MONMOUTH COUNTY THREE BRIDGES

W-7, GREEN AVENUE OVER DEBBIE'S CREEK

W-8, FISK AVENUE CULVERT BETWEEN DEBBIE'S CREEK AND THE GLIMMER GLASS

W-9, BRIELLE ROAD BRIDGE OVER THE GLIMMER GLASS

BOROUGHS OF BRIELLE AND MANASQUAN

SCOPING PHASE

STAKEHOLDER MEETING #2 NOVEMBER 29, 2016

Meeting Summary

Prepared By: Denice daCunha, The RBA Group/ NV5

Date / Time: November 29, 2016 at 7:00 p.m.

Location: Brielle Borough at the Curtis House (644 Union Lane, Brielle, NJ)

	ATTENDEES	ORGANIZATION
STAKEHOLDERS	Fran Drew	Committee to Save the Glimmer Glass Bridge
	Jack Drew	Committee to Save the Glimmer Glass Bridge
	Al Hilla Jr.	Brielle Borough Engineer
	Bette June Worth	Citizens for a Wider Safer Bridge
	Helen Young	Manasquan Beach Improvement Association
	Bob Young	Manasquan Beach Improvement Association
	John Belding	Brielle Borough Historian
	Pat Connolly	Squan Village Historic Society
	Nancy Tischio	Squan Village Historic Society
	Jeff Lee	Manasquan Borough Council
	Art Ryan	Manasquan Beach Improvement Association
	Mary L. Ryan	Manasquan Beach Improvement Association
	Robert Houseal	Brielle Environmental Commission
	Alfred Sauer	Manasquan Beach Improvement Association
	Joan Harriman	Wider Safer Bridge / Manasquan Beach Improvement Association
	Rich Read	Manasquan Borough Council
	Chris Tucker	Manasquan Borough Office of Emergency Management
	Michael Gianforte	Brielle Council
	Don Schuett	Brielle
	Andrea Schuett	Brielle
	Paul Nolan	Brielle Council
	Andrea Tingey	NJDEP - Historic Preservation Office
PROJECT TEAM	Joseph Ettore	Monmouth County Engineering • County Engineer
	Denis Walsh	Monmouth County Engineering • Project Manager
	Inkyung Englehart	Monmouth County Engineering
	Debby DeJong	Monmouth County Engineering
	Martin Hofler	North Jersey Transportation Authority
	Sarbjit Kahlon	North Jersey Transportation Authority
	Tom Berryman	NJDOT – Local Aid District 3
	Pamela Garrett	NJDOT – Division of Environmental Resources
	Sean Ream	NJDOT – Division of Environmental Resources
	Gerard Kroner	Mott MacDonald • Engineering Project Manager
	Andrew Gennaro	Mott MacDonald
	Denice daCunha	The RBA Group /NV5 • Project Facilitator
	Corrina Serrani	The RBA Group/NV5

Note: Stakeholders were invited to the meeting by letter invitation from Monmouth County. Just prior to the start of the meeting, it was brought to our attention that a reporter from the Coast Star was at the sign-in desk. He requested to attend and it was explained that it was not a public meeting. Representatives from Monmouth County, NJTPA and the Project Facilitator spoke to the reporter to explain that the intent was for invited stakeholders to express comments freely to the Project Team, that meeting notes would be posted on the project website and requested he not attend. He respectfully understood and did not attend the meeting.

MEETING SUMMARY

A sign-in table was used for recording attendance and updating contact information. The Project Aerial presentation board was displayed. A suggestion box was made available for attendees to write a comment and/or leave a comment. A PowerPoint Presentation was made and Stakeholder Input Session followed.

A. Welcome

Monmouth County Engineer Joseph Ettore welcomed stakeholder attendees on behalf of Monmouth County and collaborating agencies of North Jersey Transportation Planning Authority (NJTPA) and the New Jersey Department of Transportation (NJDOT).

B. Purpose of Meeting and Introductions

Denice daCunha, the Project Team's Facilitator, opened the meeting by reviewing meeting logistics and the agenda. The purpose of the meeting was to review the project status, summary of May 2016 Public Information Center and Stakeholder input and alternatives under consideration. It also provided stakeholders an opportunity to provide feedback and information useful to the Project Team. Prior to this meeting the County met with Manasquan officials and Brielle officials (November 10, 2016).

Project Team members and stakeholders introduced themselves.

C. Project Presentation

A Power Point presentation, attached to this Meeting Summary, was given by Denice daCunha and Gerard Kroner which covered the following topics:

1. Purpose of Meeting / Format (D. daCunha)
2. Project Delivery Process (D. daCunha)
3. Review of Spring 2016 Stakeholder and PIC Input (D. daCunha)
4. Review of P&N, Goals and Objectives (D. daCunha)
5. Review of Project Alternatives (G. Kroener)
6. Next Steps (D. daCunha)

Denice daCunha noted that two Public Information Centers, one in the afternoon and one in the evening, are scheduled for December 15, 2016 (Brielle session (2-4 PM) at The Curtis House and Manasquan session (6-8 PM) at the Borough Meeting Room).

D. Stakeholder Input

Following the PowerPoint presentation, Denice daCunha opened the meeting to Stakeholders for input. She reminded the group that input was being noted. The following is a list of comments/suggestions by stakeholders.

It is noted: Comments are the opinion of stakeholders and may not be factual. The intent, as noted at the meeting, is that the Project Team will review stakeholder comments and consider suggestions.

Comments are numbered by individual Stakeholder comment in order of comments. It is noted some stakeholders commented more than once.

1. Stakeholder Comments:
   - 3 bridges serve 0.9 miles of beachfront
   - Displayed a graphic with street widths within Manasquan and percentages as narrow as Brielle Road
   - Over 70 percent of roads in area with widths less than 20'
   - Displayed photo of two SUVs crossing W9 - felt there is not a width issue. Large SUVs cross the bridge and it's been safe for the past 60+ years
   - Stated that there has never been an accident in 80 years at the Brielle Bridge.
   - Opposes any widening of bridge. This is the only bridge of its kind left in the world.
   - People know to slow down at the bridge.
   - Children are taught to ride along side of road and not to block cars prior to the raising of the bridge gates.
   - Referenced sources of highway and traffic safety information as well as Manasquan fire response procedures. (provided copy in Comment Box)
   - Fire Chief Protocol (Stakeholder's interpretation)
   - Fire trucks go through Main St. and Ocean Ave. bridges
   - Wall Township and South Wall's Fire Departments come in next
   - Belmar and South Belmar Fire Departments comes in next
   - Brielle called to come to Manasquan Fire Station to stand by
   - Water reserve truck is in Manasquan Fire Company #2
   - Rutgers CAIT and others → wider roads; increase speed and increase pedestrian deaths
   - Bascule span is a traffic calming device

   Thanked Team for opportunity to comment

2. Stakeholder Comments:
   - History of the W9 bridge should be preserved. Should be top priority.
   - Designed by a French architect/engineer → should celebrate this bridge, not destroy it – it's important to us!

3. Stakeholder Comments:

- W9 Bridge was built before war for Point Pleasant Canal access. Wasn't put in place at this location until 1930s, but built (fabricated) before that - before cars in use
- It's not traffic calming, but a constraining device. Has seen the use of this bridge by people, not just cars. Bridge is being used way more than usual to get to the beach
- Can use other ways to calm traffic
- Cars waiting behind line of bicycles waiting for gates to open.
- Need a safe place/way for people to cross
- If you want to preserve it, preserve it elsewhere
- W9 Bridge doesn't belong here
- People don't deserve the long waits
- It's a fair compromise; preserve the technology, not the delays
- Most important thing on the bridge is the safety
- Kids on bikes with surfboards, now bicycles pulling trailers/buggies, pedestrians with baby carriages, people with bags
- Know someone who had accident; not sure it was reported
- Their survey one day shows 3-1/2 hours closed vs. 2-1/2 hours open between 10:00 – 4:00.

- Safety is the main issue
- Long waits; concerned about the environment – all those idling cars put out too much exhaust
- Put back quicker-moving bridge at W9 with beauty
- W7 is a concern. It is also beautiful bridge. Would like to see similar look with cross beams
- Size of boats should be considered and limited
- Should review opening schedule
- Out-of-towners don't know to slow down. Safety concern

4. Stakeholder Comments:

- It's a beautiful bridge, but there's a reason why this is the only one left
- Make it look like this bridge, but everything new
- Preserve the design, not the old bridge
- Only the design is original - not whole bridge. 2 roller counterweights are original
- There is a reason why there is only one rolling counterweight bascule bridge left in the world. It has out-lived its usefulness.
- Most of the roads that other stakeholder showed (76%) are probably classified as locally functional
- Design/Approval process should go faster.
- Don't use fixed roadside obstacles as traffic calming devices.
- At last meeting, the business owner at bottom of bridge said he has a collection of side view mirrors that were broken off on the bridge. Accidents do occur.

5. Stakeholder Comments:

- The official stance of the MBIA Board of Trustees is to totally replace the bridge with wider traffic lanes, shoulders, and ADA compliant sidewalks.

6. Stakeholder Comments:

- Conducted his own survey while people waited at bridge:
  7 out of 9 surveyed:
    - "Do you mind being stuck on the bridge?"
    - "Do you want the bridge replaced?"
    - Most want the bridge left as is – several hundred surveyed during summertime

7. Stakeholder Comment:

- *W-9 (Sufficiency Rating) only 7 out of 100?*
- *"Did the rating go up after most recent repairs*?"
    - Gerard Kroner replied that latest report number not yet available but still significantly below standards. Probably increased to 10 to 15, but report is not out yet.

8. Stakeholder Comments:

- MBIA would like the bridge replaced to full current standards. Provide proper width for vehicles, pedestrians and bikes

9. Stakeholder (OEM representative):

- Bridge clearly can only support SUVs, nothing larger
- Interdependency between Brielle and Manasquan includes all ambulance calls.
- Brielle provides Manasquan with first responder water rescues
- The current route down Main Street is longer
- Called in 4 times last summer
- Had 2 fatalities

- Brielle has to take a longer route in response right now; same goes for EMS
- If there are more than 2 victims, Brielle brings their ambulance as the second ambulance to Manasquan's ambulance.
- Wall and South Wall deploys their fire fighter extraction team automatically for fire fighter extraction and rescue.

10. Stakeholder Comments:

- Provide sidewalks on both sides of W7, W8 and W9.
- Improve overall connectivity.
- Put sidewalks on west side of Bridge W-7 to meet existing sidewalk on Fisk Avenue.
- Make Bridge W-9 operate faster, and maybe a little higher.
- Consider limiting the height of vessels going past Bridge W-9.
- Bridge W-7 is a beautiful bridge from the side. Put the same type/look bridge back. Even with the number of piers and spans, it is still a safe bridge (for navigating with kayaks and paddleboards).

11. Stakeholder Comments:

- Bridge is slow because the County Engineer has made it that way to protect cables. Worried about cables.
- He (Stakeholder) timed the bridge opening of Route 35 bridges and it's the same as this bridge (W9)
- Regarding concern for safety of children
  - "I share the concern"
  - You should teach your children to stay on the sidewalk, not in the middle of the road
  - Train your children to use the sidewalk
  - Bridge tender lets children go in road
    - This comment received feedback from others stating the bridge tender did this as a safety issue to let bikes and pedestrians go first once bridge in closed position
- Section 4(f): Congress mandates that you must avoid historic property → this project is not following the law. Alternatives not equal
- Child's report (Bridge Study) dated April 12, 2016 indicates rehabilitation is a feasible and prudent alternative. Piles can be capsulated.
- Wrong about heavy trucks. Trucks much heavier than a SUV go on Bridge W-9. Posted for 3 tons. Could be higher.
    - County Engineer clarification: overweight trucks needing to go over bridge or for bridge maintenance travel slowly under direct supervision of County staff in a controlled environments/manner.
- Not complying with the Historic preservation act is breaking the law. SHPO needs to hear about that.

12. Stakeholder Comments:

- Was stopped at the bridge this weekend – half dozen bikes came in front of us (they go before the vehicles)
- When Bridge W-9 is up, bicyclists line up in front of cars waiting for gate to rise. Bicyclists are of all ages, not just children. Cars must now wait the 15 minutes for bridge to rise and lower, and then for the bicyclists to clear out.
- When the bridge is open, there are a lot of idling cars putting out exhaust which is not good for the environment or for the people living along the bridge approach roads. Drivers do not turn off their cars while waiting.
- Because of striper fishing, there are a lot of boats going out and the bridge is open on demand at this time of year. The bridge is in the open position longer and takes longer time to operate open and close.

13. Stakeholder Comments:

- Regarding a clearance height of 60' for fixed bridge alternative…how realistic is it? Alternative needs to be believable. What size are boats? Should consider smaller height - less impacts. Route 35 bridge 50'. Why this one more? The boat height survey should be to the highest fixed structure, and not include anything removable on the boat.
    - Gerard Kroner response: height based on earlier vessel surveys. New vessel survey study will likely be required during final design before actual Coast Guard permit is prepared and submitted. Must also address permits. Even if 10 feet less, severe impacts. Will review.

14. Stakeholder Comments:

- He is part of the group that officially got the bridge accepted as State's National Historic designation.
- The bridge was accepted as a State and National Historic Site at great expense. Margaret Hickey of HJGA was hired to complete the forms.
- He is concerned about project. This group (Committee to Save the Glimmer Glass Bridge) is now pursuing the National Historic Landmark (NHL) designation and completing the paperwork for landmark status, which is also a costly endeavor. They have financial supporters.
- Already talked to Margaret Hickey at HJGA and actively pursuing NHL
- While there are 10 members that are particularly active in the organization, there are members that say they will fund the legal costs to challenge a decision to remove Bridge W-9.
- Thanked Team for opportunity to comment.

15. Stakeholder Comments:

- More severe high tides are now the new "norm". Main Street Bridge is impassable at high tide a few days every month.
- The crown of Brielle Road was raised by the Borough. Brielle Road is now easer to travel on than Main Street. Therefore, Bridge W-9 must be improved to allow coastal evacuation and emergency vehicles.
- These are other reasons for a new bridge.

16. Stakeholder Comments:

- 0.6 mile distance change for Brielle Fire Dept. to go over Main St. bridge instead of Glimmer Glass

Suggestion Box: Comments/input notes left in the Suggestion Box are attached.

The Project Team thanked attendees for their participation and input. They were reminded of additional opportunities to comment. Several attendees noted they appreciated the opportunity to be involved and thanked the Project Team.

Meeting ended at 9:20PM.

Post Meeting Comment:

- After the meeting ended, a stakeholder requested the historic significance be reconsidered to be part of the Purpose and Need. The portion of the presentation regarding previous meetings comments and suggestions included how this request was considered. The Team felt it was not a Historic Bridge Restoration Project and the original need came about as a transportation issue - along with the funding source. The stakeholder was told the team would further discuss at their next team meeting.

These notes are The RBA Group/NV5 representative's recollections of the meeting (and input from Team members) and represent a record of comments received. As noted, stakeholder comments are opinions and may not be factual. Meeting notes have been reviewed and accepted by the Project Team.

