93)
Date Performed	09/17/15	Jurisdiction	Township of Middletown, Monmouth County
		Analysis Year	2016
Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG
AADT _{major} (veh/day)	AADT _{MAX} = 67,700 (veh/day)	--	11,378
AADT _{minor} (veh/day)	AADT _{MAX} = 33,400 (veh/day)	--	6,327
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C _i		1.00	1.00
Data for unsignalized intersections only:			
Number of major-road approaches with left-turn lanes (0,1,2)		0	0
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:			
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	0
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	0
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	0
Type of left-turn signal phasing for Leg #1		Permissive	Not Applicable
Type of left-turn signal phasing for Leg #2		--	Not Applicable
Type of left-turn signal phasing for Leg #3		--	Not Applicable
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	4
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			50
Maximum number of lanes crossed by a pedestrian (N _{lanesx})		--	2
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	0

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF _{1i}	CMF _{2i}	CMF _{3i}	CMF _{4i}	CMF _{5i}	CMF _{6i}	CMF _{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
1.00	0.99	1.00	0.92	0.91	1.00	0.83

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N _{bimv}	Proportion of Total Crashes	Adjusted N _{bimv}	Combined CMFs	Calibration Factor, C _i	Predicted N _{bimv}
	from Table 12-10									
	a	b	c							
Total	-10.99	1.07	0.23	0.39	2.763	1.000	2.763	0.83	1.00	2.298
Fatal and Injury (FI)	-13.14	1.18	0.22	0.33	0.824	(4) _{FI} /((4) _{FI} +(4) _{PDO})	0.856	0.83	1.00	0.712
Property Damage Only (PDO)	-11.02	1.02	0.24	0.44	1.835	(5) _{TOTAL} -(5) _{FI}	1.907	0.83	1.00	1.586
						0.690				

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted N _{bimv (FI)} (crashes/year)	Proportion of Collision Type _(PDO)	Predicted N _{bimv (PDO)} (crashes/year)	Predicted N _{bimv (TOTAL)} (crashes/year)
	from Table 12-11	(9) _{FI} from Worksheet 2C	from Table 12-11	(9) _{PDO} from Worksheet 2C	(9) _{PDO} from Worksheet 2C
Total	1.000	0.712	1.000	1.586	2.298
		(2)*(3) _{FI}		(4)*(5) _{PDO}	(3)+(5)
Rear-end collision	0.450	0.320	0.483	0.766	1.086
Head-on collision	0.049	0.035	0.030	0.048	0.082
Angle collision	0.347	0.247	0.244	0.387	0.634
Sideswipe	0.099	0.070	0.032	0.051	0.121
Other multiple-vehicle collision	0.055	0.039	0.211	0.335	0.374

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N _{bisv}	Proportion of Total Crashes	Adjusted N _{bisv}	Combined CMFs	Calibration Factor, C _i	Predicted N _{bisv}
	from Table 12-12									
	a	b	c							
Total	-10.21	0.68	0.27	0.36	0.224	1.000	0.224	0.83	1.00	0.186
Fatal and Injury (FI)	-9.25	0.43	0.29	0.09	0.067	(4) _{FI} /((4) _{FI} +(4) _{PDO})	0.068	0.83	1.00	0.057
Property Damage Only (PDO)	-11.34	0.78	0.25	0.44	0.155	(5) _{TOTAL} -(5) _{FI}	0.156	0.83	1.00	0.130
						0.696				

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted N _{bisv (FI)} (crashes/year)	Proportion of Collision Type _(PDO)	Predicted N _{bisv (PDO)} (crashes/year)	Predicted N _{bisv (TOTAL)} (crashes/year)
	from Table 12-13	(9) _{FI} from Worksheet 2E	from Table 12-13	(9) _{PDO} from Worksheet 2E	(9) _{PDO} from Worksheet 2E
Total	1.000	0.057	1.000	0.130	0.186
		(2)*(3) _{FI}		(4)*(5) _{PDO}	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.002	0.000	0.002	0.000	0.000
Collision with fixed object	0.744	0.042	0.870	0.113	0.155
Collision with other object	0.072	0.004	0.070	0.009	0.013
Other single-vehicle collision	0.040	0.002	0.023	0.003	0.005
Single-vehicle noncollision	0.141	0.008	0.034	0.004	0.012

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	Predicted N_{bimv}	Predicted N_{bisv}	Predicted N_{bi}	f_{pedi}	Calibration factor, C_i	Predicted N_{pedi}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16		$(4)*(5)*(6)$
Total	--	--	--	--	1.00	--
Fatal and injury (FI)	--	--	--	--	1.00	--

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections			
(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF_{1p}	CMF_{2p}	CMF_{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	
2.78	1.35	1.00	$(1)*(2)*(3)$ 3.75

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections													
(1)	(2)					(3)	(4)	(5)	(6)	(7)			
Crash Severity Level	SPF Coefficients					Overdispersion Parameter, k	$N_{pedbase}$	Combined CMF	Calibration factor, C_i	Predicted N_{pedi}			
	from Table 12-14										from Equation 12-29	(4) from Worksheet 2H	$(4)*(5)*(6)$
	a	b	c	d	e								
Total	-9.53	0.40	0.26	0.45	0.04	0.24	0.020	3.75	1.00	0.074			
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	0.074			

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	Predicted N_{bimv}	Predicted N_{bisv}	Predicted N_{bi}	f_{bikei}	Calibration factor, C_i	Predicted N_{bikei}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17		$(4)*(5)*(6)$
Total	2.298	0.186	2.484	0.015	1.00	0.037
Fatal and injury (FI)	--	--	--	--	1.00	0.037

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections			
(1)	(2)	(3)	(4)
Collision type	Fatal and injury (FI)	Property damage only (PDO)	Total
	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.320	0.766	1.086
Head-on collisions (from Worksheet 2D)	0.035	0.048	0.082
Angle collisions (from Worksheet 2D)	0.247	0.387	0.634
Sideswipe (from Worksheet 2D)	0.070	0.051	0.121
Other multiple-vehicle collision (from Worksheet 2D)	0.039	0.335	0.374
Subtotal	0.712	1.586	2.298
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.000	0.000
Collision with fixed object (from Worksheet 2F)	0.042	0.113	0.155
Collision with other object (from Worksheet 2F)	0.004	0.009	0.013
Other single-vehicle collision (from Worksheet 2F)	0.002	0.003	0.005
Single-vehicle noncollision (from Worksheet 2F)	0.008	0.004	0.012
Collision with pedestrian (from Worksheet 2G or 2I)	0.074	0.000	0.074
Collision with bicycle (from Worksheet 2J)	0.037	0.000	0.037
Subtotal	0.168	0.130	0.297
Total	0.88	1.72	2.59

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections	
(1)	(2)
Crash severity level	Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)
	(Total) from Worksheet 2K
Total	2.59
Fatal and injury (FI)	0.88
Property damage only (PDO)	1.72

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	RC	Roadway	CR 516 (Leonardville Rd) - PROPOSED
Agency or Company	Monmouth County	Intersection	Intersection with East Rd (MP 16.93)
Date Performed	09/17/15	Jurisdiction	Township of Middletown, Monmouth County
		Analysis Year	2016
Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG
AADT _{major} (veh/day)	AADT _{MAX} = 67,700 (veh/day)	--	11,378
AADT _{minor} (veh/day)	AADT _{MAX} = 33,400 (veh/day)	--	6,327
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C _i		1.00	1.00
Data for unsignalized intersections only:			
Number of major-road approaches with left-turn lanes (0,1,2)		0	0
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:			
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	0
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive
Type of left-turn signal phasing for Leg #3		--	Not Applicable
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	4
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			50
Maximum number of lanes crossed by a pedestrian (N _{lanesx})		--	4
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	0

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF _{1i}	CMF _{2i}	CMF _{3i}	CMF _{4i}	CMF _{5i}	CMF _{6i}	CMF _{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.81	0.97	1.00	0.92	0.91	1.00	0.66

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N _{bimv}	Proportion of Total Crashes	Adjusted N _{bimv}	Combined CMFs	Calibration Factor, C _i	Predicted N _{bimv}
	from Table 12-10									
	a	b	c							
Total	-10.99	1.07	0.23	0.39	2.763	1.000	2.763	0.66	1.00	1.824
Fatal and Injury (FI)	-13.14	1.18	0.22	0.33	0.824	(4) _{FI} /((4) _{FI} +(4) _{PDO})	0.856	0.66	1.00	0.565
Property Damage Only (PDO)	-11.02	1.02	0.24	0.44	1.835	(5) _{TOTAL} -(5) _{FI}	1.907	0.66	1.00	1.259
						0.690				

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted N _{bimv (FI)} (crashes/year)	Proportion of Collision Type _(PDO)	Predicted N _{bimv (PDO)} (crashes/year)	Predicted N _{bimv (TOTAL)} (crashes/year)
	from Table 12-11	(9) _{FI} from Worksheet 2C	from Table 12-11	(9) _{PDO} from Worksheet 2C	(9) _{PDO} from Worksheet 2C
Total	1.000	0.565	1.000	1.259	1.824
		(2)*(3) _{FI}		(4)*(5) _{PDO}	(3)+(5)
Rear-end collision	0.450	0.254	0.483	0.608	0.862
Head-on collision	0.049	0.028	0.030	0.038	0.065
Angle collision	0.347	0.196	0.244	0.307	0.503
Sideswipe	0.099	0.056	0.032	0.040	0.096
Other multiple-vehicle collision	0.055	0.031	0.211	0.266	0.297

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N _{bisv}	Proportion of Total Crashes	Adjusted N _{bisv}	Combined CMFs	Calibration Factor, C _i	Predicted N _{bisv}
	from Table 12-12									
	a	b	c							
Total	-10.21	0.68	0.27	0.36	0.224	1.000	0.224	0.66	1.00	0.148
Fatal and Injury (FI)	-9.25	0.43	0.29	0.09	0.067	(4) _{FI} /((4) _{FI} +(4) _{PDO})	0.068	0.66	1.00	0.045
Property Damage Only (PDO)	-11.34	0.78	0.25	0.44	0.155	(5) _{TOTAL} -(5) _{FI}	0.156	0.66	1.00	0.103
						0.696				

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted N _{bisv (FI)} (crashes/year)	Proportion of Collision Type _(PDO)	Predicted N _{bisv (PDO)} (crashes/year)	Predicted N _{bisv (TOTAL)} (crashes/year)
	from Table 12-13	(9) _{FI} from Worksheet 2E	from Table 12-13	(9) _{PDO} from Worksheet 2E	(9) _{PDO} from Worksheet 2E
Total	1.000	0.045	1.000	0.103	0.148
		(2)*(3) _{FI}		(4)*(5) _{PDO}	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.002	0.000	0.002	0.000	0.000
Collision with fixed object	0.744	0.033	0.870	0.090	0.123
Collision with other object	0.072	0.003	0.070	0.007	0.010
Other single-vehicle collision	0.040	0.002	0.023	0.002	0.004
Single-vehicle noncollision	0.141	0.006	0.034	0.004	0.010

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	Predicted N_{bimv}	Predicted N_{bisv}	Predicted N_{bi}	f_{pedi}	Calibration factor, C_i	Predicted N_{pedi}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16		$(4)*(5)*(6)$
Total	--	--	--	--	1.00	--
Fatal and injury (FI)	--	--	--	--	1.00	--

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections			
(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF _{1p}	CMF _{2p}	CMF _{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	$(1)*(2)*(3)$
2.78	1.35	1.00	3.75

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections													
(1)	(2)					(3)	(4)	(5)	(6)	(7)			
Crash Severity Level	SPF Coefficients					Overdispersion Parameter, k	$N_{pedbase}$	Combined CMF	Calibration factor, C_i	Predicted N_{pedi}			
	from Table 12-14										from Equation 12-29	(4) from Worksheet 2H	$(4)*(5)*(6)$
	a	b	c	d	e								
Total	-9.53	0.40	0.26	0.45	0.04	0.24	0.021	3.75	1.00	0.080			
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	0.080			

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	Predicted N_{bimv}	Predicted N_{bisv}	Predicted N_{bi}	f_{bikei}	Calibration factor, C_i	Predicted N_{bikei}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17		$(4)*(5)*(6)$
Total	1.824	0.148	1.972	0.015	1.00	0.030
Fatal and injury (FI)	--	--	--	--	1.00	0.030

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections			
(1)	(2)	(3)	(4)
Collision type	Fatal and injury (FI)	Property damage only (PDO)	Total
	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.254	0.608	0.862
Head-on collisions (from Worksheet 2D)	0.028	0.038	0.065
Angle collisions (from Worksheet 2D)	0.196	0.307	0.503
Sideswipe (from Worksheet 2D)	0.056	0.040	0.096
Other multiple-vehicle collision (from Worksheet 2D)	0.031	0.266	0.297
Subtotal	0.565	1.259	1.824
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.000	0.000
Collision with fixed object (from Worksheet 2F)	0.033	0.090	0.123
Collision with other object (from Worksheet 2F)	0.003	0.007	0.010
Other single-vehicle collision (from Worksheet 2F)	0.002	0.002	0.004
Single-vehicle noncollision (from Worksheet 2F)	0.006	0.004	0.010
Collision with pedestrian (from Worksheet 2G or 2I)	0.080	0.000	0.080
Collision with bicycle (from Worksheet 2J)	0.030	0.000	0.030
Subtotal	0.154	0.103	0.257
Total	0.720	1.362	2.081

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections	
(1)	(2)
Crash severity level	Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)
	(Total) from Worksheet 2K
Total	2.1
Fatal and injury (FI)	0.7
Property damage only (PDO)	1.4

**HSM SAMPLE ANALYSIS
AADT USING 1% ANNUAL GROWTH**

YEAR	AADT - Major Leonardville Rd (CR 516)	AADT - Minor East Road	F/I	PDO
2012		6080		
2013	11043	6141		
2014	11153	6202		
2015	11265	6264		
2016	11378	6327	0.88	1.72
2017	11491	6390	0.89	1.74
2018	11606	6454	0.90	1.76
2019	11722	6519	0.91	1.78
2020	11840	6584	0.93	1.80
2021	11958	6650	0.84	1.82
2022	12078	6716	0.95	1.85
2023	12198	6783	0.96	1.87
2024	12320	6851	0.97	1.89
2025	12444	6920	0.99	1.92
2026	12568	6989	1.00	1.94
2027	12694	7059	1.01	1.96
2028	12821	7129	1.02	1.99
2029	12949	7201	1.04	2.01
2030	13078	7273	1.05	2.04
2031	13209	7345	1.06	2.06
2032	13341	7419	1.08	2.09
2033	13475	7493	1.09	2.12

MULTIPLE YEAR ECONOMIC APPRAISAL

General Information		
Project Name	Leonardville Road (CR 516) & East Road Intersection Improvements - Monmouth County	
Project Description	Traffic Signal Replacement	
Reference Number		
Analyst	C. Mittman	
Agency/Company	NJTPA	
Contact Email		
Contact Phone		
Date Completed	6/7/2016	
Economic Appraisal Information		
Baseline Data Year	2016	
Construction Year	2018	
Service Life (yrs)	15 Traffic Signals: 10-20 years (Average - 15 years)	
Annual Traffic Growth (%)	1.00%	
Discount Rate (i)	4.00% Assumed	
Selected Countermeasure(s) Information		
Description	Traffic Signal replacement including 12" LED lens	
Reference	CMFs 3948 & 1430	
CMF Total	0.74	(0.80 x 0.93)
Standard Error	0.1	
CMF Fatal/Injury		
Standard Error		

Required user input data
 Modified dependent upon Baseline Year
http://www.bls.gov/data/inflation_calculator.htm
 Calculated Results

Injury Severity	Estimated Cost	
	2001*	2015/16
Fatal (K)	\$4,008,900	\$5,365,203.00
Fatal and/or Injury (K/A/B/C)	\$158,200	\$211,722.70
Injury (A/B/C)	\$82,600	\$110,545.48
Disability Injury (A)	\$216,000	\$289,077.76
Evident Injury (B)	\$79,000	\$105,727.52
Possible Injury (C)	\$44,900	\$60,090.70
Property Damage Only (O)	\$7,400	\$9,903.59

