WEST HARTFORD ROAD DIET AND SAFETY STUDY EXECUTIVE SUMMARY

June 2016

CRCOG CAPITOL REGION COUNCIL OF GOVERNMENTS Working together for a better region.

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ACKNOWLEDGMENTS

Thank you to the many residents, employers and institutional partners who contributed their time and insights to this effort.

The Project Team would like to acknowledge:

West Hartford Road Diet and Safety Study Technical Study Committee Members

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Mary Ellen Thibodeau, West Hartford Bicycle Advisory Committee
Una Barry, Montessori School of Greater Hartford
Tracey Wilson, Resident
Robin Rifkin, Blue Back Square
Robert McCue, West Hartford Police Department
Gary Allyn, West Hartford Fire Chief
Bob Fressola, Bishops Corner Neighborhood Association
Patrick Zapatka, CT DOT
Duane Martin, P.E., Town Engineer
Todd Dumais, Town Planner

The Project Team would like to extend a special thank you to the American School for the Deaf for hosting the public workshop. Also, thank you to the Town of West Hartford for helping to organize and host Technical Study Committee meetings.

Project Background

The West Hartford Road Diet and Safety Study was championed by Senator Beth Bye, who secured state funding to complete a safety study on North Main Street, between Albany Avenue (Route 44) and Farmington Avenue.

North Main Street serves as the connection between two main commercial nodes in town; Bishops Corner to the north, and West Hartford Center to the south, but it is safety deficient and sees many accidents. Although North Main Street has continuous sidewalks and crosswalks, the pedestrian environment is not inviting to users and does not foster a space in which people feel comfortable walking (this was noted in the online survey, during field visits and during conversations at the design workshop). Narrow landscaped buffers, poor sidewalk conditions in places, lack of roadway shoulder, and high vehicular speeds account for the perception of inadequate pedestrian amenities.

Acknowledging an opportunity to enhance the safety of the corridor, this study analyzes the feasibility of implementing a road diet on North Main Street.

What is a Road Diet?

A road diet modification is to reduce and/or narrow the number of automobile travel lanes on a roadway. One of the most common applications of a road diet is to improve the safety of four lane, roadways. In this case, the four travel lanes are reduced to three with one travel lane in each direction, and a two-way left-turn turn lane (TWLTL) in the middle. The additional space that is freed up by removing a vehicular travel lane can be converted into bicycle lanes, wider shoulders, parking lanes, or enhanced pedestrian space.

Road diets are usually successful on roads carrying fewer than 20,000 vehicles per day (VPD). If properly designed, traffic does not divert to other streets after a road diet has been installed. In fact road diets have been found to maintain (and enhance) traffic flow while reducing crashes. Road diets have even been successfully implemented on streets carrying up to 25,000 VPD, but careful evaluation is required at these traffic levels. North Main Street carries between 17,000 and 26,000 VPD placing it at the upper limits of road diet feasibility; hence the need for this study.

Typical section of a four- lane roadway

Proposed three-lane roadway section under road diet scenario

Why a Road Diet on North Main Street?

Vehicular speeding is a major concern on North Main Street. Speed observations revealed that traffic routinely exceeds 35 miles per hour (MPH), and 45 MPH over significant sections of the corridor. Observed vehicular speed is incompatible with North Main Street's residential context and discourages bicycling and walking.

In the past three years, crash records indicate that over 90 crashes per year[1] occur along North Main Street between West Hartford Center and Bishops Corner. This equates to a crash rate that is almost three times greater than similar roadways in Connecticut.[2]

Applying a Road Diet on North Main Street between north of Brace Road to approximately Haynes Road[3], will reduce the number of lanes from four to three and increase safety by...

- **Providing a center turn lane so that left turns are simpler and safer**
- **Reducing the crossing distance for pedestrians**
- **Providing an opportunity to re-purpose street space for other uses such as bicycle or pedestrian infrastructure**

Benefits of a Road Diet

Reduces frequency of crashes

Crashes can be reduced due to improved sight lines, eliminating the need to change lanes and weaving traffic around left turning vehicles.

Increases bicyclist's safety

Road diets often allow for the opportunity to install separated bike lanes with the space that had previously been used for the 4th automobile lane.

Creates a safer pedestrian environment

Pedestrians have one less lane to cross and there is an increased buffer between automobile lanes and sidewalks.

Calms traffic and helps reduce speeding

Road diets have been shown to slow vehicle speeds and decrease the frequency of people speeding, thus reducing serious crashes.

Improves neighborhood aesthetics

There may be opportunities along the roadway where landscaped medians or other treatments can be installed. A safer, more people friendly street may also increase property value.

1. Data from Connecticut Crash Data Repository taken from 2012- 2014; www.ctcrash.uconn.edu/
2. Refer to Appendix B for SLOSS calculation
3. Exact Road Diet Limits have not been determined

North Main Street Safety Issues

- High traffic volumes- average daily traffic is between 17,600 and 25,300 vehicles per day
- High speeds in excess of 35 - 45 miles per hour in some spots along the corridor
- Residential environment, many driveways and side streets
- Narrow travel lane widths without any shoulder and minimal buffer between road and sidewalks
- Crash rate is three times higher than average

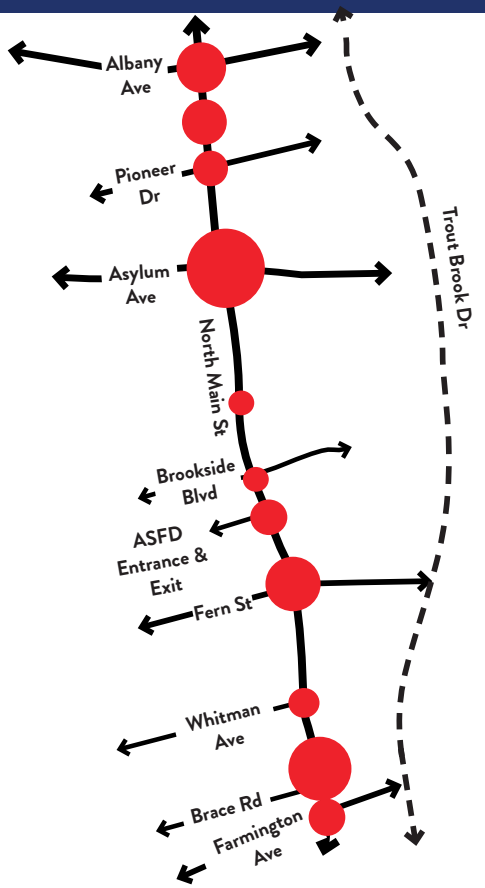
High Speeds

+

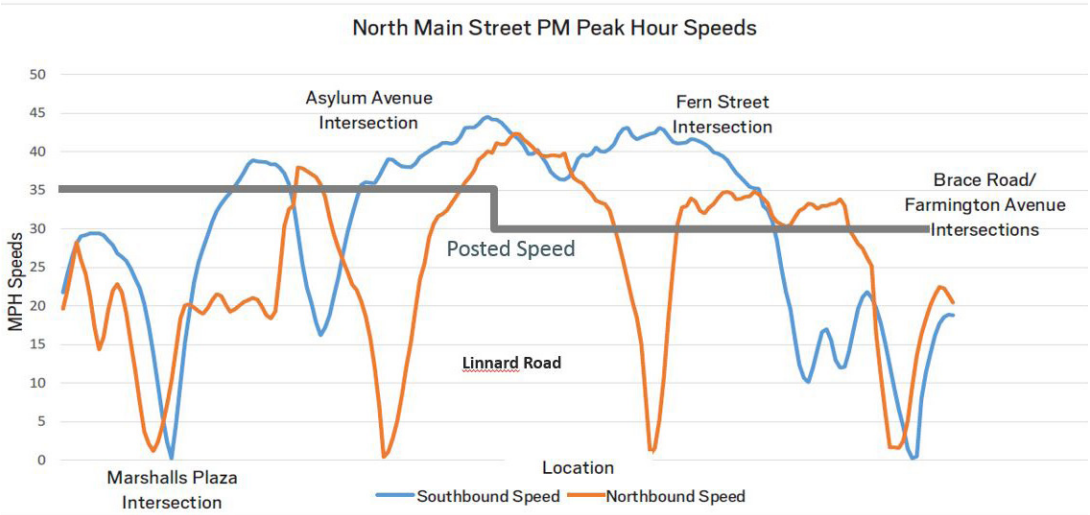
High Access

=

High Crash Frequency

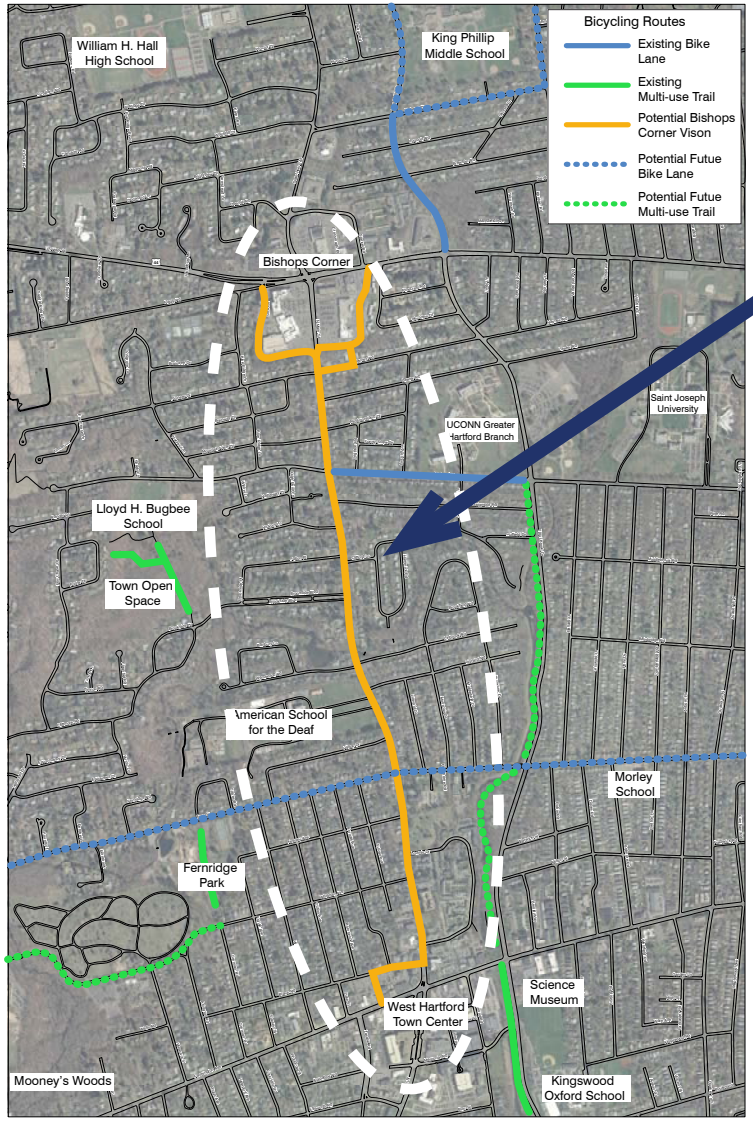


Major intersections have the greatest crash frequency



The left diagram represent speeds along North Main Street, taken at the PM peak hour, where there is the most traffic. The gray line in the middle of the diagram shows the posted speeds through the study area. As shown, actual speeds are higher than the posted speeds, despite the presence of heavy traffic volumes. This speeding contributes to unsafe conditions for all modes of travel along the corridor.

Existing Bicycle Infrastructure



Map of bicycle infrastructure in and around the North Main Street study area.

- Lack of connected bicycle network
- North Main Street could provide the "missing link", connecting the Bishops Corner area to West Hartford Center

Local Examples of Successful Road Diets

There are many local examples (Hartford) where lane reductions have been implemented and are successful. These roads, under the road diet configuration, accommodate the same traffic volumes that existed in the original four-lane configuration. Vehicular safety has been improved on these roads while also enhancing the bicycle and pedestrian environment. Please see Appendix C for case study examples of road diet configurations.

New Park Avenue (Hartford segment) road diet with two-way left turn lane and on-street parking.

Franklin Avenue road diet with two-way left turn lane, bike lane and on-street parking.

