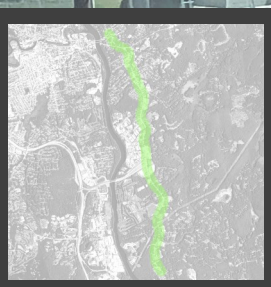
Congestion Management Report

NH 3A (LOWELL RD & RIVER RD), HUDSON



Segment Length: 4.73 miles

Daily Traffic Volumes: 7,000—31,000

Analysis Period: September 2016

Number of Traffic Signals: 10

Number of travel lanes: 2-4

Roadway Class: II (Minor Arterial) and IV (Principal Arterial— Other)

NH 3A serves as the major north-south thoroughfare in the Nashua Region east of the Merrimack River. The portion of the NH 3A corridor in Hudson comprises Lowell Rd and River Rd, which serves several local and region transportation functions. Its location on the state border encourages shoppers to enjoy New Hampshire's sales tax-free environment.

The route also parallels U.S. Route 3 at this juncture and the Merrimack River, thereby connecting Litchfield with Tyngsborough, Massachusetts. It is an alternative commuting route for those working within southern New Hampshire and metropolitan Boston area. It is also an important road for freight transportation and local attractions, including the Walmart, various shopping plazas, Hudson Center.

Due to its role as a commercial corridor, Lowell Rd is expected to have some degree of congestion during peak travel times. In addition to the high volume of cars at certain peak travel times, contributors to this congestion are segments where travel lanes vary from two to four lanes in either direction, and short distances between traffic lights. Along certain segments, there is also a high density of curb cuts, which contribute to congestion.

Additionally, the southern portion of Lowell Road is a key access point to the Sagamore Bridge, which links Hudson with Nashua via one of the Merrimack River crossings in the Region. The Taylor Falls Bridge, which is further north, is the other Merrimack River crossing in the Nashua Region. This bridge crossing also intersects with NH 3A.

Along the route, there is minimal infrastructure for pedestrians and cyclists. Some segments of sidewalks exist near the commercial uses, such as Walmart, and nearby grocery stores.

Report, travel time runs and data analysis conducted by

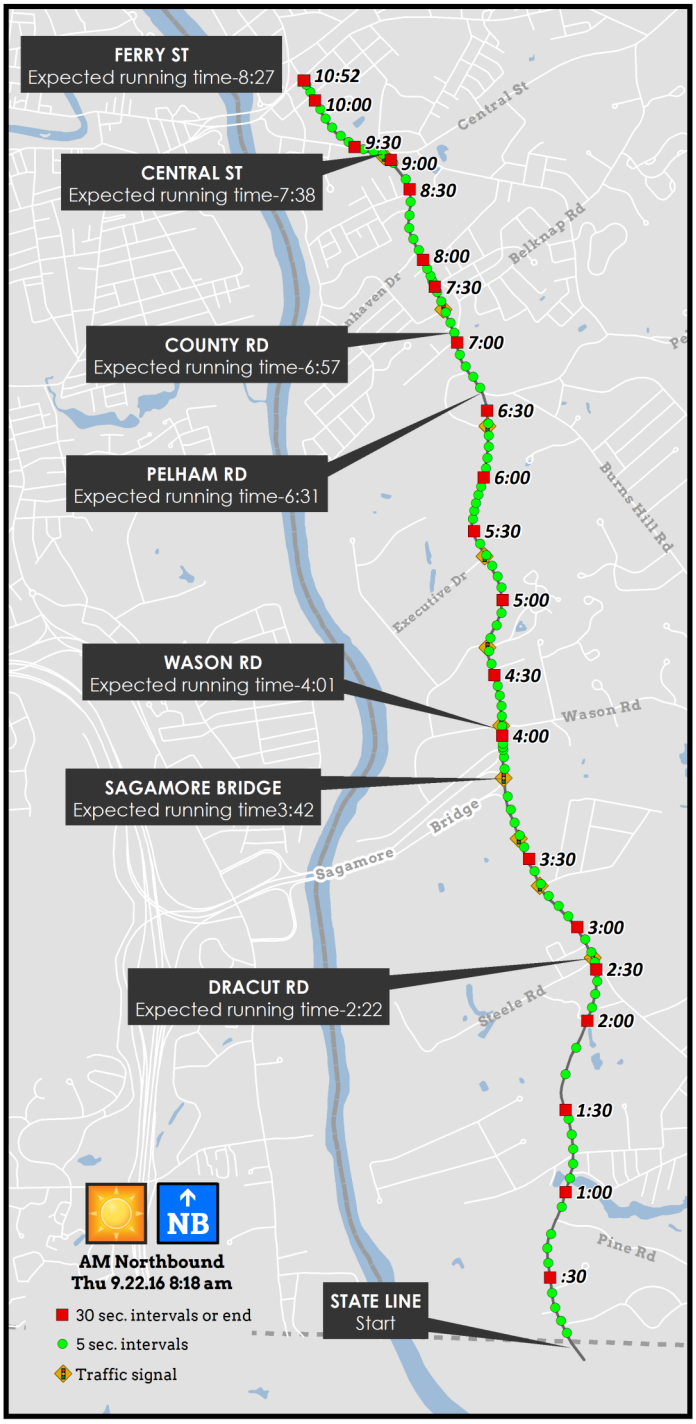
NRPC Nashua Regional Planning Commission