* Societal Crash Costs by Severity, FHWA-HRT-05-051, October 2005

\$ 339,000	Project Cost
\$ 645,967	TOTAL CRASH BENEFIT
1.91	Benefit / Cost Ratio

Year	Expected Average Crash Frequency at Intersection						Annual Monetary Value of Change in Crashes					Conversion to Present Value					
	WITHOUT Countermeasure			WITH Countermeasure			Δ N ^{Expected}			FI Crash Cost	FI Crash Cost Benefit	PDO Crash Cost	PDO Crash Cost Benefit	Total Crash Cost Benefit	Years in service life (y)	(P/F,i,y)	Present Value Crash Cost Benefit
	N ^{Expected Before}			N ^{Expected After}			Total	FI	PDO								
	Total	FI	PDO	Total	FI	PDO	Total	FI	PDO								
2016	2.6	0.9	1.7	1.9	0.7	1.2	0.7	0.2	0.5	\$0	\$0	\$0	\$0	\$0	0	0.0	\$ -
2017	2.6	0.9	1.7	2.0	0.7	1.3	0.6	0.2	0.4	\$0	\$0	\$0	\$0	\$0	0	1.0000	\$ -
2018	2.7	0.9	1.8	2.0	0.7	1.3	0.7	0.2	0.5	\$0	\$0	\$0	\$0	\$0	0	1.0000	\$ -
2019	2.7	0.9	1.8	2.0	0.7	1.3	0.7	0.2	0.5	\$211,723	\$44,462	\$9,904	\$4,754	\$49,215	1	0.9615	\$ 47,323
2020	2.7	0.9	1.8	2.0	0.7	1.3	0.7	0.2	0.5	\$211,723	\$48,696	\$9,904	\$4,952	\$53,648	2	0.9246	\$ 49,601
2021	2.7	0.8	1.8	2.0	0.6	1.4	0.7	0.2	0.4	\$211,723	\$50,813	\$9,904	\$4,160	\$54,973	3	0.8890	\$ 48,871
2022	2.8	1.0	1.9	2.1	0.7	1.4	0.7	0.3	0.5	\$211,723	\$52,931	\$9,904	\$4,457	\$57,387	4	0.8548	\$ 49,055
2023	2.8	1.0	1.9	2.1	0.7	1.4	0.7	0.3	0.5	\$211,723	\$55,048	\$9,904	\$4,655	\$59,703	5	0.8219	\$ 49,071
2024	2.9	1.0	1.9	2.1	0.7	1.4	0.8	0.3	0.5	\$211,723	\$57,165	\$9,904	\$4,853	\$62,018	6	0.7903	\$ 49,014
2025	2.9	1.0	1.9	2.2	0.7	1.5	0.7	0.3	0.4	\$211,723	\$61,400	\$9,904	\$4,160	\$65,559	7	0.7599	\$ 49,820
2026	2.9	1.0	1.9	2.2	0.7	1.5	0.7	0.3	0.4	\$211,723	\$63,517	\$9,904	\$4,358	\$67,874	8	0.7307	\$ 49,595
2027	3.0	1.0	2.0	2.2	0.8	1.4	0.8	0.2	0.6	\$211,723	\$44,462	\$9,904	\$5,546	\$50,008	9	0.7026	\$ 35,135
2028	3.0	1.0	2.0	2.2	0.8	1.4	0.8	0.2	0.6	\$211,723	\$46,579	\$9,904	\$5,843	\$52,422	10	0.6756	\$ 35,414
2029	3.1	1.0	2.0	2.3	0.8	1.5	0.8	0.2	0.5	\$211,723	\$50,813	\$9,904	\$5,051	\$55,864	11	0.6496	\$ 36,288
2030	3.1	1.1	2.0	2.3	0.8	1.5	0.8	0.3	0.5	\$211,723	\$52,931	\$9,904	\$5,348	\$58,279	12	0.6246	\$ 36,401
2031	3.1	1.1	2.1	2.3	0.8	1.5	0.8	0.3	0.6	\$211,723	\$55,048	\$9,904	\$5,546	\$60,594	13	0.6006	\$ 36,391
2032	3.2	1.1	2.1	2.4	0.8	1.6	0.8	0.3	0.5	\$211,723	\$59,282	\$9,904	\$4,853	\$64,135	14	0.5775	\$ 37,036
2033	3.2	1.1	2.1	2.4	0.8	1.6	0.8	0.3	0.5	\$211,723	\$61,400	\$9,904	\$5,150	\$66,549	15	0.5553	\$ 36,953
2034	0.0			0.0	0.0	0.0	0.0	0.0	0.0	\$0	\$0	\$0	\$0	\$0	0	1.0000	\$ -
2035	0.0			0.0	0.0	0.0	0.0	0.0	0.0	\$0	\$0	\$0	\$0	\$0	0	1.0000	\$ -
2036	0.0			0.0	0.0	0.0	0.0	0.0	0.0	\$0	\$0	\$0	\$0	\$0	0	1.0000	\$ -
2037	0.0			0.0	0.0	0.0	0.0	0.0	0.0	\$0	\$0	\$0	\$0	\$0	0	1.0000	\$ -
2038	0.0			0.0	0.0	0.0	0.0	0.0	0.0	\$0	\$0	\$0	\$0	\$0	0	1.0000	\$ -
2039	0.0			0.0	0.0	0.0	0.0	0.0	0.0	\$0	\$0	\$0	\$0	\$0	0	1.0000	\$ -
2040	0.0			0.0	0.0	0.0	0.0	0.0	0.0	\$0	\$0	\$0	\$0	\$0	0	1.0000	\$ -
2041	0.0			0.0	0.0	0.0	0.0	0.0	0.0	\$0	\$0	\$0	\$0	\$0	0	1.0000	\$ -
2042	0.0			0.0	0.0	0.0	0.0	0.0	0.0	\$0	\$0	\$0	\$0	\$0	0	1.0000	\$ -
2043	0.0			0.0	0.0	0.0	0.0	0.0	0.0	\$0	\$0	\$0	\$0	\$0	0	1.0000	\$ -
																TOTAL CRASH BENEFIT	\$645,967



CMF / CRF Details

CMF ID: 1430

Improve visibility of signal heads

Description:

Prior Condition: Improvements included one or more of the following: signal lens size upgrade, installing new backboards, adding reflective tape to existing backboards, and installing additional signal heads.

Category: Intersection traffic control

Study: [*Evaluating the Safety Impacts of Improving Signal Visibility at Urban Signalized Intersections*, Sayed et al., 2007](#)

Star Quality Rating:



[\[View score details\]](#)

Crash Modification Factor (CMF)

Value: 0.93

Adjusted Standard Error:

Unadjusted Standard Error:

Crash Reduction Factor (CRF)

Value: 7 (*This value indicates a **decrease** in crashes*)

Adjusted Standard Error:

Unadjusted Standard Error:

Applicability

Crash Type: All

Crash Severity: All

Roadway Types: Not specified

Number of Lanes:

Road Division Type:

Speed Limit: 50 km/h (30 mph)

Area Type: Urban

Traffic Volume:

Time of Day: All

If countermeasure is intersection-based

Intersection Type: Roadway/roadway (not interchange related)

Intersection Geometry: 4-leg

Traffic Control: Signalized



CMF / CRF Details

CMF ID: 3948

Install left-turn lane

Description:

Prior Condition: Unknown

Category: Intersection geometry

Study: [*A full Bayes multivariate intervention model with random parameters among matched pairs for before-after safety evaluation, El-Basyouny and Sayed, 2011*](#)

Star Quality Rating:



[\[View score details\]](#)

Crash Modification Factor (CMF)

Value: 0.79

Adjusted Standard Error:

Unadjusted Standard Error:

Crash Reduction Factor (CRF)

Value:	21 (<i>This value indicates a decrease in crashes</i>)
Adjusted Standard Error:	
Unadjusted Standard Error:	

Applicability

Crash Type:	All
Crash Severity:	Fatal, Serious injury, Minor injury
Roadway Types:	Not Specified
Number of Lanes:	
Road Division Type:	
Speed Limit:	
Area Type:	Urban
Traffic Volume:	
Time of Day:	All

If countermeasure is intersection-based

Intersection Type:	Roadway/roadway (not interchange related)
Intersection Geometry:	Not specified
Traffic Control:	Not specified
Major Road Traffic Volume:	



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Recycling Superintendent
JOHN T. KENDZULAK, JR.
Transportation Director
YVONNE C. MANFRA
Vehicle Maintenance Supervisor
MICHAEL F. ROMANELLO
Somerset Union Soil Conservation
District Manager
FRANK CALO

MEMORANDUM

TO: MATTHEW LOPER, COUNTY ENGINEER

FROM: JOSEPH FISHINGER, PRINCIPAL ENGINEER (TRAFFIC) 

RE: HIGHWAY SAFETY MANUAL ANALYSIS
WASHINGTON AVENUE (CR 529) SAFETY IMPROVEMENTS

DATE: MAY 29, 2014

Introduction

As part of the preparation of the FY 2015 Local Safety Program grant process administered by NJTPA, I have completed a before and after Highway Safety Manual (HSM) analysis for the proposed Washington Avenue (CR 529) Safety Improvements. The HSM analysis utilizes accepted crash research to determine a predicted number of crashes for a transportation facility given its geometric and operational characteristics. Improvements to the facility can then be checked using the HSM to determine what changes to the predicted number of crashes a given improvement will have. Utilizing available estimates for the societal value of a crash, a cost benefit analysis can then be performed to evaluate the benefits of a given improvement.

Baseline Conditions

The Washington Avenue corridor is an approximately 0.4 mile corridor consisting of two travel lanes in each direction with no shoulders, median or on-street parking. The posted speed limit along the corridor is 40 mph and the AADT is approximately 21,000 vehicles per day (2013 values). There is one signalized intersection along the corridor at Greenbrook Road (CR 634) and no un-signalized intersections. There are approximately 19 driveways along the corridor (16 commercial, 1 institutional, and 3 residential). There are utility poles on both sides of the corridor at approximately 150 foot spacing, with the poles offset less than 2 feet from the edge of traveled way.

The intersection of Washington Avenue and Greenbrook Road is a four way signalized intersection operating on a two phase, semi-actuated traffic signal. All four approaches consist of two approach lanes, a shared left/through and a shared through/right. AADT is 21,000 vpd on Washington Avenue and approximately 6,000 vpd on Greenbrook Road (2013 volumes). No turn on red signs are posted on all four corners of the intersection

- Mission Statement -

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and red light running cameras are not present. Pedestrian volumes (sum of all crossings) was observed at 37 crossings per day. There are no bus stops, liquor stores or schools within 1,000 feet of the intersection.

Existing Conditions HSM Analysis

Based on the information identified above, an HSM analysis was performed for the corridor under baseline conditions. The analysis was conducted using the Urban and Suburban Arterial model and looked at Washington Avenue as a single segment with the intersection of Washington Avenue and Greenbrook Road broken out as a separate intersection. The HSM analysis indicates that the corridor (including the signal) will experience predicted crash rates of 3.076 injury/fatal crashes and 6.540 property damage crashes per year under current conditions for a total predicted crash rate of 9.616 crashes per year. Copies of the HSM worksheets detailing the analysis are attached for reference.

Observed Crash Rates

Based on four years of crash data (2010 – 2013, crash diagram attached) the corridor experiences a total of approximately 8.0 crashes per year, with crash types typical for such a corridor, predominately sideswipe crashes along the roadway segments and left turn related crashes at the Washington Avenue and Greenbrook Road signal. A crash diagram and the relevant crash reports are attached for reference.

Proposed Conditions HSM Analysis

The proposed project includes the conversion of Washington Avenue from a four lane section to a three lane section with center turn lanes where appropriate. Also, the intersection of Washington Avenue and Greenbrook Road will be reconfigured to provide a dedicated left turn lane and a shared through/right turn lane in each direction with protected / permitted left turn phasing on all approaches. All other conditions relevant to the HSM analysis (i.e. driveway density, fixed objects, etc) will remain unchanged. A second HSM analysis was conducted, accounting for the changes detailed above and the resulting predicted crash rates were calculated: 2.030 injury/fatal crashes and 4.814 property damage crashes per year under current conditions for a total predicted crash rate of 6.844 crashes per year. Copies of the HSM analysis are again included for reference.

Cost Benefit Analysis

Using FHWA-HRT-05-051, "Crash Cost Estimates by Maximum Police-Reported Injury Severity within Selected Crash Geometries", October, 2005 as a baseline, the costs associated with a "Fatal and/or Injury" crash and a "Property Damage Only" crash were expanded to a 2016 base year using an assumed discount rate of 4% per year, for a cost of \$284,909 and \$13,327 respectively (2016 costs) and also expanded at 4% per year for the next 15 years. The crash rates under the existing and proposed conditions determined using the HSM analysis were also projected out to a 2016 base year and for a 15 year service life thereafter, utilizing a 1% per annum growth rate consistent with a principal

arterial in Somerset County using NJDOT Access Permit Annual Background Growth Rate Table, issued April, 2013.

For each year, the dollar values per crash were totaled based on the predicted change in the number of crashes between the existing and proposed conditions. The costs were then converted to present (2016) year values using a 4% discount rate, for a resulting estimated present monetary value of approximately \$5.4 million dollars. The project is anticipated to cost approximately \$776,000 to construct, for a resulting cost / benefit ratio of approximately 6.9 to 1.

Conclusions

Based on the HSM and cost benefit analysis contained herewith, the Washington Avenue (CR 529) Safety Improvements project, with an estimated cost of \$776,000 will have a positive benefit to society resulting in an approximately 6.9 to 1 benefit to cost ratio.

Cc: A. Slutsky
File:20130074

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ATTACHMENT D

FHWA PROVEN SAFETY COUNTERMEASURES

Proven Safety Countermeasures

Backplates with Retroreflective Borders

Backplates are added to a traffic signal indication in order to improve the visibility of the illuminated face of the signal by introducing a controlled-contrast background. The improved visibility of a signal head with a backplate is then made more conspicuous by framing the backplate with a retroreflective border. Taken together, a signal head equipped with a backplate with retroreflective border is made more visible and conspicuous in both daytime and nighttime conditions, which is intended to reduce unintentional red-light running crashes.

Background

A project initiated in 1998 by the Insurance Corporation of British Columbia and the Canadian National Committee on Uniform Traffic Control investigated the effectiveness of applying retroreflective tape around the borders of traffic signal backplates. A small number of signalized intersections were treated and followed up with a simple before/after study, which concluded that the enhancement was effective at reducing crashes. A larger number of sites were subsequently treated and a more robust statistical study was performed.



Since their initial introduction in Canada, several U.S. State highway departments and local road agencies have adopted practices and policies concerning this countermeasure. Additionally, the FHWA has encouraged this treatment as a human factors enhancement of traffic signal visibility and conspicuity for older and colorblind drivers. Adding retroreflective borders is also advantageous during periods of power outages when the signals would otherwise be dark. The retroreflective sheeting continues to provide a visible cue for travelers to take note of the dark signal and adjust their actions accordingly. Per the study included in the Crash Modification Factor Clearinghouse, the use of backplates with retroreflective borders may result in a 15 percent reduction in all crashes at urban, signalized intersections.

Guidance

Backplates with retroreflective borders should be considered as part of efforts to systemically improve safety performance at signalized intersections. Adding a retroreflective border to an existing signal backplate can be a very low-cost safety treatment, as the materials are simple strips of retroreflective sheeting. For existing traffic signals that lack even standard backplates, the addition of backplates with a retroreflective border can often be accommodated on existing mast arm and span wire assemblies, but the structural capacity of the supports must be properly evaluated. The most effective means of implementing this proven safety countermeasure is to adopt it as a standard treatment for signalized intersections across a jurisdiction so that it is consistently included with all new construction and modernization projects, as well as being a worthy retrofit project for existing signals at intersections with red-light running crash histories. It is important to note that the Manual on Uniform Traffic Control Devices (MUTCD) specifically allows this treatment as an option that is discussed in



Part 4. In terms of color and size, implementation of backplates and retroreflective borders must be consistent with the latest edition of the MUTCD.

Key Resources

Retroreflective Borders on Traffic Signal Backplates – A South Carolina Success Story

<http://safety.fhwa.dot.gov/intersection/resources/casestudies/fhwas09011/>

Manual on Uniform Traffic Control Devices (2009 Edition), Part 4D Traffic Control Signal Features

<http://mutcd.fhwa.dot.gov/htm/2009/part4/part4d.htm#section4D12>

FHWA Interim Approval for Use of Retroreflective Border on Signal Backplates (prior to 2009 Edition)

http://mutcd.fhwa.dot.gov/pdfs/ia_retroborder.pdf

Florida Department of Transportation, Plan Preparation Manual, Chapter 7 Traffic & ITS Design (Section 7.4.17)

<http://www.dot.state.fl.us/rddesign/PPMManual/2009/Volume1/zChap07.pdf>

Senior Mobility Series: Article 4 - Marking the Way to Greater Safety, FHWA Public Roads Volume 70/No. 1

<http://www.fhwa.dot.gov/publications/publicroads/06jul/08.cfm>

Crash Modification Factor (CMF) Clearinghouse [*quick search* “retroreflective backplate”]

<http://www.cmfclearinghouse.org/>

Evaluating Impact on Safety of Improved Signal Visibility at Urban Signalized Intersections

<http://pubsindex.trb.org/view.aspx?id=800943>

Road Safety Performance Associated with Improved Traffic Signal Design and Increased Signal Conspicuity

<http://mutcd.fhwa.dot.gov/texts/miska/miska02.htm#toc>

FHWA Contacts

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FHWA Resource Center: Timothy Taylor, timothy.taylor@dot.gov, 404-562-3560

FHWA Website: <http://safety.fhwa.dot.gov/intersection/>

Proven Safety Countermeasures

Corridor Access Management

Access management is a set of techniques that State and local governments use to control access to highways, major arterials, and other roadways. The benefits of access management include improved movement of traffic, reduced crashes, and fewer vehicle conflicts. Access management principles are applicable to roadways of all types, ranging from fully access-controlled facilities, such as freeways, to those with little or no access control, such as local streets. Successful access management, managed by change in access density, seeks to simultaneously enhance safety, preserve capacity, and provide for pedestrian and bicycle needs.

Background

Every at-grade intersection, from a busy signalized intersection to a simple unpaved driveway, has the potential for conflicts between motorized vehicles, pedestrians, and bicycles. In general, the number and types of conflict points (i.e., the number of locations where the travel paths of two different users may cross) influence the safety performance of the intersection or driveway. Analysis of access-related crashes has revealed that driveways and minor uncontrolled intersections can be especially dangerous locations for pedestrians and bicyclists.



Access management refers to the design, implementation, and control of entry and exit points along a roadway. This includes intersections with other roads and driveways that serve adjacent properties. These entry and exit points can be managed by carefully planning their location, complexity, extent (i.e., types of turning movements allowed), and if appropriate, use of medians or other schemes that facilitate or prohibit access to the roadway. Developing and implementing effective access management strategies that improve safety requires considering the location of driveways in the context of current and future access and intersection operation needs and mobility for pedestrians and bicyclists. Per the Highway Safety Manual, areas where effective access management has been implemented have experienced:

- ◆ A 5-23 percent reduction in all crashes along two-lane rural highways, and
- ◆ A 25-31 percent reduction in severe (injury/fatal) crashes along urban/suburban arterials.