Project Approach

The Road Diet and Safety Study Planning Process

The West Hartford Road Diet and Safety Study was a six month process that began in Summer of 2015 and was completed in March 2016. The study has many components including:

- **Technical Study Committee (TSC):** the TSC acted as a steering committee that guided the process. The TSC included representatives from the Town of West Hartford, the Connecticut Department of Transportation (CTDOT), as well as West Hartford residents, property owners, and business owners.

- **Public Workshop:** the public workshop was a key instrument for engaging the public and ensuring that the study was sensitive to local concerns and interest.

- **Pop-Up Kiosks:** two Pop-Up events were conducted, one at the Bishops Corner Farmers' Market, and a second at the West Hartford Center Farmers' Market. These events consisted of interactive booths during peak activity hours designed to solicit information and receive feedback from residents, employees, and visitors to West Hartford.

- **Online Survey:** An online survey was created and made available to the public prior to the workshop. This was a method to illicit valuable feedback from the community while also promote the upcoming public workshop.

Public outreach was a vital component of this study. Emily Hultquist, CRCOG Project Manager, is shown above during one of the Pop-Up Kiosk events.

- **Postcard Mailing**: To promote the public workshop and online survey, 1,500 postcard invitations were mailed to residents in the study area.

Project Approach Continued...

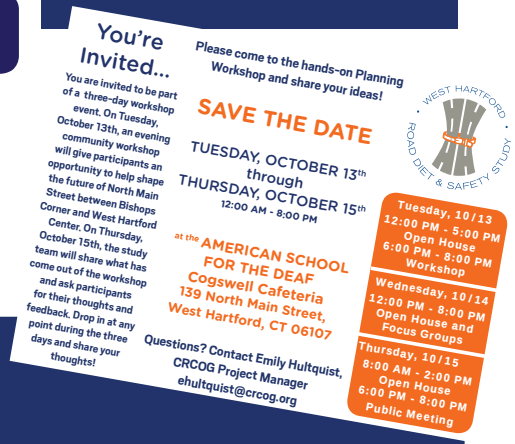
Comprehensive Review of Existing Conditions:

- Currently planned or programmed roadway improvements
- Existing traffic volumes
- Travel time data
- Crash data analysis
- Pedestrian/Bicycle network data collection
- Transit systems inventory
- Roadway geometry

- **Production of Development Scenarios:** Various scenarios were created to show road diet configuration options. Roadway improvements that serve all users (pedestrian, bicycle, transit, and auto) were developed. See Development Concepts section.

- **Recommendations and Design Guidance:** Recommendations and design guidance was provided to the Town, for consideration of adoption. These recommendations are intended to address safety deficiencies and offer reasonable opportunities to include improved bicycle and pedestrian amenities in a manner that is preferred by the community.

- **Implementation Strategy Matrix:** An implementation strategy matrix is included. This identifies a step by step process for implementing the improvements identified in the study.



The Public Workshop

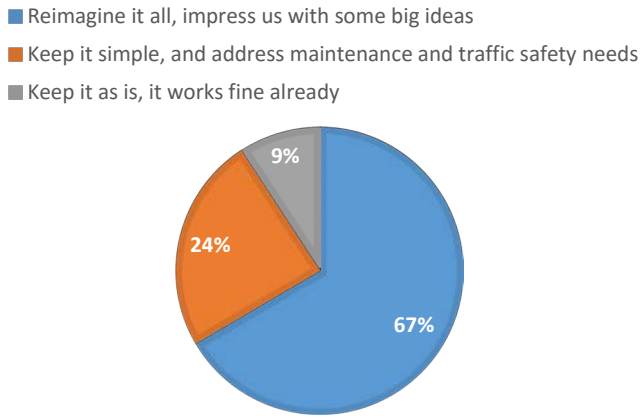
Public involvement is a key component of the planning process. As such, a three-day design workshop was held from Tuesday, October 13th to Thursday, October 15th. The public workshop featured an evening public design workshop, a Technical Study Committee meeting, open house sessions, and a public presentation of the workshop findings. All public workshop functions were held at the American School for the Deaf, located within the study corridor.

The public workshop was promoted via direct mailings to all residents and property owners living within a quarter mile of the North Main Street Study corridor. Flyers were posted at various businesses throughout Town and handed out a the pop-up kiosks events. The workshop was also promoted by email invitation through a town e-blast and distribution to various groups, including the Neighbors and Friends of West Hartford Facebook page.

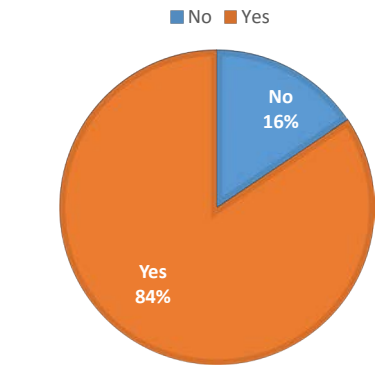
Online Survey Results

An online survey, conducted via Survey Monkey (https://www.surveymonkey.com/r/CRCOG), was made available four weeks prior to the public workshop and was held open throughout the duration of the workshop. Over 300 responses were received from residents and stakeholders in the area. Please see Appendix F for survey results.

HOW AMBITIOUS SHOULD THE PROJECT TEAM BE IN THE PLANNING AND DESIGN PROCESS?



DO YOU THINK SAFETY IS AN ISSUE ON NORTH MAIN STREET?



An overwhelming portion of survey respondents believe that safety and congestion are issues throughout the corridor.

Over half of survey respondents believe that North Main Street should serve local residents and businesses equally.

The majority (about 67 percent) felt the study team should re-imagine North Main Street, and impress them with some big ideas regarding the planning and design process.

Public Workshop Discussion

A public workshop was conducted on the evening of October 13th, 2015 and was attended by more than thirty stakeholders, including residents, property owners, and business owners. The workshop was a key feature of the three-day event and was held at the American School for the Deaf, located in the study corridor.

The workshop was comprised of a presentation about the project and study area and included an interactive survey. The survey was followed by a break-out session made up of several groups of four to eight people. Each group conducted an exercise discussing and noting strengths, issues, and ideas for North Main Street, between Bishops Corner and West Hartford Center. Each discussion was documented on study area maps and flip charts. Upon completion of the exercise, each group reported back on their discussion. An overwhelming proportion of participants were in favor of improvements to North Main Street. The key findings are listed at right.

Break-out discussion session with local residents during the public workshop.

Strengths

- Very direct route- good access to destinations throughout town, great location
- Seems to work “as is”
- Sidewalk in the northbound direction is ok
- Residential character, very scenic and well lit at night
- Sidewalks and crosswalk throughout
- Traffic moves well when there are no accidents
- Good bus service

Issues

- Narrow lanes feel unsafe
- Sidewalks are not wide enough
- Cars speeding, aggressive drivers
- Lots of blind spots, no room for error
- No shoulder, no buffer (green strip) for protection
- Kids are not safe walking or biking, unsafe for student bike/ped travel
- Very few mid-block crossings
- Auto orientation of Bishops Corner
- No local alternative north-south route for bicyclists
- Businesses are difficult to access and it is also difficult to get out of driveways, aprons are too narrow

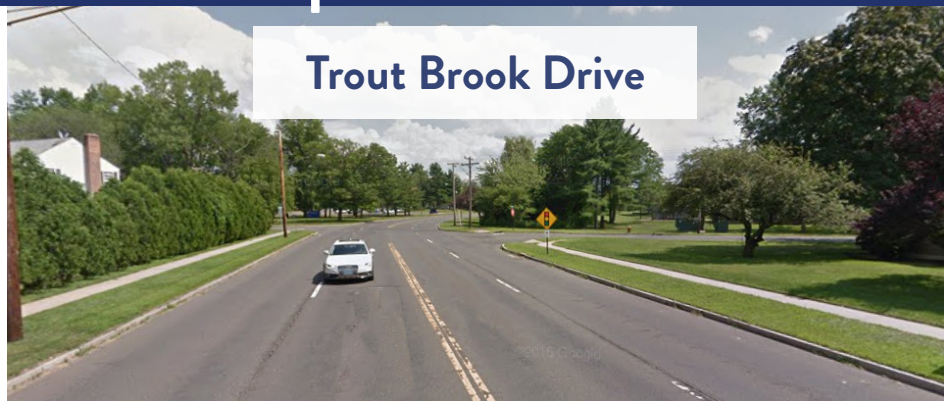
Ideas

- Make the road safe for all users
- Reroute traffic onto Troutbrook Drive if possible, put up signage at Albany Avenue and send traffic down that way
- Reduce speeds and shrink the road to three lanes
- Created buffers for bikes and pedestrians
- Town should encourage bike/ped/transit travel- make it a policy goal and implement it