Monmouth County Three Bridges

Boroughs of Brielle and Manasquan

Bridge W-7, Green Avenue over Debbie's Creek
Structure W-8, Fisk Avenue Culvert between Debbie's Creek and The Glimmer Glass
Bridge W-9, Brielle Road Bridge over The Glimmer Glass

Stakeholder Meeting #2

The Curtis House, Brielle Borough
November 29, 2016

Agenda

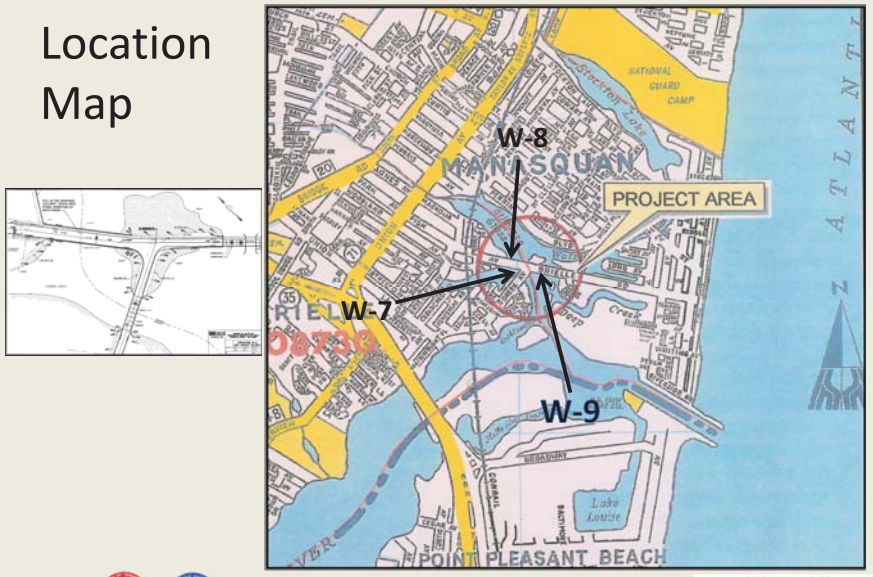
- Welcome / Introductions
- Purpose of Meeting / Format
- Project Delivery Process
- Recap Project Site
- Review of Spring 2016 Stakeholder and PIC Input
- Review of P&N, Goals and Opportunities
- Review of Project Alternatives
- Next Steps
- Stakeholder Input

Project Delivery Process

PHASES	Scoping	Final Design / Right of Way Acquisition	Construction
MAJOR TASKS	Purpose and Need Statement	Environmental Reevaluations	Complete Construction
	Data Collection & Environmental Screening	Environmental Permits	As-Builts
	Prepare Environmental Studies and Develop Alternatives Alternative Analysis / Evaluation	Acquisition of ROW	Close-Out Documentation
	Approved Environmental Document	Construction Contract Documents and PS&E Package	
	Cost Estimate (Final Design, ROW and Construction)		

We are here

Location Map



May 24, 2016 PIC Meeting Summary

Brielle Township: 2:00-4:00pm
Manasquan Township: 6:00-8:00pm

Purpose of PIC

- Re-introduce Project
- Solicit Public Opinion on Purpose, Needs, Goals and Objectives

PIC Notifications and Invitations

- Municipal Websites
- Notification by Mail - 324
- Email Contacts - 48
- Newspaper Legal Notices: APP and Coast Star
- Bulletin Boards/Flyers within study area
- Project Website Visits during May/June ~ 600

May 24, 2016 PIC Meeting Summary

84 Attendees, Excluding Project Team
- Brielle Attendees: 45
- Manasquan Attendees: 39

160 Comments Recorded by Team Members

64 Comments from Suggestion Boxes and 30-Day Period
- Suggestion Boxes: 32
- E-mail: 30
- via Mail / Fed Ex: 2

❖ **Project Website FAQ**

Concerns Expressed During Purpose and Needs PIC (through 30 day comment period)

Six Categories: *(in no particular order)*

- Safety / Bicyclists / Pedestrians
- Operations (roadway and waterway)
- Historic Significance and Character of the Area
- Environmental and Right of Way Impacts
- Cost / Funding / Schedule
- Suggestions for Alternatives

Concerns Expressed During Purpose and Needs PIC (through 30 day comment period)

Safety

- Safety for all users, especially for pedestrians and bicyclists
- Roads and bridges are too narrow for all users to share
- Speeding (on roadways and to get to Bridge W9)
- Truck traffic will increase if roads/ bridges are widened and load limits increased
- Safety needs of kayakers under Bridge W7

Concerns Expressed During Purpose and Needs PIC (through 30 day comment period)

Operations

- Bridge W9 takes too long to open / close
- Traffic disruption for frequent repairs
- Need better sidewalk/ bike connectivity
- Tidal flooding impacts on traffic
- Storm/ flood evacuation
- Improve traffic signing and controls
- Access by EMS and storm evacuation vehicles
- Dredge waterways to accommodate maritime use and improve tidal circulation
- Information provided on vehicle traffic, Bridge W9 opening delays, congestion, bicycle/ pedestrian/skate board use

Concerns Expressed During Purpose and Needs PIC (through 30 day comment period)

Historic Significance and Character of Area

- Preserve aesthetics
- Area character and history is important
- Include Preservation of Bridge W9 in Purpose / Need
- Save/ Rehabilitate Bridge W9

Concerns Expressed During Purpose and Needs PIC (through 30 day comment period)

Environment and Right of Way

- Protect environment/ minimize temporary and permanent impacts/ avoid use of CCA/ AZCA timber
- Avoid/Minimize acquisition of property for project

Cost/ Funding/ Schedule

- Cost - where is funding coming from?
- Schedule - Concern over lengthy design and construction schedules, expedite construction
- Why Delay?, Resolutions of project support already provided by Manasquan and Brielle (2003, 2008, 2014)

Concerns Expressed During Purpose and Needs PIC (through 30 day comment period)

Suggestions for Alternatives

- Replace Bridge W9 to modern standards but design it to "look same" as existing
- Build new bike/ pedestrian bridge parallel to W9
- Remove W9 and insert as part of W7, or as a fishing pier in vicinity of project
- Rehabilitation

Project Purpose and Needs *(definition)*

- **Project Purpose** identifies the intent of the project undertaking
- **Project Needs** identify specific deficiencies and critical concerns to be addressed by the project
- Projects typically also have **goals and objectives** that are strived for as part of the project; not all may be achieved by the final selected alternative

Project Purpose

To provide a safe and efficient crossing for all modes of travel within the project limits by addressing the geometric, structural, and operational and maintenance deficiencies of:

Bridge W-7 (Green Avenue over Debbie's Creek),
Structure W-8 (Fisk Avenue Culvert), and
Bridge W-9 (Brielle Road over the Glimmer Glass).

Project Needs

- Bridge Needs (including emergency vehicles, clearances, bridge width)
- Roadway Needs (Lane/Shoulder Widths)
- System Linkage (Emergency Response, Coastal Evacuation, Marine Access)
- Pedestrian and Bicycle Compatibility / ADA

Project Goals and Objectives

- Provide sidewalk connectivity
- Reduce the safety risks for all users
- Reduce the frequency of major bridge maintenance activities
- Maintain traffic with minimum disruption during construction

Slide 1 of 2

Project Goals and Objectives

- Avoid or minimize social, economic and environmental impacts
- Avoid, minimize and, if necessary, mitigate adverse effects on the National and NJ Register of Historic Places listed Bridge W-9
- Incorporate Context Sensitive Solutions approach into the design

Slide 2 of 2

Revisions to P & N, Goals and Objectives

The existing already cover many comments/ concerns. Noted are:

- Add "minimize flooding" to Project Goals
  - Issues fall outside Project Limits
- Include Preservation of Bridge W9 in the Purpose and Needs
  - Since not a Historic Bridge Preservation Project, not specific to P & N
  - Historic importance already included in two Project Goals and Objectives:
  - "Avoid, Minimize and, if necessary, mitigate adverse effects on the National and NJ Registers of Historic Places listed Bridge W-9."
  - "Incorporate Context Sensitive Solutions approach into the design"
- Add "streamline design & construction schedules" and "Cost Effective Design" to Project Goals
  - *Will Incorporate Value Engineering into Design*

Alternatives Considered

- Alternatives investigated generally include:
  - No-Build
  - Rehabilitation
  - Replacement
- Parallel bridge alternatives were also investigated for Bridge W-9 with several sub-alternative variations

General Definitions

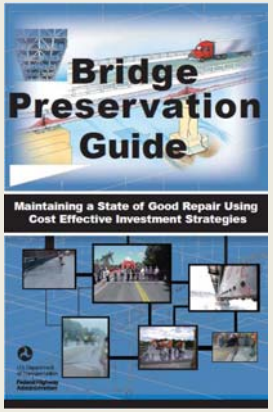
No-Build Alternative

- Required by FHWA
- Serves as baseline with which to compare alternatives
- Includes normal maintenance and repairs and can include minor safety upgrades

General Definitions

Repair vs. Rehabilitation

- Repair – generally implies regular maintenance to keep existing components functioning as intended
- Rehabilitation – generally more substantial work that restores structural integrity, corrects defects (especially safety) and may include incidental geometric changes



General Definitions

Secretary of the Interior (SOI) Standards for the Treatment of Historical Properties

- Title 36, Chapter I of the Code of Federal Regulations (CFR)
- Requires work to be "compatible with the historic materials, features, size, scale and proportions, and massing to protect the integrity of the property"

General Definitions

Structural Capacity/Load Posting

- All bridges are rated based on their as-built condition as modified by current conditions

NJ Legal Loads

15 Tons

25 Tons

40 Tons

Bridge W-7

- Bridges are rated for several legal vehicles defined by the State (2 axle, 3 axle, etc.)
- Load posting required when rated load < legal load
- Posting represents maximum permissible weight per vehicle type

General Definitions

Widening (as it pertains to this project)

- Bridge widths are controlled by 3 main elements
  - Lanes
  - Shoulders
  - Sidewalks
- **None of the rehabilitation or replacement alternatives investigated add additional travel lanes**

General Definitions

Roadway Functional Classifications

– NJDOT classification of Fisk Ave/Brielle Road: Urban Major Collector

Imagery ©2015 DigitalGlobe, USDA Farm Service Agency, Map data ©2015 Google

General Definitions

Lanes

- For urban collectors: "Lanes within the traveled way should range in width from 3.0 to 3.6 m [10 to 12 ft]."

  - AASHTO Policy on Geometric Design of Highways and Streets

Shoulders

- "Shoulder width of at least 5 ft (1.5 m) is recommended from the face of a guardrail, curb, or other roadside barrier…"

  - AASHTO Guide for the Development of Bicycle Facilities

Sidewalks

- "…the continuous clear width of pedestrian access routes shall be 1.2 m (4.0 ft) minimum, exclusive of the width of the curb."
- "…passing spaces shall be provided…" and "… shall be 1.5m (5.0 ft) minimum by 1.5 m (5.0 ft) minimum."

  - United States Access Board Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way

General Definitions

Clear Zone

Defined as "the unobstructed, traversable area provided beyond the edge of the traveled way for the recovery of errant vehicles…includes shoulders, bicycle lanes, and auxiliary lanes"

"Where establishing a full-width clear zone in an urban area is not practical…consideration should be given to establishing a reduced clear zone or incorporating as many clear zone concepts as practical, such as removing roadside objects or making them crashworthy"

- AASHTO Policy on Geometric Design of Highways and Streets

General Definitions

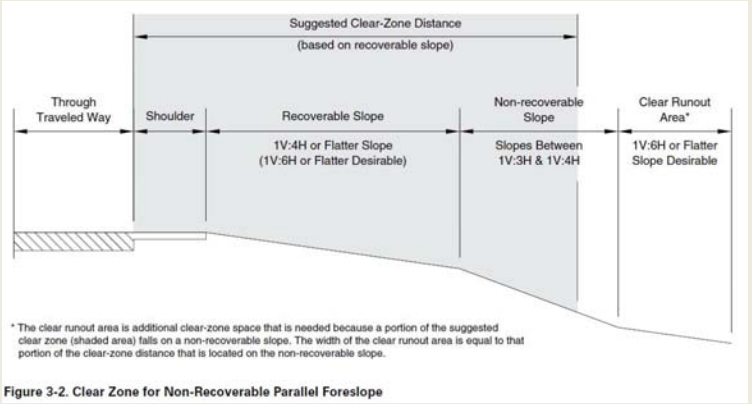


Figure 3-2. Clear Zone for Non-Recoverable Parallel Foreslope

For the design speed and traffic volume on Fisk Avenue/Brielle Road, the AASHTO suggested minimum clear zone distance is 12 feet.

W-7: Green Avenue over Debbie's Creek

EXISTING CONDITIONS:

- **NARROW BRIDGE ROADWAY WIDTH (21.7')**
- **SUBSTANDARD LIVE LOAD CAPACITY**
- **SUBSTANDARD RAILINGS**
- **2013 NBIS REPORT SUFFICIENCY RATING OF 18.7 OUT OF 100**

W-7: Green Avenue over Debbie's Creek

Alternatives Considered

Monmouth County Bridge W-7

Green Avenue over Debbie's Creek

- Alternative 1 – No-Build
- Alternative 2 – Rehabilitation
- Alternative 3 – Replacement with Wider Bridge

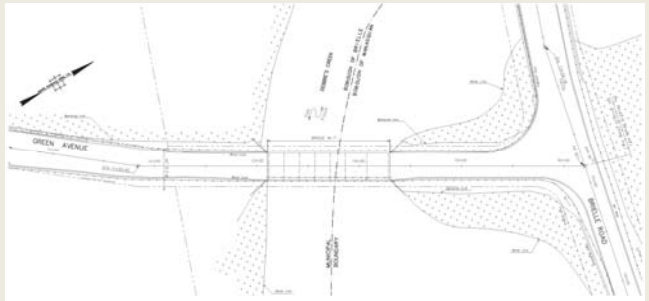
Alternatives Considered

Monmouth County Bridge W-7

Green Avenue over Debbie's Creek

<u>Alternative 1: No-Build</u>

- Perform regular maintenance and repairs only



Alternatives Considered

Monmouth County Bridge W-7

Green Avenue over Debbie's Creek

Alternative 2: Rehabilitation

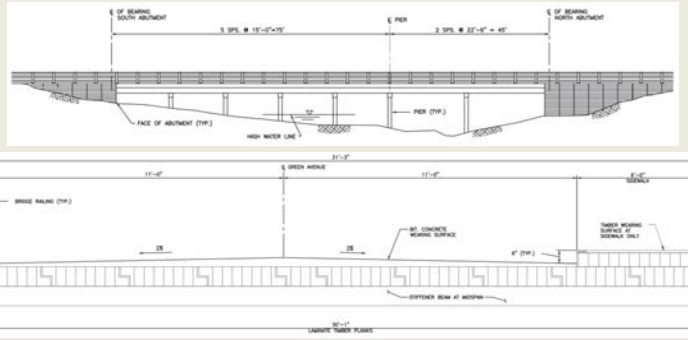
- Rehabilitate with like materials/components (timber)
- Increase structural capacity
- Maintain span arrangement
- Maintain existing curb-to-curb roadway width
- Widen bridge slightly to accommodate standard ADA compliant sidewalk
- Upgrade roadside safety features (railings, end treatments, etc.)