Guidance

Access management techniques are designed to manage the frequency and magnitude of conflict points at intersections and driveways by altering access patterns. Several of the more common access management treatments include:



- ♦ Driveway closure, consolidation, or relocation,
- ♦ Restricted-movement designs for driveways (such as right-in/right-out only),
- ♦ Restricted-movement and alternative designs for intersections (such as J-turns, median U-turns and quadrant roadways),
- ♦ Raised medians that prevent cross-roadway movements and focus turns and/or U-turns to key intersections,
- ♦ Adding auxiliary turn lanes (including exclusive left or right and two-way left),
- ♦ Constructing parallel, lower speed one-way or two-way frontage roads for access, and
- ♦ Using roundabouts or mini roundabouts to provided needed or desired access.

A corridor access management approach involves seeking an appropriate balance between the safety and mobility of a roadway facility with the access needs of adjacent land uses. Access management should be considered as part of any Federally-funded highway project that involves new construction or reconstruction, as well as on major rehabilitation or roadway widening projects, especially facilities with moderate to heavy daily traffic volumes.

Key Resources

Access Management in the Vicinity of Intersections Technical Summary

<http://safety.fhwa.dot.gov/intersection/resources/fhwasa10002/>

Access Management Principles

http://ops.fhwa.dot.gov/access_mgmt/presentations/am_principles_intro/index.htm

Alternative Intersections/Interchanges Resources

http://safety.fhwa.dot.gov/intersection/alter_design/#resources

“Safe Access is Good for Business” Brochure

http://ops.fhwa.dot.gov/publications/amprimer/access_mgmt_primer.htm

Transportation Research Board Access Management Website

<http://www.accessmanagement.info/>

Guidebook for Incorporating Access Management in Transportation Planning (NCHRP Report 548)

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_548.pdf

Highway Safety Manual, American Association of State Highway and Transportation Officials

<http://www.highwaysafetymanual.org/Pages/default.aspx>

Crash Modification Factor (CMF) Clearinghouse [*quick search* “access management”]

<http://www.cmfclearinghouse.org/>

FHWA Contacts

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FHWA Resource Center: David Engstrom, david.engstrom@dot.gov, 708-283-3545

FHWA Intersection Safety Website: <http://safety.fhwa.dot.gov/intersection/>

FHWA Access Management Website: http://ops.fhwa.dot.gov/access_mgmt/index.htm

Proven Safety Countermeasures

Enhanced Delineation and Friction for Horizontal Curves

Low-cost safety treatments vary by the severity of the curvature and the operating speed. Low-cost treatments typically include methods for warning the driver in advance of the curve, but treatments will vary by intensity of the warning. Implementing the recently published curve treatments included in the Manual on Uniform Traffic Control Devices (MUTCD) should improve curve safety over past practices by providing consistency. However, additional enhancements can be made with post-mounted delineation in the curve or an enhanced signing treatment that may include larger chevron signs with enhanced retroreflectivity. For more challenging curves, dual indicated advanced signs with constant flashing beacons may be effective. Pavement markings are also an effective communication tool to indicate the alignment change. Pavement friction is critical for changing vehicle direction and ensuring the vehicle remains in its lane. Traditional friction courses or high friction surface treatments should be considered for curves with numerous wet weather crashes or severe curves with higher operating speeds.



Background

Horizontal curves are a change in roadway alignment that creates a more demanding environment for the driver, vehicle, and pavement. The challenges associated with safe navigation of horizontal curves compound with the addition of a nighttime driving environment or inclement weather. Recent data analysis shows that 28 percent of all fatal crashes occur on horizontal curves. Furthermore, about three times as many crashes occur on curves as on tangential sections of roadways. These statistics make horizontal curves prime sites for safety improvements.

Early driver perception and appropriate reaction to changes in the roadway greatly improve the safety of the curve. Inconsistent use of warning signs has been identified as an important factor contributing to the high incidence of crashes on curves. The MUTCD was recently revised to attempt to provide a more uniform application across the United States. Other recent research on signing practices in curves has shown great potential for improving safety with low-cost options. In addition to these treatments, new technologies are being evaluated for challenging curves, such as dynamic advanced curve warning signs and dynamic sequential light-emitting diodes (LED lights) on chevrons.

There are a variety of high-friction surface treatments available. While they typically have a higher unit cost than traditional friction courses, they can often be applied at the specific curve location for a relatively low cost. Additionally, where cross-section problems such as lack of appropriate superelevation exist, this can be a low-cost alternative to address a problem in the short-term until further improvements can be made.



Crash Modification Factors are available from the FHWA Clearinghouse and present effectiveness levels for various horizontal curve treatments. For example:

- ♦ Installing chevron signs, curve warning signs, and/or sequential flashing beacons can result in a 38–43 percent reduction in all fatal and injury crashes.
- ♦ Installing chevron signs on horizontal curves can produce a 16 percent reduction in non-intersection fatal and injury crashes.
- ♦ Installing new fluorescent curve signs or upgrading existing curve signs to fluorescent sheeting can result in 25 percent reduction in non-intersection fatal and injury crashes.
- ♦ Providing static combination horizontal alignment/advisory speed signs can generate a 13 percent reduction in all injury crashes.
- ♦ Refinishing pavement with microsurfacing treatment can bring about a 43 percent reduction in all fatal and serious injury crashes.

Guidance

Each State with identified problems on horizontal curves should review those locations in light of the guidance provided in Section 2C.05 of the 2009 MUTCD to improve consistency within and across jurisdictions. Additionally, States should review signing practices and policies to ensure they comply with the intent of the new guidance.

Each State should also develop a process for identifying and treating problem curves. This process should consider the full range of available treatments described here and use the appropriate application for the identified problem(s), as noted in the countermeasure description above.

Key Resources

Manual on Uniform Traffic Control Devices, FHWA, 2009

<http://mutcd.fhwa.dot.gov/>

Low-Cost Treatments for Horizontal Curve Safety, 2006, FHWA-SA-07-002

http://safety.fhwa.dot.gov/roadway_dept/horcurves/fhwasa07002/

Safety Evaluation of Improved Curve Delineation

<http://www.fhwa.dot.gov/publications/research/safety/09045/09045.pdf>

AASHTO Highway Safety Manual (Available for purchase from AASHTO)

<http://www.highwaysafetymanual.org/pages/default.aspx>

Crash Modification Factor (CMF) Clearinghouse [*quick search* “horizontal curve”]

<http://www.cmfclearinghouse.org>

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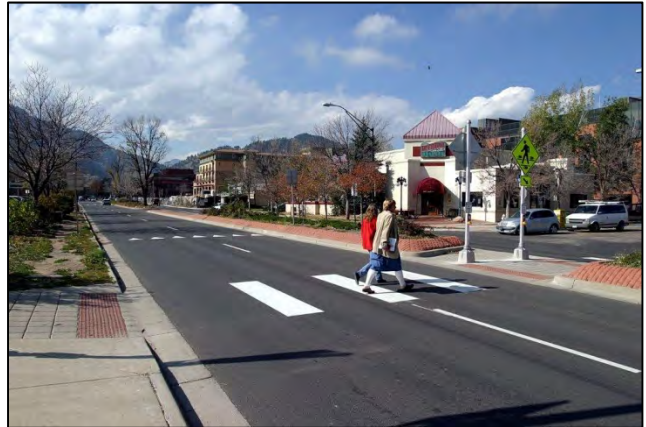
FHWA Website: http://safety.fhwa.dot.gov/roadway_dept/horcurves/

Proven Safety Countermeasures

Medians and Pedestrian Crossing Islands in Urban and Suburban Areas

A *median* is an area between opposing lanes of traffic, excluding turn lanes. Medians in urban and suburban areas can either be open (pavement markings only) or they can be channelized (raised medians or islands) to separate various road users.

Pedestrian crossing islands (or refuge areas)—also known as center islands, refuge islands, pedestrian islands, or median slow points—are raised islands placed on a street at intersections or midblock locations to separate crossing pedestrians from motor vehicles.



There are several types of medians and pedestrian crossing islands, and if designed and applied appropriately, they improve the safety benefits to both pedestrians and vehicles in the following ways:

- ♦ They may reduce pedestrian crashes by 46 percent and motor vehicle crashes by up to 39 percent.
- ♦ They may decrease delays (by greater than 30 percent) for motorists.
- ♦ They allow pedestrians a safe place to stop at the mid-point of the roadway before crossing the remaining distance.
- ♦ They enhance the visibility of pedestrian crossings, particularly at unsignalized crossing points.
- ♦ They can reduce the speed of vehicles approaching pedestrian crossings.
- ♦ They can be used for access management for vehicles (allowing only right-in/right-out turning movements).
- ♦ They provide space for supplemental signage on multi-lane roadways.

Background

Midblock locations account for more than 70 percent of pedestrian fatalities. This is where vehicle travel speeds are higher, contributing to the larger injury and fatality rate seen at these locations. More than 80 percent of pedestrians die when hit by vehicles traveling at 40 mph or faster while less than 10 percent die when hit at 20 mph or less. Installing such raised channelization on approaches to multi-lane intersections has been shown to be especially effective. Medians are a particularly important pedestrian safety countermeasure in areas where pedestrians access a transit stop or other clear origins/destinations across from each other. Providing raised medians or pedestrian refuge areas at marked crosswalks has demonstrated a 46 percent reduction in pedestrian crashes. At unmarked crosswalk locations, medians have demonstrated a 39 percent reduction in pedestrian crashes.



Guidance

Raised medians (or refuge areas) should be considered in curbed sections of multi-lane roadways in urban and suburban areas, particularly in areas where there are mixtures of significant pedestrian and vehicle traffic (more than 12,000 Average Daily Traffic (ADT)) and intermediate or high travel speeds. Medians/refuge islands should be at least 4 feet wide (preferably 8 feet wide to accommodate pedestrian comfort and safety) and of adequate length to allow the anticipated number of pedestrians to stand and wait for gaps in traffic before crossing the second half of the street.

Key Resources

A Review of Pedestrian Safety Research in the United States and Abroad, p. 85-86

<http://www.walkinginfo.org/library/details.cfm?id=13>

Pedestrian Facility User's Guide: Providing Safety and Mobility, p. 56

http://drusilla.hsnc.unc.edu/cms/downloads/PedFacility_UserGuide2002.pdf

Guide for the Planning, Design, and Operation of Pedestrian Facilities, American Association of State Highway and Transportation Officials, 2004 [Available for purchase from AASHTO]

https://bookstore.transportation.org/item_details.aspx?id=119

Pedestrian Road Safety Audits and Prompt Lists

<http://www.walkinginfo.org/library/details.cfm?id=3955>

FHWA Office of Safety Bicycle and Pedestrian Safety

http://safety.fhwa.dot.gov/ped_bike/

Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations, p. 55

<http://www.walkinginfo.org/library/details.cfm?id=54>

Handbook of Road Safety Measures

http://www.cmclearinghouse.org/study_detail.cfm?stid=14

Analyzing Raised Median Safety Impacts Using Bayesian Methods

http://www.cmclearinghouse.org/study_detail.cfm?stid=213

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FHWA Resource Center: Peter Eun, peter.eun@dot.gov, 360-753-9551

FHWA Web site: http://safety.fhwa.dot.gov/policy/memo071008/#ped_refuge

Proven Safety Countermeasures

Pedestrian Hybrid Beacon

The *pedestrian hybrid beacon* (also known as the **H**igh intensity **A**ctivated cross**W**alk (or HAWK)) is a pedestrian-activated warning device located on the roadside or on mast arms over midblock pedestrian crossings. The beacon head consists of two red lenses above a single yellow lens. The beacon head is “dark” until the pedestrian desires to cross the street. At this point, the pedestrian will push an easy to reach button that activates the beacon. After displaying brief flashing and steady yellow intervals, the device displays a steady red indication to drivers and a “WALK” indication to pedestrians, allowing them to cross a major roadway while traffic is stopped. After the pedestrian phase ends, the “WALK” indication changes to a flashing orange hand to notify pedestrians that their clearance time is ending. The hybrid beacon displays alternating flashing red lights to drivers while pedestrians finish their crossings before once again going dark at the conclusion of the cycle.

Background

Midblock locations account for more than 70 percent of pedestrian fatalities. Vehicle travel speeds are usually higher at midblock locations, contributing to the higher injury and fatality rates at these locations. More than 80 percent of pedestrians die when hit by vehicles traveling at 40 mph or faster while less than 10 percent die when hit at 20 mph.

The pedestrian hybrid beacon is a great intermediate option between the operational requirements and effects of a rectangular rapid flash beacon and a full pedestrian signal because it provides a positive stop control in areas without the high pedestrian traffic volumes that typically warrant the installation of a signal. In addition, the alternating red signal heads allows vehicles to proceed once the pedestrian has cleared their side of the travel lane, thus improving vehicle traffic flow.



Installation of the pedestrian hybrid beacon has been shown to provide the following safety benefits:

- ♦ Up to a 69 percent reduction in pedestrian crashes at midblock crossings, and
- ♦ Up to a 29 percent reduction in total roadway crashes.

Guidance

Pedestrian hybrid beacons should only be used at midblock locations in conjunction with a marked crosswalk. In general, they should be used if gaps in traffic are not adequate to permit pedestrians to cross, if vehicle speeds on the major street are too high to permit pedestrians to cross, or if pedestrian delay is excessive. Transit and school locations may be good places to consider using the pedestrian hybrid beacon. Chapter 4F of the Manual on Traffic Control Devices (MUTCD) contains a chapter on the pedestrian hybrid beacon and when and where it should be installed. Practitioners should follow the MUTCD guidelines, which are referenced below. Since the pedestrian hybrid beacon is a traffic control device many people are not yet familiar with, effort should be made to perform outreach to the public before implementation so there is no confusion about how the beacon operates and what drivers and pedestrians should do when encountering it.

Key Resources

A Review of Pedestrian Safety Research in the United States and Abroad

<http://www.walkinginfo.org/library/details.cfm?id=13>

Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations

<http://www.walkinginfo.org/library/details.cfm?id=54>

Guide for the Planning, Design, and Operation of Pedestrian Facilities, American Association of State Highway and Transportation Officials, 2004 [Available for purchase from AASHTO]

https://bookstore.transportation.org/item_details.aspx?id=119

Pedestrian Road Safety Audits and Prompt List

<http://www.walkinginfo.org/library/details.cfm?id=3955>

FHWA Office of Safety Bicycle and Pedestrian Safety

http://safety.fhwa.dot.gov/ped_bike/

Crossing Solutions at Roundabouts and Channelized Turn Lanes for Pedestrians with Vision Disabilities (NCHRP Report 674)

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_674.pdf

Manual on Uniform Traffic Control Devices, Chapter 4F. Pedestrian Hybrid Beacons

<http://mutcd.fhwa.dot.gov/htm/2009/part4/part4f.htm>

Safety Effectiveness of the HAWK Pedestrian Crossing Treatment

<http://www.fhwa.dot.gov/publications/research/safety/10042/10042.pdf>

Crash Modification Factors (CMF) Clearinghouse [*quick search* "HAWK"]

<http://www.cmfclearinghouse.org>

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FHWA Website: http://safety.fhwa.dot.gov/ped_bike/

Proven Safety Countermeasures

“Road Diet” (Roadway Reconfiguration)

The classic roadway reconfiguration, commonly referred to as a “road diet,” involves converting an undivided four lane roadway into three lanes made up of two through lanes and a center two-way left turn lane. The reduction of lanes allows the roadway to be reallocated for other uses such as bike lanes, pedestrian crossing islands, and/or parking. Road diets have multiple safety and operational benefits for vehicles as well as pedestrians, such as:

- ♦ Decreasing vehicle travel lanes for pedestrians to cross, therefore reducing the multiple-threat crash (when one vehicle stops for a pedestrian in a travel lane on a multi-lane road, but the motorist in the next lane does not, resulting in a crash) for pedestrians,
- ♦ Providing room for a pedestrian crossing island,
- ♦ Improving safety for bicyclists when bike lanes are added (such lanes also create a buffer space between pedestrians and vehicles),
- ♦ Providing the opportunity for on-street parking (also a buffer between pedestrians and vehicles),
- ♦ Reducing rear-end and side-swipe crashes, and
- ♦ Improving speed limit compliance and decreasing crash severity when crashes do occur.

Background

Midblock locations tend to experience higher travel speeds, contributing to increased injury and fatality rates. More than 80 percent of pedestrians hit by vehicles traveling at 40 mph or faster will die, while less than 10 percent will die when hit at 20 mph or less. When appropriately applied, road diets have generated benefits to users of all modes of transportation, including bicyclists, pedestrians, and motorists. The resulting benefits include reduced vehicle speeds, improved mobility and access, reduced collisions and injuries, and improved livability and quality of life. When modified from four travel lanes to two travel lanes with a two-way left-turn lane, roadways have experienced a 29 percent reduction in all roadway crashes. The benefits to pedestrians include reduced crossing distance and fewer midblock crossing locations, which account for more than 70 percent of pedestrian fatalities.



Road Before



Road After



Guidance

Road diets can be low cost if planned in conjunction with reconstruction or simple overlay projects, since a road diet mostly consists of restriping. Roadways with Average Daily Traffic (ADT) of 20,000 or less may be good candidates for a road diet and should be evaluated for feasibility. It has been shown that roads with 15,000 ADT or less had very good results in the areas of safety, operations, and livability. Driveway density, transit routes, the number and design of intersections along the corridor, as well as operational characteristics are some considerations to be evaluated before deciding to implement a road diet.