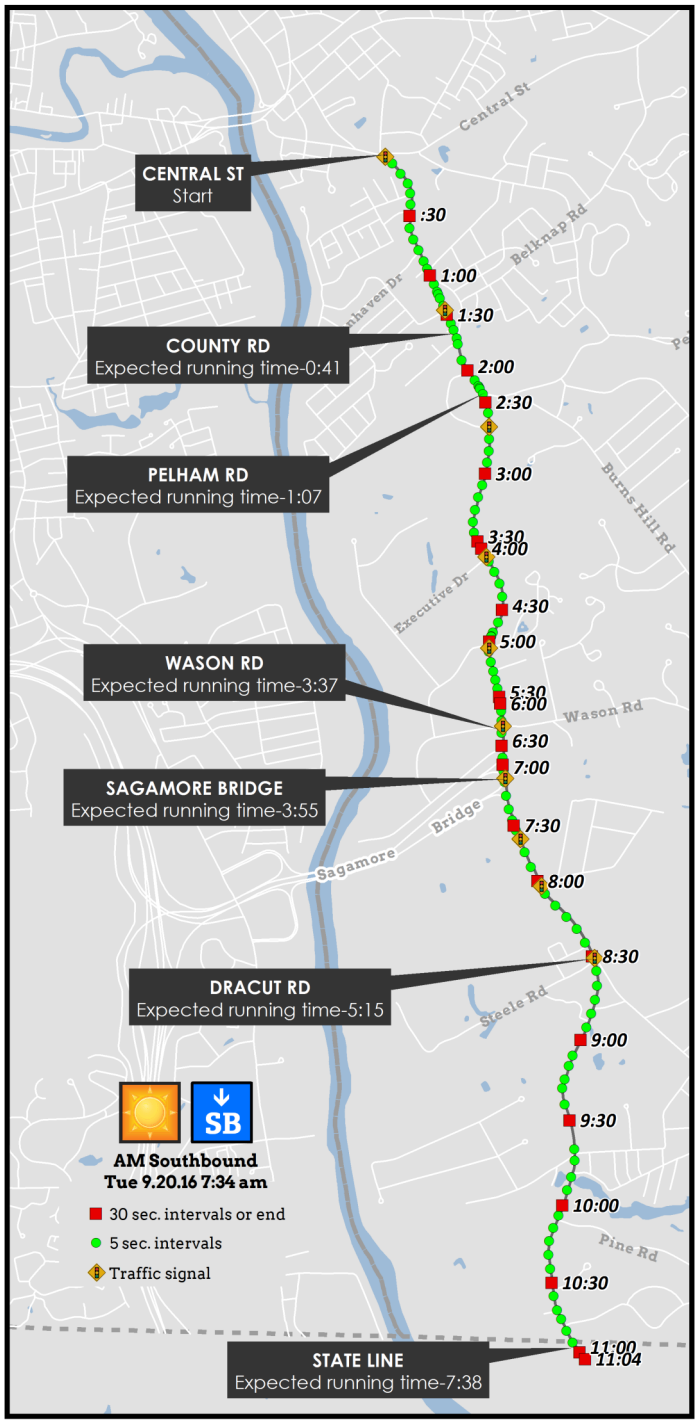
2018

Value Yesterday, Enhance Tomorrow, Plan Today... and Avoid Congestion

AM Peak Period Actual & Expected Travel Times

Corridor Extents: Northbound: Ferry St to Massachusetts State Line. Southbound: Central St to Massachusetts State Line





Expected Travel Time during the Morning Commute

8 minutes and 27 seconds, traveling in *northerly* direction based upon posted speeds and free flowing traffic

7 minutes and 38 seconds, traveling in *southerly* direction based upon posted speeds and free flowing traffic

