February 22, 2018

14th Street Corridor Traffic Analysis Overview

Introduction

In late October 2012, Hurricane Sandy devastated New York City and left 43 New Yorkers dead, 2 million people without power, flooding in 17% of the city affecting some 90,000 buildings, and $19 billion in damages to the City alone.

The effects of the extensive damage to the subway system serve as a reminder of Sandy's huge impact. All six of the MTA-NYCT's East River subway tunnels were inundated with storm water surges, corroding the various mechanical, electrical and communications components with saltwater.

The 92-year-old tubes of the Canarsie Tunnel, connecting Brooklyn and Manhattan via the L Line, were flooded with seven million gallons of salt water. While the tubes were drained and service was restored just 10 days after the storm, it was clear that a full reconstruction of the tunnel was required.

Service Planning for the Canarsie Tube Closure

Starting in April 2019, the 15-month closure of the L train's Canarsie Tunnel will **directly affect 275,000 daily customers**. While MTA New York City Transit (NYCT) and the New York City Department of Transportation (DOT) have been working together to provide alternatives and new travel options, it is difficult to overstate the significant disruption and inconvenience being brought to the lives of hundreds of thousands of New Yorkers.

With most L commuters moving to other subways, even those New Yorkers who do not ride the L will see their commutes affected by the influx of L riders on their subway lines. But for displaced customers looking to travel between Brooklyn and Manhattan, and along 14th Street within Manhattan, the L train closure will demand new surface transit alternatives.

When L train service is suspended, the 14th Street corridor will need to serve up to **84,000 bus transit customers each day**, making it the busiest bus corridor per mile in the entire United States. In addition to the subway service the MTA plans to add on other lines, the unprecedented disruption will be mitigated by a number of planned changes, including new temporary ferry service, temporary L-Alternative bus service, and -- with cycling and pedestrian volumes expected, at minimum, to double along the Manhattan portion of the L – widened sidewalks and new bike lanes.

Proposed Design and Service Plan

Fourteenth Street is a mixed-use corridor that supports dozens of residential buildings along with a vibrant mix of commercial, health care and educational institutions. The corridor today is a

major destination for 16 subway lines including the L train. In addition to L train passengers, the M14A/D local bus service carries 30,000 daily passengers on the street's surface today.

To accommodate this extraordinary ridership for the duration of the closure, NYCT and NYC DOT are proposing a robust service plan of additional bus service, made possible by critical updates to the street's design to accommodate the surge of commuters at street level.

Figure 1: Busway extents and proposed M14SBS stops

Based on the analysis described below, NYCT plans to run very frequent bus service on 14th Street. A new M14 Select Bus Service (SBS) route – featuring off-board fare collection and all-door boarding – is planned to operate between a temporary East Side ferry terminal at 20th Street and Avenue C and a West Side terminus at 14th Street and Tenth Avenue, supplementing the existing M14A and M14D bus routes. Together, these routes are expected provide a bus every 1-2 minutes at peak times in each direction along the street.

To deliver reliable service to the large number of new crosstown bus passengers, NYCT aims for an end-to-end run time of approximately 17 minutes – a **37% reduction** from current M14A/D travel times. If these ambitious travel-time goals are not met, or are inconsistent, would-be passengers are more likely to seek out alternative modes including personal or for-hire vehicles only exacerbating traffic conditions.

To support the extraordinary transit demand at street level, DOT must also balance sometimes competing demands: the need for increased pedestrian activity and protected bikeways; commercial loading needs for trucks, taxis, FHVs and Access-A-Ride; and the effects of temporarily displaced traffic as a result of street design changes. All of this must be done while maintaining the agency's foremost Vision Zero focus on safety.

To best achieve this, DOT has developed the following proposed designs.

14th Street Busway

The core of 14th Street (Ninth to Third Avenues eastbound and Third to Eighth Avenues westbound) is expected to serve as an exclusive "Busway" with peak hour restrictions. Additionally, offset bus lanes are planned to be added from Eighth Avenue to Ninth Avenue westbound, and a combination of curbside and offset bus lanes are expected to be added from First Avenue to Third

WHO CAN USE THE BUSWAY?

✓buses	✗ taxis/FHVs
✓local deliveries	✗ through trucks
✓cars accessing garages	✗ general traffic
✓Access-A-Ride and emergency vehicles	

Avenue in both directions. The street redesign would likely bring temporary bus bulbs and expanded sidewalks to the corridor. DOT also plans to add new pedestrian space along Union Square West from 14th to 15th Streets and 16th to 17th Streets.