It is a good practice for someone in an agency to know well in advance of when road reconstruction and overlay projects will be initiated so an evaluation can be conducted. It is important to analyze and understand the effects of the proposed change, obtain input from the community stakeholders, and ensure the appropriate elements are included in the project. Improvements to intersection turn lanes, signing, pavement markings, traffic control devices, transit stops, and pedestrian and bicyclist facilities may be needed to support this concept. It should be noted that the classic four-to-three-lane road diet is very compatible with single-lane roundabouts.

Key Resources

Pedsafe: Pedestrian Safety Guide and Countermeasure Selection System, p. 62

http://www.walkinginfo.org/pedsafe/pedsafe_downloads.cfm

Pedestrian Facility User's Guide: Providing Safety and Mobility, p. 53

http://drusilla.hsrrc.unc.edu/cms/downloads/PedFacility_UserGuide2002.pdf

Guide for the Planning, Design, and Operation of Pedestrian Facilities, American Association of State Highway and Transportation Officials, 2004 [Available for purchase from AASHTO]

https://bookstore.transportation.org/item_details.aspx?id=119

Pedestrian Road Safety Audits and Prompt List

<http://www.walkinginfo.org/library/details.cfm?id=3955>

FHWA Office of Safety Bicycle and Pedestrian Safety

http://safety.fhwa.dot.gov/ped_bike/

Road Diet Handbook: Setting Trends for Livable Streets [Available for purchase from ITE]

<http://www.ite.org/emodules/scriptcontent/Orders/ProductDetail.cfm?pc=LP-670>

Comparison of empirical Bayes and full Bayes approaches for before-after road safety evaluations

http://www.cmfclearinghouse.org/study_detail.cfm?stid=192

Crash Reduction Factors for Traffic Engineering and ITS Improvements

http://www.cmfclearinghouse.org/study_detail.cfm?stid=23

The Safety and Operational Effects of Road Diet Conversion in Minnesota

http://www.cmfclearinghouse.org/study_detail.cfm?stid=68

AASHTO Highway Safety Manual (available for purchase)

<http://www.highwaysafetymanual.org/pages/default.aspx>

FHWA Traffic Analysis Toolbox, "Designing Walkable Urban Thoroughfares: A Context Sensitive Approach"

<http://www.ite.org/emodules/scriptcontent/Orders/ProductDetail.cfm?pc=RP-036A-E>

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FHWA Web site: http://safety.fhwa.dot.gov/ped_bike

Proven Safety Countermeasures

Roundabouts

The modern roundabout is a type of circular intersection defined primarily by three basic operational principles:

- ◆ Geometry that results in a low-speed environment, creating substantial safety advantages.
- ◆ Entering traffic yields to vehicles in the circulatory roadway, leading to excellent operational performance.
- ◆ Channelization at the entrance and deflection around a center island are designed to be effective in reducing conflict.

Background

There are an estimated 300,000 signalized intersections in the United States. About one-third of all intersection fatalities occur at these locations, resulting in roughly 2,300 people killed each year. Furthermore, about 700 people are killed annually in red-light running collisions. Although traffic signals can work well for alternately assigning the right-of-way to different user movements across an intersection, roundabouts have demonstrated substantial safety and operational benefits compared to most other intersection forms and controls, with especially significant reductions in fatal and injury crashes. The *Highway Safety Manual (HSM)* indicates that:

- ◆ By converting from a two-way stop control mechanism to a roundabout, a location can experience an 82 percent reduction in severe (injury/fatal) crashes and a 44 percent reduction in overall crashes.
- ◆ By converting from a signalized intersection to a roundabout, a location can experience a 78 percent reduction in severe (injury/fatal) crashes and a 48 percent reduction in overall crashes.

The benefits have been shown to occur in urban and rural areas under a wide range of traffic conditions, and ongoing research has expanded our collective knowledge on safety performance for specific scenarios. Although the safety performance of all-way stop control is comparable to roundabouts (per the HSM), roundabouts provide far greater operational advantages. Roundabouts can be an effective tool for managing speed and creating a transition area that moves traffic from a high-speed to a low-speed environment. However, proper site selection, channelization, and design features are essential for making roundabouts accessible to all users.

Guidance

Roundabouts should be considered as an alternative for intersections on federally funded highway projects that involve new construction or reconstruction. Roundabouts should also be considered when rehabilitating existing intersections that have been identified as needing major safety or operational improvements. Roundabouts have also proven to be effective at freeway interchange ramp terminals and at rural high-speed intersections.



Key Resources

Roundabouts: An Informational Guide, Second Edition (NCHRP Report 672)

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_672.pdf

Roundabouts Outreach & Education Toolbox

<http://safety.fhwa.dot.gov/intersection/roundabouts/roundabouttoolbox/>

Roundabouts and Mini Roundabouts Technical Summaries

<http://safety.fhwa.dot.gov/intersection/roundabouts/fhwasa10006/>

<http://safety.fhwa.dot.gov/intersection/roundabouts/fhwasa10007/>

Roundabouts Informational Brochure and DVD

<http://safety.fhwa.dot.gov/intersection/roundabouts/fhwasa08006/>

<http://safety.fhwa.dot.gov/intersection/roundabouts/#video>

Public Rights-of-Way Accessibility Guidelines (NPRM Edition) (July 2011)

<http://www.access-board.gov/prowac/nprm.pdf>

Crossing Solutions at Roundabouts and Channelized Turn Lanes for Pedestrians with Vision Disabilities (NCHRP Report 674)

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_674.pdf

Highway Safety Manual, American Association of State Highway and Transportation Officials

<http://www.highwaysafetymanual.org/Pages/default.aspx>

Crash Modification Factor (CMF) Clearinghouse [*quick search* "roundabout"]

<http://www.cmfclearinghouse.org/>

Evaluation of Safety Strategies at Signalized Intersections (NCHRP Report 705)

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_705.pdf

Roundabouts in the United States (NCHRP Report 572)

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_572.pdf

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FHWA Website: <http://safety.fhwa.dot.gov/intersection/roundabouts/>

Proven Safety Countermeasures

Longitudinal Rumble Strips and Stripes on Two-Lane Roads

Longitudinal rumble strips are milled or raised elements on the pavement that cause vibration and sound, serving to warn inattentive drivers that their vehicles have left the travel lane. There are a number of possible applications that can be applied:

- ◆ **Shoulder rumble strips** are installed on a shoulder near the edge of the travel lane. They significantly reduce run-off-road (ROR) crashes.
- ◆ **Edge line rumble strips** are very similar to shoulder rumble strips, but are placed at the edge of the travel lane, typically in line with the edge line pavement marking.
- ◆ **Center line rumble strips** are installed at or near the center line of an undivided roadway and may be comprised of either a single or double line of rumbles. They reduce crashes that result from drivers crossing the center line, such as head-on collisions and some left ROR (left) crashes.
- ◆ **Rumble stripes** are either edge line or center line rumble strips where the pavement marking is placed over the rumble strip. This countermeasure increases nighttime visibility of the pavement marking.



Background

Roadway departure crashes account for approximately 53 percent of fatal crashes each year on the Nation's highways. In 2009, 8,780 single vehicle roadway departure fatalities occurred on two-lane roads. Rumble strips are designed primarily to address the subset of driver error crashes caused by distracted, drowsy, or otherwise inattentive drivers who unintentionally drift from their lane. Since driver error occurs on all roadway systems (including two-lane roads), rumble strips are most effective when deployed in a systemic application.

Continuous rumble strips can be applied on many miles of roads in a cost-effective manner. NCHRP 641: Guidance for Design and Application of Shoulder and Centerline Rumble Strips documented the following crash modification factors:

- ◆ Center line rumble strips on rural two-lane roads can produce a 44 percent reduction of head on fatal and injury crashes.
- ◆ Center line rumble strips on urban two-lane roads can result in a 64 percent reduction of head-on fatal and injury crashes.
- ◆ Shoulder rumble strips on rural two-lane roads can bring about a 36 percent reduction of run-off-road fatal and injury crashes.

While FHWA also recommends the use of rumble strips on multi-lane facilities, the focus here is on two-lane facilities where the application of rumbles has been somewhat limited despite studies showing greater crash reductions from using them on this type of facility than on other roadway types.



Guidance

Federal, State, and local agencies and tribal governments administering highway projects should consider rumble strips or rumble stripes on highway projects using Federal funds as follows:

Continuous milled center line rumble strips (application includes passing zone areas) should be applied:

- ♦ System-wide on undivided rural roads with posted speeds of 50 mph or greater where the lane plus shoulder width beyond the rumble strip will be at least 14 feet (i.e., systemic safety projects);
- ♦ Along rural and urban two-lane road corridors where significant numbers of opposing direction crashes involving any form of motorist inattention have been identified (i.e. location-specific corridor safety improvements);
- ♦ Along any highway with a history of head-on or opposing direction sideswipe collisions; or
- ♦ Where center line rumble strips were overlaid during the paving process (e.g., reconstruction or resurfacing projects).

Continuous, milled edge line or shoulder rumble strips should be applied:

- ♦ System-wide on rural highways with posted or statutory speeds of 50 mph or greater (i.e., systemic safety projects);
- ♦ Along rural or urban corridors where significant numbers of run-off-road crashes that involve any form of motorist inattention have been identified (i.e., location-specific safety improvement projects); or
- ♦ Along any highway with a history of run-off-road crashes or where shoulder or edge line rumble strips were overlaid during the paving process (e.g., reconstruction or resurfacing projects).

Key Resources

NCHRP Report 641, Guidance for the Design and Application of Shoulder and Centerline Rumble Strips, 2009

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_641.pdf

Technical Advisory 5040.39, Shoulder and Edge Line Rumble Strips

http://safety.fhwa.dot.gov/roadway_dept/pavement/rumble_strips/t504039/

Technical Advisory 5040.40, Center Line Rumble Strips

http://safety.fhwa.dot.gov/roadway_dept/pavement/rumble_strips/t504040/

FHWA Guidance: Revisions to T 5040.39 Shoulder and Edge Line Rumble Strips and T 5040.40 Center Line Rumble Strips

http://safety.fhwa.dot.gov/roadway_dept/pavement/rumble_strips/t5040_memo/

AASHTO Highway Safety Manual (available for purchase)

<http://www.highwaysafetymanual.org/pages/default.aspx>

Crash Modification Factor (CMF) Clearinghouse [*quick search* "rumble strips"]

<http://www.cmfclearinghouse.org>

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FHWA Web site: http://safety.fhwa.dot.gov/roadway_dept/pavement/rumble_strips/

Proven Safety Countermeasures

Safety Edge_{SM}

The Safety Edge_{SM} is a proven technology that shapes the edge of a paved roadway at approximately 30 degrees from the pavement cross slope during the paving process. The Safety Edge_{SM} eliminates tire scrubbing, a phenomenon that contributes to losing control of a vehicle. It has been successfully constructed on both asphalt and concrete pavements. The Safety Edge_{SM} has minimal impact on project cost combined with the potential to improve pavement life.

Background

Vertical pavement edges are a recognized detriment to safety, contributing to severe crashes that frequently involve rollovers or head-on collisions. Studies in some States find that crashes involving edge drop-offs are two to four times more likely to include a fatality than other crashes on similar roads. Providing a flush, unpaved surface adjacent to the pavement resolves the issue temporarily, but the material is often displaced over time, recreating the dangerous drop-offs either continuously or intermittently along the pavement edge. Research in the early 1980s found a 45 degree pavement edge somewhat effective in mitigating the severity of crashes involving pavement edge drop-offs. However, constructing a durable edge was not perfected until the 1990s, and during development it was found that a flatter, 30 degree angle was easier to construct. Additional testing indicated that the 30 degree edge improved the chances of a safe recovery.

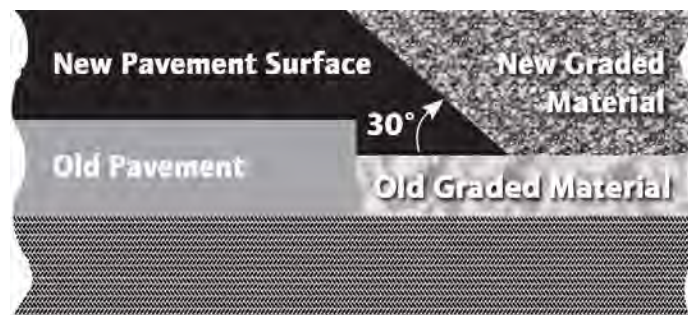


The Safety Edge_{SM} is one of the innovative technologies being deployed as part of FHWA's Every Day Counts initiative. The majority of State DOTs have built at least one project using the Safety Edge_{SM}, and approximately a dozen State DOTs now include it as a standard practice when paving.

An empirical Bayes evaluation published in the report Safety Evaluation of the Safety Edge Treatment (FHWA-HRT-11-024) indicates that the application of Safety Edge_{SM} led to an estimated reduction of 6 percent in total crashes on two-lane highways. Because of the low cost of the Safety Edge_{SM}, the benefit-cost ratio on two-lane roads ranges from 4 to 63.

Guidance

States should develop standards for implementing the Safety Edge_{SM} for all asphalt paving projects without curbs. Standard application should also be encouraged for concrete pavements. Local agencies should be



encouraged to use the Safety Edge_{SM} on their paving and resurfacing projects as well. For asphalt pavements, it is important to provide compression as the asphalt is shaped to produce a durable edge. This can be readily attained using a specially designed device. Shoulders should still be pulled up flush with the pavement surface at project completion.

Key Resources

The Safety Edge: A Pavement Edge Drop-Off Treatment, FHWA-SA-10-034

<http://www.fhwa.dot.gov/everydaycounts/technology/safetyedge/brochure/brochure.pdf>

FHWA Guide Specification for the Safety Edge

<http://www.fhwa.dot.gov/everydaycounts/technology/safetyedge/specs.cfm>

Frequently Asked Questions about the Safety Edge

<http://www.fhwa.dot.gov/everydaycounts/technology/safetyedge/faqs.cfm>

Safety Evaluation of the Safety Edge Treatment, HSIS Summary Report, FHWA-HRT-11-025

<http://www.fhwa.dot.gov/publications/research/safety/hsis/11025/>

Safety Evaluation of the Safety Edge Treatment, FHWA-HRT-11-024

<http://www.fhwa.dot.gov/publications/research/safety/11024/>

Influence of Roadway Surface Discontinuities on Safety, State of the Art Report, Transportation Research Circular, Number E-C134

<http://onlinepubs.trb.org/onlinepubs/circulars/ec134.pdf>

Safety Impacts of Pavement Edge Drop-offs

http://www.aaafoundation.org/pdf/PEDO_report.pdf

Construction of a Safe Pavement Edge: Minimizing the Effects of Shoulder Drop-off

<http://www.transtechsys.com/pdf/trb%20swm.pdf>

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FHWA Resource Center (Pavement): Chris Wagner, christopher.wagner@dot.gov, (404) 562-3693

FHWA Web site: <http://www.fhwa.dot.gov/everydaycounts/technology/safetyedge>

ATTACHMENT E

CATEGORICAL EXEMPTIONS

According to an existing agreement between NJDOT and FHWA, only the following (30) activities in PART 1 may be designated as Categorical Exemptions without further approval provided that they do not cause any impacts listed in PART 2.

PART 1

- 1) Activities which do not involve or lead directly to construction, such as planning and technical studies; grants for training and research programs; research activities as defined in 23 U.S.C. 307; approval of a unified work program and any findings required in the planning process pursuant to 23 U.S.C. 134; approval of statewide programs under 23 CFR part 630; approval of project concepts under 23 CFR part 476; engineering to define the elements of a proposed action or alternatives so that social, economic, and environmental effects can be assessed; and Federal-aid system revisions which establish classes of highways on the Federal-aid highway system.
- (2) Approval of utility installations along or across a transportation facility.
- (3) Construction of bicycle and pedestrian lanes, paths, and facilities.
- (4) Activities included in the State's "highway safety plan" under 23 U.S.C. 402.
- (5) Transfer of Federal lands pursuant to 23 U.S.C. 317 when the subsequent action is not an FHWA action.
- (6) The installation of noise barriers or alterations to existing publicly owned buildings to provide for noise reduction.
- (7) Landscaping.
- (8) Installation of fencing, signs, pavement markings, small passenger shelters, traffic signals, and railroad warning devices where no substantial land acquisition or traffic disruption will occur.
- (9) Emergency repairs under 23 U.S.C. 125.
- (10) Acquisition of scenic easements.
- (11) Determination of payback under 23 CFR part 480 for property previously acquired with Federal-aid participation.
- (12) Improvements to existing rest areas and truck weigh stations.
- (13) Ridesharing activities.
- (14) Bus and rail car rehabilitation.
- (15) Alterations to facilities or vehicles in order to make them accessible for elderly and handicapped persons.