Corridor Conditions

Roadway Conditions -
North Main Street/ Trout Brook Drive Comparison

Google Earth street-view section of North Main Street

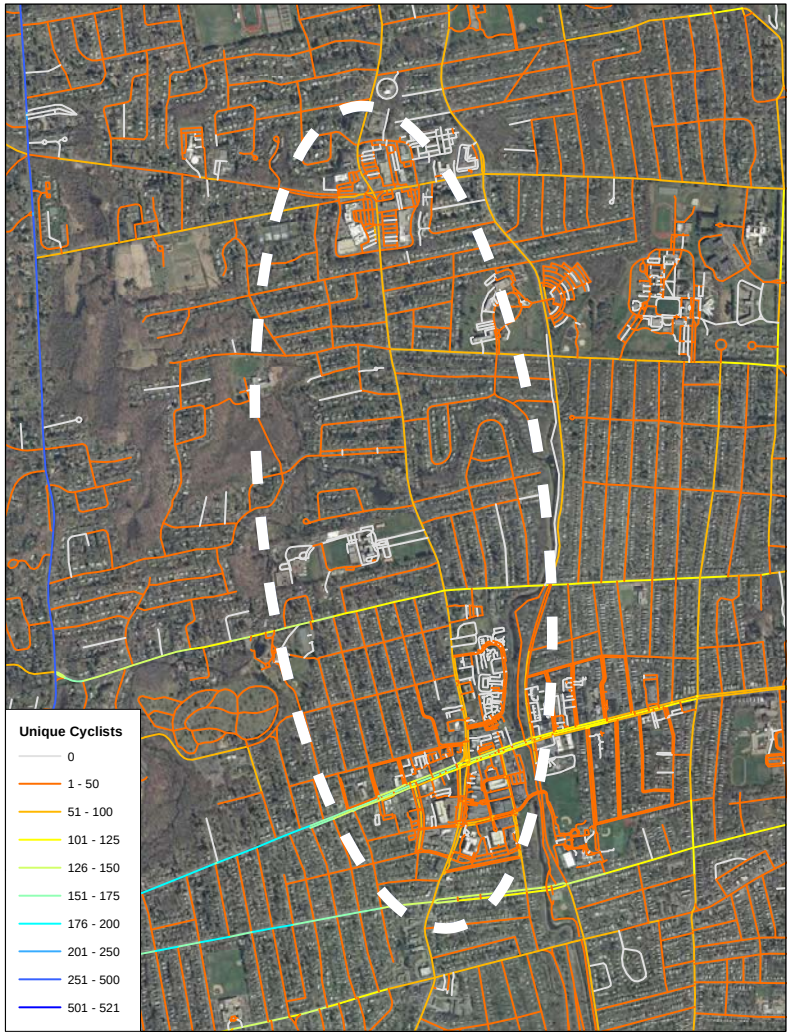


Google Earth street-view sections of Trout Brook Drive

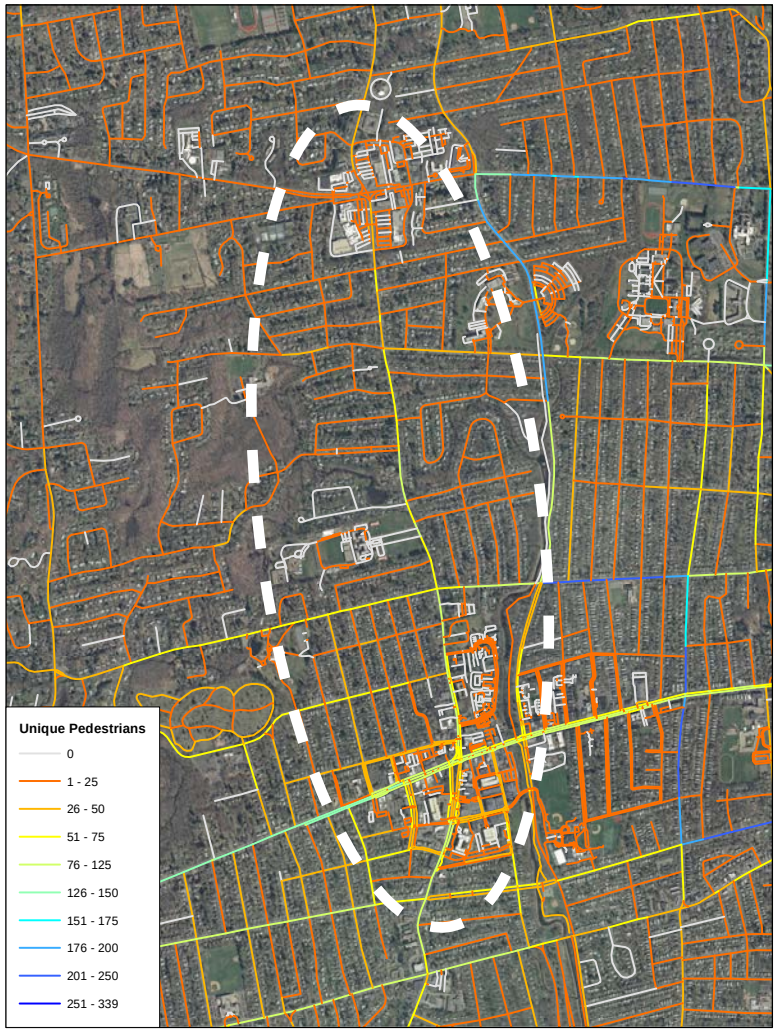
- Classified as a principal arterial
- Four, 10’ lanes
- 109 driveways, 26 intersecting streets causing conflicts with cars, bicyclists, and pedestrians
- Average daily traffic (ADT) is 15,200 vehicles per day (2012 counts- just north of Brace Road)
- 270 crashes on North Main Street between 2012 - 2014

- Classified as a minor arterial
- Four, 12’ lanes
- 80 driveways, 14 intersecting streets
- Average daily traffic (ADT) is 17,300 vehicles per day (2012 counts- south of Milton Street)
- 122 Crashes on Trout Brook Drive between 2012 - 2014

Non-motorized Roadway Users



Bicyclists



Pedestrians

Despite the conditions on North Main Street, bicyclists and pedestrians are still using the street as a travel route. According to 2015 Strava data, between 51 - 100 unique bicycle riders traveled on North Main Street in 2015 and 51- 75 unique pedestrian users were logged. Strava is a mobile application and website used to track athletic activity via GPS. Notably, this data only records those trips taken by users logged into Strava, so it is assumed that there are additional unique trips by users who do not use the Strava application.

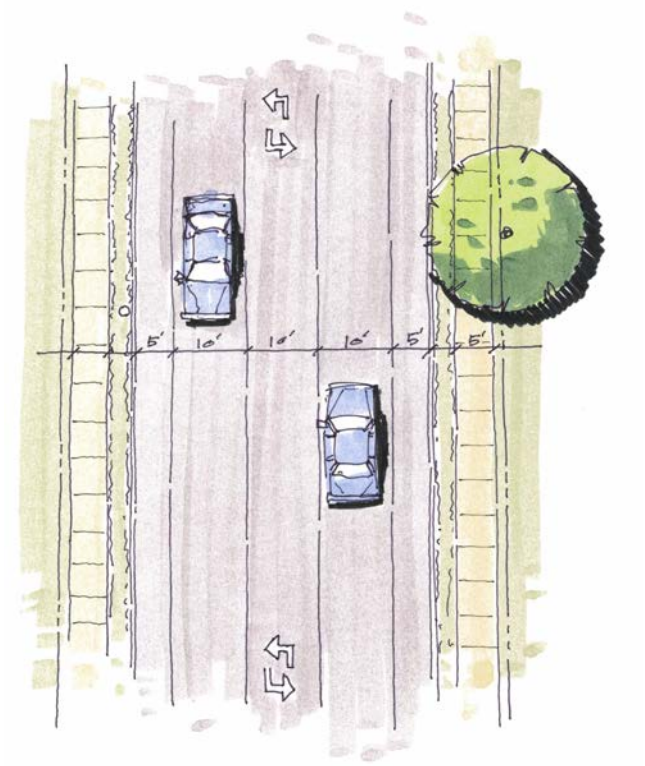
Sources

Strava Open Street Map, data for bicylists and pedestrians

Development Concepts

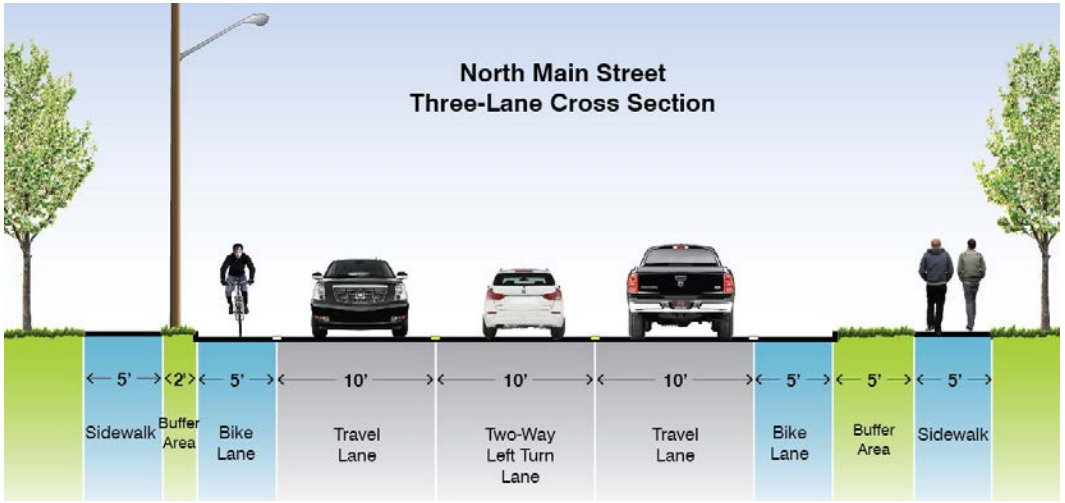
Concept 1:

Road Diet -Two-way left turn lane with 5’ shoulder/bike lane



Proposed site plan of road diet with 5’ bike lanes

This concept reduces the four-lane road down to a three-lane cross section with a two-way left turn lane. The additional ten feet gained by the lane reduction would then be converted to a five foot shoulder or bike lane on both the east and west sides of North Main Street.



Proposed cross section of Concept 1

Rendering of Concept 1 - road diet and five-foot shoulder option

Benefits of Concept 1:

Reduces frequency of crashes
Crashes can be reduced due to improved sight lines and eliminating the need to change lanes to get around left turning vehicles.

Improved bicycling environment for cyclists
Experienced cyclist will gain a five foot shoulder on each side of North Main Street, where currently there is no shoulder/ bike lane.

Better pedestrian environment
Pedestrians will gain an additional five foot buffer and shorter crossing distances on each side of North Main Street where the shoulder/ bike lane will be installed.

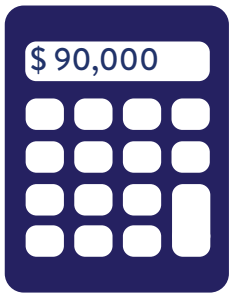
Slower traffic speeds
Cars will travel slower throughout the corridor if there is a shoulder on both sides, marked as a bike lane.

Driveway access
Easier ingress/egress at most driveways.

Potential drawbacks

- On road bike lanes may not be suitable for less experienced bicyclists
- Additional delay at signalized intersections is expected if traffic does not divert or signal timing are not modified
- Increased vehicular queuing could result in air quality hot spots

Cost



Concept 1 is the least expensive option because it essentially requires only the re-striping of lanes on North Main Street.

This cost includes modifications to traffic signals at Fern Street and Asylum Avenue.

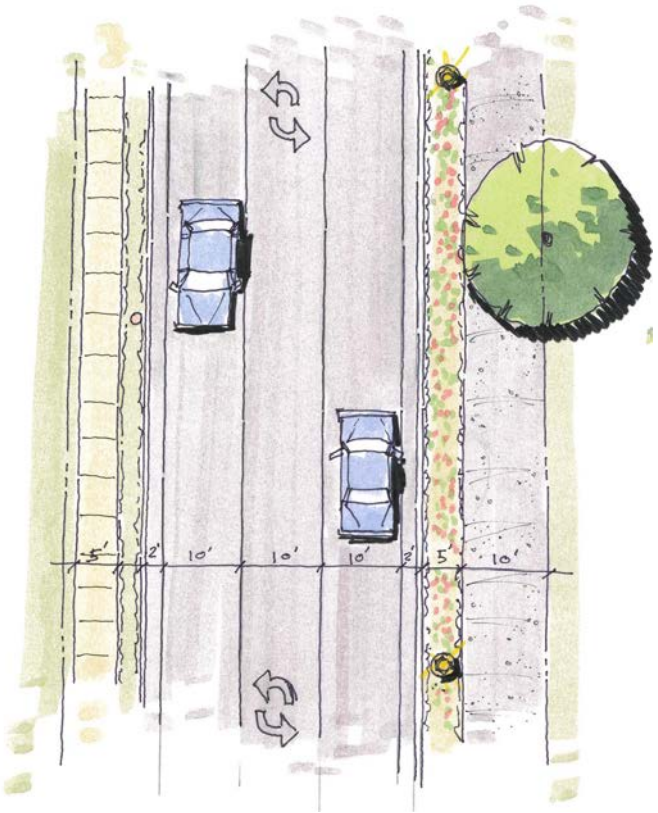
Timeline

SHORT-TERM

Concept 1 would be the quickest option to implement due to lack of complexity or construction elements.

Concept 2:

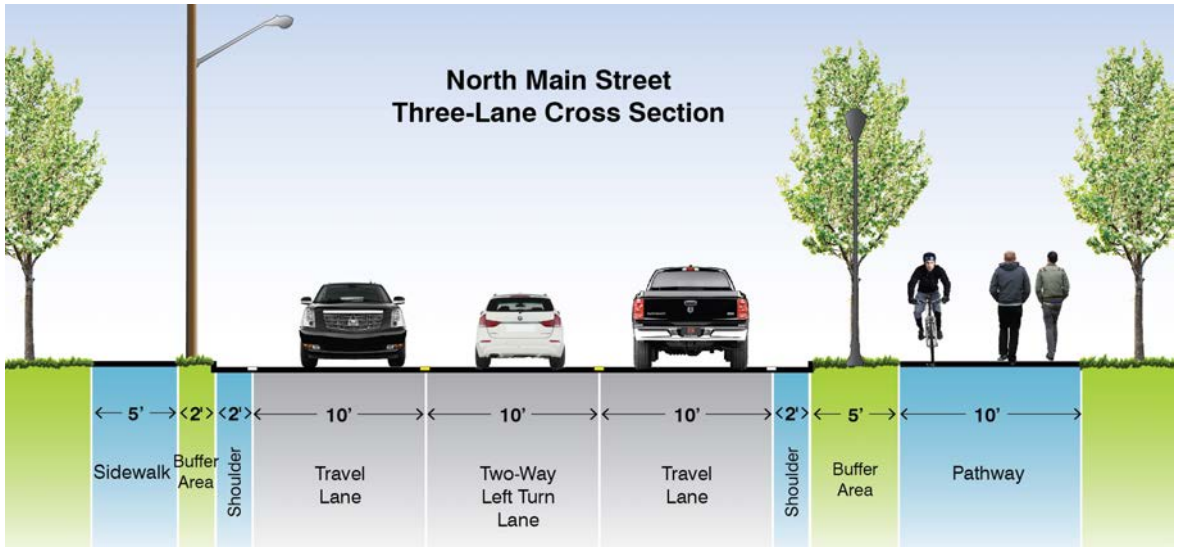
Road Diet with side path



Proposed site plan of road diet with side path concept

Like Concept 1, this concept applies the road diet to North Main Street, eliminating one lane of travel. The additional ten feet gained by the lane reduction would then be converted to multi-use side path on the eastern side, (northbound direction) of North Main Street.