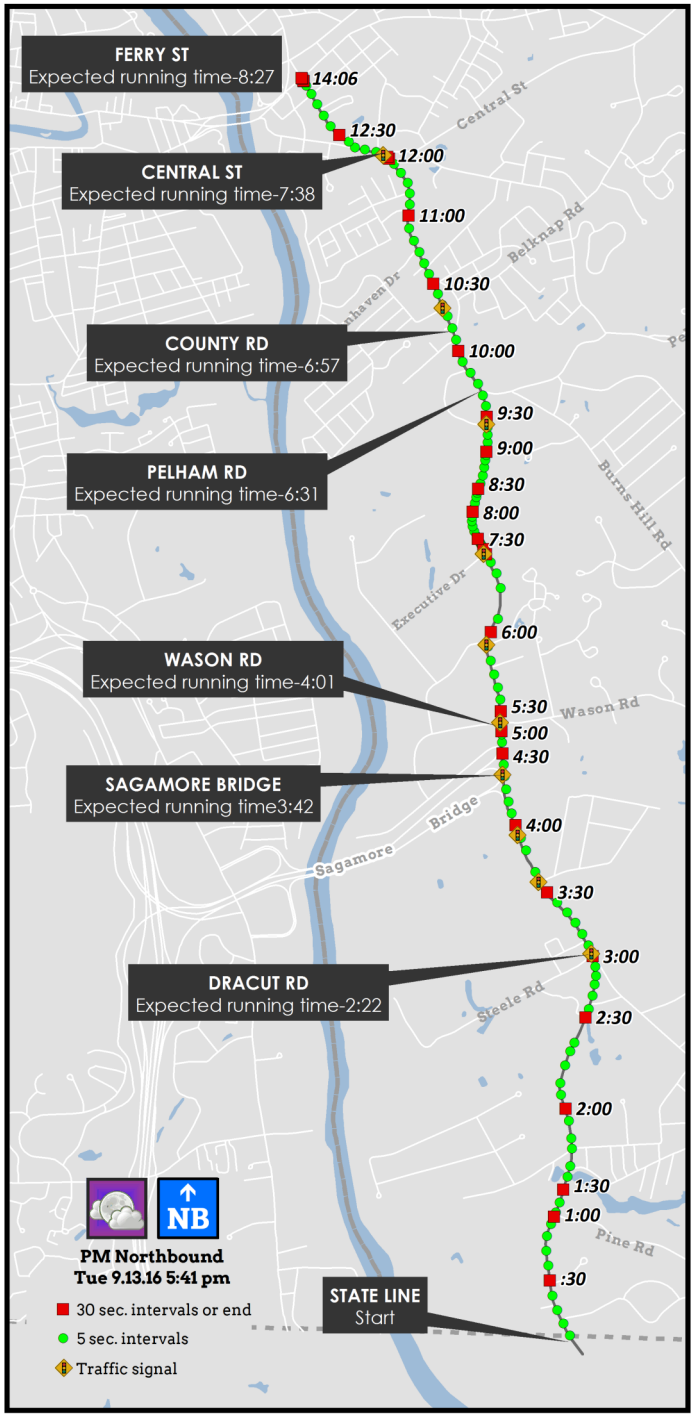
Actual Travel Time during the Morning Commute:*

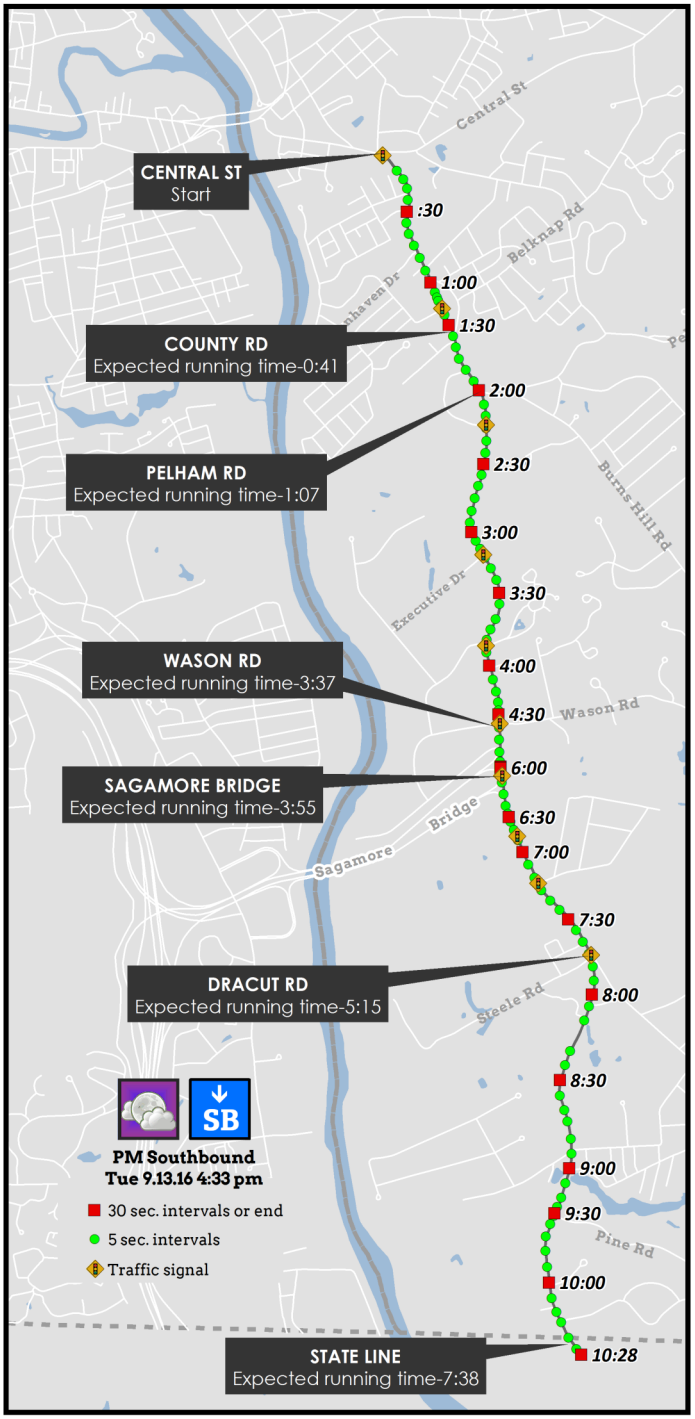
Northbound	Southbound
10 minutes and 52 seconds	11 minutes and 04 seconds
2 minutes and 25 seconds (29%) longer than expected	3 minutes and 26 seconds (45%) longer than expected

*The actual travel time is based upon a single travel run that was similar in duration and congestion to the average observed travel time.