- (16) Program administration, technical assistance activities, and operating assistance to transit authorities to continue existing service or increase service to meet routine changes in demand.
- (17) The purchase of vehicles by the applicant where the use of these vehicles can be accommodated by existing facilities or by new facilities which themselves are within a CE.
- (18) Track and railbed maintenance and improvements when carried out within the existing right-of-way.
- (19) Purchase and installation of operating or maintenance equipment to be located within the transit facility and with no significant impacts off the site.
- (20) Promulgation of rules, regulations, and directives.
- (21) Modernization of a highway by resurfacing, restoration, rehabilitation. **Reconstruction is not included in this category.** As of this writing, "3R" projects, until full implementation of the NJDOT Capital Project Delivery Guidelines, will be defined as per the FHWA/NJDOT Letter of Agreement (Project Reports, Project Development, and Certification Acceptance), dated November 16, 1992.
- (22) Highway Safety or traffic operations improvement projects including the installation of ramp metering control devices and lighting.
- (23) Approvals for disposal of excess right-of-way or for joint or limited use of right-of-way, where the proposed use does not have significant adverse impacts.
- (24) Construction of new bus storage and maintenance facilities in areas used predominately for industrial or transportation purposes where such construction is not inconsistent with existing zoning and located on or near a street with adequate capacity to handle anticipated bus and support vehicle traffic.
- (25) Rehabilitation or reconstruction of existing rail and bus buildings and ancillary facilities where only minor amounts of additional land are required and there is not a substantial increase in the number of users.
- (26) Construction of bus transfer facilities (an open area consisting of passenger shelters, boarding areas, kiosks and related street improvements) when located in a commercial area or other high activity center in which there is adequate street capacity for projected bus traffic.
- (27) Construction of rail storage and maintenance facilities in areas used predominantly for industrial or transportation purposes where such construction is not inconsistent with existing zoning and where there is no significant noise impact on the surrounding community.
- (28) Acquisition of land for hardship or protective purposes; advance land acquisition loans under section 3(b) of the UMT Act. Hardship and protective buying will be permitted only for a particular parcel or a limited number of parcels. These types of land acquisition qualify for a CE only where the acquisition will not limit the evaluation of alternatives, including shifts in alignment for planned construction projects, which may be required in the NEPA process. No project development on such land may proceed until the NEPA process has been completed.
- (29) Bridge painting.
- (30) Transportation Enhancement Activities.

PART 2

A PROPOSED PROJECT MUST BE INDIVIDUALLY APPROVED BY FHWA IF:

Section 4(f) or 6(f): The proposed project results in the use of any property or properties protected under Section 4(f) of the Department of Transportation Act, or Section 6 (f) of the Land and Water Conservation Fund Act.

Historic Properties: Consultation with FHWA and the New Jersey State Historic Preservation Officer (SHPO) has resulted in an agreement that the proposed project results in an “Adverse Effect” upon any properties eligible for or listed in the National Register of Historic Places

Wetlands: The proposed project results in the placement of fill in 5 or more acres (2 hectares) of freshwater wetlands or State open waters, or if it requires the placement of fill in tidal wetlands, or if a Nationwide 404 permit applies

Endangered Species: The proposed project affects species or critical habitat of species protected by the Endangered Species Act

Sole Source Aquifer: The proposed project is located within a designated Sole Source Aquifer *and* the project requires an EPA approval of a groundwater assessment.

Noise: The proposed project is a Type I action requiring a noise study in accordance with Section 772 of the Federal Aid Policy Guide.

Air Quality: The proposed project caused any exceedances of the National Ambient Air Quality Standards (NAAQS), *or* if a Congestion Management Study/Major Investment Study (CMS/MIA) is required.

Right of Way: The proposed action requires relocation of any residences or businesses, involves a control of access change or has a high risk of hazardous material involvement.

ATTACHMENT F

LIST OF USEFUL WEBSITES FOR ENVIRONMENTAL SCREENINGS

Website Name	Website Link	Environmental Concern
NJDEP Landscape Project	http://www.state.nj.us/dep/fgw/ensp/landscape/	General information about NJDEP's Landscape Project (habitat mapping)
NJDEP GIS	http://www.state.nj.us/dep/gis/	Downloadable environmental data layers for users of GIS software
NJDEP I-MapNJ	http://www.state.nj.us/dep/gis/depsplash.htm	Interactive environmental mapping program for non-GIS software users (available to anyone with a computer)
Highlands	http://www.state.nj.us/dep/highlands/	Highlands Act information and mapping
NJDEP Surface Water Quality Classifications	http://www.nj.gov/dep/wmm/sgwqt/200610swqs.pdf	Lists and describes surface water quality classifications for Category One Waters, Trout Maintenance Waters, and Trout Production Waters in NJ. List is towards the end of the document.
Pinelands	http://www.state.nj.us/pinelands/	General Pinelands information and mapping
USFWS ~ Consultation Process	http://www.fws.gov/northeast/nifieldoffice/Endangered/consultation.htm	General information about Section 7 consultation, threatened and endangered species information, and other useful links
USFWS ~ List of Municipalities	http://www.fws.gov/northeast/nifieldoffice/Endangered/munlist.pdf	List of NJ municipalities, by county, with known occurrence of federally listed threatened and endangered species
NOAA Northeast Regional Office	http://www.nero.noaa.gov/hcd/webintro.html	Guide to Essential Fish Habitat (EFH) designations in the Northeast US with other useful links
NOAA Northeast Regional Office (Maps)	http://www.nero.noaa.gov/hcd/index2a.htm	Maps of EFH Designations in the Northeast US with additional links to EFH descriptions
NJDEP Shellfish	http://www.nj.gov/dep/bmw/waterclass.htm	Links to maps of shellfish classifications of NJ's coastal waters
NJDEP Vernal Pools	http://www.state.nj.us/dep/fgw/ensp/vernalpool.htm	General information about vernal pools
Rutgers University Vernal Pools	http://www.dbcrrsa.rutgers.edu/ims/vernal/graphics.htm	Maps of potential/certified vernal pools
EPA Sole Source Aquifers	http://www.epa.gov/region02/water/aquifer/	Map of EPA Region II's sole source aquifers with links to support documents for each
NJDEP Land Use	http://www.state.nj.us/dep/landuse/index.html	Useful links for various NJ environmental permitting issues (CAFRA, FWWL, Waterfront Development, Stream Encroachment, etc.)
ACOE New York District	http://www.nan.usace.army.mil/business/buslinks/regulat/index.htm	Links to ACOE permitting information
ACOE Philadelphia District	http://www.nap.usace.army.mil/cenap-op/regulatory/regulatory.htm	Links to ACOE permitting information
Topozone	http://www.topozone.com/default.asp	Interactive mapping website that allows you to print topographic maps

National Wild & Scenic Rivers	http://www.nps.gov/rivers/wildriverslist.html	Links to national wild & scenic rivers by state
NJPDES Construction Activity Stormwater Permitting	http://www.state.nj.us/dep/dwq/constrfs.htm	Information regarding NJDES construction stormwater permitting
NJ Stormwater	http://njstormwater.org/	Information and links regarding NJ stormwater permitting and management programs
D&R Canal Commission	http://www.dandrcanal.com/drc/regulatory.html	Information regarding the D&R Canal Commission's regulatory program
NJ Meadowlands Commission	http://www.meadowlands.state.nj.us/land_use/index.cfm	Links to guidelines and procedures, maps, and other general information
NJDEP Tidelands Program	http://www.state.nj.us/dep/landuse/tideland.html	General information about the tidelands program and useful links
Delaware River Basin Commission	http://www.state.nj.us/drbc/	General information and useful links
NJDEP Green Acres	http://www.state.nj.us/dep/greenacres/	General information about the Green Acres Program
NJDEP Green Acres ROSI	http://www.state.nj.us/dep/greenacres/openspace.htm	Recreation and Open Space Inventory (ROSI)
US Coast Guard	http://www.uscg.mil/hq/g-o/g-opt/Regulations.htm	Laws & Regulations, and links that contain information about permitting
USEPA Greenbook	http://www.epa.gov/oar/oaqps/greenbk	Non-attainment and maintenance areas for air quality
NJDEP Site Remediation & Waste Management	http://www.state.nj.us/dep/srp/kcs-nj/	Contains the known Contaminated Sites in New Jersey (KCS-NJ) report, which contains basic information on approximately 14,000 contaminated sites
NJDEP Data Miner	http://www.nj.gov/dep/opra/online.html	NJDEP's comprehensive listing of environmental data, including know contaminated sites
NJDEP Historic Preservation Office	http://www.state.nj.us/dep/hpo/identify/nrsr_lists.htm	All properties listed on the NJ and National Registers of Historic Places by County and Municipality and any properties found eligible for listing in the National Register; links to state and federal regulations and resources pertinent to historic properties
NJDOT Historic Bridge Survey	http://www.state.nj.us/transportation/works/environment/HistBrintro.htm	Bridge on and off the state system built prior to 1945 with an evaluation of their individual eligibility for listing in the National Register of Historic Places by county and structure number; eligibility as part of an historic district is discussed when information is available.

ATTACHMENT G
SYSTEMIC IMPROVEMENTS

A Systemic Approach to Safety

Using Risk to Drive Action

The systemic approach to safety involves improvements that are widely implemented based on high-risk roadway features correlated with particular severe crash types. As the figure on the right illustrates, 57 percent of fatal crashes occur on rural roads, which are often part of the local system. Because these crashes are not evenly distributed across the many miles of rural roadways, it is often difficult to isolate high-crash locations for safety improvements. The systemic approach answers the question:

Do all systems and crash types present equal opportunities for crash reduction, or do specific parts of the system and certain crash types offer a greater opportunity to save lives?

The Benefits of a Systemic Approach

Several agencies implementing systemic improvements have reported staggering results in crash reductions. The systemic approach:

Solves an Unmet Need in Transportation Safety

A significant number of severe crashes are spread out over a wide area, particularly on rural and local roadways, and for specific crash types such as those involving vulnerable road users. These crashes are rarely identified through the traditional site analysis approach because it is difficult to isolate high-crash locations. The systemic approach provides state, regional, and local agencies an alternative method to address these crash types and fulfill a previously unmet need.



Source: Cambridge Systematics, Inc.

Uses a Risk-Based Approach to Prevent Crashes

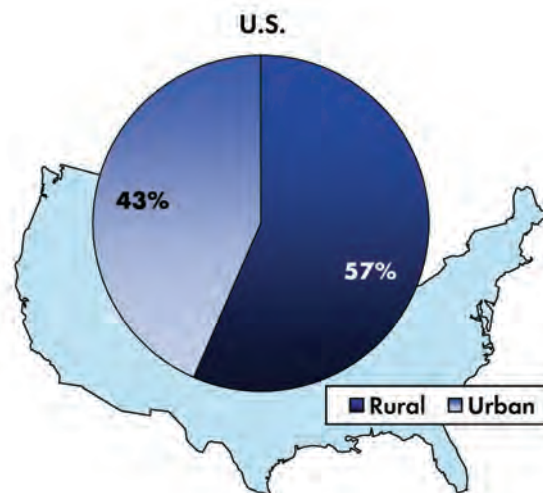
Systemic starts with a different premise for identifying safety problems, leading to a different set of projects. The systemic approach looks at crash history on an aggregate basis to identify high-risk roadway characteristics. While the traditional site analysis approach results in safety investments at high-crash locations, the systemic approach leads to widespread implementation of projects to reduce the potential for severe crashes.

Results in a Comprehensive Road Safety Program

The systemic approach does not replace the site analysis approach. It is a complementary technique intended to supplement site analysis and provide a more comprehensive and proactive approach to safety management efforts. Reducing crashes at individual locations clearly requires continued attention. At the same time, the systemic approach aims to reduce the risk of and the potential for the occurrence of future crashes.

Advances a Cost-Effective Means to Address Safety Concerns

The systemic approach considers multiple locations with similar risk characteristics. When examining the system as a whole, a particular roadway element may have a high-crash experience, and it is more cost-effective to correct the problem on a systemwide basis rather than by individual high-crash location.



Source: Cambridge Systematics, Inc.

How to Utilize the Systemic Approach

The systemic approach is iterative and intended to be flexible and easy to apply to a variety of systems, locations, and crash types. Similar to the site analysis approach and most common safety management processes, the systemic planning approach involves problem identification, countermeasure identification, and project prioritization.

Identify Target Crash Types/Risk Factors

Review systemwide data and location characteristics to focus on specific crash types and associated risk factors.

For example:

Crash Type – Roadway departure crashes on rural two-lane highways various roadway features.

Risk Factors – Average daily traffic volumes, curve density, access density.

Screen and Prioritize Candidate Locations

Use the risk factors to screen the network and prioritize candidate locations for safety investments that will reduce the potential for future severe crashes.

Select Countermeasures

Evaluate countermeasures such to select those that address roadway departures on roads with the identified risk factors.

For example:

Rumble strips, cable median barriers, or advanced curve delineation.

Prioritize Projects

Prioritize safety projects for implementation based on the risk-based assessment, available funding, other programmed projects, time to develop projects, and other considerations.



Source: Cambridge Systematics, Inc.

Forging Ahead

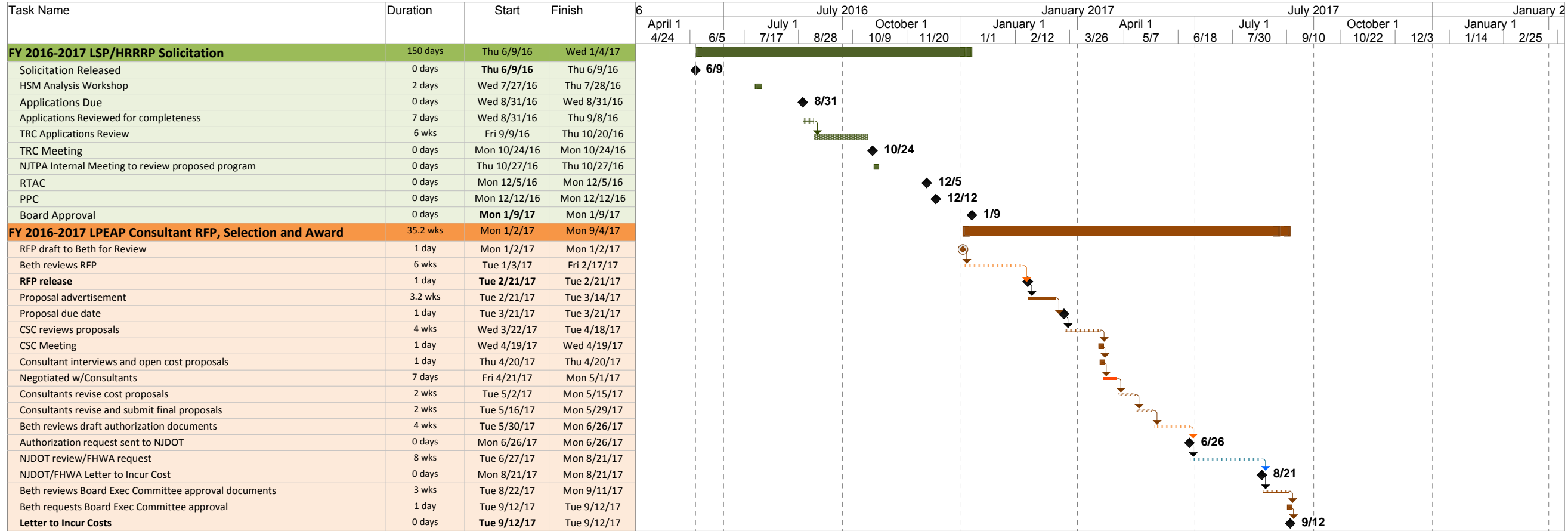
“The systemic approach has offered the State of Minnesota another opportunity to further improve safety on our roadways by proactively addressing at-risk elements not typically identified through traditional approaches. This has given us a way to fund and build safety projects in rural Minnesota, which in the past did not qualify for safety investments due to the lack of identified “high-crash” locations.”

– Sue Groth, State Traffic Engineer, MnDOT

The Federal Highway Administration is currently developing a systemic safety project selection tool intended to outline a step-by-step process to conduct systemic safety planning and analysis; present a decision-making framework to balance investments for systemic safety improvements and spot safety improvement projects; and establish a mechanism to quantify benefits of systemic safety improvements. The tool is expected to be available in the spring of 2013. In the meantime, visit the FHWA Office of Safety web site at <http://safety.fhwa.dot.gov/> or contact Karen Scurry at karen.scurry@dot.gov, (609) 637-4207 for additional information.

ATTACHMENT H

FY 2017-2018 LOCAL SAFETY AND HIGH RISK RURAL ROADS PROGRAMS/LOCAL PRELIMINARY ENGINEERING ASSISTANCE PROGRAM SCHEDULE



ATTACHMENT I

PUBLIC OUTREACH SAMPLE DOCUMENTS

PUBLIC INFORMATION CENTER MEETING NOTICE
COUNTY OF HUDSON
JFK BOULEVARD (CR 501)
INTERSECTION SAFETY IMPROVEMENT PROJECT
FROM COMMUNIPAW AVENUE TO SIP AVE
CITY OF JERSEY CITY, NEW JERSEY

Hudson County, together with the North Jersey Transportation Planning Authority, will be hosting a Public Information Center meeting to inform local residents, officials, businesses and the general public of the intersection safety improvement project for JFK Boulevard (CR 501) in the City of Jersey City. The project includes 17 intersections from Communipaw Avenue to Sip Avenue and is being funded through the North Jersey Transportation Planning Authority using the Federal Highway Administration's Highway Safety Improvement Program Funds.

The purpose of this meeting is to inform the public and solicit input and comments on the proposed improvements. This meeting is open to all members of the public. County engineering staff, a NJTPA representative and the consulting design engineer will be available to answer questions.

Date: Tuesday, May 17, 2016

Time: 6 pm – 9 pm (presentation followed by Q&A at 7 pm)

Place: St. Paul's Church, 38 Duncan Avenue, Jersey City, NJ

Written comments will be accepted through Friday, May 27, 2016. Comments may be mailed, faxed, or emailed to:

Jose M. Sieira, Director of Traffic and Transportation
Department of Roads & Public Property
Division of Engineering
830 Bergen Avenue, Floor 6B
Jersey City, NJ 07036
201-369-4340
jsieira@hcnj.us

Hudson County
JFK Boulevard (CR 501) Intersection Safety Improvements Project
from Communipaw Avenue to Sip Avenue

PROJECT INFORMATION

Hudson County is receiving Federal Highway Safety Improvement Program Funds from the Federal Highway Administration through the North Jersey Transportation Planning Authority (NJTPA) for the design, construction, and construction inspection services for safety improvements at 17 intersections along JFK Boulevard (CR 501) from Communipaw Avenue to Sip Avenue.