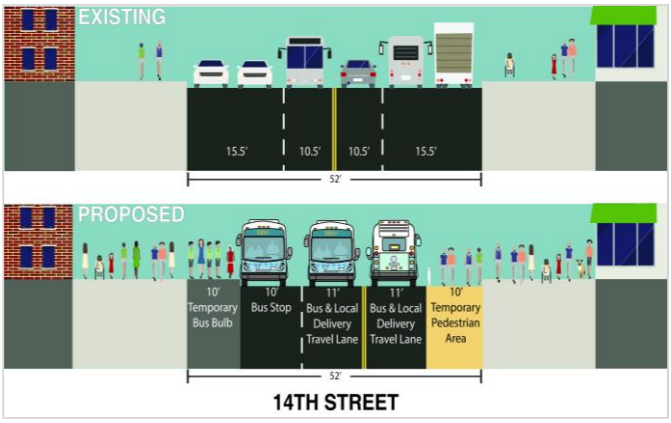


Figure 2: Existing and proposed typical 14th Street busway cross section

Under this plan, access to the Busway would be mostly limited to M14 local and SBS buses; however, Access-A-Ride vehicles, local deliveries, emergency vehicles, and private cars accessing parking garages would also be permitted.

14th Street bus priority treatments would be in effect during peak periods, with specific hours still to be determined.

13th Street Bike Path

With the L Train closure, DOT expects bike ridership to double at a minimum, and we anticipate as many as 5,000 new daily cyclists will use streets around Union Square. We must provide safe crosstown routes to major north-south bike lanes on avenues, destinations along 14th Street, and for other short trips that now use the L Train. The projected heavy bus and pedestrian uses along 14th Street will make the street not conducive to cycling. In order to meet the anticipated increased demand, DOT has planned a protected bike lane along 13th Street.

Figure 3: Existing and proposed typical 13th Street bike path cross section

A 13th Street bikeway would provide a path in both directions that is separated from traffic, offering a safe, accessible option for thousands of daily cyclists. Parking on the south side of the street would be removed and replaced with a standard 2-way path separated from the roadway by a buffer and flexible delineators. The effective width of the roadway would remain the same and sidewalk space would not be altered in any way. DOT is reviewing the curb regulations along the northern curb to accommodate other curb access needs, including local access. In order to minimize heavy parking loss associated with a protected lane, 13th Street was chosen as a two-way bike corridor rather than splitting the lanes into a one-way pair.

While 236 parking spaces along the street's south curb would be lost, all vehicular travel lanes would remain. Intersections would be widened to increase capacity at key points, bikes would be physically separated so they would not be contending for space on the roadway, and most

importantly, protected lanes would increase ridership and shift people away from taking for-hire vehicles on an already over-burdened street. Overall, a 13th Street bikeway would dramatically increase what is known among traffic planners as "*person throughput*," greater capacity that would improve mobility for area residents and visitors during the L Train shutdown period.

Why a bike lane on 13th Street?

- **13th Street Two-Way Path: DOT Preferred option**
    - Minimizes parking loss
    - Closest street to 14th Street, providing the greatest benefit to L train commuters
    - Provides longest continuous east-west connectivity (1.5 miles from Avenue C to Eighth Avenue) – with potential to continue along shared or standard lanes to Hudson St.
    - A two-way path provides 14th Street access to the greatest number of riders, reduces the overall parking loss (vs. two one-way paths), and is the most direct route to connect both eastbound and westbound riders to the every existing north/south protected lane to and from midtown Manhattan.

Why other streets (14th Street, 12th Street, or 15th/16th Street) are less desirable

14th Street

- Tens of thousands of new pedestrians and frequent bus service along new 14th Street Busway would create high capacity for conflicts.

12th Street

- Farther from key retail and transit destinations on 14th Street
- 12th St is a cobblestoned roadway west of Greenwich Ave, and does not allow full east-west connections (street shifts southwest as it goes west of Greenwich Ave)

15th/16th Street

- These streets do not offer a full east-west connection, as they are interrupted by Union Square Park, Stuyvesant Square Park, and Stuyvesant Town.
- Bikes could not be diverted through parks due to the potential for unsafe conflicts with high pedestrian volumes.
- Existing conventional bike lanes will serve as feeder and alternate routes for riders heading north of 14th Street
- Estimated parking loss: over 400 spaces

A one-way pair on 12th/13th Streets is feasible, but…

- Any protected bike lane would require removing parking on one side of the street, doubling the parking loss of the 13th St proposal.