Alternatives Considered

Monmouth County Bridge W-7

Green Avenue over Debbie's Creek

Alternative 2: Rehabilitation

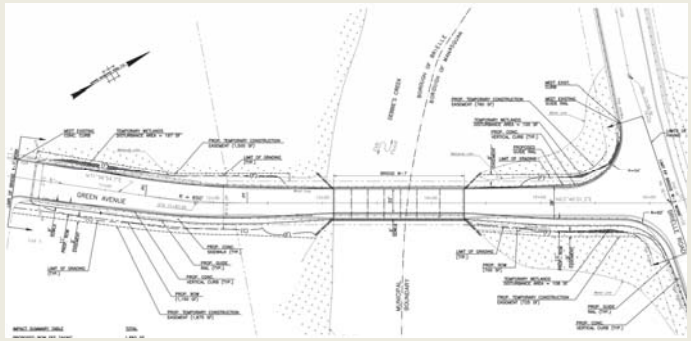


Alternatives Considered

Monmouth County Bridge W-7

Green Avenue over Debbie's Creek

Alternative 2: Rehabilitation



Alternatives Considered

Monmouth County Bridge W-7

Green Avenue over Debbie's Creek

Alternative 3: Replacement with Wider Bridge

- Provide new bridge with more durable materials (concrete)
  - Architectural treatments can be explored in final design
- Reduce number of piers/spans
- Widen bridge to provide standard width lanes with bicycle compatible shoulders and standard ADA compliant sidewalk

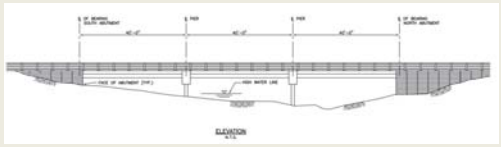
➢ *Public comment: Consider providing sidewalks on each side and consider adding additional sidewalk width to accommodate fishing*

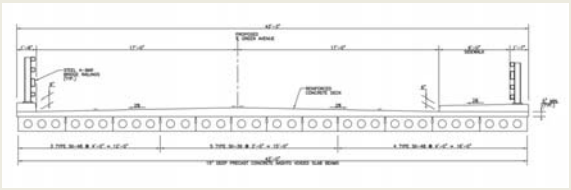
Alternatives Considered

Monmouth County Bridge W-7

Green Avenue over Debbie's Creek

Alternative 3: Replacement with Wider Bridge



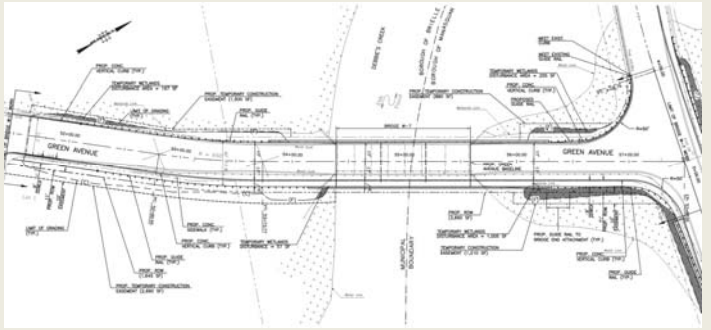


Alternatives Considered

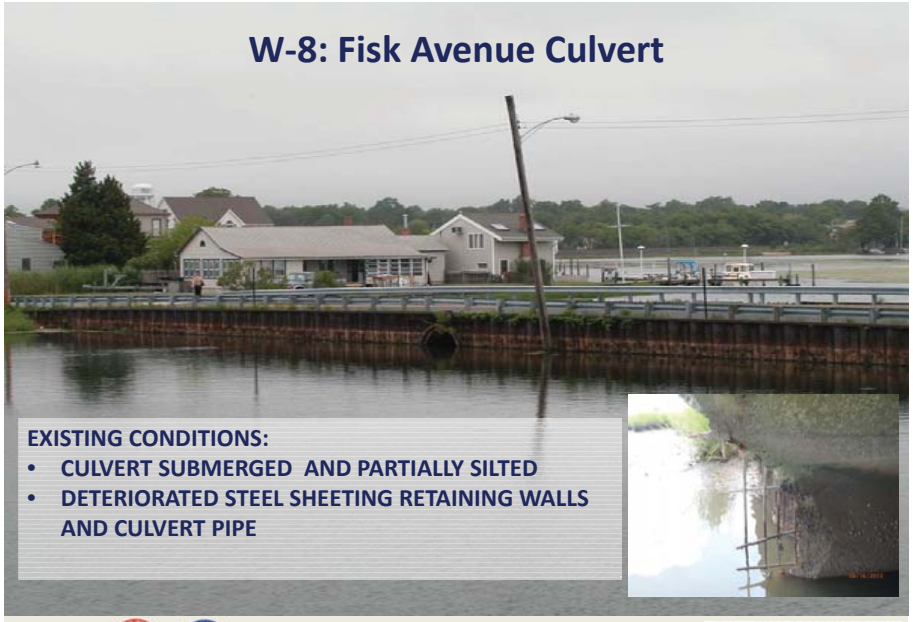
Monmouth County Bridge W-7

Green Avenue over Debbie's Creek

Alternative 3: Replacement with Wider Bridge



W-8: Fisk Avenue Culvert



EXISTING CONDITIONS:

- **CULVERT SUBMERGED AND PARTIALLY SILTED**
- **DETERIORATED STEEL SHEETING RETAINING WALLS AND CULVERT PIPE**

W-8: Fisk Avenue Culvert

Fisk Avenue, looking west

Alternatives Considered

Monmouth County Bridge W-8

Fisk Avenue Culvert

- Alternative 1 – No-Build
- Alternative 2 – Rehabilitation
- Alternative 3 – Elimination of the Culvert
- Alternative 4 – Replacement of Culvert

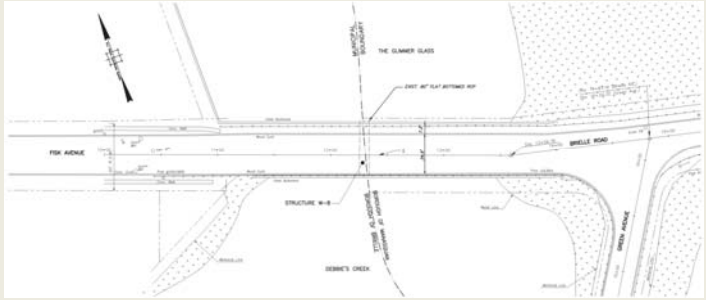
Alternatives Considered

Monmouth County Bridge W-8

Fisk Avenue Culvert

Alternative 1: No-Build

- Perform regular maintenance and repairs only



Alternatives Considered

Monmouth County Bridge W-8

Fisk Avenue Culvert

Alternative 2: Rehabilitation

- Rehabilitate culvert with like materials/components
  - Repair spalls
  - Consider use of a pipe liner
- Remove debris and reestablish inlet and outlet
- Rehabilitate steel bulkhead and headwalls at each end
- Maintain existing roadway width

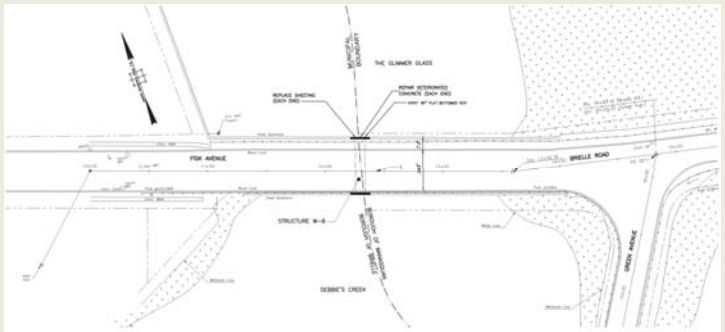
➢ *Public comment: Consider replacing steel bulkhead along full length of causeway (both sides)*

Alternatives Considered

Monmouth County Bridge W-8

Fisk Avenue Culvert

Alternative 2: Rehabilitation



Alternatives Considered

Monmouth County Bridge W-8
Fisk Avenue Culvert

Alternative 3: Elimination of the Culvert

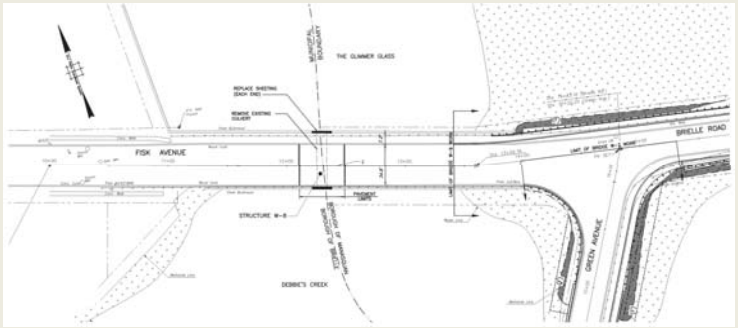
- Completely remove culvert
- Fill void
- Maintain existing roadway width
- Drive new steel sheeting at both ends

➢ *Public comment: Elimination of culvert would have strong negative effect on Debbie's Creek*

Alternatives Considered

Monmouth County Bridge W-8
Fisk Avenue Culvert

Alternative 3: Elimination of the Culvert



Alternatives Considered

Monmouth County Bridge W-8
Fisk Avenue Culvert

Alternative 4: Replacement of Culvert

- Provide new culvert with similar materials (concrete)
  - Match existing hydraulic opening
- Rehabilitate steel bulkhead at each end

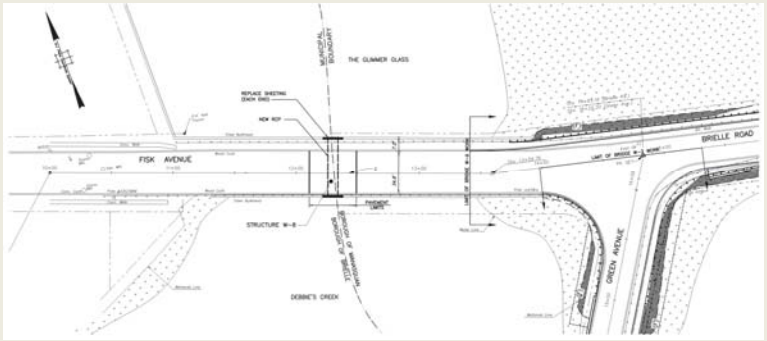
➢ *Public Comment: Consider increasing the hydraulic opening to improve flow between the Glimmer Glass and Debbie's Creek*

➢ *Public Comment: Consider replacing steel bulkhead along full length of causeway (both sides)*

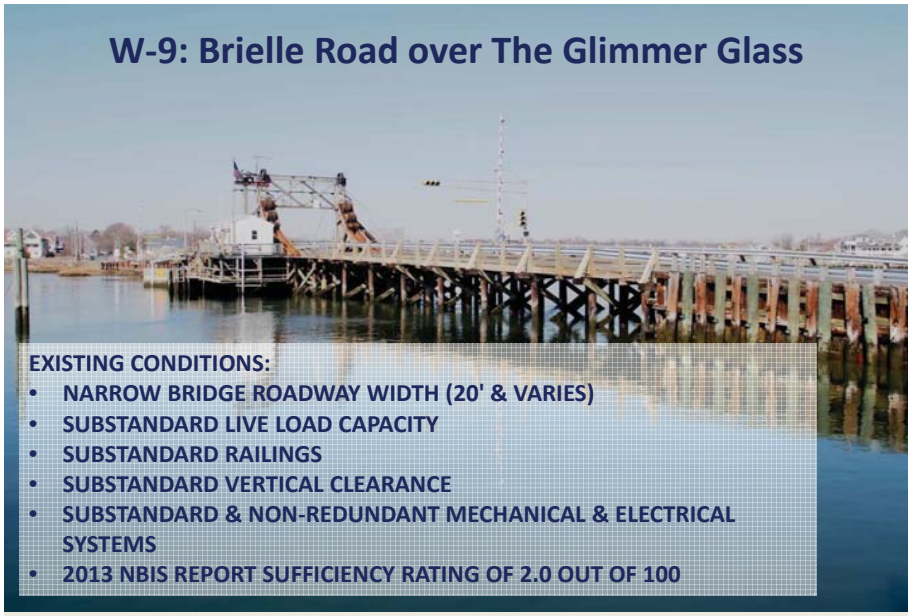
Alternatives Considered

Monmouth County Bridge W-8
Fisk Avenue Culvert

Alternative 4: Replacement of Culvert



W-9: Brielle Road over The Glimmer Glass



EXISTING CONDITIONS:

- NARROW BRIDGE ROADWAY WIDTH (20' & VARIES)
- SUBSTANDARD LIVE LOAD CAPACITY
- SUBSTANDARD RAILINGS
- SUBSTANDARD VERTICAL CLEARANCE
- SUBSTANDARD & NON-REDUNDANT MECHANICAL & ELECTRICAL SYSTEMS
- 2013 NBIS REPORT SUFFICIENCY RATING OF 2.0 OUT OF 100

2014 Failure

W-9: Brielle Road over The Glimmer Glass

Video Clips of Underwater Pile Inspections

2014-2015 Emergency Repairs

W-9: Brielle Road over The Glimmer Glass




Alternatives Considered

Monmouth County Bridge W-9
Brielle Road over the Glimmer Glass



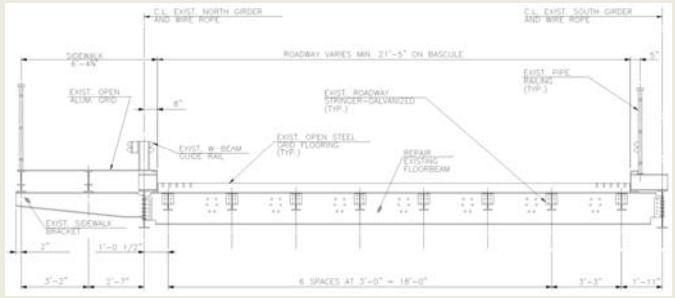
- Alternative 1 – No-Build
- Alternative 2 – Rehabilitation (3 sub-alternatives)
- Alternative 3 – Retain Existing Bridge and Build Parallel Bridge (3 sub-alternatives)
- Alternative 4 – Replace Bridge (4 sub-alternatives)

Alternatives Considered

Monmouth County Bridge W-9
Brielle Road over the Glimmer Glass

<u>Alternative 1: No-Build</u>

- Perform regular maintenance and repairs only



Alternatives Considered

Monmouth County Bridge W-9
Brielle Road over the Glimmer Glass

<u>Alternative 2: Rehabilitation Sub-Alternatives:</u>

- Alternative 2A – Rehabilitation in Accordance with SOI Standards (Historic Restoration)
- Alternative 2B – Rehabilitation not in Accordance with SOI Standards with Replacement of the Approach Spans

- *Variation: Alternative 2C – Rehabilitation of Movable Span in Accordance with SOI Standards with Replacement of the Approach Spans (Hybrid of Alternatives 2A and 2B)*

Alternatives Considered

Monmouth County Bridge W-9

Brielle Road over the Glimmer Glass

Alternative 2A: Rehabilitation in Accordance with the Secretary of the Interior Standards

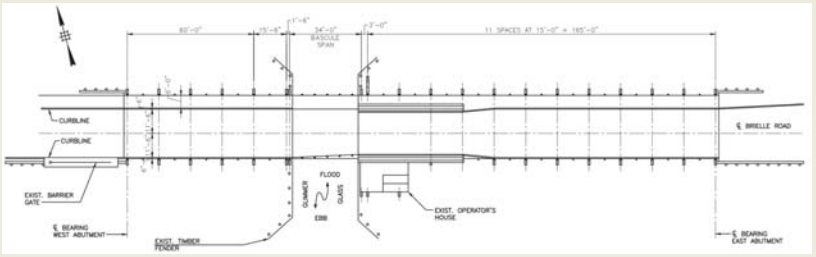
- Rehabilitate with like materials/components (timber/steel) of similar dimensions
- Increase structural capacity marginally
- Maintain existing geometry (span arrangement, roadway width, and bridge width)
- Upgrade mechanical/electrical systems
- Upgrade roadside safety features (railings, end treatments, etc.)

Alternatives Considered

Monmouth County Bridge W-9

Brielle Road over the Glimmer Glass

Alternative 2A: Rehabilitation in Accordance with the Secretary of the Interior Standards



Alternatives Considered

Monmouth County Bridge W-9

Brielle Road over the Glimmer Glass

Alternative 2B: Rehabilitation not in Accordance with the Secretary of the Interior Standards

- Rehabilitate with like materials/components (timber/steel) of similar dimensions
- Increase structural capacity
- Add additional piers between existing ones
- Maintain existing roadway and bridge widths
- Upgrade mechanical/electrical systems
- Upgrade roadside safety features (railings, end treatments, etc.)