Project Background

Based on an analysis of crash records conducted by Rutgers CAIT on behalf of NJTPA and the New Jersey Department of Transportation utilizing the Plan4Safety crash analysis tool, this section of JFK Boulevard is ranked #1 in the County and the NJTPA region as a high crash pedestrian corridor. There were 425 crashes in a 3-year period between 2012 and 2014 including 38 crashes involving pedestrians. There were also 2 pedestrian fatalities between 2010 and 2014.

A Road Safety Audit was conducted in September 2013 which offered a series of recommendations for safety improvements. The majority of the pedestrian facilities including curb ramps, pedestrian signals, and push buttons do not meet ADA compliance standards. There are also visibility issues with pedestrians in the crosswalks along the corridor.

Proposed Improvements

- Pedestrian curb bump-outs at several intersections;
- New ADA compliant curb ramps (with detectable warning surfaces), pedestrian countdown traffic signals and push buttons, high visibility crosswalks;
- Installation or replacement of regulatory, warning and pedestrian signs;
- 12" LED traffic signal heads with back plates and image detection cameras;
- Interconnection of the Fire House located at Bergen Avenue and Duncan Avenue with the traffic light at JFK and Duncan Avenue'
- Fully upgrading two traffic signals: JFK at Glenwood Avenue and JFK at Communipaw Avenue
- Optimization of traffic signal timings and MUTCD compliant vehicular and pedestrian clearances
- Replacement of deteriorated sidewalks near the intersections and removal of trip hazards;

No roadway widening is proposed. If needed, permission will be requested through in-lieu of easement agreements for work that is to be performed outside of the existing right-of-way such as grading and sidewalk repairs necessary to meet ADA compliance. The existing intersections will be open during construction and the duration of construction is anticipated to be 9 months.

The cost to design this project is \$490,000 and the estimated construction cost is \$3,000,000.

Estimated Schedule

Design complete and federal authorization	Winter 2016
Construction	Spring/Summer 2017

Contact Information

Jose M. Sieira, Director of Traffic and Transportation
Department of Roads & Public Property
Division of Engineering
830 Bergen Avenue, Floor 6B
Jersey City, NJ 07036
201-369-4340
jsieira@hcnj.us

HUDSON COUNTY JFK BOULEVARD (CR 501) Intersection Safety Improvements

Public Meeting
May 17, 2016

North Jersey Transportation Planning Authority (NJTPA)

Christine Mittman
Project Manager

**Hudson County
Division of Engineering**

Jose M. Sieira
Project Manager

GPI Greenman-Pedersen, Inc.
Consulting Engineers



Defining the Vision. Shaping the Future.



GPI Greenman-Pedersen, Inc.
Engineering and Construction Services



U.S. Department
of Transportation
**Federal Highway
Administration**

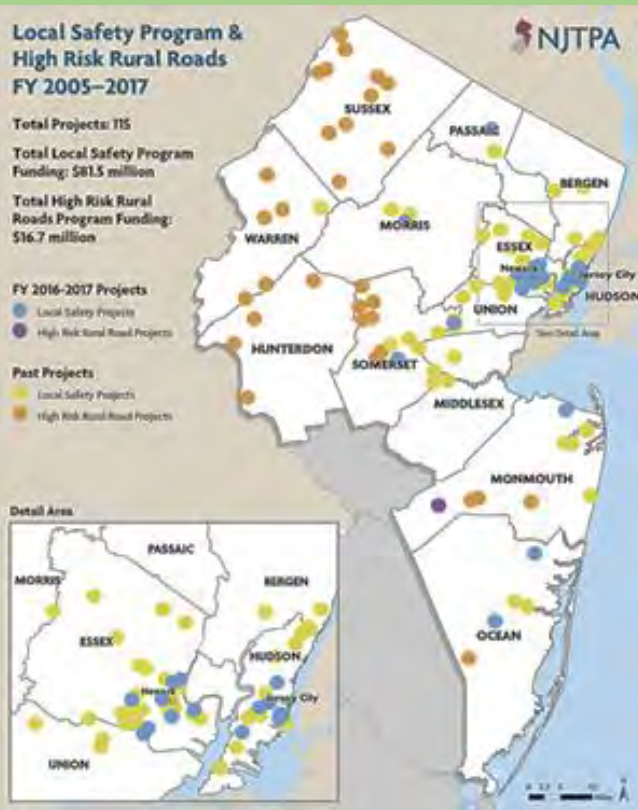


Federal Transportation Funding

through the

North Jersey Transportation Planning Authority

The Metropolitan Planning Organization for Northern New Jersey



Local Safety and High Risk Rural Roads Programs

Over \$98 million in funding since 2005 on County and Local Roadways
Relatively quick-fix safety improvements

Highway Safety Improvement Program (HSIP) funds

Emphasizes a data-driven, strategic approach to improving highway safety

Network Screening

Identifies locations experiencing:
High crash frequencies
Severe crash injuries
Specific crash types such as right-angle or roadway departures

Community Outreach

Provides the public, local stakeholders and officials with an opportunities for provide comments and ask questions

Defining the Vision. Shaping the Future.

Federally Funded Hudson County Local Safety Projects Along JFK Boulevard (CR 501)

Project Name	Construction Cost	Construction Completed
1 <u>FY 2005 (North Bergen, West New York)</u> CR 501 (a.k.a. JFK Boulevard) (MP 35.99-37.21) from 67th St. to 91st St. : Pavement markings including crosswalks, centerlines, stop line, cross hatching	\$ 161,572	2006
2 <u>FY 2006 (Jersey City, North Bergen)</u> CR 501 (a.k.a. JFK Boulevard) (MP 29.37-33.8) from Communipaw Avenue to 18th St. : Pavement markings including crosswalks, centerlines, stop line, cross hatching; At 32nd St.: left turn lane, traffic signals, pavement markings	\$ 340,000	2007
3 <u>FY 2008 (North Bergen, Union City, West New York, Guttenberg)</u> CR 501 (JFK Boulevard) (MP 34.31-37.21) from 36th Street to 91st Street: new LED countdown Ped. Signals at 39 intersections	\$ 239,290	2009
4 <u>FY 2009 (Jersey City, North Bergen, Union City)</u> CR 501 (a.k.a. JFK Boulevard) (MP 27.19-33.2) from Pamrapo St. and 15th St.: New LED countdown Ped. Signals at 39 Intersections	\$ 590,000	2010
5 <u>FY 2011 (Guttenberg, North Bergen, Union City, West New York)</u> CR 501 (a.k.a. JFK Boulevard) (MP 34.31 - 37.07) from 36th Street and 89th Street: Replacing traffic signals heads at 42 intersections	\$ 413,000	2012
6 <u>FY 2013-2014 (Bayonne, Guttenberg, North Bergen, Union City, West New York)</u> CR 501 (JFK Boulevard (MP 0.00-0.52, 23.99-26.84, 31.35-33.90) 87 Intersection Improvements: Replace traffic signals heads	\$ 750,100	2015
7 <u>FY 2015 (Jersey City)</u> CR 501 (JFK Boulevard (MP 29.35-30.36) from Communipaw to Sip Avenue, 16 Intersections: replacing traffic signal heads, backplates, image detection, signal timing optimization, pedestrian countdown signals, curb extensions, crosswalk, striping and sign upgrades.	\$ 2,999,267	In design
8 <u>FY 2016 (Jersey City)</u> CR 501 (JFK Boulevard (MP 30.27-30.56) from Bond Place to Bergen Avenue, 5 Intersections & 1 mid-block crossing: replacing traffic signal heads, backplates, image detection, signal timing optimization, ped. countdown signals, curb extensions, crosswalk, striping and sign upgrades.	\$ 1,410,000	Selected for the FY 2016-2017 program

Total: \$6.9 Million

Federally Funded Jersey City Local Safety Projects

Project Name	Construction Cost	Construction Completed
1 FY 2010 - Dr. MLK Jr. Drive Intersection improvements including countdown ped. signals, ADA compliant curb ramps, textured crosswalks, upgraded signs	\$ 959,000 <i>(\$329 K Federal funds)</i>	2013
2 FY 2011 - Central Avenue from Jefferson Avenue to North Street 22 Intersection improvements: ped. countdown signals, ADA compliant curb ramps, international crosswalks, upgraded signs	\$ 516,000 <i>(\$477 K Federal funds)</i>	2014
3 FY 2012 - Summit Avenue (Phase I) 42 Intersection improvements: ped. countdown signals, ADA compliant curb ramps, international crosswalks, upgraded signs	\$ 1,426,000	2014
4 FY 2013 - McGinley Square (Phase I) 5 Intersection improvements: ped. countdown signals, ADA compliant curb ramps, international crosswalks, upgraded signs	\$ 367,000	2015
5 FY 2014 - McGinley Square (Phase II) 4 Intersection improvements: ped. countdown signals, ADA compliant curb ramps, international crosswalks, upgraded signs	\$ 410,000	2015
6 FY 2015 - Summit Avenue (Phase II) 12 Intersection improvements: ped. countdown signals, ADA compliant curb ramps, international crosswalks, upgraded signs	\$ 450,000	Awaiting federal Authorization to construct
7 FY 2015 - Dr. MLK Jr. Drive 8 Intersection improvements: ped. countdown signals, ADA compliant curb ramps, international crosswalks, upgraded signs	\$ 400,000	Currently in Design
8 FY 2015 - Communipaw Avenue from Park Street to Marcy Avenue 12 Intersections and corridor improvements: Ped. countdown signals, ADA compliant curb ramps, high visibility crosswalks, upgraded signs	\$ 885,000	Currently in Design
9 FY 2015 - Montgomery Street 15 Intersections and corridor improvements: Raised median along a portion of the corridor, curb extensions, ped. countdown signals, ADA compliant curb ramps, high visibility crosswalks	\$ 1,200,000	Currently in Design
10 FY 2016 - Marin Blvd 7 Intersections and corridor improvements: exclusive left turn lanes, ped. countdown signals, curb extensions, high visibility crosswalks	\$ 885,000	Awaiting selection of Design consultant
11 FY 2016 - Oakland Avenue & St. Pauls Avenue 1 intersection - new traffic signal, ped. countdown signals, curb extensions, high visibility crosswalks	\$ 289,000	Awaiting selection of Design consultant

Total: \$7.1 Million

Location Map



Crash Details

#1 ranked high-crash pedestrian corridor in Hudson County and the NJTPA region.

425 crashes in a 3-year period from 2012-2014, including 38 pedestrian crashes.

2 pedestrian fatalities between 2010 and 2014.

Road Safety Audit (September 2013)

Long-Term Recommendations:

- ▶ **Replace 8” traffic signal heads with 12” LED**
- ▶ Install image detection
- ▶ Install ADA compliant pushbuttons and handicap ramps
- ▶ Optimize existing traffic signal timings /coordination
- ▶ Install fire pre-emption at Duncan Avenue intersection
- ▶ Analyze pedestrian and vehicular lighting
- ▶ Evaluate existing signing
- ▶ Install pedestrian bump-outs at various intersections
- ▶ Investigate implementation of traffic bollards
- ▶ Perform sidewalk repairs
- ▶ Investigate feasibility of Road Diet along JFK Blvd.

Road Safety Audit (September 2013)

Short-Term/Implemented Recommendations:

- ▶ Flexible bollards in north corners of Duncan Avenue
- ▶ Left turn arrow and delayed green sign at Duncan Avenue NB approach
- ▶ Steel bollards at SW corner of Duncan Avenue
- ▶ Edge line striping added along JFK Boulevard NB/SB
- ▶ Trimming of trees
- ▶ Verified operation of push buttons
- ▶ Verified operation of loop detectors at Fairmount Avenue

Existing Conditions

- ▶ Undivided 4-lane
- ▶ Urban principal arterial
- ▶ Posted 25 mph
- ▶ County jurisdiction
- ▶ On-street parking throughout
- ▶ Bisects Saint Peters University between Montgomery Street and Glenwood Avenue
- ▶ Lincoln Park entrance/exit
- ▶ Numerous school crossings
- ▶ Surrounding land use mix of residential and commercial



Glenwood Avenue intersection looking south



Pedestrian crossing at Montgomery Street

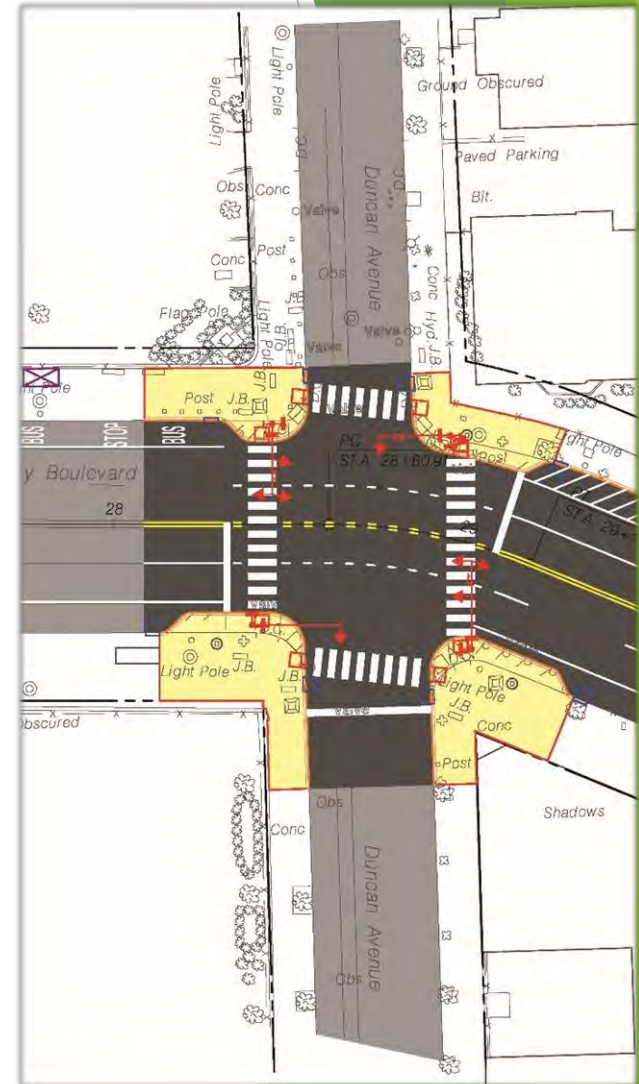
Traffic Data

- ▶ Performed manual turning movement traffic counts December 10, 2015
- ▶ ADT over 24,000 vpd
- ▶ Project volumes to 2040 via NJTPA population and employment projections
- ▶ Potential optimization of traffic signal timings

JFK Boulevard -2016 Existing Level of Service			
<i>Intersection</i>	<i>Level of Service</i>		
	<i>AM</i>	<i>MD</i>	<i>PM</i>
<i>Communipaw Avenue (Signalized)</i>	D	C	C
<i>Harrison Avenue (Signalized)</i>	B	A	C
<i>Bentley Avenue (Signalized)</i>	A	A	B
<i>Gifford Avenue (Signalized)</i>	B	A	B
<i>Lincoln Park Exit/Belmont Avenue (Signalized)</i>	B	A	B
<i>Lincoln Park Entrance (Signalized)</i>	A	A	A
<i>Kensington Avenue (Signalized)</i>	B	A	B
<i>Jewett Avenue (Signalized)</i>	A	A	A
<i>Fairview Avenue (Signalized)</i>	B	A	B
<i>Duncan Avenue (Signalized)</i>	B	A	B
<i>Fairmount Avenue (Signalized)</i>	B	A	B
<i>Montgomery Street (Signalized)</i>	D	C	D
<i>Glenwood Avenue (Signalized)</i>	B	A	B
<i>Highland Avenue (Signalized)</i>	B	A	B
<i>Dekalb Avenue (Unsignalized)</i>	A	A	A
<i>Stuyvesant Avenue (Signalized)</i>	B	A	B
<i>Bond Street (Signalized)</i>	A	B	B

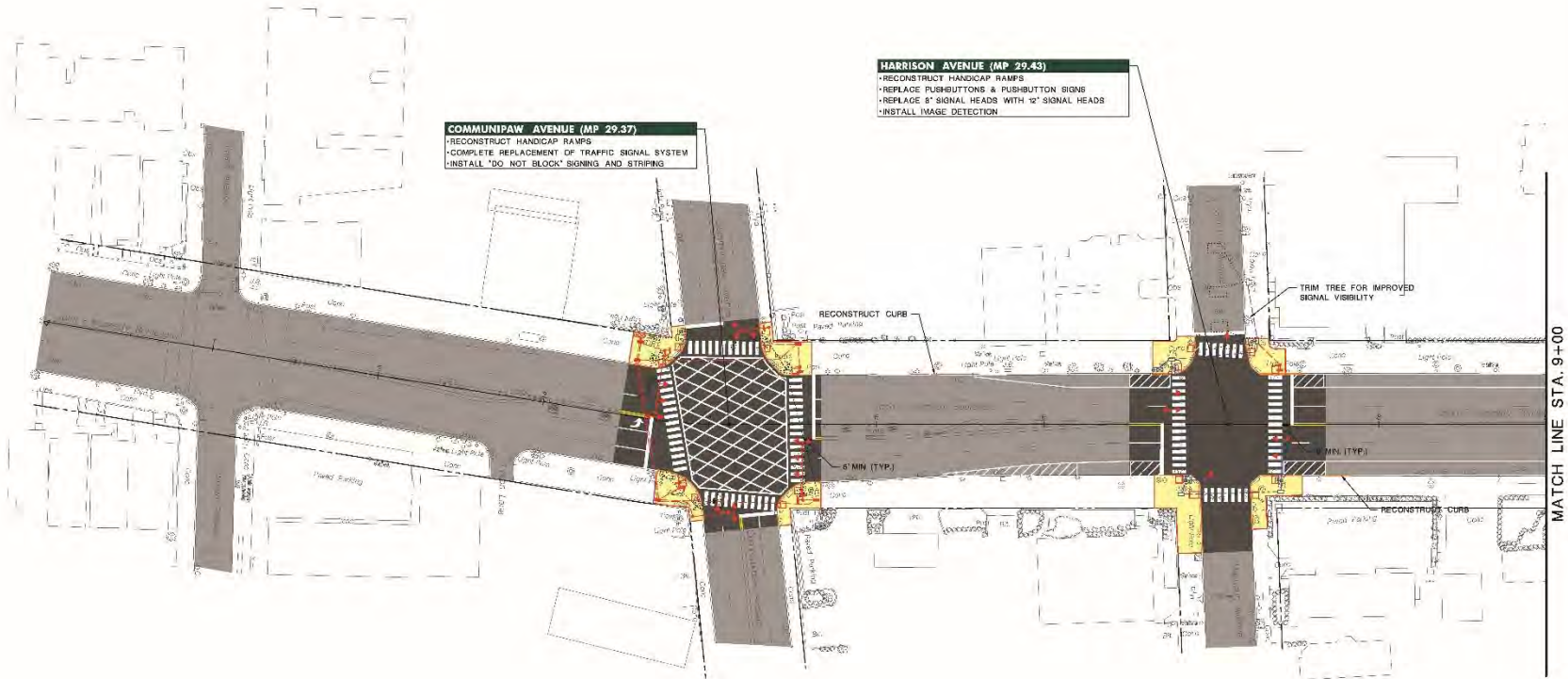
Proposed Improvements

- ▶ MUTCD compliant vehicle and pedestrian clearances
- ▶ **12” LED traffic** signal heads with backplates
- ▶ ADA compliant handicap ramps and push buttons
- ▶ Image detection
- ▶ Pedestrian curb bump-outs at several intersections
- ▶ High-visibility crosswalks
- ▶ MUTCD compliant signs and breakaway sign supports
- ▶ Optimization of traffic signal timings



Proposed Improvements at Duncan Avenue

Proposed Improvement Plan



MATCH LINE STA. 9+00

LEGEND

- PROPOSED CURB
- PROPOSED SIDEWALK
- EXISTING TRAFFIC SIGNAL EQUIPMENT
- PROPOSED TRAFFIC SIGNAL EQUIPMENT
- REMOVAL OF EXISTING TRAFFIC SIGNAL EQUIPMENT
- PROPOSED PAVEMENT RESURFACING
- PROPOSED INLET
- EXISTING R.O.W.