- A two-way path is most efficient: because of narrowness of these crosstown streets, any protected lane requires parking loss. Most streets in the area are 29-33 feet wide. A parking-protected, one-way bike path with parking on both sides requires at least 34 feet and a 2-way lane requires at least 37 feet.

What are the projections for increased bike usage?

- Based on the experience in 2012 after Hurricane Sandy closed the Canarsie Tunnel for more than a week, we project bike ridership over the Williamsburg Bridge will increase at least 300% from today's average volume of 7,100. This volume will disperse throughout Manhattan using the existing network and new protected lanes along Grand Street, Delancey Street, First Avenue, Second Avenue, as well as onto 13th Street.
- DOT projects 2,000 to 5,000 daily cyclists would use the 13th Street protected lane during the L Train's closure. This number is based on cyclist counts on existing lanes near Union Square and the growth of cycling expected on the Williamsburg Bridge, and experience on similar protected bike lane projects where ridership has grown by at least 300%. DOT anticipates that the loss of the L train will also spur cycling volume among Manhattan residents.

Union Square Pedestrian Plaza Expansions

As a result of the Canarsie Tunnel closure, the Union Square subway station is projected to see some of the greatest changes in passenger flows. With that, increased pedestrian space and bicycle parking space would be needed to provide relief to already congested sidewalks and meet the new pedestrian and cycling demand.

Along with additional temporary pedestrian space along the curb lanes of 14th Street, DOT is considering creating much-needed new pedestrian space on Union Square West from East 17th Street to East 16th Street, and from East 15th Street to East 14th Street, a formal bike connection from Broadway to University Place, and space for market truck parking to ease pedestrian congestion at the northwest end of the square near the N/Q/R/W train entrance. The block between East 16th Street and East 15th Street will remain open for local access and circulation for deliveries and passenger pick-up and drop-off.

DOT is exploring either a similar pedestrian treatment on the block of University Place between E 14th Street and E 13th Street, just south of Union Square. In addition to an expanded pedestrian zone, this block is anticipated to be programmed for both a high-capacity, secure bike parking facility and a Citi Bike valet station.

Traffic volume on these particular streets is already relatively low. With access to 14th Street already restricted to accommodate the Busway, these streets offer limited utility for traffic management. Further refinement of the traffic analysis will take these closures into account, but the overall effects on traffic are expected to be negligible.

Traffic Analysis Findings

Introduction

DOT recognizes that the analysis of the 14th Street corridor during the L train closure relies on the full network of streets adjacent to 14th Street. The side streets near 14th Street have a more residential character than 14th Street, and carry a fraction of the people, so the plan reflects the imperative to balance the needs of local access on these streets while addressing the larger challenge of accommodating tens of thousands of crosstown subway riders who will shift to buses, bikes and walking. The following analysis presents the effects of traffic shifts as a result of the proposed plan both along side streets in the area and along 14th Street itself – the crosstown street we estimate will carry the vast majority of crosstown commuters displaced by the L train closure.

Analysis was conducted using the industry-standard Advanced Interactive Simulator for Urban and Non-Urban Networks (known as "*Aimsun")* micro-simulation tool. Planners examined the effects of crosstown travel on 12th –16th Streets based on scenarios that modeled various bus priority configurations and general traffic access along 14th Street. The scenarios modeled were: 1) **Existing Conditions** with the L train running and estimated traffic growth for 2019; 2) a **Do Nothing** scenario where the L train is closed, NYCT runs additional bus service to support the corridor, but DOT makes no changes to the street; 3) an **SBS** scenario that offers standard transit priority lanes and typical turn restrictions found along other crosstown SBS routes; 4) a **'Short Busway'** that restricts general traffic access on 14th Street between Third Avenue and Sixth Avenue; and 5) a similar **Busway** scenario spanning from Third Avenue to Eighth Avenue in the westbound direction and Ninth Avenue/Hudson Street to Third Avenue in the eastbound direction. Additionally, both Busway options offer standard bus lanes outside of the blocks with restricted access.