Rendering of Concept 2 - road diet and side path option



Proposed cross section of Concept 2

Benefits of Concept 2:

Improved bicycling environment for riders of all levels
The side path separates cyclists from motorized traffic, and will enable riders of all levels to comfortably travel on North Main Street. Experienced riders can continue to ride in the street as they currently do.

Better pedestrian environment
Pedestrians will gain a wider sidewalk on the east side of North Main Street. That, paired with the two foot shoulder added on both sides of the street should increase the safety and comfort of walking along North Main Street.

Improves neighborhood aesthetics and increases property values
The side path option will enhance the character of the neighborhood and features like these have been shown to raise property values.

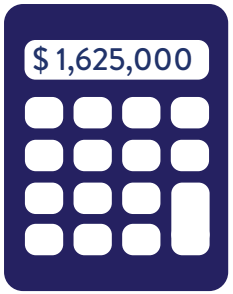
Slower traffic speeds
Cars will travel slower throughout the corridor if there is a side path.

Driveway access
Easier ingress/egress at most driveways.

Potential drawbacks

- Side path may potentially increase risk of crashes at intersections because motorists may fail to look in both direction for oncoming bicyclists
- Numerous driveways are conflict points for cyclists
- Additional delay at signalized intersections is expected if traffic does not divert or signal systems are not modified
- Increased vehicular queuing could result in air quality hot spots
- Addtional maintenance required by either property owner or the Town of West Hartford Public Works Department

Cost



The side path option is the most expensive option due to:

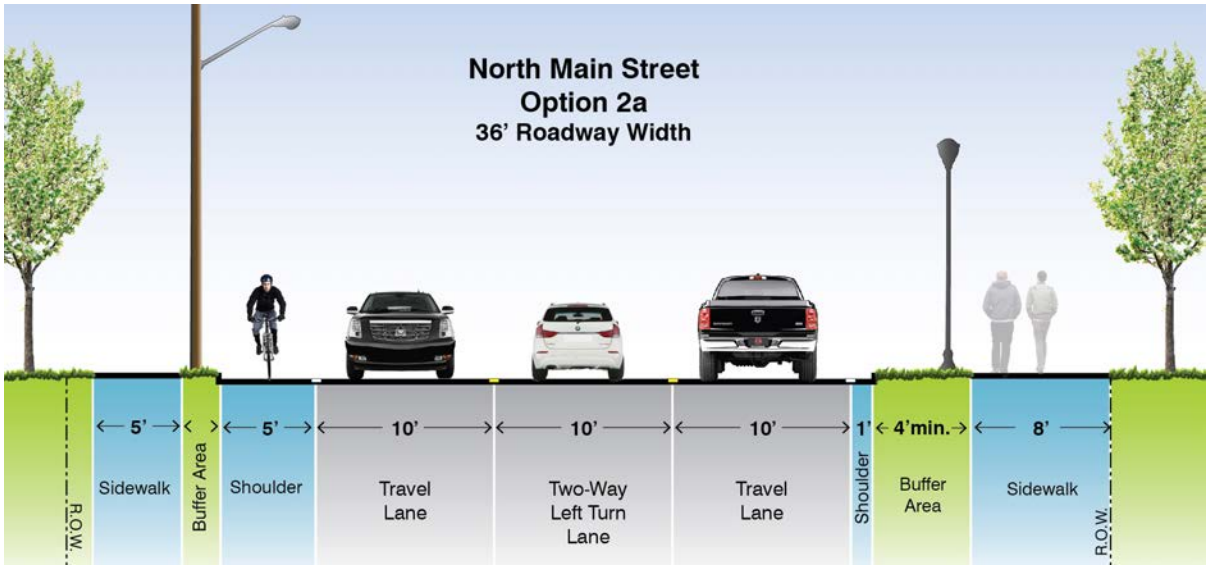
- Bituminous pathway construction
- Relocation of curbs
- New driveway aprons
- Tree planting
- Crosswalk markings
- Utility impacts

Timeline

Concept 2 has a mid-term time frame because it would require construction as well as impacts to utilities and residential driveway aprons.

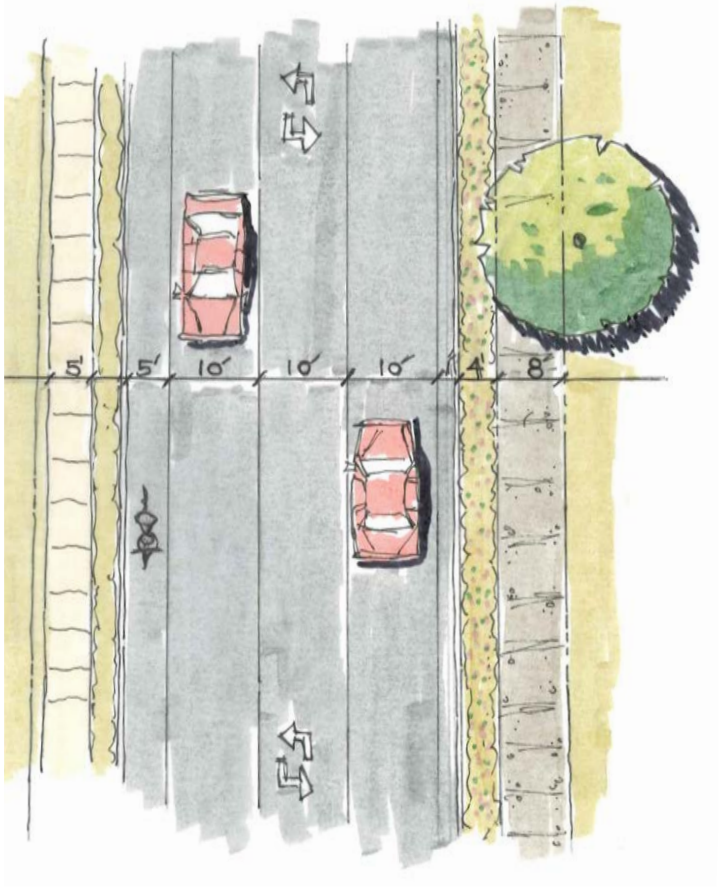
Concept 3a:

Southbound shoulder with east side extended sidewalk



Proposed cross section of Concept 3a

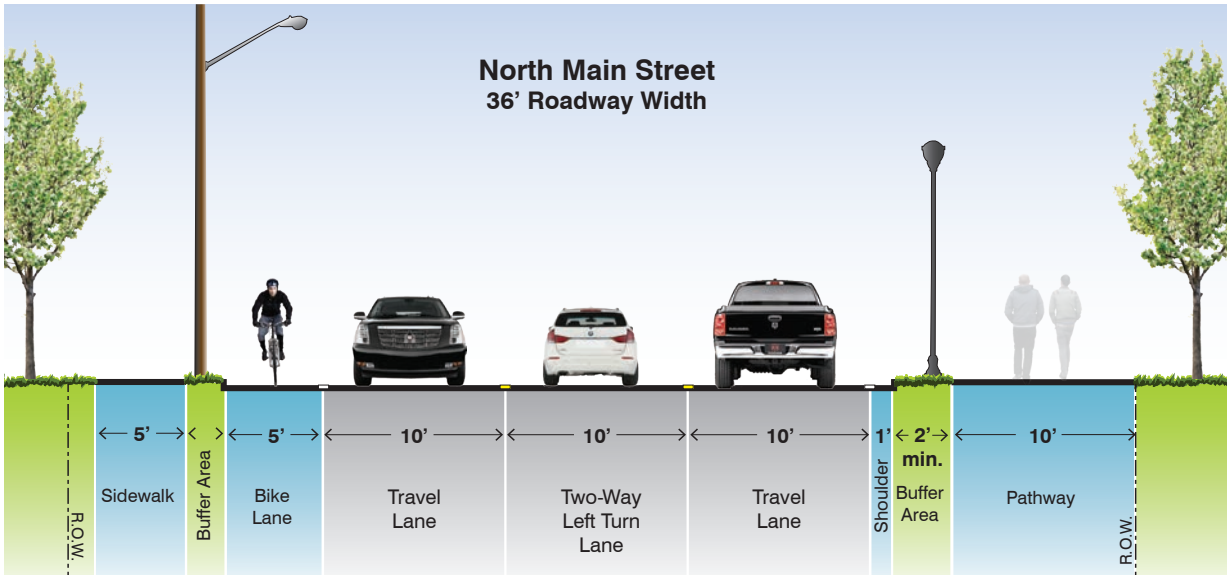
This concept widens the sidewalk on the east side of North Main Street for pedestrian use. It also provides a five foot shoulder on the west side of North Main Street so cyclists traveling in the southbound direction could use this option. This shoulder would also provide a buffer for the sidewalk on the west side of the street.



Proposed site plan of Concept 3a

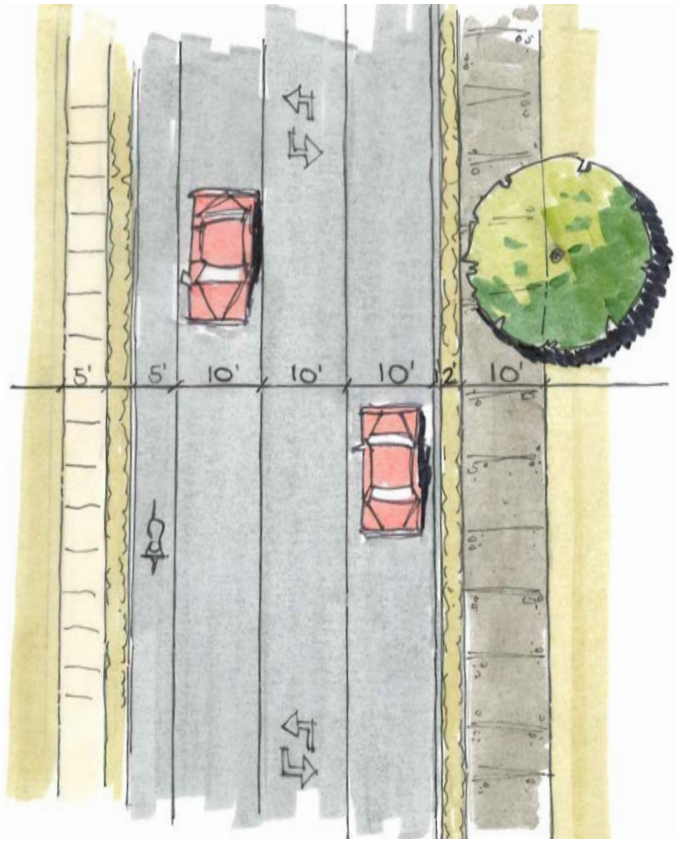
Concept 3b:

Southbound shoulder with east side extended sidewalk



Proposed cross section of Concept 3b

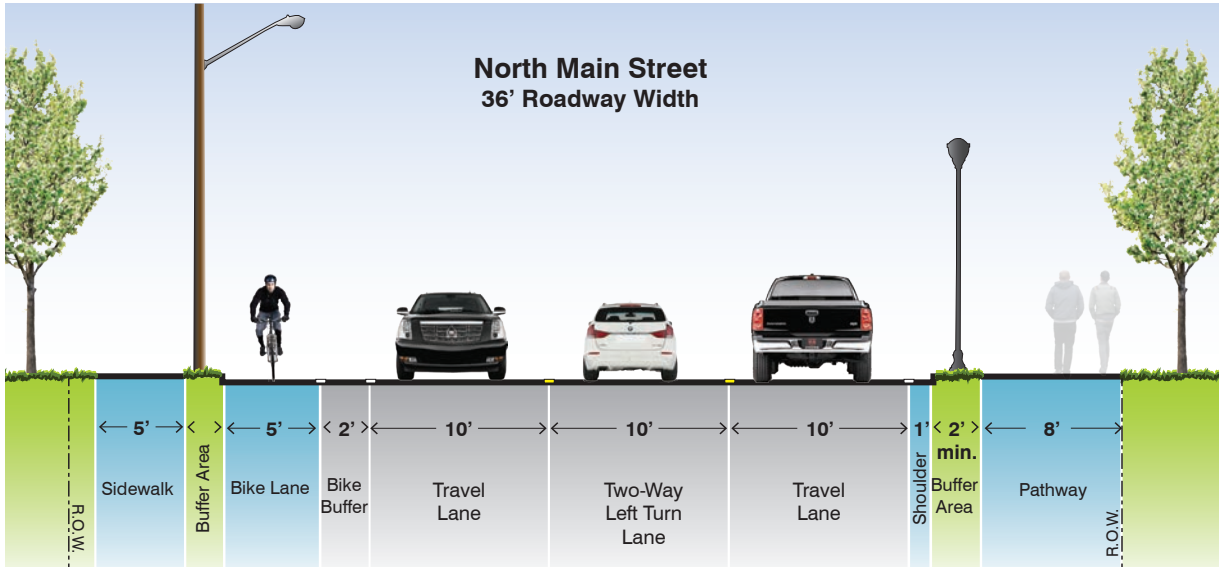
This concept widens the sidewalk on the east side of North Main Street, creating a ten foot pathway that could be used by both pedestrians and cyclists riding northbound. A five foot bike lane added on the west side of North Main Street would accommodate cyclists riding in the southbound direction. To accommodate the ten foot pathway, the buffer area on the east side of North Main Street has been reduced to two feet.