Alternatives Considered

Monmouth County Bridge W-9

Brielle Road over the Glimmer Glass

Alternative 2C: Rehabilitation of Movable Span in Accordance with SOI Standards with Replacement of the Approach Spans

- Hybrid of alternatives 2A and 2B
- Rehabilitate movable span with like materials/components (timber/steel) of larger dimensions, replace approach spans
- Maintain existing bridge width for movable span, improve geometry on approach spans
- Upgrade mechanical/electrical systems
- Upgrade roadside safety features (railings, end treatments, etc.)

Alternatives Considered

Monmouth County Bridge W-9

Brielle Road over the Glimmer Glass

Alternative 3: Parallel Bridge Sub-Alternatives:

- Alternative 3A – Retain Existing Bridge (Close to Vehicular Traffic) and Build New Bridge on a Parallel Alignment – High Level Fixed Span Bridge
- Alternative 3B – Retain Existing Bridge (Close to Vehicular Traffic) and Build New Bridge on a Parallel Alignment – Movable Bridge, Vertical Lift
- Alternative 3C – Retain Existing Bridge (Convert to One-Way Traffic) and Build New Bridge on a Parallel Alignment – Movable Bridge, Vertical Lift

➢ *Public Suggested Variation – Rehabilitate Existing Bridge and Build New Parallel Bridge for Pedestrians/Bicyclists Only*

Alternatives Considered

Monmouth County Bridge W-9

Brielle Road over the Glimmer Glass

Alternative 3A: Retain Existing Bridge (Close to Vehicular Traffic) and Build New Bridge on a Parallel Alignment – High Level Fixed Span Bridge

- Build taller, non-moveable, parallel bridge to North
  - Tall enough to accommodate all marine traffic
- Provides standard lane and shoulder widths on new bridge
- Retain existing bridge for pedestrians/bicyclists only

Alternatives Considered

Monmouth County Bridge W-9

Brielle Road over the Glimmer Glass

Alternative 3B: Retain Existing Bridge (Close to Vehicular Traffic) and Build New Bridge on a Parallel Alignment – Movable Bridge, Vertical Lift

- Build vertical lift, parallel bridge to North
- Provide standard lane and shoulder widths on new bridge
- Retain existing bridge for pedestrians/bicyclists only

Alternatives Considered

Monmouth County Bridge W-9

Brielle Road over the Glimmer Glass

Alternative 3C: Retain Existing Bridge (Convert to One-Way Traffic) and Build New Bridge on a Parallel Alignment – Movable Bridge, Vertical Lift

- Build one-directional, vertical lift, parallel bridge to North
- Provide standard lane and shoulder widths on new bridge
- Rehabilitate existing bridge as per Alternative 2A and convert existing bridge to one-directional

Alternatives Considered

Monmouth County Bridge W-9

Brielle Road over the Glimmer Glass

Alternative 4: Bridge Replacement Sub-Alternatives:

- Alternative 4A – Build New Bridge on Current Alignment – High Level Fixed Span Bridge
- Alternative 4B – Build New Bridge on Current Alignment – Movable Bridge, Vertical Lift
- Alternative 4C – Build New Bridge on Current Alignment – Movable Bridge, Trunnion Bascule
- Alternative 4D – Build New Bridge on Current Alignment – Movable Bridge, Rolling Counterweight

Alternatives Considered

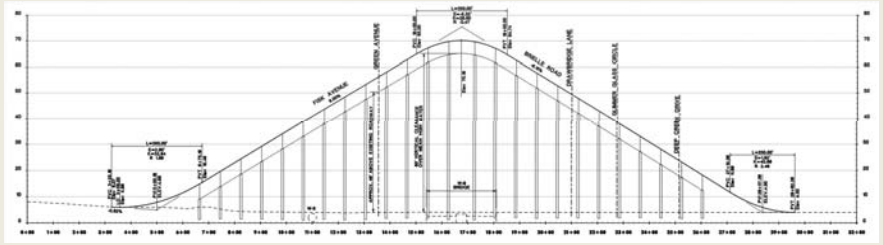
Monmouth County Bridge W-9

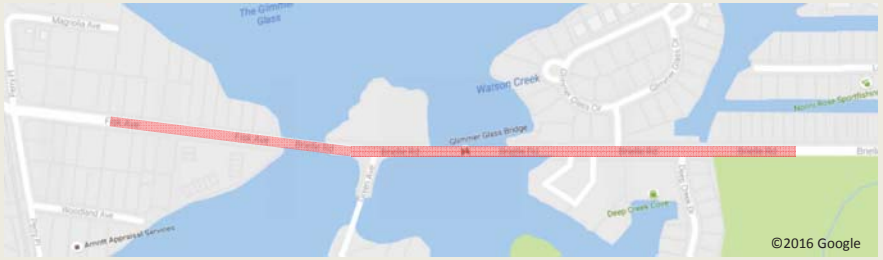
Brielle Road over the Glimmer Glass

Alternative 4A: Build New Bridge on Current Alignment – High Level Fixed Span Bridge

- Remove existing bridge
- Build new, taller, non-moveable bridge in same location
  - Tall enough to accommodate all marine traffic
- Provide standard lane and shoulder widths, and ADA compliant sidewalks

Alternative 4A: Build New Bridge on Current Alignment – High Level Fixed Span Bridge





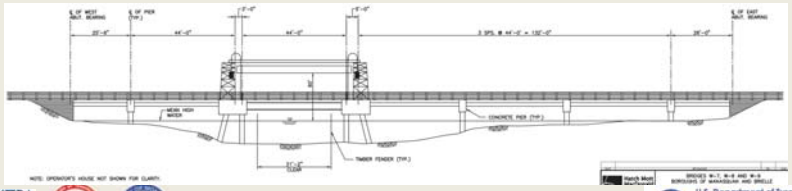
Alternatives Considered

Monmouth County Bridge W-9

Brielle Road over the Glimmer Glass

Alternative 4B: Build New Bridge on Current Alignment – Movable Bridge, Vertical Lift

- Remove existing bridge
- Build new, vertical-lift bridge in same location
- Provide standard lane and shoulder widths, and ADA compliant sidewalks



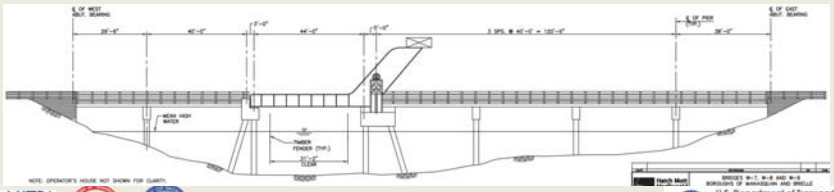
Alternatives Considered

Monmouth County Bridge W-9

Brielle Road over the Glimmer Glass

Alternative 4C: Build New Bridge on Current Alignment – Movable Bridge, Trunnion Bascule

- Remove existing bridge
- Build new, trunnion bascule bridge in same location
- Provide standard lane and shoulder widths, and ADA compliant sidewalks



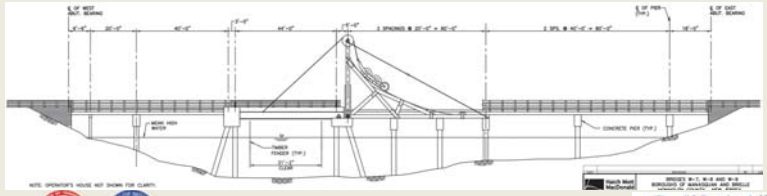
Alternatives Considered

Monmouth County Bridge W-9

Brielle Road over the Glimmer Glass

Alternative 4D: Build New Bridge on Current Alignment – Movable Bridge, Rolling Counterweight

- Remove existing bridge
- Build new, rolling counterweight bridge in same location
- Provide standard lane and shoulder widths, and ADA compliant sidewalks



Alternatives Considered

Monmouth County Bridge W-9

Brielle Road over the Glimmer Glass

Public Suggested Alternative 5: Relocate Bridge and Build New Bridge on Current Alignment

- *Alternative 5A: Relocate Bridge W-9 to Location of Bridge W-7 (openings no longer required) and Build New Bridge as per Alternative 4*
- *Alternative 5B: Relocate Bridge W-9 to Fishing Pier (Block 136, Lot 26.01) and Build New Bridge as per Alternative 4*

Assessment of Alternatives

Alternatives will be evaluated based on the following criteria:

- Meeting Project Purpose
- Achieving Project Needs
  - Bridge Needs
  - Roadway Needs
  - System Linkage
  - Pedestrian/Bicyclist Compatibility, ADA Compliance
- Achieving Goals and Objectives
  - Sidewalk Connectivity
  - Environmental Impacts
  - Historic Resources Impacts
  - Safety Improvements
  - Long Term Maintenance
  - Traffic Impacts & Detour

Assessment of Alternatives

Additional Considerations:

- Construction / Life Cycle Costs
- Various Environmental Impacts
- Required permitting
- ROW Impacts and Costs
- Construction Duration and Detours

Next Steps

- **Continued Public Outreach**

  Round #2 – Project Alternatives

  - Local Officials Briefings **November 10, 2016**
  - Stakeholder Meeting **November 29, 2016**
  - Public Information Center (Manasquan & Brielle) **December 15, 2016**
    - Two Meetings
    - 30 day Post Comment Period
- **Consider Comments**
- **Prepare Alternative Analysis**

Next Steps

- **Identify Preliminary Preferred Alternative (PPA) for Each Structure**
- **Continued Public Outreach**

  Round 3 – Present PPA

  - Local Officials Briefings **Q1 2017**
  - Stakeholder Meeting **Q1 2017**
  - Public Information Center (Manasquan & Brielle) **Q1 2017**
    - Two Meetings
    - 30 day Post Comment Period
- **Incorporate Comment Responses**
- **Prepare / Submit Draft AA Report**

Next Steps

- **Cultural Resource / Section 106 Process**
  - **New Jersey Register Authorization**
- **Final Alternatives Analysis Report**
- **NEPA Process / Section 4(f)**
- **Federal Authorization For Final Design**

Input

? Comments ?

Additional Opportunity to Comment

- after this Meeting
- at PIC's on **December 15, 2016**
  - 2-4 PM, Curtis House
  - 6-8 PM, Manasquan Borough Hall
- after PIC during 40 Day Comment Period / extended from 30 days due to holidays – to January 24, 2016

STAKEHOLDER # 1 COMMENTS

NOVEMBER 29, 2016

STAKEHOLDER MEETING

MONMOUTH COUNTY THREE BRIDGES
W-7, GREEN AVENUE OVER DEBBIE'S CREEK
W-8, FISK AVENUE CULVERT BETWEEN DEBBIE'S CREEK AND GLIMMER GLASS
W-9, BRIELLE ROAD BRIDGE OVER GLIMMER GLASS
BOROUGHS OF BRIELLE AND MANASQUAN

PROJECT ALTERNATIVES: COMMENTS & SUGGESTIONS

COMMENTS (PLEASE PRINT CLEARLY):

PLEASE PLACE SIDEWALKS ON BOTH SIDES OF W-7, W-8 + W-9

KINDLY SUBMIT COMMENTS BY DECEMBER 10, 2016 TO (MAIL OR EMAIL):

DENICE DACUNHA
PROJECT FACILITATOR
THE RBA GROUP / NV5
7 CAMPUS DRIVE, SUITE 300 • PARSIPPANY, NJ 07054
P: 973-946-5624
E: MCW789FACILITATOR@RBAGROUP.COM

-OR-

INKYUNG ENGLEHART
COUNTY PROJECT FACILITATOR
MONMOUTH COUNTY ENGINEERING
1 EAST MAIN STREET • FREEHOLD, NJ 07728
P: 732-431-7760 EXT. 3643
E: ENGINEER@CO.MONMOUTH.NJ.US

COMMENTS ARE OPINIONS AND MAY NOT BE FACTUAL

G.

STAKEHOLDER # 2 COMMENTS

STAKEHOLDER MEET #2 11 29 16

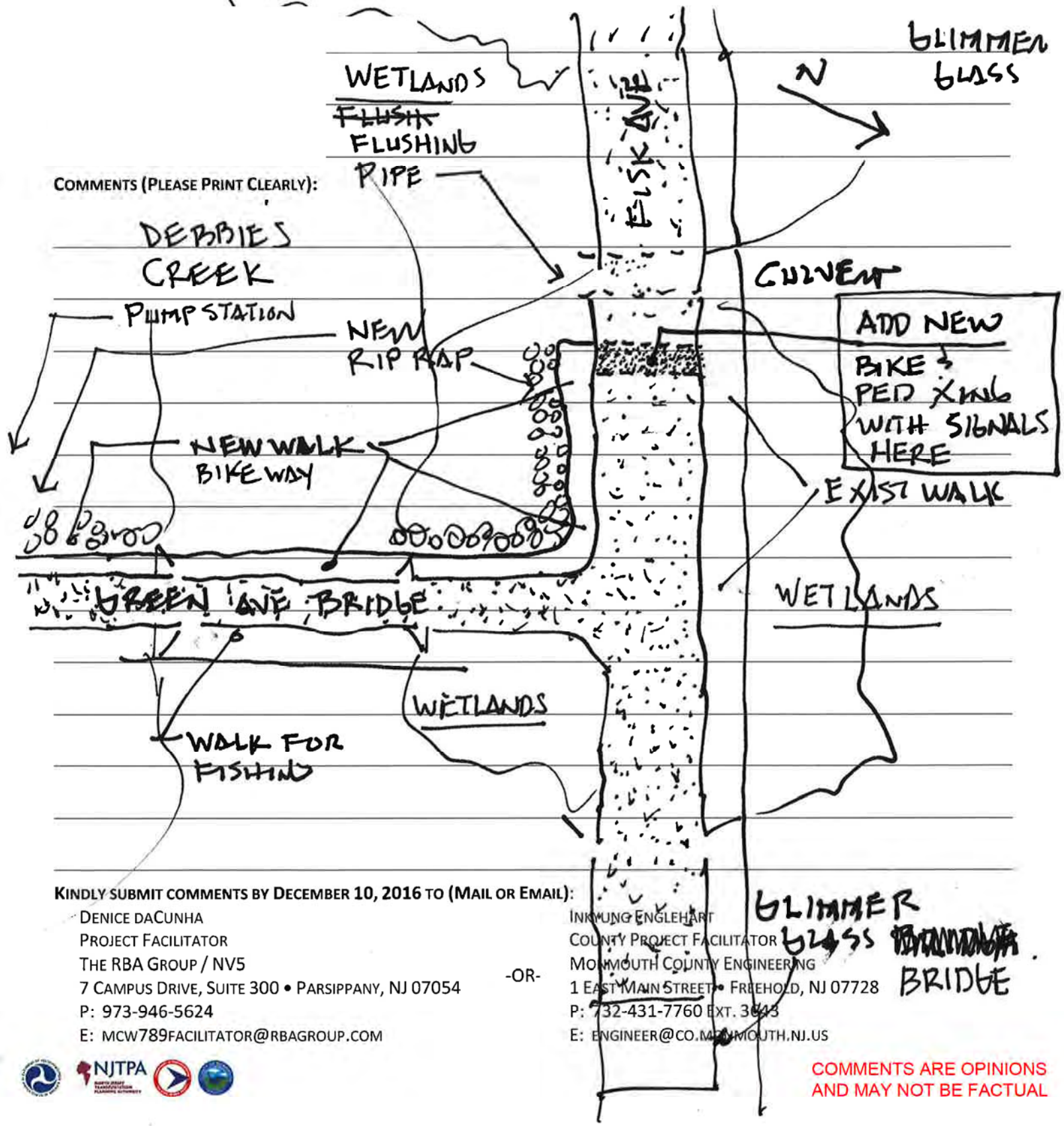
NOVEMBER 29, 2016

STAKEHOLDER MEETING

MONMOUTH COUNTY THREE BRIDGES
W-7, GREEN AVENUE OVER DEBBIE'S CREEK
W-8, FISK AVENUE CULVERT BETWEEN DEBBIE'S CREEK AND GLIMMER GLASS
W-9, BRIELLE ROAD BRIDGE OVER GLIMMER GLASS
BOROUGHS OF BRIELLE AND MANASQUAN

PROJECT ALTERNATIVES: COMMENTS & SUGGESTIONS

COMMENTS (PLEASE PRINT CLEARLY):



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STAKEHOLDER # 3
COMMENTS

NOVEMBER 29, 2016

STAKEHOLDER MEETING

MONMOUTH COUNTY THREE BRIDGES
W-7, GREEN AVENUE OVER DEBBIE'S CREEK
W-8, FISK AVENUE CULVERT BETWEEN DEBBIE'S CREEK AND GLIMMER GLASS
W-9, BRIELLE ROAD BRIDGE OVER GLIMMER GLASS
BOROUGHS OF BRIELLE AND MANASQUAN

PROJECT ALTERNATIVES: COMMENTS & SUGGESTIONS

COMMENTS (PLEASE PRINT CLEARLY):

SAVE The Historic Glimmer Glass Bridge.