PM Peak Period Actual & Expected Travel Times

Corridor Extents: Northbound: Massachusetts State Line to Ferry St. Southbound: Central St to Massachusetts State Line





Expected Travel Time during the Evening Commute

8 minutes and 27 seconds, traveling in *northerly* direction based upon posted speeds and free flowing traffic
7 minutes and 38 seconds, traveling in *southerly* direction based upon posted speeds and free flowing traffic

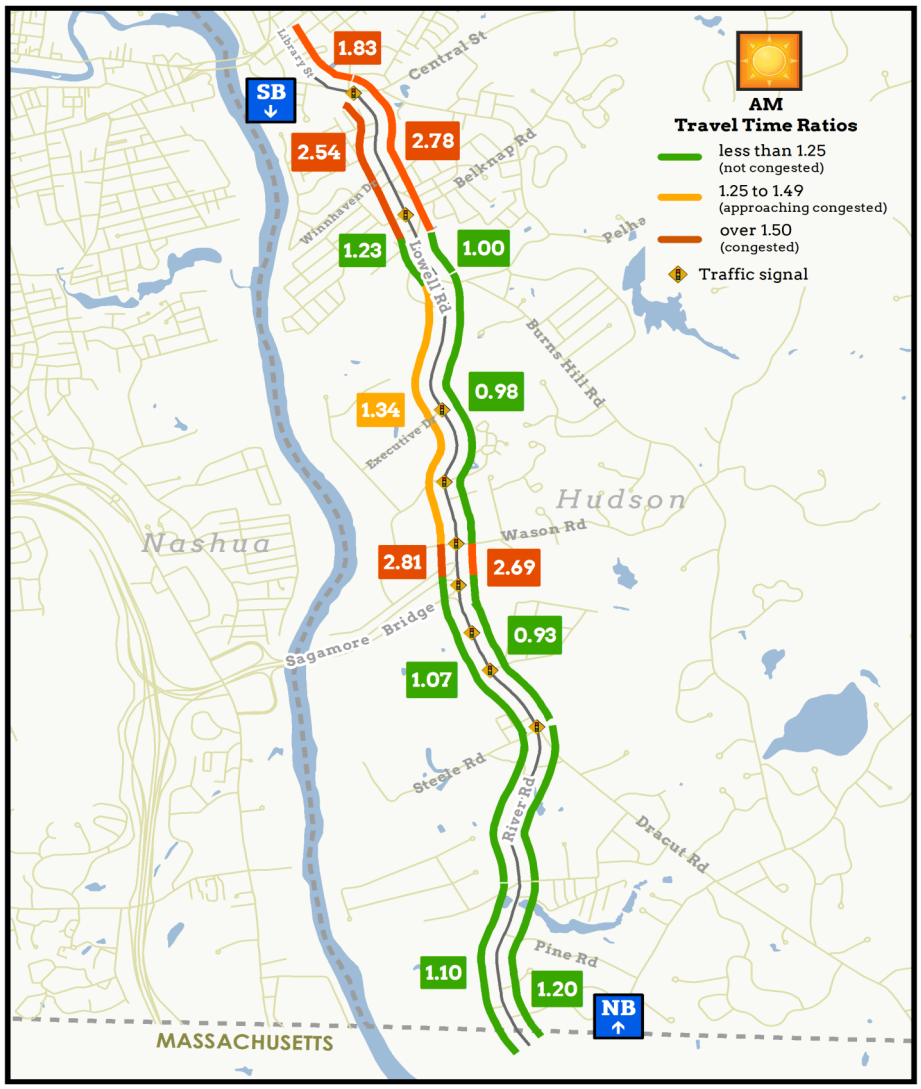
Actual Travel Time during the Evening Commute:*

Northbound	Southbound
14 minutes and 06 seconds	10 minutes and 28 seconds
5 minutes and 39 seconds (69%) longer than expected	2 minutes and 50 seconds (37%) longer than expected

*The actual travel time is based upon a single travel run that was similar in duration and congestion to the average observed travel time.

AM Travel Time Ratios (7:00am—9:00am)

Corridor Extents: Northbound: Massachusetts State Line to Ferry St. Southbound: Central St to Massachusetts State Line



Travel Time Ratio

A travel time ratio (TTR) compares the actual (measured) & expected (non-congested) travel times along a corridor. It is assumed that in non-congested conditions, motorists can travel at the posted speed limit. The actual time is the average of several travel time runs. The ratio between the actual time and the expected time would equal 1 for a non-congested segment.

Southbound

Congestion occurs during the morning peak period along several segments north of the Sagamore Bridge with ratios above the 1.5 threshold. Congestion does not occur south of the Sagamore Bridge.

On average, travel between Central St and Massachusetts State Line in the southbound direction during the morning commute takes approximately 2 minutes and 52 seconds (37%) longer as compared to free-flow conditions.