Proposed site plan of Concept 3b

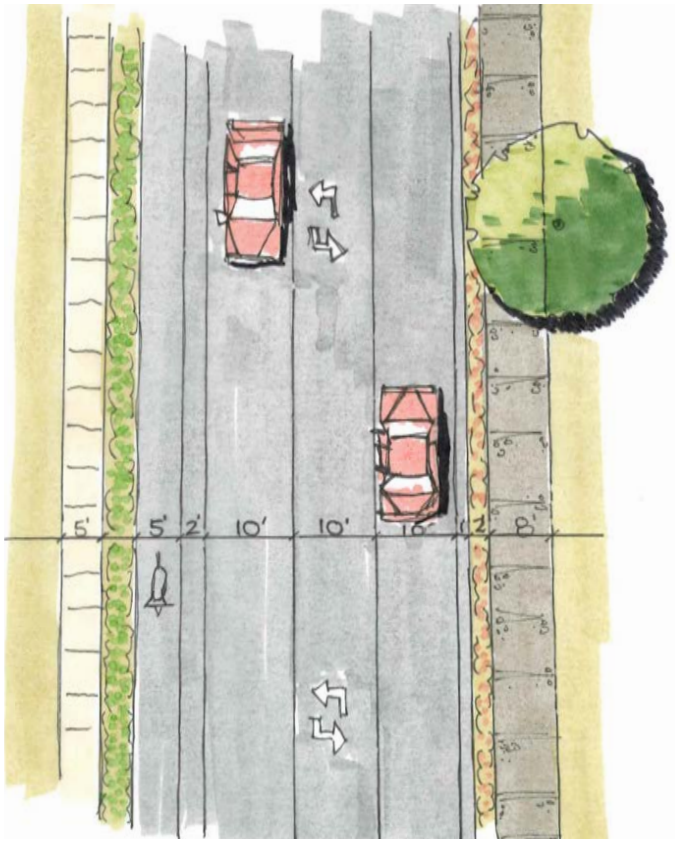
Concept 3c:

Southbound shoulder with northbound extended sidewalk



Proposed cross section of Concept 3c

Concept 3c extends upon Concept 3a, by adding in a two foot bike buffer adjacent to the bike lane on the west side of North Main Street. This will provide added protection to the bike lane, while also creating an additional buffer for those pedestrians using the sidewalk on the west side of North Main Street. The sidewalk on the east side of the street would be reduced from 10' to 8'.



Proposed site plan of Concept 3c

Benefits of Concept 3 abc:

Improved bicycling environment for riders of all levels
The side path would potentially enable riders of different levels to comfortably travel on North Main Street. Experienced riders can continue to ride in the street as they currently do, both northbound and in the southbound bicycle lane. Concept 3b also provides an additional bike lane buffer.

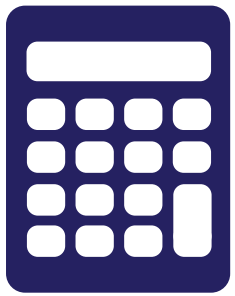
Better pedestrian environment
Pedestrians will gain a wider sidewalk on the east side of North Main Street. Additionally, the bike lane on west side of the street with provide an added buffer against traffic and will increase the safety and comfort of walking along North Main Street.

Enhance the neighborhood environment
The pathway or extended sidewalk provided in the various Concept 3 options will add character to the neighborhood while also creating a safer environment for all users. Like a boulevard or planted center median, the pathway is something that would distinguish the North Main Street neighborhood from other streets in town, and potentially increase property value.

Potential drawbacks

- Having one on-street (southbound) and one off-street (Northbound) facility may be confusing to cyclists and motorists
- Inexperienced riders may choose to ride on the wide sidewalk in both directions, which could be less safe at intersections
- Increased vehicular queuing could result in air quality hot spots

Cost



3a - $2,100,000 for 8’ wide concrete sidewalk

3b - $ 1,625,000 for 10’ wide bituminous pathway

3c - $ 1,350,000 for 8’ bituminous pathway

Timeline

Concept 4:
Bishops Corner Vision

Given the heavy traffic volume, high conflict driveways, and bicycle unfriendly intersection with Albany Avenue, alternative solutions for connecting to Bishops Corner were developed.

The first option creates a circumferential bicycle path around the outer edges of the shopping center parking areas.

The second option explores a longer-term solution involving a reconfiguration of building scale and orientation that would transform Bishops Corner into a more multi-modal, human-scale environment. A network of primary and secondary streets would distribute traffic more uniformly and take pressure off of North Main Street and the Albany Avenue intersection, providing safer conditions for walking and cycling.

Images clockwise from top left; aerial of Bishops Corner with proposed bicycling path, human scale shopping environment at Blue Back Square in West Hartford, Shops at Canton shopping center with pedestrian amenities like lighting and benches

$400,000 for 10' wide bituminous pathways

Near-term

Diana Road, off of Haynes Road is a small dead-end road that provides an opportunity to connect up through parking lots in Bishops Corner and out onto Albany Avenue.

Long-term

Concept 4:

Connection to West Hartford Center

In Concept 4, there is the potential to connect the bicycle path through West Hartford Center to Farmington Avenue, if the route connects off of Sylvan Avenue and goes off-road behind the properties.

This path would cross over Brace Road and connect to Farmington Avenue via the existing town parking lot on Brace Road.

$130,000 for 10' wide bituminous pathway

Rendering of potential off-road bicycle path parallel to North Main Street, from Farmington Avenue to Sylvan Avenue.

View of Sylvan Avenue, where bicycle path would veer off of North Main Street and begin an off-road route

View of Farmington Avenue, where potential bicycle path could exit

Benefits of Concept 4:

Provides a safer pedestrian environment
Safer pedestrian access in an around shopping areas when development is geared to a more human scale, that emphasizes pedestrian needs while also providing parking in strategic locations.

Reduce excessive traffic speeds while maintaining traffic flow
Traffic flow is maintained and access management techniques are implemented to aid in entrances and exiting maneuvers.

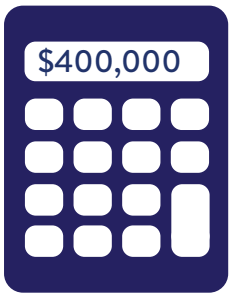
Neighborhood and community aesthetics
The appearance of big box stores and large parking lots are reduced because development is moved closer to the street and parking lots are tucked behind the buildings.

Improved bicycling environment with connection to shopping destination
The ring road bicycle trail will provide cycling access to the shopping center and will safely bring users around the intersection of North Main Street and Albany Avenue.

Potential drawbacks

- Partially property takings will be required, which may make this concept impractical

Cost



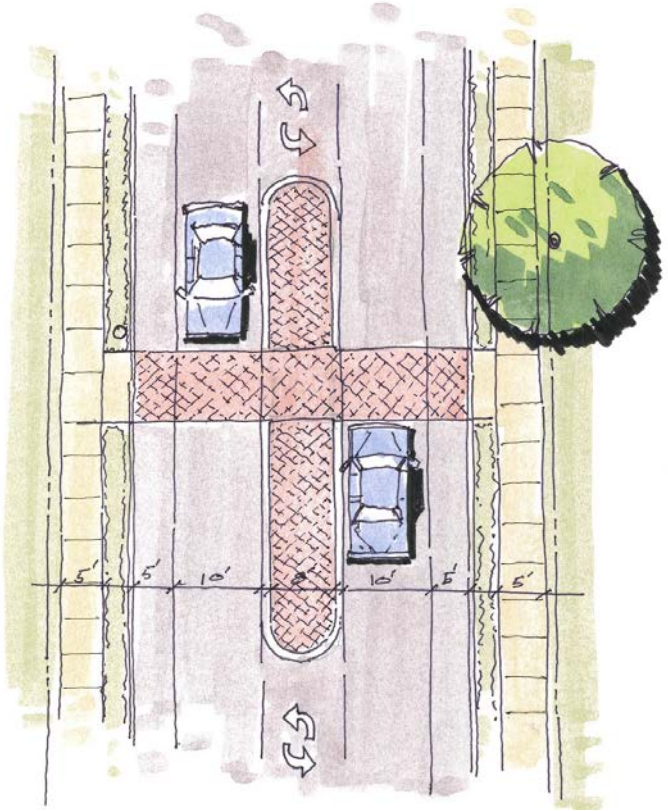
The near-term vision component would require about $530,000 to add a loop bicycle path around the outside of the Bishops Corner parking lots and the pathway connection to West Hartford Center.

This would be an option that could be implemented in a very short time-frame.

Near-term Vision Timeline

Long-term Vision Timeline

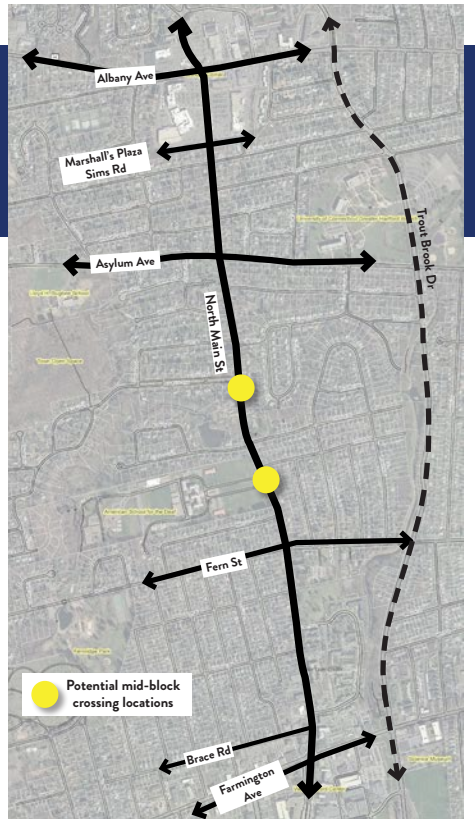
Road Diet Add-on Concept 1:
Mid-block Crossing Opportunity



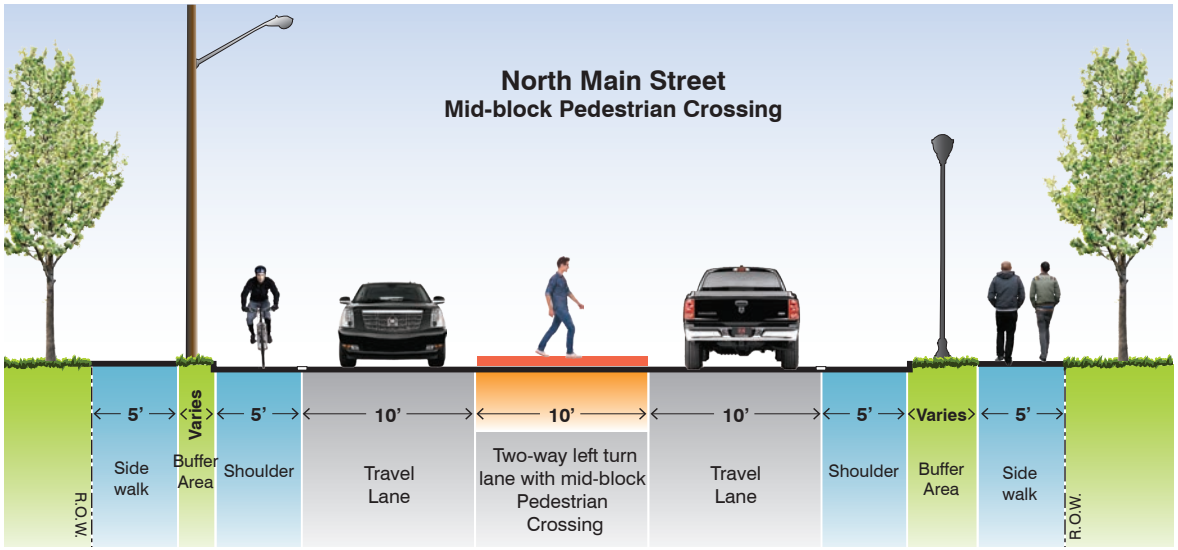
Proposed site plan of mid-block crossing

This add-on concept explores different crossing options for bicycle and pedestrian users. The center median crossing would be strategically placed at various points along North Main Street to aid in crossings.