Over 2000 have signed the petition & MOST of the signers are residents of Brielle & Manasquan. The Historic Societies of Manasquan & Brielle passed a resolution to save this historic bridge!

No Accidents in 80 yrs.!!!

KINDLY SUBMIT COMMENTS BY DECEMBER 10, 2016 TO (MAIL OR EMAIL):

DENICE DACUNHA
PROJECT FACILITATOR
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7 CAMPUS DRIVE, SUITE 300 • PARSIPPANY, NJ 07054
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COMMENTS ARE OPINIONS AND MAY NOT BE FACTUAL

STAKEHOLDER # 3
ATTACHMENTS

Glimmer Glass Bridge Listed On National Historic Register

The Glimmer Glass Bridge was built around 1898; the 34-foot drawbridge mechanism was installed in 1938. The unique rolling counterweight design, which originated in 18th Century France, features a drawbridge lifted by a pair of chains, ropes or cables connected to a counterweight that runs along an elliptical track.

The two-lane bridge, with single sidewalk, spans the Glimmer Glass, a navigable tidal inlet of the Manasquan River. The bridge is located in a salt marsh surrounded by what historically had been a seasonal community of small cottages. Many of the cottages have been enlarged and/or converted to year-round houses.

The rolling counterweight single-leaf bascule bridge with a deck girder movable leaf is the only example of the late 19th Century bridge type in the country. The bridge represents technology that was developed prior to 1885. It was used in New Jersey by railroads and over canals. The Glimmer Glass Bridge still operates in the original manner and is historically and technologically significant.

The bridge is controlled from an operator's house on the southeast side. An electric motor mounted atop the upstream tower column brace engages the drive shaft to turn the sheaves which cause the counterweights to start moving down the track. The motor reverses the action to close the bridge. The operator's house, like many elements of the bridge, has been upgraded over the years, but its function and profile are original.

No original records or plans are available for the Glimmer Glass span, although plans for the bascule section date back to 1922. The bridge was rebuilt several times. The wood tower column and track were rehabilitated in 1957 and 1971 and the steel grid deck on the c. 1950 deck girder movable span was installed in 1962. The significance of the structure is derived from the fact that it maintains its integrity of original design.

In 2005 a group of area residents sought to save the bridge from demolition and formed Save the Glimmer Glass Bridge in an effort to raise awareness and funds to hire professionals to complete the necessary paperwork for nomination to the National Register of Historic Places. Coordinated by Eloise Knight, a Manasquan resident, thousands of dollars were raised and the group focused on placing the bridge of the National Register of Historic Places.

The Glimmer Glass Bridge, a national treasure, was entered on the National Register of Historic Places on April 25, 2008. "The National Register is the Nation's official list of cultural resources significant in American history, architecture, archaeology, engineering or culture." (Source: NJDEP, Historic Preservation Office)

On February 28, 2008, the Glimmer Glass Bridge was placed on the New Jersey Register of Historic Places. It is "a resource of national significance." (Source: New Jersey State Historic Preservation Office)

Today, the Glimmer Glass Bridge continues to operate as it was originally constructed, retaining the basic technologies developed in the 1890s.

The Glimmer Glass Bridge survived Hurricane Sandy and was re-opened for traffic soon after the storm. After Sandy, a tidal station to monitor storms as well as tides, wind speed, air and water temperature, and barometric pressure was installed on the Glimmer Glass Bridge. It will be administered by the US Geological Survey in cooperation with the National Weather Service and the New Jersey State Police. During Sandy, the tidal station at Sandy Hook failed. The next station, located at Atlantic City, can not provide information the area needs.

COMMENTS ARE OPINIONS
AND MAY NOT BE FACTUAL

STAKEHOLDER # 3
ATTACHMENTS

GLIMMER GLASS BRIDGE

Fact Sheet

HISTORY: The Glimmer Glass Bridge was built around 1898 and the 34' drawbridge was installed in 1938. The unique rolling counterweight design, which originated in 19th century France, features a drawbridge lifted by a pair of cables connected to a counterweight that runs along an elliptical track. The bridge is architecturally significant as it exemplifies advances in moveable bridge technology for transportation of vehicles over navigable water ways. It is the only remaining example of its type in the USA. The bridge was entered on the National Register of Historic Places and the New Jersey Register of Historic Places in 2008.

CURRENT SITUATION: Now it is in danger of being torn down for a new larger bridge. This year the County has re-started a process to consider actions to replace or repair the bridge. Because the bridge is on the historic register, the process involves a series of public meetings, now on-going. To date, over 2,000 people have signed the petition in support of saving the Glimmer Glass Bridge. Most of the signers are Manasquan and Brielle residents, but signers also include people from 20 other States.

COMMENTS ARE OPINIONS
AND MAY NOT BE FACTUAL

STAKEHOLDER # 3
ATTACHMENTS

GUIDELINES FOR HISTORIC BRIDGE REHABILITATION AND REPLACEMENT

Requested by:

American Association of State Highway and Transportation Officials (AASHTO) Standing Committee on the Environment

Excerpt from Page A-26

STEP 3: HISTORICAL AND ENVIRONMENTAL CONSIDERATIONS

While engineering issues and costs often drive the decision to rehabilitate or replace a historic bridge, they are not the only factors involved in the analysis and selection of the preferred alternative. Since passage of the NHPA and the US DOT Act in 1966 and NEPA in 1969, the federal government has established procedures affording those concerned with historic preservation opportunities to be a meaningful part of the analysis and decision-making process when historic properties are involved. This means that for projects to have credibility with multiple perspectives, it must be demonstrated that preservation and/or avoidance of an adverse effect has been fairly considered as part of the scoping and preliminary engineering studies, and that all possible planning to minimize harm to historic properties was done.This integration of historical and environmental issues has the greatest efficacy when it is done from the outset of the project.

Excerpt from page 29

Life-cycle costs are one of the most frequently used factors in decision making. Agencies have limited resources, and choices must continually be made whether to utilize them on old bridges. There are some historic bridges where cost clearly is not an issue, like our landmark bridges or long bridges that will be rehabilitated without being considered for replacement. But those instances are few and far removed from the problems of allocating resources among the much more common shorter and average significance bridges. It is for these structures where initial construction and long-term maintenance costs are vitally important and often the deciding factor. Additionally, a bias that new is better than old often factors into decisions.

Once the issues related to load capacity, functional adequacy and environmental concerns have been addressed, the remaining question is "How much do initial cost (cost of rehabilitation) and life-cycle costs differ from that of a new bridge?" There are no hard and fast rules to answer that question, but it can be said with certainty that if the cost of rehabilitation is less than the cost of replacement, if the life-cycle costs are approximately equal to that of a new bridge, and if the life of the rehabilitation is on the order of 25 years, then rehabilitation can be easily justified even though a new bridge may have a life of 50 years or more. Experience shows that even if the cost of rehabilitation approaches the cost of replacement, as long as the cost of maintenance and the rehabilitation life remains reasonable, rehabilitation of the historic bridge is justified.

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EMERGENCY RESPONSE

On Thursday, June 16,2016, I was told by Christopher Barkalow, Director of Fire Services for the Manasquan Fire District, that Manasquan's two fire departments do not go over the Glimmer Glass Bridge, they use the Main Street Bridge and the Ocean Avenue Bridge. And, when they need assistance, the Manasquan Fire Chief contacts the two South Wall fire departments, who also go over the Main Street Bridge or the Ocean Avenue Bridge, NOT the Glimmer Glass Bridge. Then, as indicated in the Protocol, the Brielle Fire Department is to go directly to the two Manasquan Fire houses and standby.

Also, the water rescue/dive trailer is housed at Manasquan Engine #2 (111 Parker Avenue). In the event of a Beach response, the most direct route would be the Ocean Avenue Bridge.

This is all spelled out in the Fire Department's Protocol. .

Fran Drew ©732-245-0538
111 Third Avenue
Manasquan, NJ 08736

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BRIDGE SAFETY

There are those who want a wider bridge, thinking it would be safer. I respect and endorse their goal of safety. Safety is the goal of the committee, as well. However, the bridge has no accident record and, contrary to their expectations, a wider bridge would have the opposite effect. It would reduce safety. This view is shared by Highway safety authorities who are part of a growing move to introduce narrower roads as a traffic calming and speed reducing measure. This has been proven to enhance safety. Attached are a number of supporting references.

TRAFFIC CALMING

1. Federal Highway Administration publication, October 15, 2014:

"Safe Roads for a Safer Future

"Traffic Calming

"Roundabouts, curb bulb-outs and speed bumps are all forms of traffic calming, which offer promise, if properly applied, to curb speeding and some forms of aggressive driving. Pedestrians especially benefit from traffic calming. Traffic calming employs physical changes to the roadway, signage or operation and can be thought of as "silent policemen" enforcing speed limits where no law enforcement are present."

2. Institute of Transportation Engineers, 2016

"Traffic Calming

"Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users.

Traffic calming goals include:

1. Increasing the quality of life
2. Creating safe and attractive streets
3. Reducing the negative effects of motor vehicles on the environment, eg, pollution, etc.
4. Promoting pedestrian, cycle and transit use

Traffic calming objectives include:

1. Achieving slower speeds of motor vehicles
2. Reducing collision frequency and severity
3. Increasing safety of non-motorized users of the streets
4. Reducing the need for police enforcement"

3. FHWA Course on Bicycle and Pedestrian Transportation

"Lesson 11 Traffic Calming

"Traffic calming is a term that emerged in Europe to describe a range of methods to slow cars –"
" The benefit for pedestrians and bicyclists is that cars now drive at speeds that are safer and more compatible to walking and bicycling. There is, in fact, a kind of equilibrium among all the users of the street so no one mode can dominate at the expense of the other."

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4. Wikipedia

Traffic Calming

(An extensive treatment.) Some highlights:

"For much of the twentieth century, streets were designed by engineers who were charged only with ensuring smooth traffic flow and not with fostering other functions of the streets. The basis for traffic calming is broadening traffic engineering to include designing for these functions."

"A number of visual changes to roads are being made to cause more attentive driving, reduced speeds, reduced crashes and a greater tendency to yield to pedestrians. Visual traffic calming includes lane narrowing (9-10 feet), reduction in lanes, use of trees, etc.---"

WIDENING STREETS

Wider, Straighter and Faster Not the Solution for Older Drivers (A Publication of the Project for Public Spaces, Mar. 6, 2012)

"It's time for AASHTO and TRIP and other members of that establishment to recognize the limitations of 'Forgiving Highways' principles. ---- Evidence is mounting that not only does the 'wider, straighter, faster' philosophy fail to fix safety problems on urban and suburban arterials – *it actually makes them worse.*"

"In the 'Smart Transportation Guide', Pennsylvania's and New Jersey's DOT provide guidance to their engineers on how to use design to *slow down* vehicles when appropriate to the context. The Institute of Transportation Engineers and the Congress for New Urbanism do likewise in their guide "Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities"

"Bigger Roads are Less Safe (despite what your traffic engineer says)
(a publication of Walkable Streets March 17, 2003)"

"In a great many cases, 'improved safety' is the reason cited for adding travel lanes (widening a road). Indeed, because 'improved safety' is a moral high ground, the safety rationale is perhaps the most common reason for why a road 'must' be widened."

"The 'Forgiving Road' was thought to promote safety. Of course, human nature being what it is, such a design encourages reckless, inattentive high-speed driving because human psychology compels us to tend to drive at the highest speed that still feels safe. After all, we are always 'running late'. We are always in a hurry.

The predictable result: An increase in crashes due to speeding, inattentiveness and recklessness.

Wider Lanes Make City Streets More Dangerous (a publication of **Greater** Greater Washington, May 29, 2015)

"The 'Forgiving Highway' approach to traffic engineering holds that wider is safer when it comes to street design. After decades of adherence to these standards, American cities are now criss-crossed with

12-foot wide lanes. A Walkable Cities author, Jeff Speck argued that this is actually terrible for public safety and a pedestrian environment."

"A new study reinforces the argument that cities need to reconsider lane widths and redesign streets accordingly." --- "Looking at crash databases, Karim (author) found that collision rates escalate as lane widths exceed about 10.5 feet. Roads with the widest lanes – 12-feet or wider—were associated with greater crash rates and higher speeds."

Flexible Design of New Jersey's Main Streets (A publication of **Rutgers** Voorhees Transportation Policy Institute)
More Complete Analysis of Safety Impacts, (pp13,14,15)

"The wider, straighter more open approach to highway design is based on crash research in rural areas, where prevailing speeds are high. --- Urban areas are another matter. Not only are speeds lower, but contexts are very different. Design options are constrained by active land uses along urban rights of way. These active uses generate bicycle and pedestrian traffic, which has to be a factor in design decisions. The wider, straighter more open approach to design will not be safer if it leads to higher speeds and, consequently, more frequent and severe crashes.

"A study published in the ITE Journal in 2000 found that pedestrian crash rates were primarily a function of traffic speed. An increase of traffic speed from 20 to 30 mph was associated with 7.6 times the risk of pedestrian injury.

"An analysis of 20,000 crashes in Longmont, California found that – crash rates increased exponentially with street width and were higher for straight streets than for curvilinear streets."

CONCLUSION

Based on the above information, we see that the 20-foot wide bascule section of the bridge is creating a traffic calming effect, no doubt leading to its excellent safety record. We have a safe bridge now and if we widen it, in our attempt to do good, we will, again based on the above data, make it *less* safe. Common sense has told us for years "If it ain't broke, don't fix it" This wisdom surely applies most directly here. There is no safety reason to widen the Glimmer Glass Bridge and we should **not** do it.

WIDENING THE BRIDGE IS NOT AN ENGINEERING, FINANCIAL OR LEGAL NEED

There are no engineering reports that propose widening the bridge for structural reasons. The only reason reported is that to obtain Federal funding, the standard width for Federal highways of 30 feet is called for. However for a local roadway, such as this, a waiver from this standard can be obtained, especially for an historic bridge. MaryAnn Nabor, FHWA Historic Preservation Office stated that "There are provisions to grant an exception for road width if the bridge functions safely." With a waiver in hand, all applicable standards and practices and will have complied with and there would be no legal impediment to retaining the 20-foot road width.