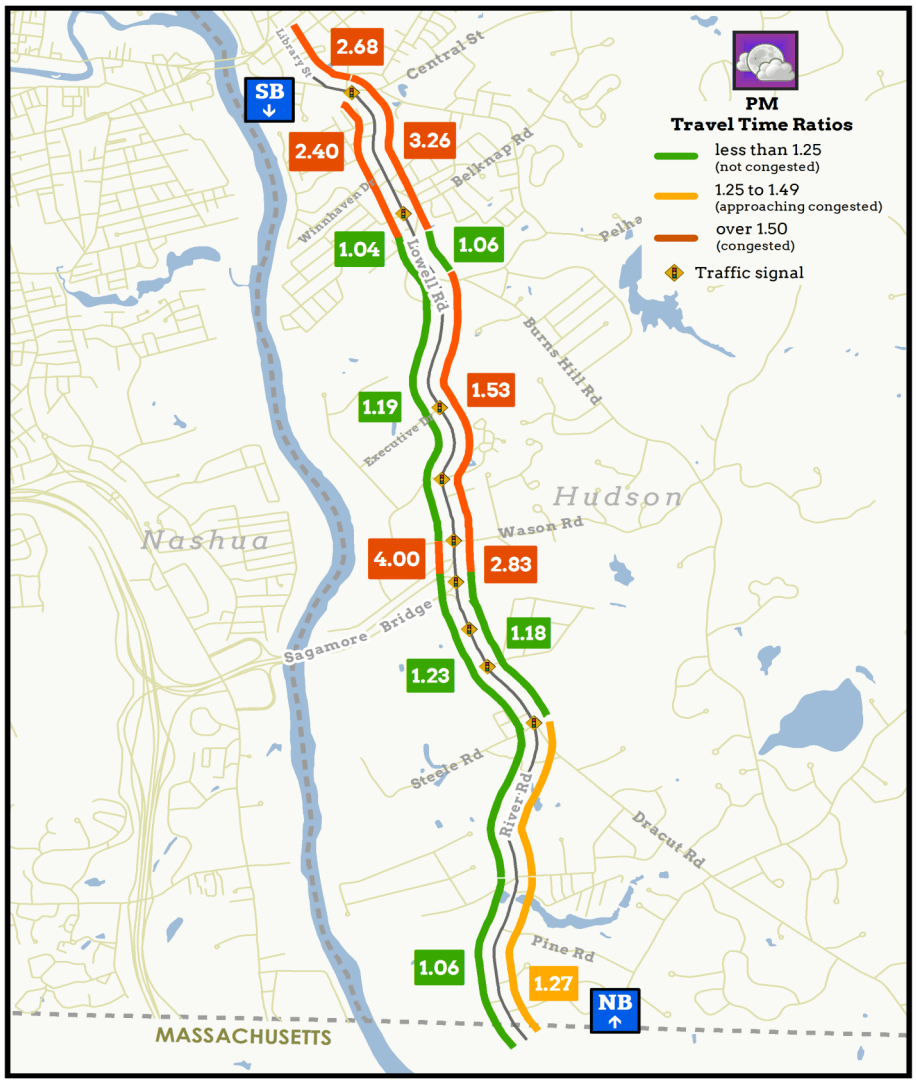
Northbound

Congestion does occur in the northbound direction between Central St and County Rd and between Wason Rd and the Sagamore Bridge, as indicated by ratios that are above the threshold of 1.5. However, congestion does not occur for most of the segments.

NORTHBOUND	Length (miles)	Average Observed Travel Time (mm:ss)	Expected Travel Time (mm:ss)	Additional Travel Time (mm:ss)	Travel Time Ratio >1.5 = congestion
Massachusetts S/L to Dracut Rd	1.6	02:50	02:22	00:28	1.20
Dracut Rd to Sagamore Bridge	0.8	01:15	01:20	-00:05	0.93
Sagamore Bridge to Wason Rd	0.2	00:48	00:18	00:30	2.69
Wason Rd to Pelham Rd	1.3	02:26	02:30	-00:04	0.98
Pelham Rd to County Rd	0.2	00:27	00:26	00:00	1.00
County Rd to Central St	0.3	01:54	00:41	01:13	2.78
Central St to Ferry St	0.4	01:30	00:49	00:41	1.83
	4.73	11:10	08:27	02:44	
SOUTHBOUND	Length (miles)	Average Observed Travel Time (mm:ss)	Expected Travel Time (mm:ss)	Additional Travel Time (mm:ss)	Travel Time Ratio >1.5 = congestion
Central St to County Rd	0.3	01:44	00:41	01:03	2.54
County Rd to Pelham Rd	0.2	00:32	00:26	00:06	1.23
Pelham Rd to Wason Rd	1.3	03:21	02:30	00:51	1.34
Wason Rd to Sagamore Bridge	0.2	00:50	00:18	00:32	2.81
Sagamore Bridge to Dracut Rd	0.8	01:26	01:20	00:06	1.07
Dracut Rd to Massachusetts S/L	1.6	02:36	02:22	00:14	1.10
	4.32	10:29	07:38	02:52	

PM Travel Time Ratios (4:00pm—6:00pm)

Corridor Extents: Northbound: Ferry St to Massachusetts State Line. Southbound: Central St to Massachusetts State Line



Travel Time Ratio

A travel time ratio (TTR) compares the actual (measured) & expected (non-congested) travel times along a corridor. It is assumed that in non-congested conditions, motorists can travel at the posted speed limit. The actual time is the average of several travel time runs. The ratio between the actual time and the expected time would equal 1 for a non-congested segment.

Southbound

Congestion does occur in the southbound direction in the segments between the Central St to Country Rd and Wason Rd to Sagamore Bridge during the evening peak period, as indicated by ratios that are above the threshold of 1.5.