The *Aimsun* simulation tool uses state-of-the art technology that has thus far proven invaluable in planning for the L train's disruption. However, even with the best planning, we expect that on-the-street results will vary from simulations. After April 2019, some adjustments to the final plans developed using those simulations will be both inevitable and necessary.

Full outputs of DOT's *Aimsun* model are presented in the attached appendices, along with processed results and turning movement count summaries.

Existing Conditions

Existing 14th Street traffic volumes, as with most Manhattan crosstown streets, begins trending upwards in the traditional AM peak period. While there is some slight decrease in volume during the midday, this is more likely attributed to higher traffic saturation on the surrounding street network and frequent double parking than any true decrease in demand.

When charted, bus passenger rates show more clearly defined peak periods. However, it is important to view this in context. Even with a midday dip in ridership, this reduced passenger demand is still higher than almost any other bus route's peak hour ridership.

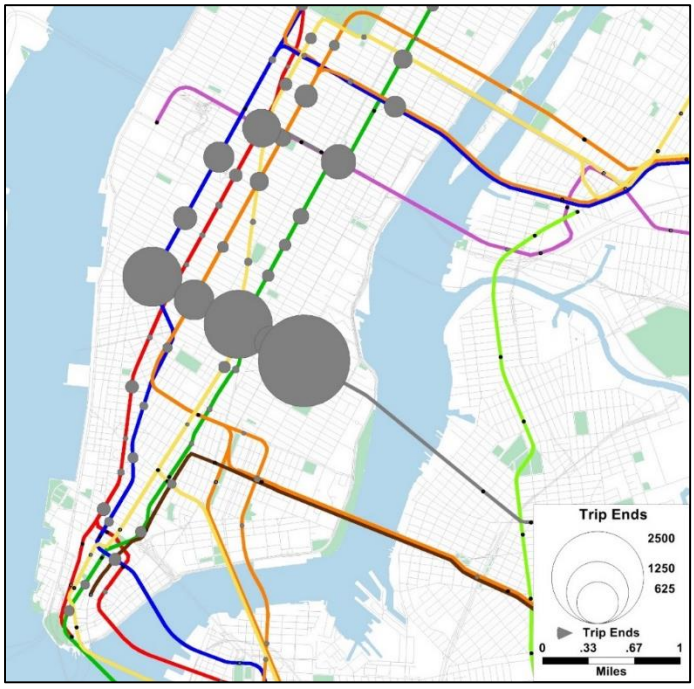


Figure 4: AM Peak Hour Trip Ends of Intra-Manhattan L Riders

The 15 month closure of the L Train running under 14th Street represents an order of magnitude higher demand for surface transportation across the corridor. While most L Train customers use the line to travel to other parts of the city, 114,000 L Train riders have their final destination along 14th Street. Of that, 50,000 originate in Manhattan and 64,000 originate their trip in Brooklyn.

NYCT projects that 84,000 daily customers, consisting of 57% of the intra-Manhattan L Train customers, 11% of the Brooklyn L riders, and the 30,000 current M14A/D riders, will require a fast and reliable surface transit option across the corridor.

Transit Ridership Modeling

Methodology

NYCT bases estimates of customers' origins based on where the MetroCard is swiped first in a day. NYCT bases estimates of customers' destinations based on where the MetroCard is swiped the next time. Not everyone enters the subway in the same general area where they exited last, but the vast majority do. These estimates are supplemented by survey data and census data.

NYCT then "assigns" which path people use based on travel times, crowding levels and other factors. This is handled in a standard industry modeling software package called TransCAD.

The model is not 100% accurate, but it can match observed loads on trains to reasonable levels of accuracy (+/- 5% for most routes, and within 2% on the L train as it enters Manhattan), and has been successfully used to predict patterns during other service changes. Notable among these is the Second Avenue Subway, where current observed volumes of 190,000 riders per day are within 5% of modeled projections, and peak hour ridership has been within 2% of projections.

Effects of Williamsburg Bridge HOV

A primary component of the alternative service plan is to provide shuttle bus service from neighborhoods in Brooklyn to subway connections in Manhattan via the Williamsburg Bridge. Providing fast and reliable bus service is critical to alleviate potential overcrowding on the J/M lines and prevent large shifts to private and for-hire vehicles.

Currently, Williamsburg Bridge travel times are highly variable, ranging from 10-40 minutes. To ensure reliability, DOT will be implementing a policy of HOV 3+, buses and trucks only in both directions on the bridge during peak hours.