There is no engineering, financial or legal reason to widen the bridge.

U.S. Department of Transportation
Federal Highway Administration
1200 New Jersey Avenue, SE
Washington, DC 20590
202-366-4000

Safety

Traffic Calming

Roundabouts, curb bulb-outs, and speed humps are all are forms of traffic calming, which offer promise if properly applied to curb speeding and some forms of aggressive driving. Pedestrians especially benefit from traffic calming. Traffic calming employs physical changes to the roadway, signage or operation changes, and can be thought of as a "silent policeman" enforcing speed limits where no law enforcement are present.

Traffic Calming Website

The Federal Highway Administration has financially supported the Institute of Transportation Engineers to develop a Traffic Calming Website in the interest of information exchange.
Within the traffic calming website:

- Traffic Calming Library
  The Traffic Calming Library contains a searchable database of reports, articles and other documents related to traffic calming.

- Selected Reports
  This section of the Traffic Calming Web site allows you to view two full text reports and portions of a third report online.

  - **Traffic Calming: State of the Practice**
    At the local level, traffic calming responds to public concerns about speeding and cut-through traffic. Citizens look to their elected officials, and elected officials look to transportation professionals for technical solutions. The purpose of this report is to provide balanced information so readers can make their own informed decisions. Contact ITE.

- Traffic Calming Seminar Instructional Material
  ITE and FHWA developed a 1-day seminar for transportation professionals on Traffic Calming.

Page last modified on October 15, 2014.

Safe Roads for a Safer Future
Investment in roadway safety saves lives

Traffic Calming

Traffic Calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users.[1]

Traffic calming goals include:

- increasing the quality of life;
- incorporating the preferences and requirements of the people using the area (e.g., working, playing, residing) along the street(s), or at intersection(s);
- creating safe and attractive streets;
- helping to reduce the negative effects of motor vehicles on the environment (e.g., pollution, sprawl); and
- promoting pedestrian, cycle and transit use.[1]

Traffic calming objectives include:

- achieving slow speeds for motor vehicles,
- reducing collision frequency and severity,
- increasing the safety and the perception of safety for non-motorized users of the street(s),
- reducing the need for police enforcement,
- enhancing the street environment (e.g., street scaping),
- encouraging water infiltration into the ground,
- increasing access for all modes of transportation, and
- reducing cut-through motor vehicle traffic.[1]

[1]Lockwood, Ian. *ITE Traffic Calming Definition*. ITE Journal, July 1997, pg. 22.

Calming Measures
Library
Seminar Materials
Selected Reports
Public Information
Locations
Other Links

U.S. Department of Transportation
Federal Highway Administration

Institute of Transportation Engineers
1627 Eye Street, NW, Suite 600 | Washington, DC 20006 USA
Telephone: +1 202-785-0060 | Fax: +1 202-785-0609
ite_staff@ite.org

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Traffic calming

From Wikipedia, the free encyclopedia

Traffic calming consists of physical design and other measures, including narrowed roads and speed humps, put in place on roads for the intention of slowing down or reducing motor-vehicle traffic as well as to improve safety for pedestrians and cyclists. Urban planners and traffic engineers have many strategies for traffic calming. Such measures are common in Australia and Europe (especially Northern Europe), but less so in North America. Traffic calming is a calque (literal translation) of the German word *Verkehrsberuhigung* - the term's first published use in English was in 1985 by Carmen Hass-Klau.[1]

Signing indicating that a motorist is approaching traffic calming devices.

Contents

History

In its early development in the UK in the 1930s, traffic calming was based on the idea of residential areas protected from through traffic. Subsequently, it was mainly justified on the grounds of pedestrian safety and reduction of the noise and local air pollution that traffic produces. However, car traffic severely impairs the social and recreational functions that streets are now recognized to have. The *Livable Streets* study by Donald Appleyard (1981)[2] found that residents of streets with light traffic had, on average, three more friends and twice as many acquaintances as the people on streets with heavy traffic which were otherwise similar in dimensions, income, etc.

For much of the twentieth century, streets were designed by engineers who were charged only with ensuring smooth traffic flow and not with fostering the other functions of streets. The basis for traffic calming is broadening traffic engineering to include designing for these functions.

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Measures

Traffic engineers refer to three "E's" when discussing traffic calming: engineering, (community) education, and (police) enforcement. Because neighborhood traffic management studies have shown that residents often contribute to the perceived speeding problem within their neighborhoods, instructions on traffic calming (for example in Hass-Klau et al., 1992[3]) stress that the most effective traffic calming plans entail all three components—that engineering measures alone will not produce satisfactory results.

Engineering measures

Engineering measures involve physically altering the road layout or appearance to actively or passively retard traffic by increasing the cognitive load of driving. Measures include speed humps, chicanes, curb extensions, and living street and shared space type schemes. The town of Hilden in Germany has achieved a rate of 24% of trips being on two wheels, mainly via traffic calming and the use of 30 km/h or 20 mph zones.[4] In 1999, the Netherlands had over 6000 woonerven where cyclists and pedestrians have legal priority over cars and where a motorised speed limit of "walking speed" applies.[5] However, some UK and Irish "traffic calming" schemes, particularly involving road narrowings, are viewed as extremely hostile and have been implicated directly in death and injury to cyclists and pedestrians.[6][7]

A number of **visual changes** to roads are being made to many streets to cause more attentive driving, reduced speeds, reduced crashes, and a greater tendency to yield to pedestrians. Visual traffic calming includes *lane narrowings* (9-10'), *road diets* (reduction in lanes), use of trees next to streets, on-street parking, and buildings placed in urban fashion close to streets.

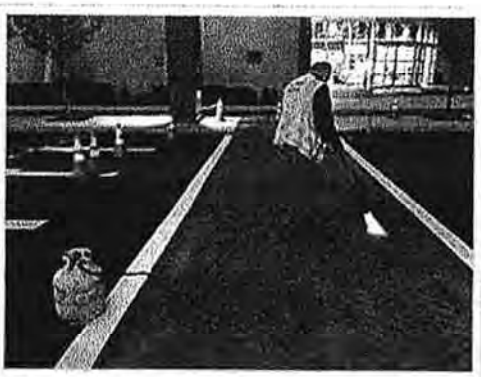
Physical devices include speed humps, speed cushions, and speed tables, sized for the desired speed. Such measures normally slow cars to between 10 and 25 miles per hour (16 and 40 km/h). Most devices are made of asphalt or concrete but rubber traffic calming products are emerging as an effective alternative with several advantages.

Traffic calming can include the following engineering measures, grouped by similarity of method:[8]

- Narrowing: Narrowing traffic lanes differs from other road treatments by making slower speeds seem more natural to drivers and less of an artificial imposition as opposed to most other treatments, which physically force lower speeds or restrict route choice. Such means include:
  - Narrower traffic lanes — streets can be narrowed by extending the sidewalk, adding bollards or planters, or adding a bike lane or on-street parking.
  - Curb extensions (also called bulbouts) that narrow the width of the roadway at pedestrian crossings
  - Chokers, which are curb extensions that narrow the roadway to a single lane at points[9]
  - Road diets: actively remove a lane from the street.
    - Allowing parking on one or both sides of a street to reduce the number of driving lanes.
  - Pedestrian refuges or small islands in the middle of the street.
  - Converting one-way streets into two-way streets.

- Vertical deflection: These include:
  - Speed bumps, sometimes split or offset in the middle to help emergency vehicles reduce delay
  - Speed humps, parabolic devices that are less aggressive than speed bumps and used on residential streets.

- Speed cushions, two or three small speed humps sitting in a line across the road that slow cars down but allows (wider) emergency vehicles to straddle them so as not to slow emergency response time.
- Speed tables, long flat-topped speed humps that slow cars more gradually than humps
- Raised pedestrian crossings, which act as speed tables, often situated at intersections.
- Changing the surface material or texture (for example, the selective use of brick or cobblestone). Changing in texture may also including changing in color to highlight to drivers that they are in a pedestrian centric zone.



Construction of polymer cement overlay to change asphalt to brick texture and color to indicate high traffic crosswalk

- Horizontal deflection, i.e. make the vehicle swerve slightly. These include:
  - Chicanes, which create a horizontal deflection that causes vehicles to slow as they would for a curve.
  - Pedestrian refuges again can provide horizontal deflection, as can curb extensions and chokers.
- Block or restrict access. Such traffic calming means include:
  - Median diverters to prevent left turns or through movements into a residential area.
  - Converting an intersection into a cul-de-sac or dead end.
  - Boom barrier, restricting through traffic to authorised vehicles only.
  - Closing of streets to create pedestrian zones.
- Other means

Quite often residents have used a variety of homemade devices ranging from faux enforcement camera signs and even faux speed cameras and including dummy police. Some Canadian communities erect flexible bollards in the middle of the street in school zones. The bollards have a sign affixed indicating a 40 km/hr speed limit.

Enforcement and education measures

Enforcement and education measures for traffic calming include:

- Reducing speed limits near institutions such as schools and hospitals (see below)
- Vehicle activated sign, signs which react with a message if they detect a vehicle exceeding a pre-determined speed.
- Watchman, traffic calming system

Speed limits

Speed reduction has traditionally been attempted by the introduction of statutory speed limits. Traffic speeds of 30 km/h (20 mph) and lower are said to be more desirable on urban roads with mixed traffic.[10] The Austrian city of Graz, which has achieved steady growth in cycling, has applied 30 km/h limits to 75% its streets since 1994.[11] Zones where speeds are set at 30 km/h (or 20 mph) are gaining popularity [12] as they are found to be effective at reducing crashes and increasing community cohesion.[13] Speed limits which are set below the speed that most motorists perceive to be reasonable for the given road require

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additional measures to improve compliance. Attempts to improve speed limit observance are usually by either education, enforcement or road engineering. "Education" can mean publicity campaigns or targeted road user training.

Speed limit enforcement techniques include: direct police action, automated systems such as speed cameras or vehicle activated signs or traffic lights triggered by traffic exceeding a preset speed threshold. One cycling expert argues for placing direct restrictions on motor-vehicle speed and acceleration performance.[14] An EU report on promoting walking and cycling specifies as one of its top measures comprehensive camera-based speed control using mainly movable equipment at unexpected spots.[15] The Netherlands has an estimated 1,500 speed/red-light camera installations and has set a target for 30 km/h limits on 70% of urban roads. The UK has more than 6,000 speed-cameras, which raised more than £100 million in fines in 2006/07.[16]

Examples around the world

Europe

Traffic calming has been successfully used for decades in cities across Europe. For example, a living street (sometimes known as home zones or by the Dutch word *woonerf*, as the concept originated in the Netherlands) towards the end of the 1960s, initially in Delft, is a street in which the needs of car drivers are secondary to the needs of users of the street as a whole; traffic calming principles are integrated into their design. From the Netherlands, application spread rapidly to Germany, starting in North-Rhine Westphalia in 1976, becoming very widespread by the early 1980s. The ideas and techniques also spread to the UK towards the end of the 1980s, and practice there was advocated by academics such as Tim Pharaoh and Carmen Hass-Klau. The guidelines published by Devon County Council (of which Tim Pharaoh was the principal author) in 1991 were particularly well received.[17]

North America

More recently, in response to growing numbers of traffic accidents and speeding problems, cities across North America have begun creating traffic calming programs to improve safety and liveability on residential streets. Many municipalities create asphalt or concrete measures, although preformed rubber products that are easier to install and consistently meet standardized requirements are becoming increasingly popular.

Reception and evaluation

A Cochrane Review of studies found that there is evidence to demonstrate the efficacy of traffic calming measures in reducing traffic-related injuries and may even reduce deaths. However, the review found that more evidence is needed to demonstrate its efficacy in low income countries.[18]

According to economic commentator and smart growth critic Randal O'Toole, the main goal of traffic calming is to increase congestion of motor traffic for the social engineering. He claims that some traffic calming measures such as reverting one way roads into two-way roads or creating "bump outs" have

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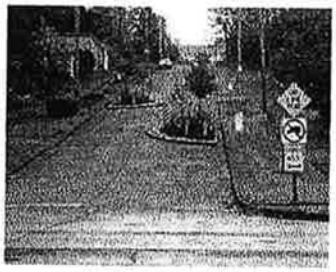
increased motor traffic congestion, resulted in more accidents and increased pedestrian fatalities.[19] According to Florida urban planner Dom Nozzi "[c]ongestion is a powerful disincentive for sprawl; sprawl that steamrolls outlying ecosystems. With congestion, the sprawl market wither."[20]

Gallery

Median island with a raised mid-block pedestrian crossing

Curb extension at a mid-block pedestrian crossing

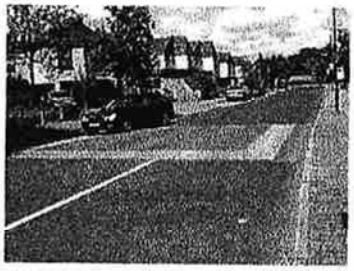


Chicane on a one-lane road

A diverter replaces a four-leg intersection with two curves, forcing motor vehicles to turn

A motorist disregards a directional closure (a two-lane roadway with one terminus converted to one-way access)

Two traffic calming measures: speed cushions (the two reddish pads in the road) and a curb extension (marked by the black posts and white stripes)



A (rather wide) speed table

Speed camera

See also

- Assured Clear Distance Ahead
- Hierarchy of roads
- Low emission zone
- Pedestrian
- Road traffic control
- Shared space
- Street hierarchy
- Sustainable transportation

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16. Gary Cleland (14 March 2008). "Speed cameras collect over £100m in fines". *The Daily Telegraph* (Telegraph Media Group). Retrieved 18 March 2008.
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19. Randal O'Toole "Gridlock" p. 32-33
20. "Congestion is our friend" Gainesville Sun, 10 February 2008. http://www.walkablestreets.com/congestionfriend.htm

External links

Media related to Traffic calming at Wikimedia Commons

- Traffic calming in an Ontario, Canada community (http://www.johnsankey.ca/calming.html)
- TrafficCalming.org Guide to Traffic Calming (US) (http://www.trafficcalming.org)

Retrieved from "https://en.wikipedia.org/w/index.php?title=Traffic_calming&oldid=718239840"

Categories: Traffic calming | Road transport | Street furniture | Transportation planning | Sustainable transport

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STAKEHOLDER # 3
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Wider, Straighter, and Faster Not the Solution for Older Drivers

By Gary Toth on Mar 6, 2012 | 8 Comments

This response to a new report from AASHTO and TRIP on safety issues for older drivers was written by Gary Toth, senior director of transportation initiatives for Project for Public Spaces, and co-signed by Congress for the New Urbanism, the WALC Institute, and Strong Towns.

The issue of safety and older drivers is an important one. And we are grateful for the way the special needs of those drivers are highlighted in a new report called "Keeping Baby Boomers Mobile: Preserving the Mobility and Safety of Older Americans." (You can download it here.) Unfortunately, the report, produced by AASHTO (the American Association of State Highway and Transportation Officials) in collaboration with TRIP, a national transportation research group representing contractors and engineering firms, continues to reinforce the "forgiving highways" orthodoxy that the transportation establishment has been promoting for too long now. (On the positive side, it also endorses a number of measures that AARP has been pressing for: better signs, retroreflective paint, brighter street lighting, etc.)

It is time for AASHTO, TRIP, and other members of that establishment to recognize the limitations of "forgiving highways" principles. This approach, which aims to reduce crashes by designing roads to accommodate driver error, might work well for interstates, freeways, and rural highways. But it should not be applied to the rest of our nation's roads. Evidence is mounting that not only does the "wider, straighter, and faster" philosophy fail to fix safety problems on urban and suburban arterials — *it actually makes them worse.* Let's consider the issue of older drivers and safety from an engineering perspective. Engineering involves the practical application of science and math to solve problems, so we'll take a closer look at the problem defined in the report and the applications suggested to address that problem.