Source: National Center for Safe Routes to School; http://saferoutesinfo.org



Potential locations along the corridor for mid-block crossings



Proposed cross section of Add-on 1

Benefits of Add-on Concept 1:

Aid in traffic calming
Pedestrian crossing medians and bump outs help to calm traffic and would aid in slowing vehicle speeds along North Main Street.

Safer pedestrian environment
Pedestrians will gain crossing opportunities at strategic locations along North Main Street. These crossing medians will increase the safety of the pedestrian environment.

Potential drawbacks

- Mid-block crossings may need additional traffic control devices, such as a Pedestrian Hybrid Beacon (PHB) or a Rectangular Rapid Flash Beacon (RRFB) - see below for image of RRFB
- Potential blocking of emergency vehicles

Cost

$ 40,000

Median crossings would cost an anticipated $40,000 dollars (on-top of original road diet cost) and would be an additional traffic calming element to the road diet.

Timeline

SHORT-TERM

Add-on Concept 1 would have a short- term time from and could be completed after the road diet was implemented.

Road Diet Add-on Concept 2:

Roundabout at the American School for the Deaf Entrance/exit

Google Street view image of American School for the Deaf entrance

Existing driveway entrance and exit to the American School for the Deaf

This add-on concept looks at the possibility of installing a roundabout at the entrance to the American School for the Deaf. This would slow traffic on North Main Street while also providing safer access to the school driveway.

Potential modern roundabout at the American School for the Deaf

Benefits of Add-on Concept 2:

Reduce frequency and severity of crashes
Up to 80% reduction in injury crashes and 40% reduction in all crashes when intersections are converted to roundabouts.[1]

Reduce excessive traffic speeds while maintaining traffic flow
Designed properly, a roundabout reduces speeds and can be implemented as part of a broader traffic calming scheme. The low-speed environment also enhances the intersection for non-motorized users.

Provide an attractive gateway feature to the neighborhood
Roundabouts provide opportunities for landscape and aesthetic improvements that can enhance and define corridors, neighborhoods, and tourism.

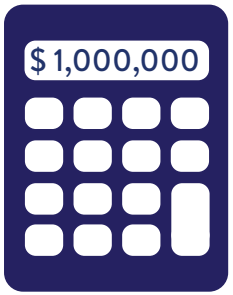
Reduce traffic delays, increase traffic capacity
Roundabouts can result in approximately 90% reduction in traffic delays.[1]

Provide opportunities to make U-turns
Easier turnarounds could be made

Potential drawbacks

- Would require private property to construct
- Design would need to relocated/reconfigure a few residential driveways

Cost



Installing a roundabout would cost an anticipated $800,000 to $1,000,000 dollars (on-top of original road diet cost). It would also require the consent and sale of property from the American School for the Deaf.

Timeline

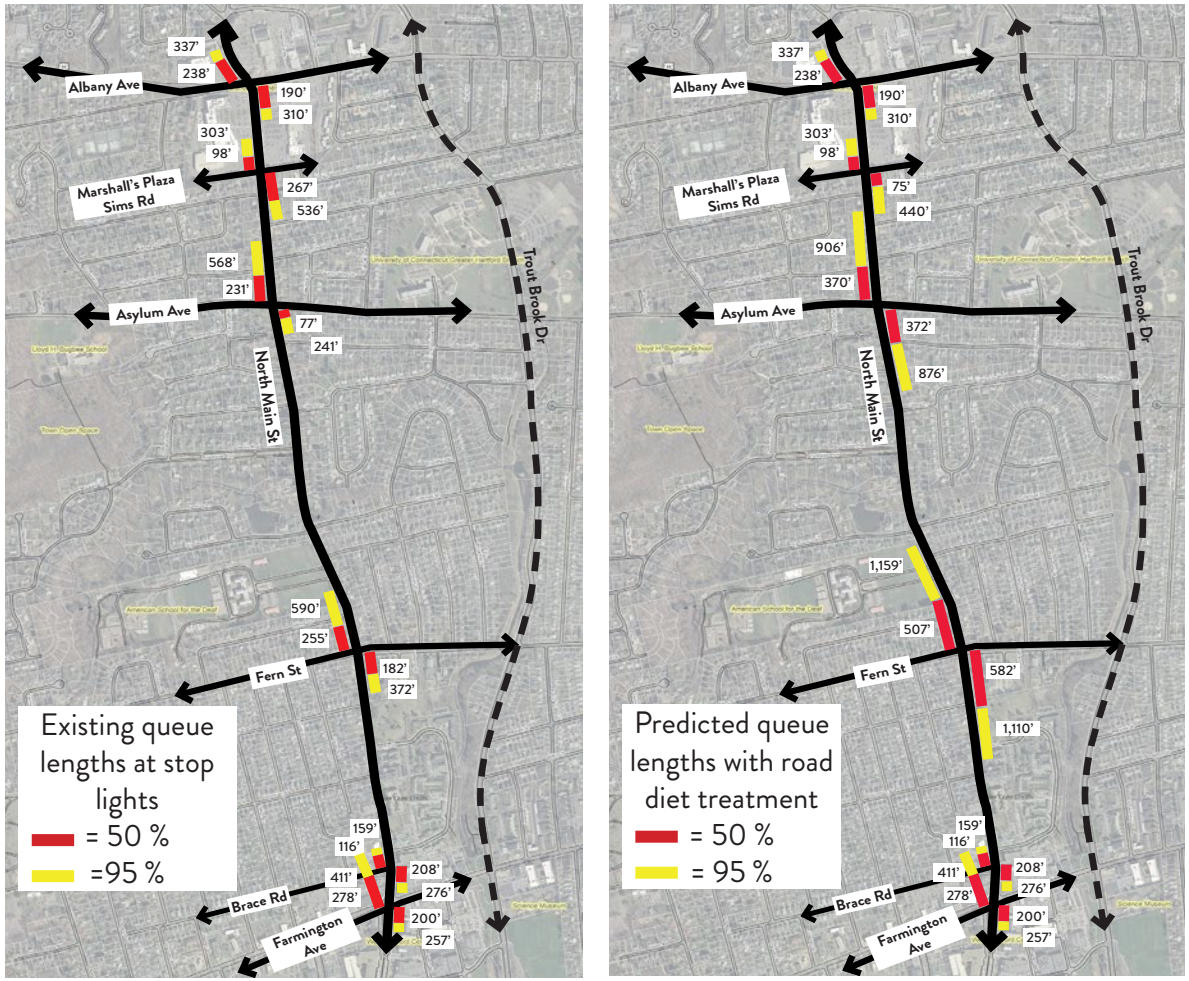
Add-on Concept 2 would be a long-term project, probably completed years after the road diet was implemented.

Sources

1. NCHRP Program Report 672-Roundabouts: An Informational Guide Second Edition, FHWA: http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_672.pdf

Analysis Results

Potential Traffic Impacts of a Road Diet



Existing and predicted average and 95th percentile queue length diagrams for North Main Street

- **Potential for longer queue lengths when stopped at traffic lights**

  Due to lane reduction, when stopped at traffic lights, vehicle queue lengths will increase because of the consolidated traffic volumes.

- **Marginal increase in travel time through the road diet corridor**

  Time it takes to traverse North Main Street would increase slightly (around 44 seconds) under the road diet scenario.

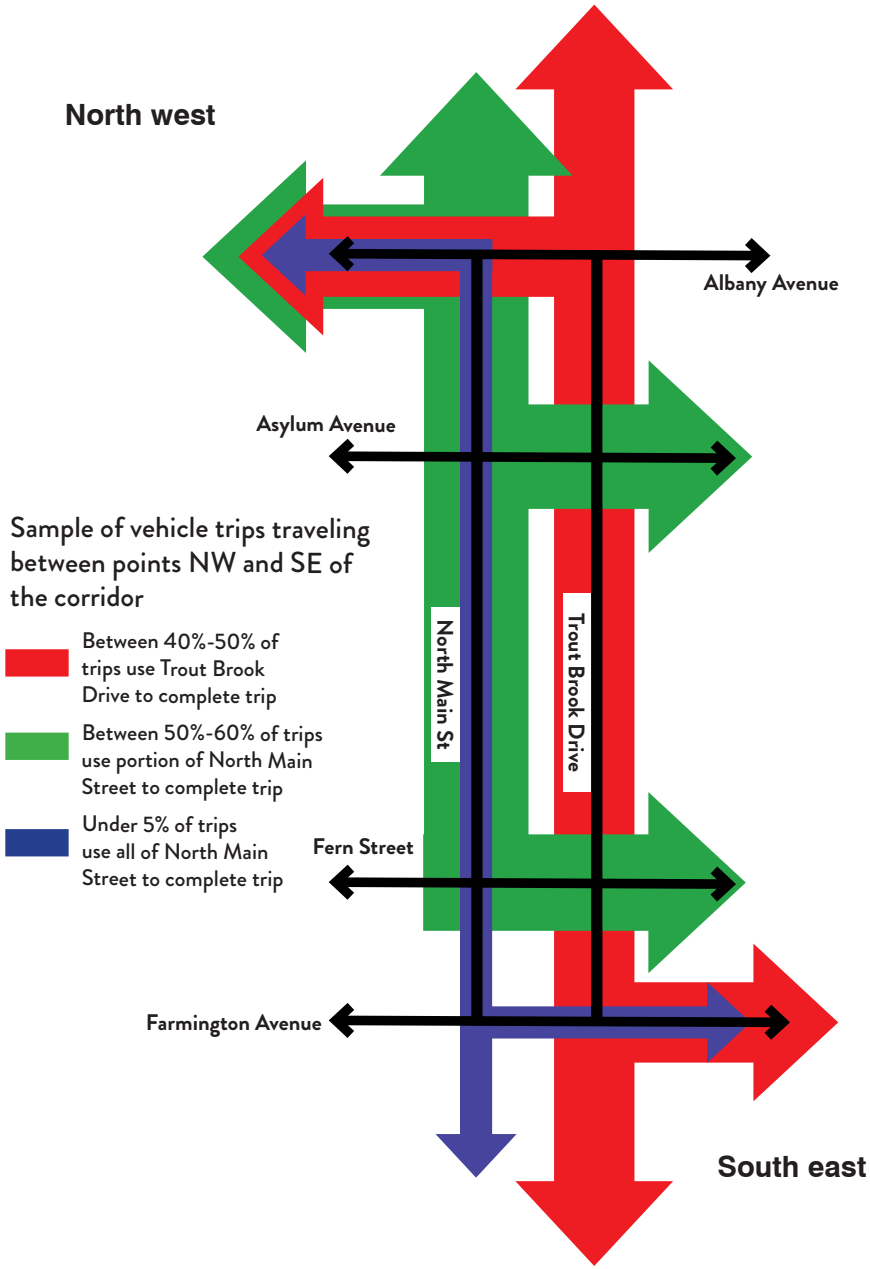
- **Long platoons of vehicles could reduce gaps for making left turns**

  Due to long platoons of vehicles and additional queue lengths, left turns may become more difficult.

- **Traffic diversion to adjacent streets**

  Drivers may chose to use different routes, thus causing a small increase in the volume of traffic on other roads in the area. Residential streets may be used as cut-through routes to larger connector roads.