Northbound

Congestion occurs during the evening peak period in the northbound direction in the segments north of the Sagamore Bridge (except for Pelham Rd to County Rd segment). Travel between the State Line and Dracut Rd approaches congested conditions.

On average, travel between the Massachusetts State and Ferry St in the northbound direction during the evening commute takes approximately 5:42 seconds (67%) longer as compared to free-flow conditions.

NORTHBOUND	Length (miles)	Average Observed Travel Time (mm:ss)	Expected Travel Time (mm:ss)	Additional Travel Time (mm:ss)	Travel Time Ratio >1.5 = congestion
Massachusetts S/L to Dracut Rd	1.6	03:01	02:22	00:39	1.27
Dracut Rd to Sagamore Bridge	0.8	01:34	01:20	00:14	1.18
Sagamore Bridge to Wason Rd	0.2	00:51	00:18	00:33	2.83
Wason Rd to Pelham Rd	1.3	03:50	02:30	01:20	1.53
Pelham Rd to County Rd	0.2	00:28	00:26	00:01	1.06
County Rd to Central St	0.3	02:13	00:41	01:32	3.26
Central St to Ferry St	0.4	02:12	00:49	01:23	2.68
	4.73	14:09	08:27	05:42	
SOUTHBOUND	Length (miles)	Average Observed Travel Time (mm:ss)	Expected Travel Time (mm:ss)	Additional Travel Time (mm:ss)	Travel Time Ratio >1.5 = congestion
Central St to County Rd	0.3	01:38	00:41	00:57	2.40
County Rd to Pelham Rd	0.2	00:28	00:26	00:01	1.04
Pelham Rd to Wason Rd	1.3	02:59	02:30	00:29	1.19
Wason Rd to Sagamore Bridge	0.2	01:12	00:18	00:54	4.00
Sagamore Bridge to Dracut Rd	0.8	01:39	01:20	00:19	1.23
Dracut Rd to Massachusetts S/L	1.6	02:30	02:22	00:08	1.06
	4.32	10:25	07:38	02:47	

Probe Travel Time Data

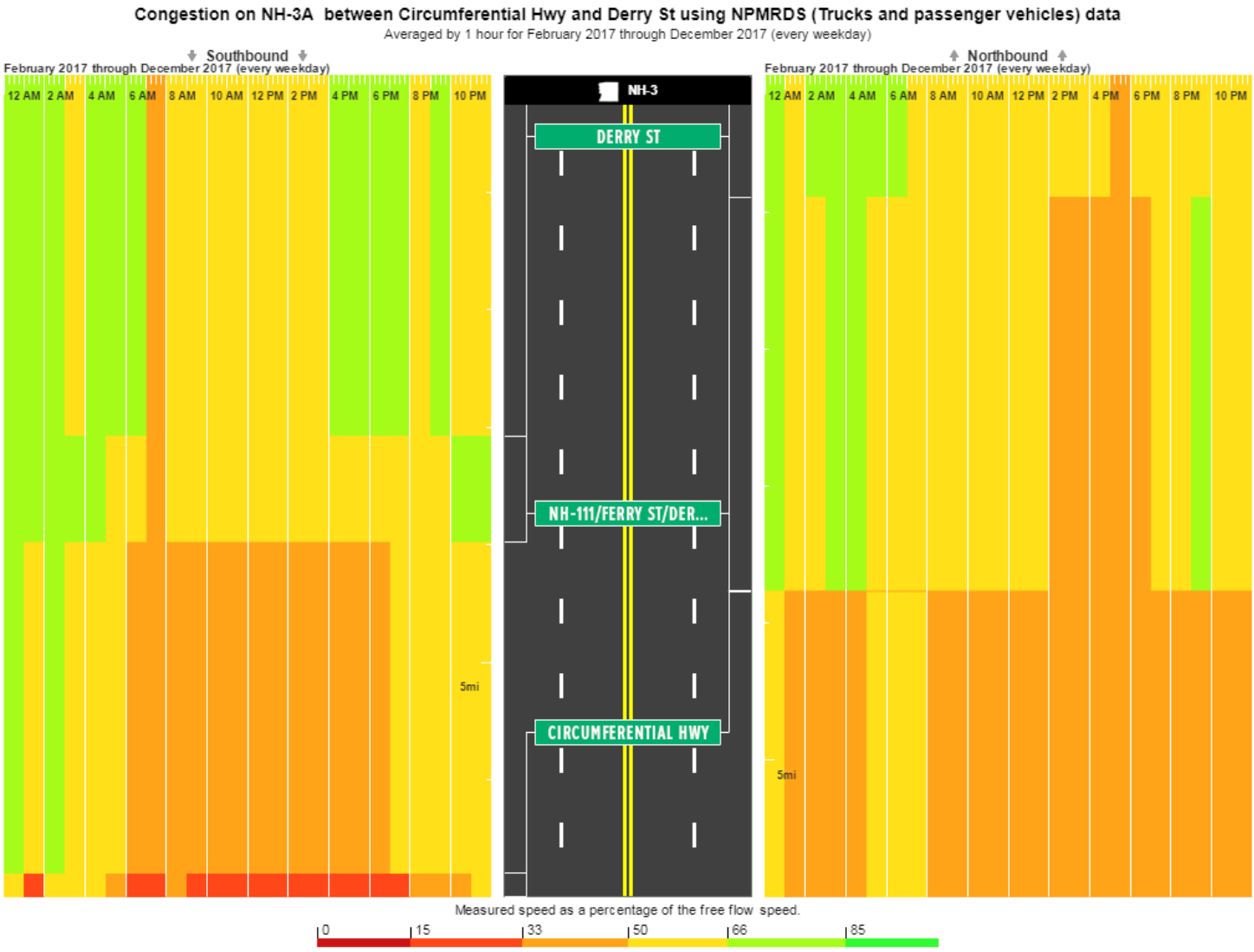
Corridor Extents: Northbound: Sagamore Bridge to Derry St. Southbound: Derry St to Sagamore Bridge