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century.

The Federal Highway Administration (FHWA) has already demonstrated this leadership. Its office of safety has produced a website to highlight proven countermeasures. Three of the top nine recommended measures involve approaches that either slow down vehicles and/or reduce the number of conflicts. None involve the 1960s approach of making roads wider, straighter, and faster. Similar recommendations are made on the FHWA Livability website.

There are other examples of respected members of the transportation industry acting proactively in the absence of leadership by AASHTO. In the "Smart Transportation Guide," Pennsylvania and New Jersey DOTs provide guidance to their engineers on how to use design to *slow down* vehicles when appropriate for the context. The Institute of Transportation Engineers and the Congress for New Urbanism do likewise in their guide, "Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities."

It is time for AASHTO to focus attention on the mounting evidence that arterials, collectors, and distributors need different solutions than freeways. High-speed roads in built-up areas not only decrease safety, they decimate the value of adjacent places, communities, and land use (as is so well said by Chuck Marohn of Strong Towns).

To address the needs of older drivers, AASHTO should be calling for design concepts that:

- When appropriate, slow down speeds to improve the ability of drivers to properly perceive speeds, distances, and gaps. *See FHWA countermeasure for road diets and roundabouts.*
- Eliminate the weaving and merging caused by multilane roads that are over capacity for all hours except perhaps the peak hour. *See FHWA countermeasure for road diets.*
- Eliminate the conflicts caused by a wide range of speeds created by road sections allowing some drivers to pass through at high design speeds in the same cross-section where others are slowing to enter or exit the roadway. *See FHWA countermeasure for corridor access management.*
- Eliminate the Safety Problems created by left turns on arterials, collectors and distributors. *See FHWA countermeasure for roundabouts.*

Walkable Streets

MARCH 17, 2003 · 3:31 PM

Bigger Roads are Less Safe (despite what your traffic engineer says)

Dom Nozzi, AICP

In a great many cases, "improved safety" is a reason cited as a rationale for adding travel lanes to a road ("widening" a road). Indeed, because "improved safety" is a "moral high ground" argument (i.e., the argument should be accepted for ethical reasons), the safety rationale is perhaps the most common reason given for why a road "must" be widened.

In effect, public policy makers, when confronted with the "public safety" justification, are forced into an uncomfortable position when a decision must be made to widen or not widen a road: Either agree to the widening, or take a position that seems to suggest an uncaring attitude toward public safety.

It comes as no surprise that a large number of decision-makers are persuaded solely on the basis of the public safety argument.

Because road widenings are enormously expensive, speed up car traffic, and can profoundly worsen quality of life as well as accelerate strip commercial development and urban sprawl, we must be certain that road widenings do, in fact, deliver on the promise of dramatically improved safety.

The Forgiving Road

The "Forgiving Road" is a road that "forgives" a motorist when a driving mistake is made. That is, being reckless, or driving at high-speeds, or driving inattentively is not followed by the "punishment" of consequences such as crashing into something on the side of the road. For several decades, we have designed forgiving roads. We have been pulling buildings, parked cars, pedestrians, bicyclists, trees and other "obstructions" away from the sides of roads so that even an unskilled motorist can travel at high speeds without crashing into something.

The forgiving road was thought to be a way to promote "safety"(the hidden agenda, for many, was to promote high-speed travel by large volumes of car traffic).

Of course-human nature being what it is-such a design encourages reckless, high-speed, inattentive driving because human psychology compels us to tend to drive at the highest speed that still feels safe. After all, we are always "running late." We are always in a hurry. And we are so busy.

The forgiving roadway lulls us into a false sense of security. Vigilance and concentration wane on the forgiving road. Is it any wonder that today, we increasingly see motorists driving at high speeds with one hand, while putting on make-up, drinking coffee, or chatting on the cell phone with the other?

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Since we tend to be busy and in a hurry, forgiving streets deliver lots of motorists who drive as fast as they can and "multi-task" while driving. Why? To save time.

The predictable result: An increase in crashes due to speeding, inattentiveness, and recklessness.

Ironically, motorist safety declines and driving skills atrophy, because the forgiving street conditions motorists to be less careful drivers, and lowers the need to maintain or improve driving skills. Increasingly, American motorists drive dangerously, and more ineptly.

Three Lanes vs Four Lanes

Some safety analysts point out that 3-lane roads are noticeably safer than 4-lane roads, in part because, when comparing 3 lanes to 4, average vehicle speeds are reduced, there is less variability in vehicle speeds, and there is less speeding. In addition, there is a significant reduction in what engineers call "conflict" points, and an increase in "sight distance" for turning and crossing traffic on a 3-lane versus 4-lane road (Welch, undated).

This is particularly important for senior citizens who are motorists, because fewer conflict points and increased sight distances means fewer decisions and judgements have to be made to enter or cross a 3-lane road.

Similarly, a 3-lane road reduces the street-crossing distance for pedestrians. Compared to a 4-lane road, a 3-lane can create "refuge" areas where a pedestrian can safely wait until there is a safe gap in traffic before crossing the other half of the street. A refuge is also created for motorists with 3 lanes.

A review of the research on this question raises significant questions as to whether wider roads are safer roads.

Fewer Travel Lanes

A study published in 2002 (Huang, Stewart, Zegeer, 2002) reported that in Oakland CA, a street carrying 24,000 trips per day was converted from four lanes to three. The number of annual crashes went from 81 before to 68 after. On another street in Oakland was narrowed, crashes went down 52 percent. In Minnesota, a road diet resulted in a 33-percent reduction in injury crashes. In Billings MT, a road diet resulted in 62 percent fewer crashes after travel lanes were removed. In Lewistown PA, removal of travel lanes saw the number of crashes drop to almost zero. Finally, these researchers found that in Seattle WA, a number of road diets were analyzed, and a 34-percent reduction in total crashes and a 7-percent drop in injury crashes was noted.

The Surface Transportation Policy Project (1999) released a study in 1999 that found a strong link between aggressive driving deaths and increased road capacity. Those living in states with the largest number of lane miles per capita were 65 percent more likely to die in an aggressive driving crash than in states with less lane miles per capita. Similarly, those metro areas that added the most lane miles over a five-year period had higher levels of aggressive driving deaths. See their 2003 report for additional information about how big roads are less safe.

The Iowa Department of Transportation (2001) has found that converting a four-lane undivided road to three lanes can improve safety while retaining an acceptable level of service. Their review of research found that when such conversions occurred, there was a reduction in average speeds, a significant reduction in speeding, and a substantial reduction in the total number of crashes.

According to Engwicht (1989), straighter, wider roads encourage greater speed. Accidents that do happen are therefore more severe, resulting in more injuries or a greater likelihood of death.

There is a large body of research which suggests that increasing the safety of a car or road simply encourages the driver to take greater risks. Drivers are willing to take a certain amount of risk in exchange for the benefit of faster traveling time. This risk is added to the safety limits of the car or road. The new safety features lull the driver into a new sense of security. Vigilance, concentration and attentiveness wane.

Welch (Welch, undated) conducted an analysis of converting a two-lane road to a four-lane road in Ft. Madison IA. This conversion resulted in a 4 percent increase in traffic volume, a 4 percent increase in corridor travel delay, a 2.5 mph increase in mid-block 85th percentile speed, a 14 percent increase in accidents and an 88 percent increase in injuries. The report also found that traffic traveling more than 5 mph over speed limit increased from 0.5% to 4.2%.

Welch reports that in Billings MT, when a four-lane was converted to a three-lane road, the number of reported accidents decreased from 37 in the 20 months before to 14 in the 20 months after conversion. No increase in traffic delay was found.

Despite initial apprehension from the local community and its engineers, Welch indicates that a conversion from four lanes to three in Storm Lake IA (US 71) resulted in an observed improvement in safety ("an immediate large reduction in accidents"). The Iowa DOT Office of Transportation Safety has begun actively promoting conversion of four-lane roads to three-lane when a concern about safety is expressed. In Helena MT, an urban primary highway (US 12) was converted from four lanes to three. (City staff and other state staff engineers now support the conversion after observing an improvement in traffic operations and a reduction in accidents.) In a study conducted for the Minnesota DOT, it was found that the highest urban corridor accident rates are found on four-lane undivided roads. In fact, the collision rate was 35 percent higher than on urban three-lane roads. Howard Preston, who conducted the study, stated that he would convert most four-lane roads with less than 20,000 car trips per day to three-lane roads "in a heartbeat."

In Duluth MN, a conversion from four lanes to three (21st Ave East) was initially opposed by many. After conversion, the Duluth News-Tribune editorial had this to say: "When Duluth officials announced they would convert busy 21st Avenue East...from four lanes to two, with a turn lane in the middle, some armchair analysts predicted it wouldn't work. The News-Tribune Opinion page was among them. Well, it works. About everyone agrees-from city traffic officials to neighbors-that the change has eased congestion and reduced drivers' speed making it safer for pedestrians..."

Frequently, according to Welch, emergency vehicles find it difficult to travel down four-lane roads. Emergency vehicles typically need to wait for traffic to move over to the curb lane to get out of the way. But a center two-way left-turn lane usually has less vehicle conflicts, and often produces less delay for emergency vehicles traveling down it.

Hoyle (1995) points out that widened roads are alleged to be safer roads based on data provided by those in favor of many road widenings. However, data showing a decrease in crashes per vehicle mile don't take into account the fact that widened roads encourage extra car trips that would not have happened had the road not been widened. Widened roads also encourage longer trip lengths. When such factors are taken into account, crash rates per trip or per hour spent on the road remain nearly the same.

Michael Ronkin (2001) suggests that the most effective way to reduce vehicle speed is by reducing the number of road lanes. "With two lanes in each direction, regardless of width, a driver who wants to move faster than the car in front can get into the adjacent lane and pass. With one lane in each direction, the slowest car sets the pace for all cars behind it." While driving in Boston recently, he found that "lanes are narrow, very narrow, but on multi-lane one-way streets, cars zipped along at incredibly high speeds for urban streets, around 40 MPH..."

Ronkin notes a great deal of misunderstanding among pedestrian advocates about the speeds. "Pedestrians are more

threatened by the occasional car going much faster than reasonable, than by cars travelling at an average speed." On multi-lane roads, "the crossing pedestrian has several threats and challenges: the possibility of a car going faster than the rest of traffic could be invisible as it is masked by another car, its speed may not be apparent to the pedestrian. That makes it very difficult to judge adequate gaps. With one lane in each direction, a gap is a gap."

One of the most frequent types of fatal crashes "is the multiple threat-a driver stops to let pedestrian cross on a multi-lane road, and the pedestrian is struck (and usually killed) by a driver passing in the adjacent lane." Ronkin points out that this type of crash is not possible if there is no adjacent lane.

For Ronkin, another important contributor to crashes, besides speed, is the "complexity" involved in crossing a street. After analyzing a great many fatal crashes, he concludes that many of those crashes presented both the pedestrian and the driver with a relatively complex situation. According to Ronkin, "there just wasn't enough time for both parties to react to an unforeseen event." He concludes by pointing out the importance, in designing a road crossing, of creating an environment that that minimizes the number of decisions that must be made simultaneously..

In sum, Ronkin indicates that there have been "demonstrated reductions in crashes" when a road had lanes removed-convincingly so.

Narrow Lanes

Joseph R. Molinaro (1991) reports that wider travel lanes are more dangerous because they encourage higher-speed driving. Larger neighborhood collector streets work well with only 26 feet of width, and smaller neighborhood streets are safe at 20-24 feet. He also points out that residential streets should use tighter turns in order to force slower motorist speeds. With a smaller turn radius, motorists are more likely to come to a full stop than a more dangerous rolling stop.

The ITE Transportation Planning Council Committee (ITE, undated) cites the American Association of State Highway Officials, which found that "'[t]he number of accidents increases with an increase in the number of decisions required by the driver.' A corollary to this truism is that the actual and potential effects of each driver-decision become more significant as the speed of the particular motor vehicle increases."

It is quite common for engineers to design a road for the rare large truck. Such design requires large turning radii and wide travel lanes. These relatively large dimensions far exceed those of passenger cars most common on residential streets. The overscaled design of these roads encourage faster passenger car speeds by the most frequent motor vehicles on these roads.

"Clearly, reducing the width of a street," according to ITE, "has the effect of reducing vehicular speeds."

The Conservation Law Foundation (1995) finds that vehicle speeds increase when roads are widened because there is an extra "safety cushion" provided by the increased lateral distances and increased sight distances. Psychologically, the wider road tells the motorist that it is safer to speed up, and since motorists tend to drive at the fastest speed they feel safe at, faster speeds are seen on wider roads with a higher perceived "safety cushion." In addition, the field of vision of the motorist shrinks as speed increases, which reduces the ability of the motorist to see things (such as cars or pedestrians) that are ahead.

The Foundation also points out that designing for faster driving speeds, while possibly reducing the frequency of crashes, also increase the severity of car crashes.

Swift, Painter, and Goldstein (1998) conducted a study that analyzed the safest street widths with regard to accident

frequency. Their study found that "as street width widens, accidents per mile per year increases exponentially, and that the safest residential street width is 24 feet (curb face)."

Indeed, crash rates were 18 times higher on 48-foot wide streets than on 24-foot wide streets.

The authors concluded, in part, by calling for a re-evaluation of public safety. That local governments recognize that the chance of injury or death due to, say, a neighborhood fire, is quite small compared to the much higher probability of injury or death in a neighborhood due to speeding traffic. That the reduced number of injuries or deaths resulting from wide streets and allegedly faster fire truck response time is tiny in comparison to the comparatively large number of injuries or deaths that occur due to speeding cars-a problem that increases in frequency due to widened streets. The local government should "ask if it is better to reduce dozens of potential vehicle accidents, injuries and deaths [through the creation of more modest streets], or provide wide streets for no apparent benefit to fire-related injuries or deaths."

Even if more modest streets increased fire injury risks slightly (a problem not found by the study), modest streets would still be safer than wide streets because the risk of car injuries is so much higher than fire injuries.

In other words, by focusing public safety on life safety, rather than fire safety, a much larger number of community injuries and deaths can be managed and perhaps reduced.

A large number of firefighters are starting to understand that over-sized streets have resulted in streets that are not safe for families, while providing few, if any, benefits regarding fire safety and emergency response times, according to Siegman (2002).

Siegman relates a story from Dan Burden, a colleague who works in the field of safe street design:

While in Honolulu last week doing two school traffic calming charrettes our team had two tragic nights. In both cases a squad of firemen were with us for the evening, learning about and giving good input into traffic calming their neighborhoods. They had their truck with them in case they received a call. When asked by a member of the audience what they thought of the traffic calming plan the Captain said that they rarely, if ever, can expect a fire in the area....and that their concern is to lessen the speeds on area roads so that they are protecting rather than rescuing lives. They had good reason to say this ... during the evening the firemen were called out to respond to a pedestrian tragedy several blocks from our meeting room, and in our project site.

The next school traffic calming meeting we again had four firemen, and their apparatus. We had just settled them down to a design table to design traffic calming solutions when they leaped up to attend a call. They, too, came back before the meeting was over. They had provided first assistance for a head-on crash of two motorists.

The meeting ended at 9:00. At 9:05 a bicyclist was hit (and presumably attended by these firemen). The cyclist was a star athlete on the University of Honolulu campus. She was killed one block from our school, in one of our crosswalks.

"Many firefighters," according to Siegman, "realize that traffic crashes are a far greater hazard in our communities than fires, because they so often have to pick up the pieces."