Potential Diversion Analysis



Using the CRCOG Regional Travel Demand Model, vehicular trips using the North Main Street/Trout Brook Drive travel corridor were estimated. Over a typical day, the model estimated that about 50,000 vehicular trips travel along both North Main Street and Trout Brook Drive. A sample of these trips was looked at to estimate what percentage of trips are using North Main Street as a 'cut-through' route to get to and from points northwest and southeast of the corridor.

Based on the analysis of the travel data, approximately 40% - 50% of trips use Trout Brook Drive, while the other 50% - 60% use some portion of North Main Street to complete their trip. What this reveals is that North Main Street serves a significant portion of cut through trips that use North Main Street via either Asylum Avenue or Fern Street to get to their ultimate destination (green arrow). Very few trips (under 5%) travel the entire length of North Main Street (blue arrow) to make a trip, for example, from Avon to downtown Hartford.

Given the closeness of North Main Street and Trout Brook Drive, a traffic equilibrium occurs that roughly balances demand between the two corridors. This demand can fluctuate significantly in an event such as a vehicular crash on one of the streets. Such an event causes congestion which then diverts traffic to the nearest parallel street. Given the fact that North Main Street experiences over 80 crashes per year, this diversion is relatively frequent and results in congestion on a number of streets in the network.

The best way to test potential diversion patterns is to perform a temporary installation of the road diet over a set period of time (at least 3 months) to monitor and record the traffic operations and safety benefit. A few months is necessary to allow travel patterns to normalize and for drivers to get used to the street redesign. One potential solution might be to install the road diet during the reconstruction of the North Main Street Bridge. This will help to calm traffic prior to the construction zone, and may be perceived as a major improvement once the project is completed and traffic patterns readjust.

Mitigation Strategies

To minimize the impacts of the proposed road diet, mitigation strategies were identified and analyzed from a traffic engineering perspective.

1. The first mitigation tested involves simple retiming of the traffic signals at the intersections of North Main Street at Asylum Avenue and at North Main Street at Fern Street to favor the North Main Street through movement, while reducing the green timing on the minor approaches. See Figure 1.

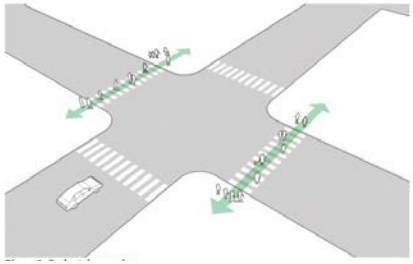
2. The second mitigation tested involves retiming the Asylum Avenue and Fern Street intersections with leading pedestrian intervals (LPI) as opposed to exclusive pedestrian phasing. A LPI typically gives pedestrians a 3–7 second head start when entering an intersection with a corresponding green signal in the same direction of travel. The town of West Hartford preffers exclusive pedestrian phases to maximize pedestrian safety and the LPI does not offer significant operational benefits, so this is not a recommended improvement at this time. Additionally, LPI's would require the education of families, kids and handicapped individuals. See Figure 2.

3. Although not technically a mitigation strategy, traffic diversion can also result in improved operations along North Main Street. Because traffic volume and congestion do not have a linear relationship, a small reduction in traffic volume can potentially result in significant congestion reduction. Based on traffic models developed for this study, a 150 vehicle reduction during the PM peak hour in both the northbound and southbound directions was tested. Both mitigation strategies above were also analyzed for this vehicle reduction.

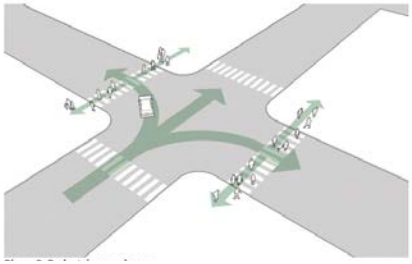
Anticipated delays and traffic queues are expected to increase along North Main Street, specifically for the northbound direction, with the construction of a road diet. Proposed mitigation strategies such as retiming a can reduce these impacts.

The traffic operations within the corridor shows greater improvement with the assumption that 150 vehicles in each direction on North Main Street are diverted to Trout Brook Drive. As illustrated in the Figure 3, traffic queues are reduced by approximately 24 percent with this shift in traffic. Although Trout Brook Drive was not analyzed as part of this effort, it is the professional judgment of the study team that the diversion will have a minimal impact to traffic flow on this road.

Additional mitigation options were analyzed in an attempt to coordinate the traffic signal at North Main Street and Fern Street to either the Farmington Avenue or Asylum Avenue signal system or to coordinate all of the traffic signals from Sims Road to Farmington Avenue. Results of those scenarios did not yield a consistent improvement for all movements along North Main Street but could be explored again in the future based on traffic conditions if the project is constructed.



Phase 1: Pedestrians only
Pedestrians are given a minimum 3-7 second head start entering the intersection.
Source: NACTO



Phase 2: Pedestrians and cars
Through and turning traffic are given the green light. Turning traffic yields to pedestrians already in the crosswalk.

Mitigation Strategies

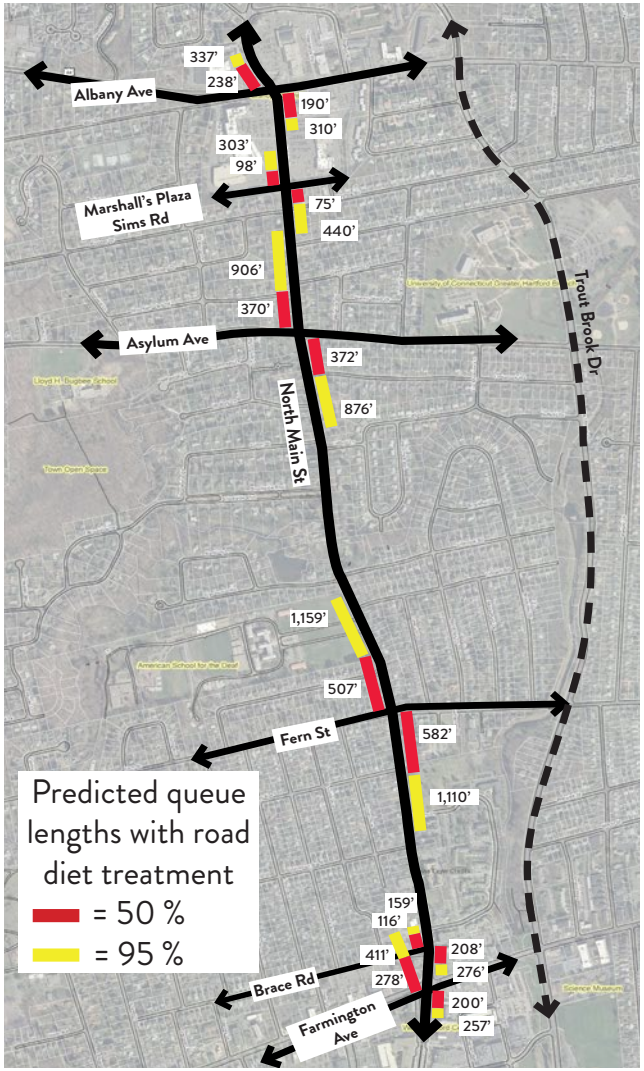


Figure 1

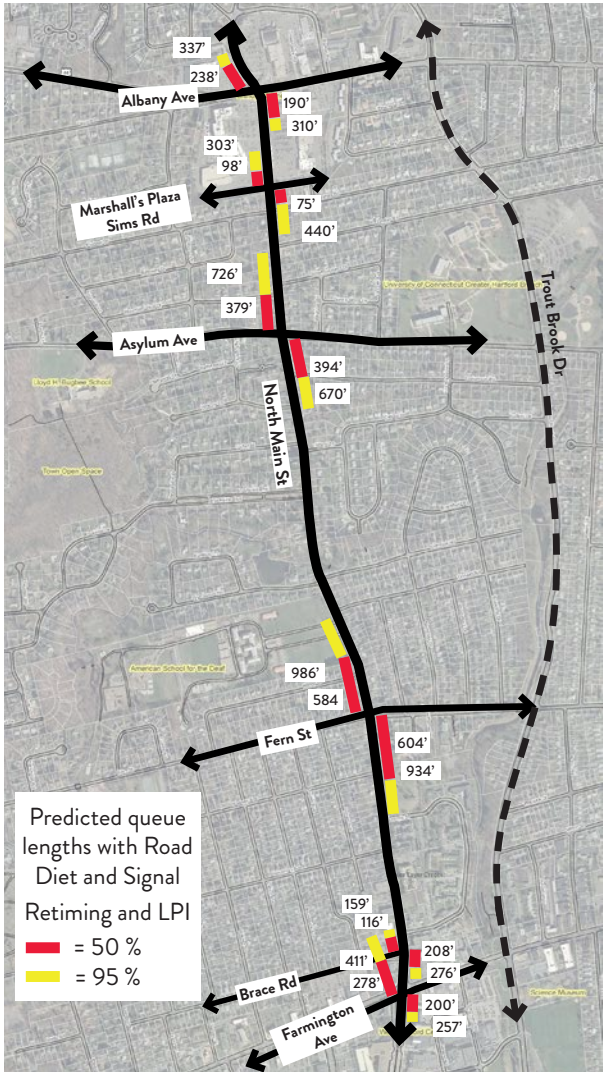


Figure 2

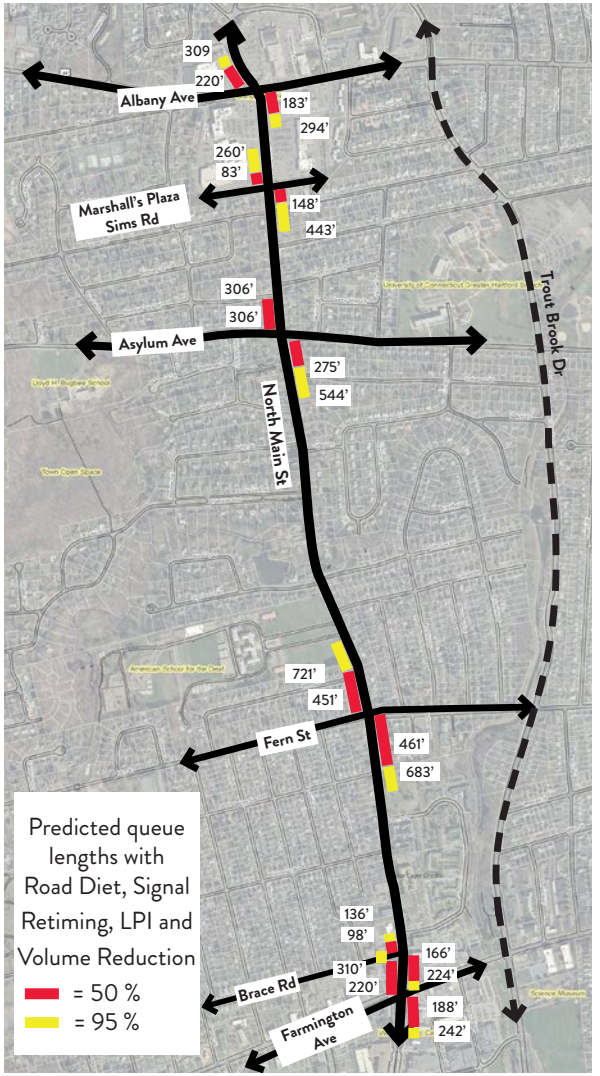


Figure 3

*Please see Appendix I for larger queue length diagrams on page 412

Mitigation Strategies Conclusion

• Due to high daily traffic volumes at the northern and southern ends of the North Main Street Study corridor, the Road Diet conversion is only feasible in the middle of North Main Street. As such, Fern Street and Asylum Avenue (in the middle of North Main Street) are the only two signalized intersections impacted by the Road Diet.

• 95th percentile queue (worst case) may extend over 1,000 feet northbound and southbound at Fern Street in the PM Peak Hour (worst case for traffic) unless mitigations are applied.

• A traffic diversion of 150 vehicles in each direction during the PM Peak Hour will further reduce vehicle queuing closer to current levels without the Road Diet.