The NPMRDS provides roadway performance data for the National Highway System (NHS). The NPMRDS data are derived from instantaneous vehicle probe speed data supplied by a variety of GPS devices carried by both trucks and cars. The data are supplied on a GIS roadway network, which divides the NHS into directional road segments based on the Traffic Message Channel (TMC) standard.

Travel times from the National Performance Measurement Research Data Set (NPMRDS) are available for the extent of NH 3A between Derry St (NH 102) and the Circumferential Highway (Sagamore Bridge). Weekday travel time data collected in 2017 along three TMCs located as shown in the figure below is summarized by measured speed as a percentage of free flow speed.

The percent of traffic traveling below the speed limit versus at or above the posted speed limit during the peak and off peak hours for each segment is graphed in figures below. The segments are arranged by the time of day shown horizontally and the location along NH 3A shown vertically. Southbound traffic is on the left, while northbound traffic s shown on the right. Segments are colored based on a scale from red to orange to green, which corresponds to transition from higher levels of congestion to lower levels of congestion.

The data indicate that, in general, that Southbound AM and PM peak near the Circumferential Highway is most congested, with greater than 66% of travel speeds below the speed limit for both passenger and



Probe Travel Time Data

Corridor Extents: Northbound: Sagamore Bridge to Derry St. Southbound: Derry St to Sagamore Bridge

The 2017 weekday travel time data was also summarized by average travel speed by hour of day for all vehicle types (passenger and freight combined), as shown in the figure below.

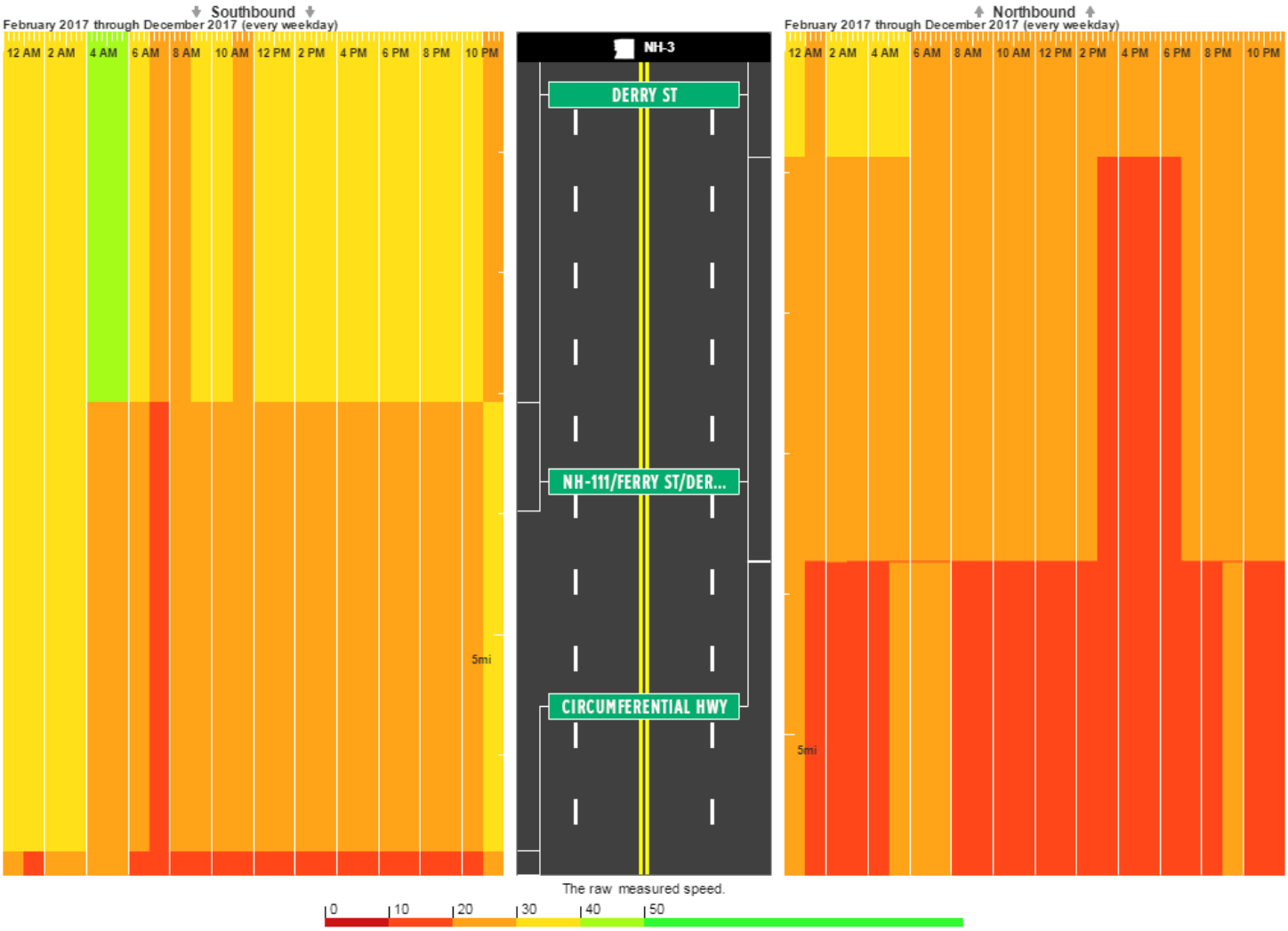
Northbound traffic slows considerably during the PM peak hours between Derry St and the Sagamore Bridge, where there is a high volume of commuter traffic in from Massachusetts.