Regional modeling of this policy suggests a **traffic volume reduction of 5%** on the larger 14th Street corridor as a result of this policy. Although this reduction has not been reflected in the local modeling results shown in this document, this would result in improved travel times compared to those presented here.

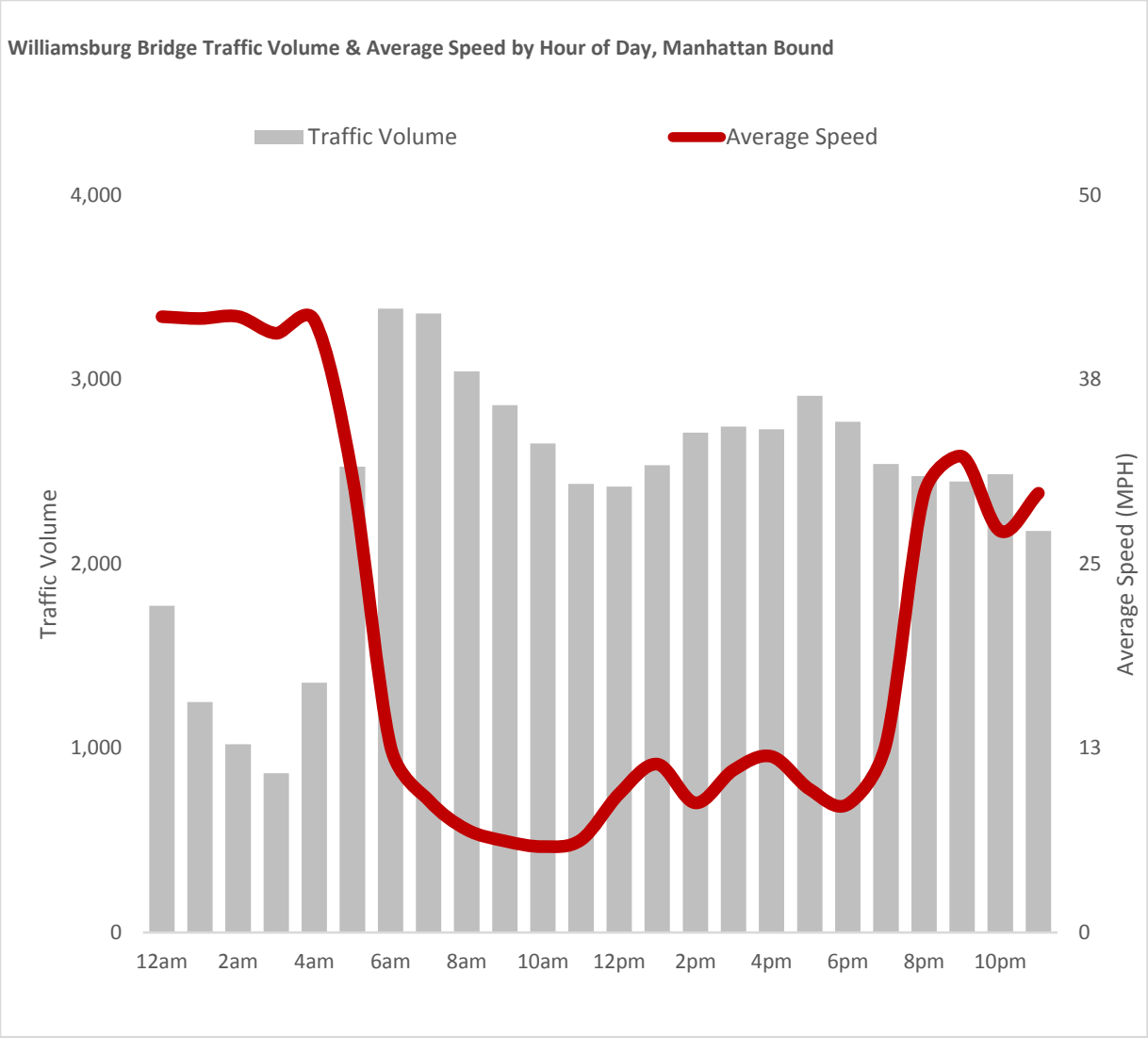


Figure 5: Existing 24 hour Williamsburg Bridge traffic volume and speed

Do-Nothing Scenario

DOT evaluated traffic conditions in a scenario where bus service is increased in response to the L train closure, and the L train is closed between Bedford Avenue and Eighth Avenue, but no changes are made to 14th Street. In this scenario, 14th Street can process slightly more buses, but due to the long travel times, the projected ridership targets cannot be met. In this scenario, 14th

Street sees some traffic volume reduction, resulting in increases on the side streets. This does not take into consideration a likely induced shift to personal and for-hire vehicles which would further increase volumes and travel times.