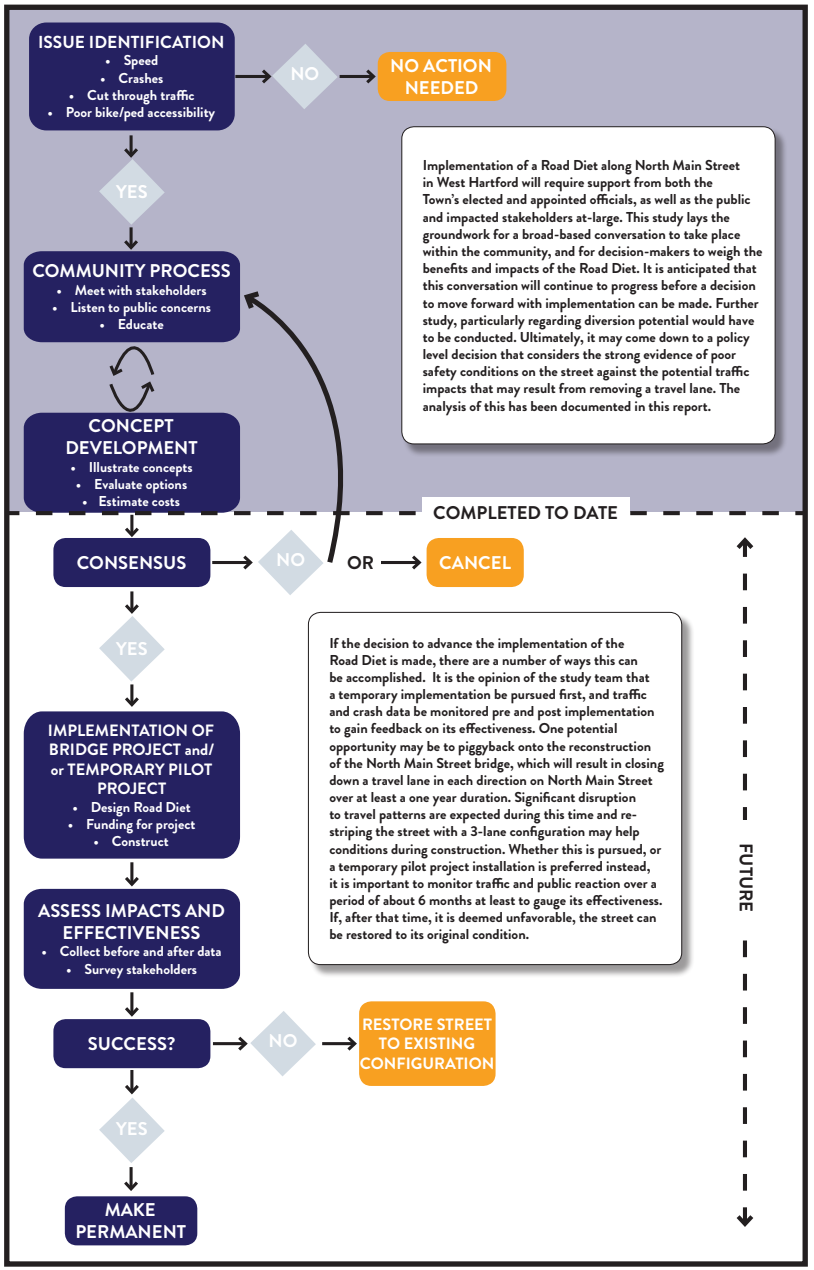
• Unsignalized intersections and driveways are expected to experience similar delays as today. Simulation models predict that vehicles on North Main Street will allow sidestreet/driveway vehicles in and out since sight limitations will be minimized under the Road Diet.

• Delay on North Main Street as well as traffic diversion are only expected during the PM Peak Hours. Assuming this is limited to about 10 hours per week, this accounts for about 6% of all of the hours in a given week. The remaining 94% of the time will enjoy safer conditions and reasonably smooth traffic operations.

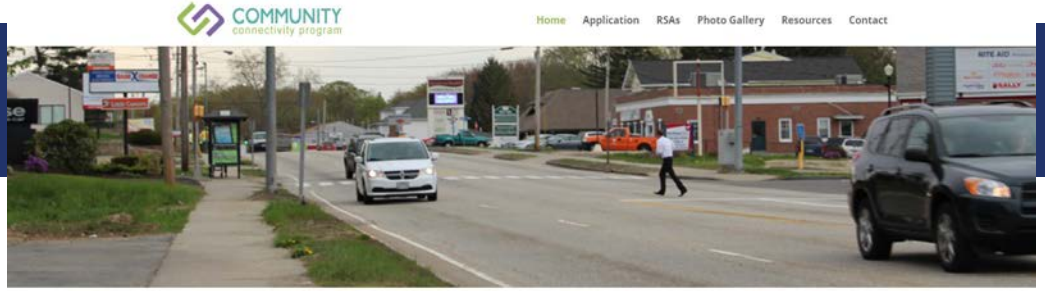
Implementation Plan

Project Implementation Next Steps

The graphic to the right displays the implementation strategy that could be followed when accessing the need for and possibly constructing the road diet configuration along North Main Street.



Funding Opportunities



There are many funding sources available to communities wishing to improve safety and enhanced environments for bicycling and walking along their roadways. These sources are listed below. Additional information about each source can be found in Appendix G.

- **Congestion Mitigation and Air Quality Funds (CMAQ)-** For the construction of pedestrian walkways and bicycle transportation facilities and for carrying out non-construction projects related to safe bicycle use. Additionally, funds may be used for projects to improve traffic flow, improve incident and emergency response or improve mobility.

- **Local Transportation Capital Improvement Program (LOTCIP) -** provides financial assistance to municipalities for eligible projects in the form of annual entitlement grants funded with State general obligation bonds. LoCIP grants can fund road construction, renovation, repair, and sidewalk and pavement improvements, as well as bridges and bikeway and greenway establishments.

- **Federal Aid and Federal Lands programs, National Highway Performance Program (NHPP), Surface Transportation Program (STP), and Highway Safety Improvement Program (HSIP) -** Multiple programs that fund bicycle and pedestrian projects.

- **TIGER Grants -** Grant program that funds infrastructure projects that promote economic competitiveness, improve energy efficiency, reduce greenhouse gas emissions and improve safety, quality-of-life and working environments in communities.

- **Transportation Alternatives Program -** Funds the construction, planning, and design of on-road and off-road trail facilities for pedestrians, bicyclists, and other non-motorized forms of transportation, including sidewalks, bicycle infrastructure, pedestrian and bicycle signals, traffic calming techniques, lighting and other safety-related infrastructure, and transportation projects to achieve compliance with the Americans with Disabilities Act of 1990.; also previous Safe Route to School Program activities.

- **Community Connectivity Program -** designed to improve conditions for walking and bicycling to and within urban, suburban and rural community centers. By making conditions safer and more accommodating for pedestrians and cyclists, the program will encourage more people to use these healthy and environmentally sustainable modes of travel. At the same time, it will make Connecticut's community centers more attractive and livable places to live and work.

Lessons Learned

The West Hartford Road Diet and Safety Study was initiated as a call to improve the safety of North Main Street. In doing so, the team also acknowledged the opportunity to provide added roadway facilities for all users, including bicyclists and pedestrians.

The Study team analyzed the existing conditions, conducted multiple outreach events including a workshop, and offered a variety of concepts that the town and stakeholders could further expand upon.

This process, like any study, involved a considerable learning curve. No two streets are alike, and every environment has its own opportunities and challenges. The following is a list of lessons learned throughout the study process:

- **Not all stakeholders have the same priorities;** while bicycle advocates were heavily in favor of a road diet, many business owners were apprehensive about what consequences the "diet" could have on the business climate of North Main Street. It was important to address these concerns and balance the discussion.

- **Know what projects are in the pipeline;** it was beneficial to this study to know about other roadway projects happening in the near future. The team was able to tie in a discussion about upcoming bridge work on North Main Street, to potential road diet implementation strategies.

- **Public outreach is key;** getting stakeholders involved early on in the process was key. The study could not have been completed without the help and advisement of the Technical Study Team, who aided in outreach efforts. Attending pop-up community events and promoting the workshop through social media helped to ensure wide public participation.

- **Safety as top priority;** This was a safety study from the beginning and keeping safety as the key priority enabled the study team to create design concepts that responded to the needs of the community.

Francisco Gomes of FHI, discussing roadway issues on North Main Street with local residents during the public workshop.

Questions and Answers

1. What is a Road Diet?

A typical road diet technique is to reduce the number of lanes on a roadway cross-section. One of the most common applications of a road diet is to improve safety in the context of two-way streets with 4-lane sections. In this case, two travel lanes in each direction are converted into a 3-lane section with one travel lane in each direction, optional bicycle lanes, and a two-way turn lane in the middle. The two-way turn lane can be transitioned into dedicated left turn lanes at intersections. The additional space that is freed up by removing a vehicular travel lane can be converted into bicycle lanes on either side of the roadway.

Road diets are usually successful on roads carrying fewer than 20,000 vehicles per day (VPD). If properly designed, traffic does not divert to other streets after a road diet has been installed. In fact road diets have been found to maintain (and enhance) traffic flow while reducing crashes. Road diets have even been successfully implemented on streets carrying up to 25,000 VPD, but careful evaluation is required at these traffic levels. North Main Street carries between 17,000 and 26,000 VPD placing it at the upper limits of road diet feasibility.

2. Why are we considering road diets?

Vehicular speeding is a major concern on North Main Street. Speed observations revealed that traffic routinely exceeds 45 miles per hour (MPH), even in front of the American School for the Deaf which is posted at 25MPH. In the past five years, crash records indicate that over 80 crashes per year occur along North Main Street between West Hartford Center and Bishops Corner.

3. How can a road with fewer lanes carry the same amount of traffic?

When a car stops in a moving traffic lane to turn left it causes congestion, blind spots, unsafe lane changes, and changes in vehicle speeds. In a three-lane system there is always one lane for driving, and one lane for turning making driving safer and more reliable, with fewer crashes and frustrations. For these reasons, a 3-lane road can handle the same amount of traffic as a 4-lane road (and in some cases it can handle more traffic).

4. How will Emergency Vehicles get down North Main Street when there are just two travel lanes?

Currently, emergency vehicles must navigate through four lanes worth of traffic to travel on North Main Street. If the road diet were implemented, emergency vehicles can use the two way left turn lane in the center of the road to bypass vehicles in the travel lanes as other vehicles pull over. The road diet can potentially result in better response times for emergency vehicles.

5. How do buses operate on a road with a road diet?

On a road with a road diet, buses have room to stop in the shoulder areas of the road, and the two way left turn lane allows other vehicles to pull around a stopped bus at a low speed.

6. How does a road diet make driving safer?

As mentioned above, road diets provide a center turn lane so that left turns are simpler. A driver crosses only one lane of traffic at a time resulting in fewer blind spots. With an undivided four lane road, a driver must find a gap in two or three lanes of traffic at once to make a left turn.

7. How does a road diet make walking safer?

First, pedestrians only have to cross three lanes of traffic, not four. Second there are fewer blind spots as there is one lane in each direction, thus there is less sight blockage by cars. Third top vehicle speeds in a three lane system are lower. Also, with the addition of bike lanes to the roads there will be less bike traffic on the sidewalks (which is already illegal, but still common, and can make sidewalks less safe for pedestrians).

8. How does a road diet make biking safer?

For the same reasons listed above for pedestrian safety. Also, with the addition of bike lanes (or shoulders) to the roads there will be less bike traffic on the sidewalks (which is legal, except in the Center, and can make sidewalks less safe for pedestrians). On North Main Street today a cyclist is at risk of being 'mirrored' by a motor vehicle passing by within a foot or two.

9. Will the road diet push traffic onto other streets?

A road diet on North Main Street should not push a considerable number of cars onto surrounding streets. Minimizing and measuring impact on surrounding streets is one of the studies objectives. It is possible that some traffic, mainly in the PM peak hour (highest hour of the day), could divert to Trout Brook Avenue.

10. What if it doesn't work?

Some members of the community fear that the road diet will push traffic onto surrounding neighborhood streets, a valid concern and one that we will do our best to measure and mitigate. If the road diet trial is deemed unsuccessful due to a negative impact on a neighborhood, the road could be returned to its current configuration and other options for improving safety explored.