A similar slow down occurs in the same area in the southbound direction during the AM and PM peak, though it is confined to a much shorter segment of NH 3A. The slow speeds in the north– and southbound directions occurs where traffic from the Sagamore Bridge merges with already existing traffic on NH 3A.

The variations in speeds on the chart below represent the changes in posted speed limit at different points along NH 3A. These fluctuations represent the different character and purposes of NH 3A within the Town of Hudson.

Speed on NH-3A between Circumferential Hwy and Derry St using NPMRDS (Trucks and passenger vehicles) data

Averaged by 1 hour for February 2017 through December 2017 (every weekday)



Projects

There are several infrastructure projects along the NH 3A that could impact the corridor. One major cause for congestion is the population growth Hudson has experienced over the past few decades. The completion of the Circumferential Highway was first proposed in the late 1950's to provide additional crossings of the Merrimack River and mitigate congestion in downtown Hudson and downtown Nashua. The Sagamore Bridge crossing south of downtown Nashua was expanded and forms the only portion of the Circumferential Highway that has been constructed to date. The Town of Hudson is considering funding options for some of the projects that could alleviate congestion impacts.

The Nashua Regional Planning Commission plans to complete an additional congestion analysis of NH 3A after the impacts of the nearby improvements are fully in effect.

Existing projects on NH 3A (Lowell Rd and River Rd), Hudson					
Project	Funding Years	Estimate^	Scope	Benefits (CMP Strategy*)	Status
Northern Crossing	2033 - 2040	$267,283,896	Construct a northern crossing of the Merrimack River to provide a four lane roadway connecting NH 102 in Hudson, NH 3A in Litchfield and US 3 in Nashua; exact location of crossing to be determined	Improved accessibility & mobility, including freight mobility; reduced congestion and auto emissions (6e)	MPO Long Range Project (Not in TYP)
NH 3A/Lowell Road Improvements	2021	$479,584	Continue Sidewalk on NH 3A/Lowell Rd from Birch St to Executive Dr	Increase mobility and access; Increase nonmotorized mode shares; Separate slow moving bicycles from motorized vehicles; Reduce incidents (3a)	MPO Long Range Project (Not in TYP)
NH 3A/Lowell Road Intersection Improvements	2021	$712,525	Add a right turn lane on NH 3A/Lowell Rd southbound from Flagstone Drive to the westbound ramp on Sagamore Bridge Rd	Increase mobility; Reduce congestion by improving bottlenecks; Increase traffic flow and improve safety (1b)	MPO Long Range Project (Not in TYP)
Nearby projects with potential impacts to NH 3A (Lowell Rd and River Rd), Hudson					
Project	Funding Years	Estimate^	Scope	Benefits (CMP Strategy*)	Status
NH 102/Derry Road Improvements - Phase II & Phase III	2021	$896,137	Phase II: Continue Pedestrian/Bike Lane on Derry Rd/NH 102, from Towhee Dr to the Hudson Mall	Increase mobility and access; Increase nonmotorized mode shares; Separate slow moving bicycles from motorized vehicles; Reduce incidents (3a)	MPO Long Range Project (Not in TYP)
East Hollis Street Improvements - 1	2017 – 2018	$4,170,111	Intersection improvements at the intersection of East Hollis Street and Bridge Street from C Street to the Hudson Town Line	Improve safety for all users, including bicyclists and pedestrians; improve traffic flow and mobility (3d)	Existing 2017 - 2020 TIP project
East Hollis Street Improvements - 2	2022 - 2025	$5,111,042	Improvements to East Hollis Street and its intersections	Improved safety for all users, including bicyclists and pedestrians; improved traffic flow and mobility (3d)	Existing 2017 - 2026 TYP Project
Park 'n Ride	1999 - 2017	$3,596,087	Construct Crown Street Park 'n Ride and accessory facilities	Support carpool, vanpool, intercity bus and alternate modes of transportation (2c)	Existing 2017 - 2020 TIP project
Capitol Corridor	2020+	$125,000,000 - $250,000,000	Establish passenger rail in New Hampshire. Lower estimate reflects Nashua option; higher estimate reflects Manchester option.	Reduced trip times, alternative mode option, improved access, economic development, reduced auto emissions	MPO Long Range Project (Illustrative)

^Estimate costs include indirects and inflation

*Strategy definitions are detailed in the NRPC MPO Congestion Management Process Toolbox: http://www.nashuarpc.org/files/4613/8981/7207/NRPC_CongMgmtProc_2010.pdf