GENERAL NOTES:

1. INSTALL BACKPLATES ON ALL EAST/WEST TRAFFIC SIGNAL HEADS.
2. RECONSTRUCT SIDEWALK OR CURB THAT IS DAMAGED OR A TRIPPING HAZARD.
3. INSTALL BREAKAWAY SIGN SUPPORTS FOR ALL GROUND MOUNTED SIGNS.
4. BRING ON-STREET PARKING INTO CONFORMANCE WITH TITLE 93.
5. ALL PROPOSED HANDICAP RAMPS TO BE COMPLIANT WITH ADA.
6. DETECTABLE WARNING SURFACES SHALL BE ADDED TO RAMPS AS REQUIRED.
7. REPLACE ALL SIGNS NOT IN CONFORMANCE WITH THE CURRENT MUTCD.
8. REPLACE ANY MISSING OR DAMAGED LIGHTING TRANSFORMER BASE COORS.
9. MILL AND PAVE INTERSECTION AREAS AS SHOWN.
10. UPGRADE STREET LIGHTING AS NEEDED.

PRELIMINARY 1
6

NJTPA LPEAP CONTRACT A

**PROJECT NO. 1 - JFK BOULEVARD (CR 501)
COMMUNIPAW AVENUE TO SIP AVENUE**

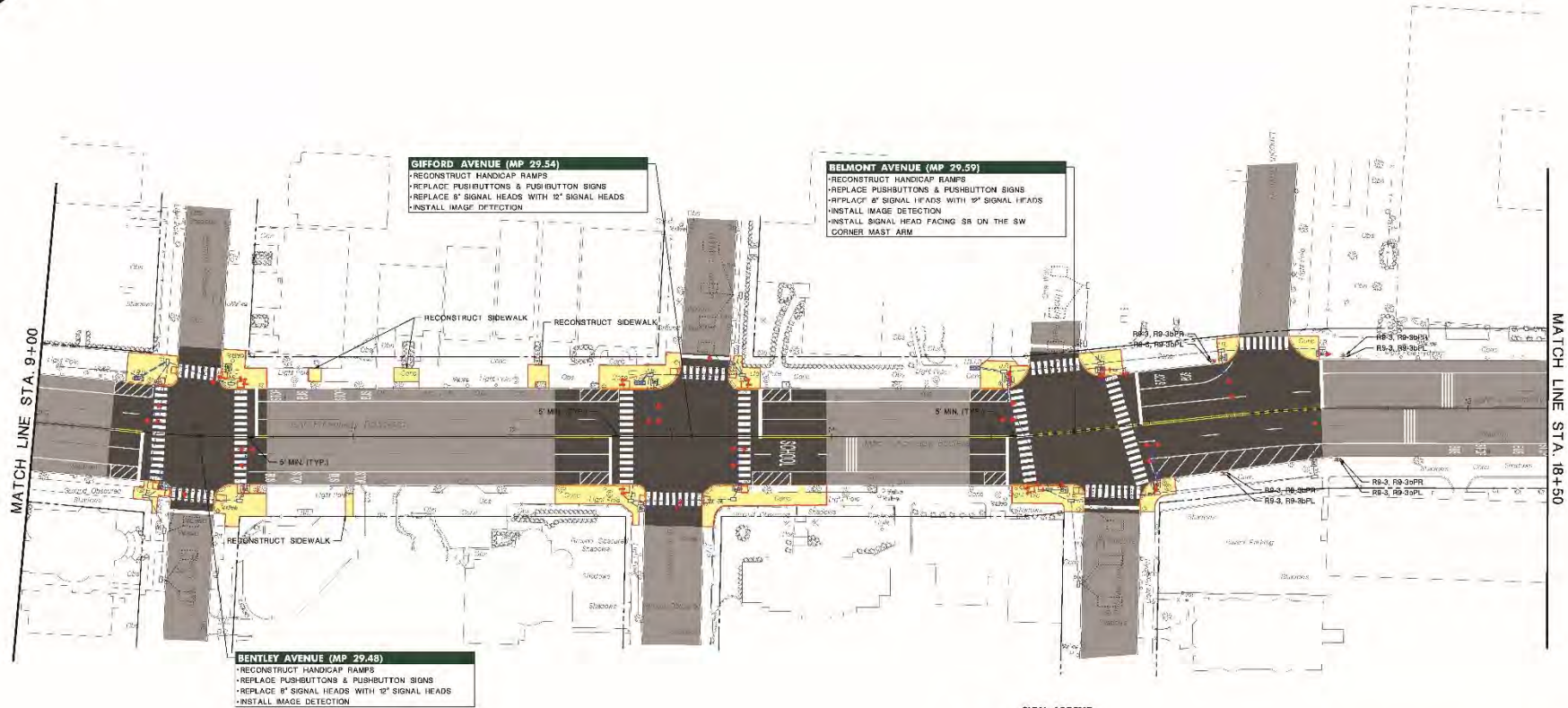
**JERSEY CITY
HUDSON COUNTY**

CONCEPT PLAN



GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

Proposed Improvement Plan

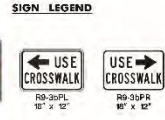


GIFFORD AVENUE (MP 29.54)
 -RECONSTRUCT HANDICAP RAMP
 -REPLACE PUSHBUTTONS & PUSHBUTTON SIGNS
 -REPLACE 8" SIGNAL HEADS WITH 12" SIGNAL HEADS
 -INSTALL IMAGE DETECTION

BELMONT AVENUE (MP 29.59)
 -RECONSTRUCT HANDICAP RAMP
 -REPLACE PUSHBUTTONS & PUSHBUTTON SIGNS
 -REPLACE 8" SIGNAL HEADS WITH 12" SIGNAL HEADS
 -INSTALL IMAGE DETECTION
 -INSTALL SIGNAL HEAD FACING SR ON THE SW CORNER MAST ARM

BENTLEY AVENUE (MP 29.48)
 -RECONSTRUCT HANDICAP RAMP
 -REPLACE PUSHBUTTONS & PUSHBUTTON SIGNS
 -REPLACE 8" SIGNAL HEADS WITH 12" SIGNAL HEADS
 -INSTALL IMAGE DETECTION

- LEGEND**
- PROPOSED CURB
 - PROPOSED SIDEWALK
 - EXISTING TRAFFIC SIGNAL EQUIPMENT
 - PROPOSED TRAFFIC SIGNAL EQUIPMENT
 - REMOVAL OF EXISTING TRAFFIC SIGNAL EQUIPMENT
 - PROPOSED PAVEMENT REBURFACING
 - PROPOSED INLET
 - EXISTING R.O.W.



- GENERAL NOTES:**
1. INSTALL BACKPLATES ON ALL EAST/WEST TRAFFIC SIGNAL HEADS.
 2. RECONSTRUCT SIDEWALK OR CURB THAT IS DAMAGED OR A TRIPPING HAZARD.
 3. INSTALL BREAKAWAY SIGN SUPPORTS FOR ALL GROUND MOUNTED SIGNS.
 4. BRING ON-STREET PARKING INTO CONFORMANCE WITH TITLE 59.
 5. ALL PROPOSED HANDICAP RAMP TO BE COMPLIANT WITH ADA.
 6. DETECTABLE WARNING SURFACES SHALL BE ADDED TO RAMP AS REQUIRED.
 7. REPLACE ALL SIGNS NOT IN CONFORMANCE WITH THE CURRENT MUTCD.
 8. REPLACE ANY MISSING OR DAMAGED LIGHTING TRANSFORMER BASE DOORS.
 9. MILL AND PAVE INTERSECTION AREAS AS SHOWN.
 10. UPGRADE STREET LIGHTING AS NEEDED.

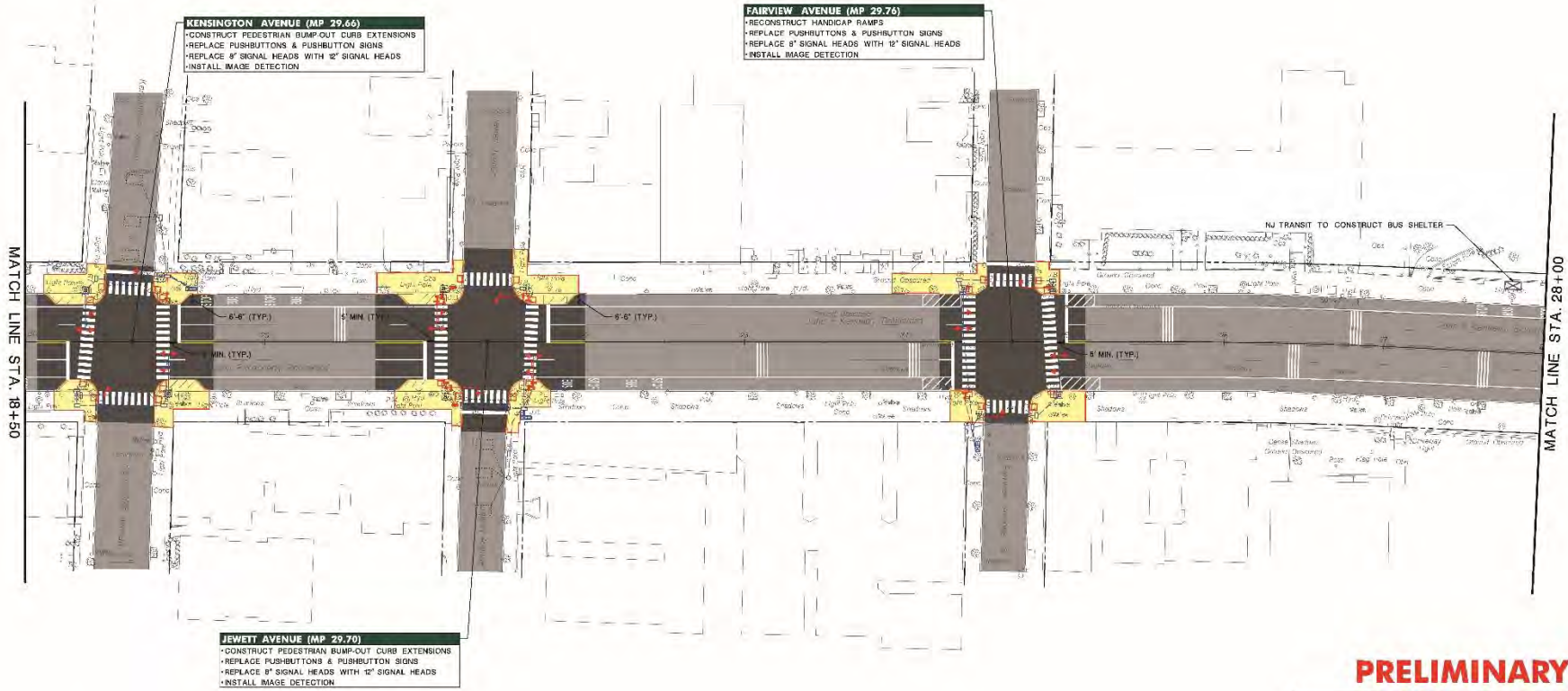
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NJTPA LPEAP CONTRACT A
PROJECT NO. 1 - JFK BOULEVARD (CR 501)
COMMUNIPAW AVENUE TO SIP AVENUE

JERSEY CITY
HUDSON COUNTY

CONCEPT PLAN

Proposed Improvement Plan



KENSINGTON AVENUE (MP 29.66)
 • CONSTRUCT PEDESTRIAN BUMP-OUT CURB EXTENSIONS
 • REPLACE PUSHBUTTONS & PUSHBUTTON SIGNS
 • REPLACE 8" SIGNAL HEADS WITH 12" SIGNAL HEADS
 • INSTALL IMAGE DETECTION

FAIRVIEW AVENUE (MP 29.76)
 • RECONSTRUCT HANDICAP RAMPS
 • REPLACE PUSHBUTTONS & PUSHBUTTON SIGNS
 • REPLACE 8" SIGNAL HEADS WITH 12" SIGNAL HEADS
 • INSTALL IMAGE DETECTION

JEWETT AVENUE (MP 29.70)
 • CONSTRUCT PEDESTRIAN BUMP-OUT CURB EXTENSIONS
 • REPLACE PUSHBUTTONS & PUSHBUTTON SIGNS
 • REPLACE 8" SIGNAL HEADS WITH 12" SIGNAL HEADS
 • INSTALL IMAGE DETECTION

LEGEND

- PROPOSED CURB
- PROPOSED SIDEWALK
- EXISTING TRAFFIC SIGNAL EQUIPMENT
- PROPOSED TRAFFIC SIGNAL EQUIPMENT
- REMOVAL OF EXISTING TRAFFIC SIGNAL EQUIPMENT
- PROPOSED PAVEMENT RESURFACING
- PROPOSED INLET
- EXISTING R.O.W.

GENERAL NOTES:

1. INSTALL BACKPLATES ON ALL EAST/WEST TRAFFIC SIGNAL HEADS.
2. RECONSTRUCT SIDEWALK OR CURB THAT IS DAMAGED OR A TRIPPING HAZARD.
3. INSTALL BREAKAWAY SIGN SUPPORTS FOR ALL GROUND MOUNTED SIGNS.
4. BRING ON-STREET PARKING INTO CONFORMANCE WITH TITLE 93.
5. ALL PROPOSED HANDICAP RAMPS TO BE COMPLIANT WITH ADA.
6. DETECTABLE WARNING SURFACES SHALL BE ADDED TO RAMPS AS REQUIRED.
7. REPLACE ALL SIGNS NOT IN CONFORMANCE WITH THE CURRENT MUTCD.
8. REPLACE ANY MISSING OR DAMAGED LIGHTING TRANSFORMER BASE DOORS.
9. MILL AND PAVE INTERSECTION AREAS AS SHOWN.
10. UPGRADE STREET LIGHTING AS NEEDED.