Siegman reminds us that "for every one person killed in a fire, more than eleven die in traffic crashes. And that for every one person injured by fire, 148 are injured in traffic crashes."

A great many firefighters also tell us that fire truck response time does not depend simply on the width of a street.

For example, Siegman tells us that fire departments know that response time is a product of the speed of travel and the

distance from the firehouse.

When streets are walkable and connected as they were in traditionally designed neighborhoods, they "usually allow far more direct routing than disconnected cul-de-sac designs." Even when narrow (or "skinny"), the connected streets, Siegman points out, "can often deliver equal or better response times." Connected streets also reduce the probability of traffic congestion, and congestion slows response times. "That understanding," notes Siegman, "is apparently not yet reflected in fire codes, which discuss street width, but...have no specifications whatsoever on directness of routing, or distance from home to the arterial, or to the fire station."

Siegman points out that a number of other fire departments are "no longer ordering U.S.-made fire engines, choosing instead the more maneuverable European models, which work well with smaller, safer, pedestrian-friendly street designs."

According to Siegman, "we aren't yet at the stage where all firefighters have excellent training in street design and traffic safety." He wonders "how many communities still design their streets and intersections to accommodate the largest fire truck in the fleet, without having weighed pedestrian safety effects as part of the truck purchase."

In conclusion, Siegman presents us with the following eye-opening statistics for fire and traffic fatalities and injuries in 1999 in the United States. In that year, "3,570 civilian (i.e. non-firefighter)" fire deaths occurred, and 21,875 civilians were injured. In addition, 112 fire fighters died while on duty-11 of them in traffic crashes. He also reports that "41,611 people were killed and 3,236,000 people were injured in the estimated 6,279,000 police-reported motor vehicle traffic crashes. 4,188,000 crashes involved property damage only."

As reported by Finch (1994) and Preston (1995), every one mph reduction in traffic speed, in general, reduces vehicle collisions by five percent, and reduces fatalities to an even greater extent.

Narrowing travel lanes made things safer unless the narrowing was done to accommodate more travel lanes, according to a report from the Transportation Research Board (1994).

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PUBLIC SAFETY

Wider lanes make city streets more dangerous

by Angie Schmitt • May 29, 2015

The "forgiving highway" approach to traffic engineering holds that wider is safer when it comes to street design. After decades of adherence to these standards, American cities are now criss-crossed by streets with 12-foot wide lanes. As Walkable City author Jeff Speck argued in CityLab last year, this is actually terrible for public safety and the pedestrian environment.

The rate of side impact crashes is lowest on urban streets with lanes about 10.5 feet wide—much narrower than the standard 12 feet. Graph by Dewan Karim via Streetsblog.

A new study reinforces the argument that cities need to reconsider lane widths and redesign streets accordingly. In a paper to be presented at the Canadian Institute of Traffic Engineers annual conference, author Dewan Masud Karim presents hard evidence that wider lanes increase risk on city streets.

Karim conducted a wide-ranging review of existing research as well as an examination of crash databases in two cities, taking into consideration 190 randomly selected intersections in Tokyo and 70 in Toronto.

Looking at the crash databases, Karim found that collision rates escalate as lane widths exceed about 10.5 feet.

Roads with the widest lanes—12 feet or wider—were associated with greater crash rates and higher impact speeds. Karim also found that crash rates rise as lanes become narrower than about 10 feet, though this does not take impact speeds and crash severity into account. He concluded that there is a sweet spot for lane widths on city streets, between about 10 and 10.5 feet.

In Toronto, where traffic lanes are typically wider than in Tokyo, the average crash impact speed is also 34 percent higher, Karim found, suggesting that wider lanes not only result in more crashes but in more severe crashes.

The "inevitable statistical outcome" of the "wider-is-safer approach is loss of precious life, particularly by vulnerable citizens," Karim concluded.

Tags: bad streets, bike safety, bus safety, pedestrian safety, planning, public safety

Angie Schmitt is a Cleveland-based writer and activist who specializes in transportatin planning and Midwestern cities. She manages the national sustainable transportation advocacy blog, Streetblog.net. Angie is a former newspaper reporter with a masters degree in urban planning, design and development.

Comments

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1. This is noisy data, and fitting a parabola to it will *always* find a minimum. Karim could just as well have fit a linear expression, and found no "sweet spot". The scatter makes the fit questionable; without some sort of a theoretical justification, normally you *would* fit these data to a straight line. But no such justification was provided.

2. The data is not convincing enough. While it is interesting, the whole study cost around $100k, and based on that you are advocating $100B in changes in urban road design.

by tondo on May 29, 2015 1:58 pm • link • report

Also I'm not sure that reducing side impact crashes has any changes to pedestrian safety.

by charlie on May 29, 2015 2:03 pm • link • report

"Karim could just as well have fit a linear expression, and found no "sweet spot". "

Which would imply that say a 3 foot wide lane would have fewer crashes than a 10 ft wide lane. Which is absurd. Karim's interpretation makes much more sense. The point, that at some point widening the lane makes crashed more likely, is somewhat counter intutive, and is supported by the data, whether you treat it as linear or not.

2. I have never seen the cost of a study used as criterion for the study's validity. Of ocurse one ask that more studies are done before we change our road designs.

COMMENTS ARE OPINIONS AND MAY NOT BE FACTUAL

Flexible Design of New Jersey's Main Streets

prepared by the

Voorhees Transportation Policy Institute
Edward J. Bloustein School of Planning & Public Policy
Rutgers, The State University of New Jersey

for the

New Jersey Department of Transportation

Reid Ewing and Michael King

Alan M. Voorhees Transportation Center

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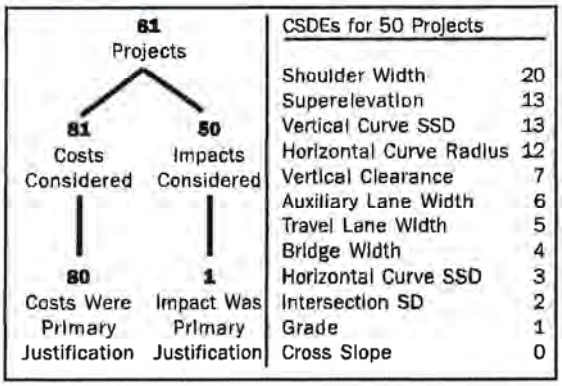

Figure 2.3: Design exceptions in New Jersey, 1997-1999.

Eighty-one design exception reports submitted between 1997 and 1999 were reviewed by the TPI study team (see Appendix A.6). This represents about one-third of all DOT construction, reconstruction, or 3R projects undertaken during the period, a sizable percentage.

Of the 81 design exception reports, 50 gave some consideration to community, historical, or environmental factors. However, other than one project involving historic preservation, land use impacts were always discussed within the context of the cost savings. Figure 2.3 shows the dominance of cost considerations.[8] It also shows that most design exceptions were for substandard design elements unlikely to be found on main streets.

DOT's current design exception policy requires an analysis of crashes and costs, and specifies how these analyses are to be conducted. Yet, when it comes to social and environmental impacts of design exceptions, the policies only encourage a discussion of such impacts "if appropriate."

The TPI study team concludes:

- Design exceptions are granted liberally in New Jersey, but almost entirely for reasons of cost saving, not "context saving." Social and environmental impacts are given short shrift.
- Most design exceptions are for controlling design elements ordinarily not a problem on main streets, such as horizontal curve radius. That such elements are so common in design exception cases, and other design elements such as lane width are so uncommon, indicates that design exceptions are either not required or not sought very often on main street projects.

The TPI study team recommends that:

- DOT's design exception format be revised to include a subsection on social, environmental, and community impacts of constructing to the standard design value vs. the proposed substandard design value; the subsection may simply state "no significant impact" for some projects, as in environment assessments (EAs).
- DOT provide guidance to its designers on the assessment of community impacts of roadway projects which will, by their nature, lead to higher traffic speeds and volumes; existing guidelines for EAs and EISs may be used for this purpose.

More Complete Analysis of Safety Impacts

It is sometimes assumed by highway designers that wider, straighter, and more open is safer. This is the underlying philosophy of the AASHTO Green Book and other highway design manuals.

The wider-straighter-more open approach to highway design is based on crash research from rural areas, where prevailing speeds are high. The National Cooperative Highway Research Program report, *Effect of Highway Standards on Safety*, summarizes the evidence on rural highway safety and, while mixed, it is compelling.[9] Urban areas are another matter. Not only are speeds lower, but

[8] Other states justify design exceptions in the same terms as New Jersey, that is, in terms of cost saving and lack of documented safety problems. TRB, op. cit., p. 83.

[9] H.W. McGee, W.E. Hughes, and K. Daily, *Effect of Highway Standards on Safety*, National Cooperative Highway Research Program Report 374, Transportation Research Board, Washington, D.C., 1995, pp. 16-37.

contexts are very different. Design options are constrained by active land uses along urban rights-of-way. These same active uses generate pedestrian and bicycle traffic, which has to be a factor in design decisions.

The wider-straighter-more open approach to design will not be safer if it leads to higher speeds and, consequently, more frequent and severe crashes. Higher speeds may also lead to more vehicle miles of travel, increasing crash exposure. There is a real question whether highway "improvements" are collectively improving highway safety.[10]

Consider the following recent urban highway safety research:

- A study presented at the 2001 Transportation Research Board Annual Meeting determined that 23 "road diet" projects, involving the reduction in cross section from four lanes to three lanes (two through lanes plus a center turn lane), reduced crash rates by 2 to 42 percent.[11]
- A study published in the ITE Journal in 2000 found that pedestrian crash rates were primarily a function of traffic speed. An increase in average speed from 20 to 30 mph was associated with 7.6 times the risk of pedestrian injury.[12]
- An analysis of 20,000 crashes in the City of Longmont, Colorado, found that two out of 13 physical characteristics of streets were statistically related to injury crashes. Crash rates increased exponentially with street width, and were higher for straight than curvilinear streets.[13]

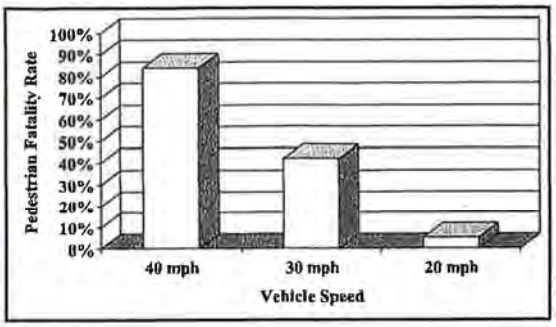

Figure 2.4: Vehicle speed vs. potential fatality rate.

Simple physics tells us that pedestrians hit by vehicles are thrown farther and the force of impact is greater the faster the speed of the vehicle. Lowering speeds from 40 to 30 mph, only 25 percent, halves the fatality risk. Between 30 and 20 mph the benefit is even greater (see Figure 2.4).

From reviews of DOT's current design exception policy and recent design exception reports, two shortcomings are evident with respect to traffic safety analysis. One is general. The other specific to urban streets.

One general shortcoming is that indicator crashes for each Controlling Substandard Design Element (CSDE) are assessed in percentage terms, relative to the total number of crashes within the project limits. Thus, unless indicator crashes are over-represented relative to other crashes on a stretch of roadway, when compared to statewide average percentages, no safety problem is detected. What if all types of crashes are significantly more common on a stretch of roadway than exposure levels would suggest? Still no problem is detected. The DOT design exception policy provides that crash analyses

[10] A study presented at the 2001 Annual Meeting of the Transportation Research Board found that, controlling for demographic changes, increased seatbelt use, and improved medical technology, highway improvements over the past 14 years had actually had a negative effect on highway safety. There were an estimated 2,000 additional fatalities, and 300,000 or more additional injuries, due to such "improvements." Increases in lane widths accounted for over half of the total increase in fatalities and about one-quarter of the increase in injuries. R. Noland, "Traffic Fatalities and Injuries: Are Reductions the Result of 'Improvements' in Highway Design Standards," paper presented at the 80th Annual Meeting, Transportation Research Board, Washington, D.C., 2001.

[11] H.F. Huang, C.V. Zegeer and J.R. Stewart, "Evaluation of Lane Reduction 'Road Diet' Measures on Crashes and Injuries," paper presented at the 80th Annual Meeting, Transportation Research Board, Washington, D.C., 2001.

[12] P. Peterson et al., "Child Pedestrian Injuries on Residential Streets: Implications for Traffic Engineering," *ITE Journal*, Feb. 2000, pp. 71-75. Also see W.A. Leaf and D.F. Preusser, *Literature Review on Vehicle Travel Speeds and Pedestrian Injuries*, National Highway Traffic Safety Administration, Washington, D.C., 1999.

[13] P. Swift and D. Painter, "Residential Street Typology and Injury Accident Frequency," pending.

should include "the overall accident rate" and "the statewide average accident rate for highways of similar cross section." The reference is to crash *rates*, not to crash *percentages*. Clearly, the intent is to compare safety across roadways of similar type. From our review of design exception reports, this policy is not being followed.

A second shortcoming is that crash analyses focus almost exclusively on motor vehicle crashes, ignoring pedestrians and bicyclists. In New Jersey, pedestrians represent 20 percent of all traffic fatalities, the fourth highest percentage in the U.S. In some urban areas, the percentage is double or triple this number. And there are 14 pedestrian injuries for every pedestrian fatality. All of this suggests that pedestrian (and bicycle) safety is a serious problem worthy of attention in highway design.[14]

Yet, in only one of 81 design exception reports reviewed were pedestrian or bicycle collisions mentioned. It is not clear why, even considering the predominance of rural and suburban projects among the roadway projects for which design exceptions were sought. Perhaps it is because vehicle-pedestrian collisions are listed among the indicator crashes for only one type of CSDE, limited sight distance. Or it may be because the threshold for a crash analysis is five accidents, and at many locations, this threshold is not reached. Given the underreporting of vehicle-pedestrian collisions unless fatalities result (35 to 80 percent underreporting by some estimates), the paucity of reported vehicle-bicycle and vehicle-pedestrian crashes may be a poor indicator of pedestrian and bicycle safety.

The TPI study team concludes:

- In the design exception process, crashes are not assessed in a manner that reflects the true safety implications of alternative designs, particularly for pedestrians and bicyclists.

The TPI study team recommends that:

- DOT require its designers to assess whether roadway projects will lead to higher traffic speeds, and hence greater crash frequency and severity.
- DOT require analyses of indicator crash rates for roadways relative to statewide averages. Pedestrian accidents should be analyzed for all main street projects, regardless of the number of such accidents or the CSDEs involved.

Pedestrian-Friendly Features as Controlling Design Elements

While DOT is paying more attention nowadays to pedestrians and bicyclists in its design practice, its design exception policies have yet to catch up. DOT's existing set of controlling design elements and minimum standards are intended largely for the convenience and safety of motorists. In certain other states, we find more balanced approaches to design exceptions (see Table 2.3). A level of care has been extended to pedestrians and bicyclists.

In most states, design speed is a controlling design element. This means that minimum design speeds for any given functional class and location can be breached by design exception. By contrast, in New Jersey's urban areas, the minimum design speed on reconstruction projects is 30 mph, 5 mph over the minimum posted speed of 25 mph. The minimum design speed on new construction projects is 35 mph, 10 mph over the minimum posted speed. These are high speeds for a pedestrian environment. The possibility of adopting lower design speeds is discussed in Section 2.5.

From other states surveyed, controlling design elements are added sometimes to give higher priority to pedestrians and cyclists. Consider the case of medians on multilane highways. While the RDM declares medians "highly desirable" on arterials with

[14] Surface Transportation Policy Project (STPP), *Mean Streets 2000: Pedestrian Safety, Health and Federal Transportation Spending*, June 2000.