PRELIMINARY

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NJTPA LPEAP CONTRACT A

**PROJECT NO. 1 - JFK BOULEVARD (CR 501)
 COMMUNIPAW AVENUE TO SIP AVENUE**

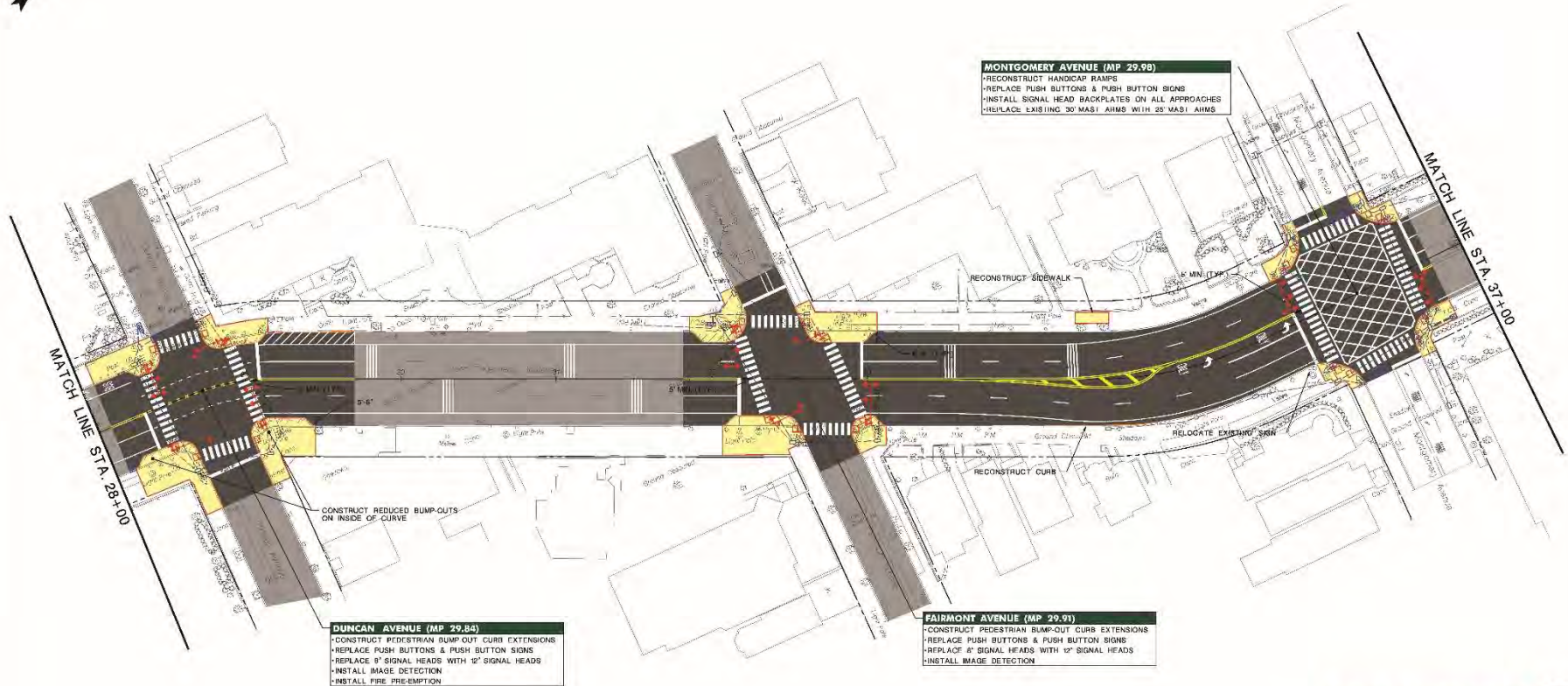
**JERSEY CITY
 HUDSON COUNTY**

CONCEPT PLAN



GPI Greenman-Pedersen, Inc.
 Engineering and Construction Services

Proposed Improvement Plan



MONTGOMERY AVENUE (MP 29.98)
 -RECONSTRUCT HANDICAP RAMP
 -REPLACE PUSH BUTTONS & PUSH BUTTON SIGNS
 -INSTALL SIGNAL HEAD BACKPLATES ON ALL APPROACHES
 -REPLACE EXISTING 30" MASI AHMS WITH 20" MASI AHMS

DUNCAN AVENUE (MP 29.84)
 -CONSTRUCT PEDESTRIAN BUMP-OUT CURB EXTENSIONS
 -REPLACE PUSH BUTTONS & PUSH BUTTON SIGNS
 -REPLACE 9" SIGNAL HEADS WITH 12" SIGNAL HEADS
 -INSTALL IMAGE DETECTION
 -INSTALL FIRE PRE-EMPTION

FAIRMONT AVENUE (MP 29.91)
 -CONSTRUCT PEDESTRIAN BUMP-OUT CURB EXTENSIONS
 -REPLACE PUSH BUTTONS & PUSH BUTTON SIGNS
 -REPLACE 8" SIGNAL HEADS WITH 12" SIGNAL HEADS
 -INSTALL IMAGE DETECTION

LEGEND

- PROPOSED CURB
- PROPOSED SIDEWALK
- EXISTING TRAFFIC SIGNAL EQUIPMENT
- PROPOSED TRAFFIC SIGNAL EQUIPMENT
- REMOVAL OF EXISTING TRAFFIC SIGNAL EQUIPMENT
- PROPOSED PAVEMENT REBURFACING
- PROPOSED INLET
- EXISTING F.L.O.W.

GENERAL NOTES:

1. INSTALL BACKPLATES ON ALL EAST/WEST TRAFFIC SIGNAL HEADS.
2. RECONSTRUCT SIDEWALK OR CURB THAT IS DAMAGED OR A TRIPPING HAZARD.
3. INSTALL BREAKAWAY SIGN SUPPORTS FOR ALL GROUND MOUNTED SIGNS.
4. BRING ON-STREET PARKING INTO CONFORMANCE WITH TITLE 93.
5. ALL PROPOSED HANDICAP RAMPS TO BE COMPLIANT WITH ADA.
6. DETECTABLE WARNING SURFACES SHALL BE ADDED TO RAMPS AS REQUIRED.
7. REPLACE ALL SIGNS NOT IN CONFORMANCE WITH THE CURRENT MUTCD.
8. REPLACE ANY MISSING OR DAMAGED LIGHTING TRANSFORMER BASE DOORS.
9. MILL AND PAVE INTERSECTION AREAS AS SHOWN.
10. UPGRADE STREET LIGHTING AS NEEDED.

PRELIMINARY

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**PROJECT NO. 1 - JFK BOULEVARD (CR 501)
 COMMUNIPAW AVENUE TO SIP AVENUE**

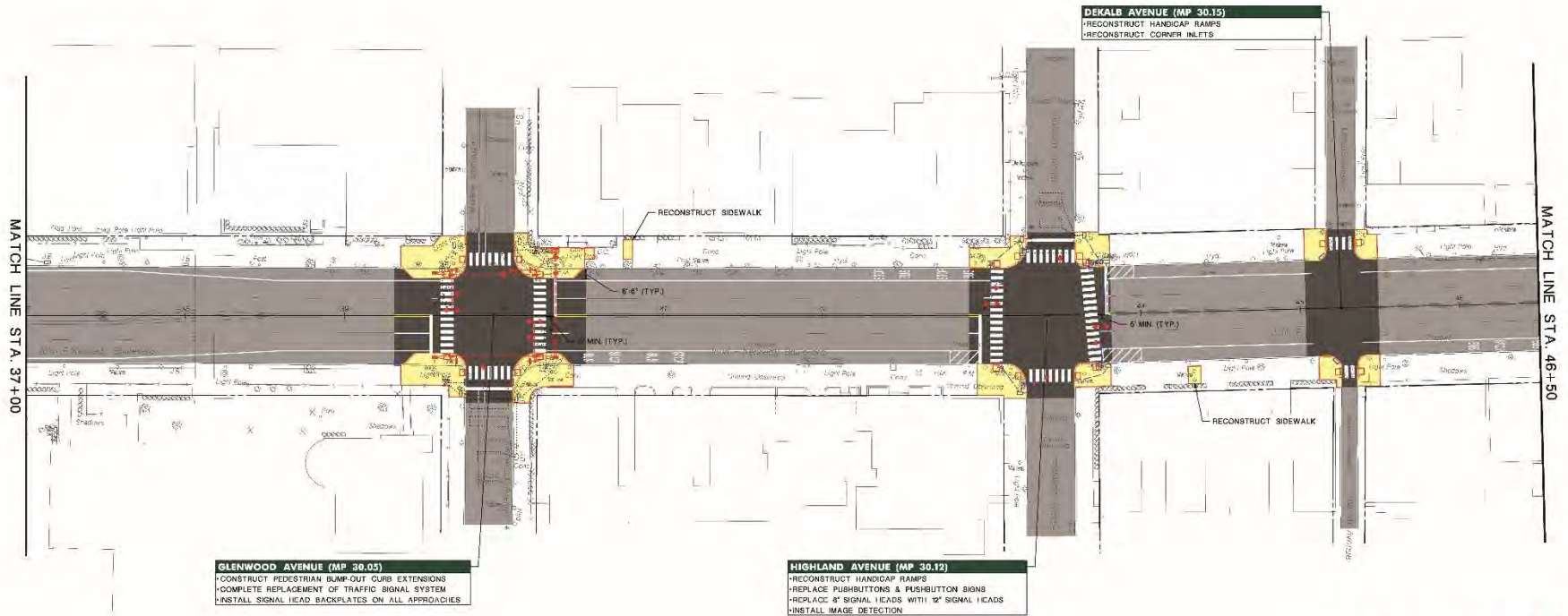
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 HUDSON COUNTY**

CONCEPT PLAN



GPI Greenman-Pedersen, Inc.
 Engineering and Construction Services

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GLENWOOD AVENUE (MP 30.05)
 -CONSTRUCT PEDESTRIAN BUMP-OUT CURB EXTENSIONS
 -COMPLETE REPLACEMENT OF TRAFFIC SIGNAL SYSTEM
 -INSTALL SIGNAL HEAD BACKPLATES ON ALL APPROACHES

HIGHLAND AVENUE (MP 30.12)
 -RECONSTRUCT HANDICAP RAMPS
 -REPLACE PUSHBUTTONS & PUSHBUTTON SIGNS
 -REPLACE 6" SIGNAL HEADS WITH 12" SIGNAL HEADS
 -INSTALL IMAGE DETECTION

DEKALB AVENUE (MP 30.15)
 -RECONSTRUCT HANDICAP RAMPS
 -RECONSTRUCT CORNER INLETS

LEGEND

- PROPOSED CURB
- PROPOSED SIDEWALK
- EXISTING TRAFFIC SIGNAL EQUIPMENT
- PROPOSED TRAFFIC SIGNAL EQUIPMENT
- REMOVAL OF EXISTING TRAFFIC SIGNAL EQUIPMENT
- PROPOSED PAVEMENT RESURFACING
- PROPOSED INLET
- EXISTING R.O.W.

GENERAL NOTES:

1. INSTALL BACKPLATES ON ALL EAST/WEST TRAFFIC SIGNAL HEADS.
2. RECONSTRUCT SIDEWALK OR CURB THAT IS DAMAGED OR A TRIPPING HAZARD.
3. INSTALL BREAKAWAY SIGN SUPPORTS FOR ALL GROUND MOUNTED SIGNS.
4. BRING ON-STREET PARKING INTO CONFORMANCE WITH TITLE 93.
5. ALL PROPOSED HANDICAP RAMPS TO BE COMPLIANT WITH ADA.
6. DETECTABLE WARNING SURFACES SHALL BE ADDED TO RAMPS AS REQUIRED.
7. REPLACE ALL SIGNS NOT IN CONFORMANCE WITH THE CURRENT MUTCD.
8. REPLACE ANY MISSING OR DAMAGED LIGHTING TRANSFORMER BASE DOORS.
9. MILL AND PAVE INTERSECTION AREAS AS SHOWN.
10. UPGRADE STREET LIGHTING AS NEEDED.

PRELIMINARY

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NJTPA LPEAP CONTRACT A

**PROJECT NO. 1 - JFK BOULEVARD (CR 501)
 COMMUNIPAW AVENUE TO SIP AVENUE**

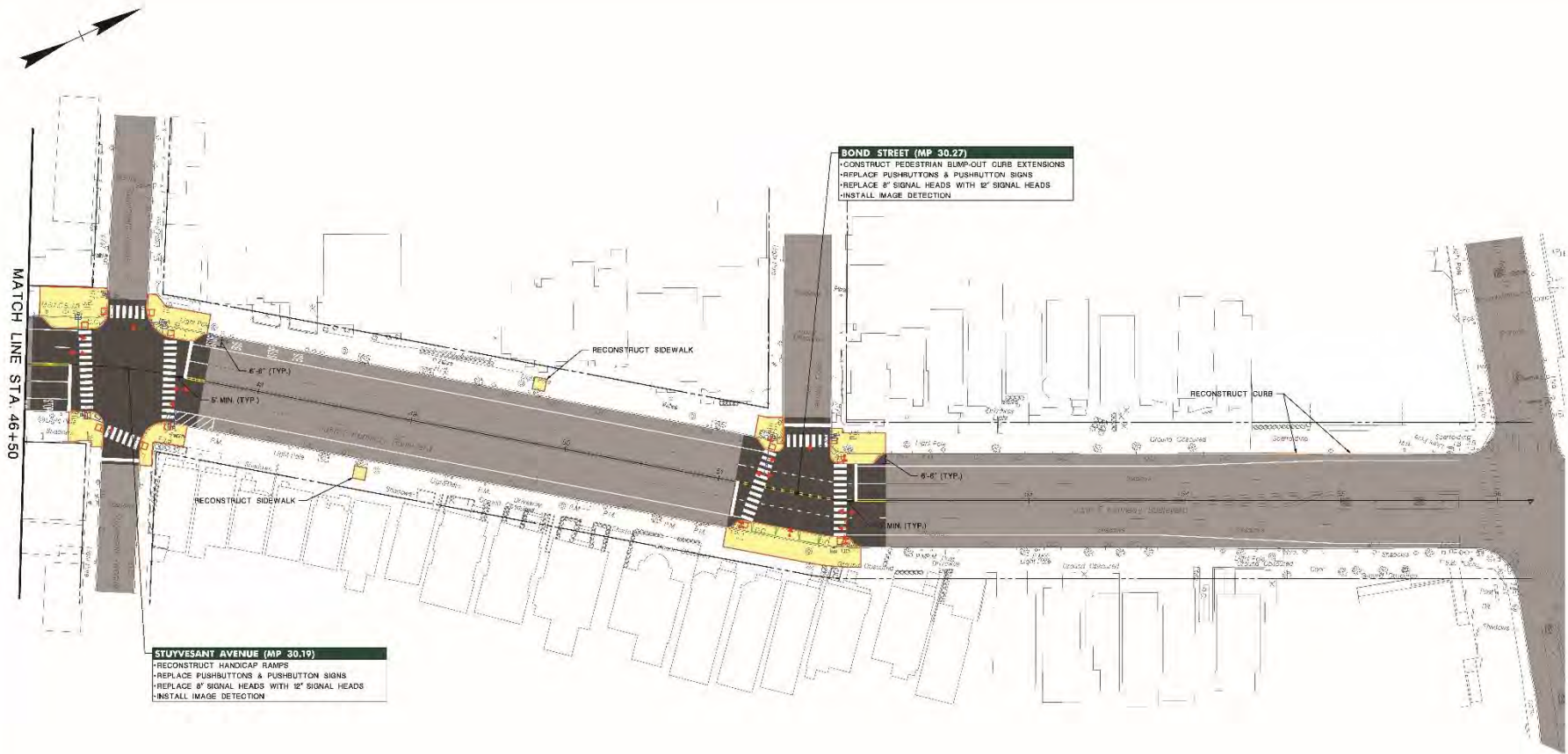
**JERSEY CITY
 HUDSON COUNTY**

CONCEPT PLAN



GPI Greenman-Pedersen, Inc.
 Engineering and Construction Services

Proposed Improvement Plan



STUYVESANT AVENUE (MP 30.19)
 -RECONSTRUCT HANDICAP RAMPS
 -REPLACE PUSHBUTTONS & PUSHBUTTON SIGNS
 -REPLACE 8" SIGNAL HEADS WITH 12" SIGNAL HEADS
 -INSTALL IMAGE DETECTION

BOND STREET (MP 30.27)
 -CONSTRUCT PEDESTRIAN BUMP-OUT CURB EXTENSIONS
 -REPLACE PUSHBUTTONS & PUSHBUTTON SIGNS
 -REPLACE 8" SIGNAL HEADS WITH 12" SIGNAL HEADS
 -INSTALL IMAGE DETECTION

MATCH LINE STA. 46+50

LEGEND

- PROPOSED CURB
- PROPOSED SIDEWALK
- EXISTING TRAFFIC SIGNAL EQUIPMENT
- PROPOSED TRAFFIC SIGNAL EQUIPMENT
- REMOVAL OF EXISTING TRAFFIC SIGNAL EQUIPMENT
- PROPOSED PAVEMENT RESURFACING
- PROPOSED INLET
- EXISTING R.O.W.

GENERAL NOTES:

1. INSTALL BACKPLATES ON ALL EAST/WEST TRAFFIC SIGNAL HEADS.
2. RECONSTRUCT SIDEWALK OR CURB THAT IS DAMAGED OR A TRIPPING HAZARD.
3. INSTALL BREAKAWAY SIGN SUPPORTS FOR ALL GROUND MOUNTED SIGNS.
4. BRING ON-STREET PARKING RAMP TO CONFORMANCE WITH TITLE 93.
5. ALL PROPOSED HANDICAP RAMPS TO BE COMPLIANT WITH ADA.
6. DETECTABLE WARNING SURFACES SHALL BE ADDED TO RAMPS AS REQUIRED.
7. REPLACE ALL SIGNS NOT IN CONFORMANCE WITH THE CURRENT MUTCD.
8. REPLACE ANY MISSING OR DAMAGED LIGHTING TRANSFORMER BASE DOORS.
9. MILL AND PAVE INTERSECTION AREAS AS SHOWN.
10. UPGRADE STREET LIGHTING AS NEEDED.

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NJTPA LPEAP CONTRACT A

**PROJECT NO. 1 - JFK BOULEVARD (CR 501)
 COMMUNIPAW AVENUE TO SIP AVENUE**

**JERSEY CITY
 HUDSON COUNTY**

CONCEPT PLAN



GPI Greenman-Pedersen, Inc.
 Engineering and Construction Services

Next Steps

Complete Preliminary Design	May 2016
NJDOT to Approve Environmental Document	September 2016
Complete Final Design and Submit to NJDOT for Review	December 2016
Anticipated Federal Authorization to Construct	January 2017
Begin Construction *	May 2017
Construction Substantially Completed *	February 2018

** Subject to NJDOT Authorization*

QUESTIONS



Defining the Vision. Shaping the Future.



GPI Greenman-Pedersen, Inc.
Engineering and Construction Services



U.S. Department
of Transportation
**Federal Highway
Administration**