In this scenario, **bus throughput and travel times are not sufficient to meet demand**, and adjacent side streets see an average traffic **increase of 18%**. As a result, **NYCDOT and NYCT believe that doing nothing to prioritize buses on 14th Street is not a viable option**.

Select Bus Service (SBS)

For other crosstown bus improvement projects, DOT has implemented a mix of curbside and offset bus lanes to create dedicated space for buses.

This design approach has been effective at balancing the needs of through traffic, turning vehicles, parking and loading on other corridors. On these corridors, buses driving in offset bus lanes are occasionally delayed behind vehicles entering bus lanes to make legal right turns, or behind illegal bus lane blockages, and these disruptions are manageable on bus routes with 5-10 minute frequencies. However, on 14th Street during the shutdown, peak period bus volumes will be well in excess of a bus per minute, so the limitations of standard bus lanes would be magnified by the presence of multiple buses. Furthermore, very frequent service means multiple buses at stops simultaneously, which in an SBS scenario then become delayed as they wait to pull out into passing traffic. Blockage factors are applied to bus lanes and bus stops in DOT traffic models, but modeling efforts still tend to underrepresent the degree to which these instances can bring bus service to a halt for multiple signal cycles.

As commuters are no longer able to rely on the L train for crosstown and inter-borough service, DOT and NYCT anticipate significant increases in pedestrians doing one or more of the following things on 14th Street:

- Waiting for M14 SBS and M14 A/D buses
- Entering or exiting stations for north-south subway lines carrying inter-borough trips previously taken on the L line
- Walking across 14th Street for trips previously taken on the L line

With these increases in pedestrian activity, DOT has identified the need to add pedestrian space along the busiest stretch of 14th Street. Select Bus Service bus lanes preclude the ability to provide this space.

For the reasons above, DOT and MTA eliminated the Select Bus Service design option.

Short Busway

DOT tested a version of the Busway restrictions on 14th Street applied to a more targeted section where bus and pedestrian activity is busiest, between Third and Sixth Avenues. While it would

seem intuitive that allowing traffic on most blocks of 14th Street would more equitably balance the needs of motorists and bus riders, the results do not confirm that hypothesis. This scenario processes buses with a similar level of efficiency as the longer, recommended Busway option, but there are a handful of significant side effects.

First, allowing general traffic to circulate well into the core of Manhattan before forcing turns off of 14th Street leads to degraded performance on the side streets in the core relative to all other options, particularly at busy turn locations such as the left turn from Fifth Avenue to 12th Street, as vehicles traveling southbound on Fifth Avenue seek the next available opportunity to head east. The Short Busway yields a **projected average 67% increase in traffic volume on the side streets compared to the Do Nothing option**.

Second, all eastbound general traffic would need to turn left at Sixth Avenue to exit 14th Street at the start of the Busway. This heavy turn volume would conflict with very heavy pedestrian volumes crossing 14th Street at this intersection (3,100 more pedestrians in the AM peak period than under current conditions), entering or exiting the heavily burdened F/M subway and PATH station on the north corners. The intersection of 14th Street and Sixth Avenue has already been designated a Vision Zero priority intersection even without the additional pedestrian activity that will be generated by the L shutdown, so DOT eliminated this option from consideration.

Busway Scenario

In this scenario, the blocks between Third and Eighth Avenues in the westbound direction, and Ninth Avenue/Hudson Street and Third Avenue in the eastbound direction, would be restricted to buses and a limited group of other permitted vehicles only.

Outside of these restricted blocks, general traffic will be able to travel east until Ninth Avenue before being diverted south. General traffic may also travel east as far as Ninth Avenue before being diverted south on Hudson Street. Standard bus lanes will be provided both eastbound and westbound between First and Third Avenues, and westbound from Eighth to Ninth Avenue.

Analysis shows that with the Busway design, buses are able to meet NYCT's target travel times and bus volumes, ensuring reliable service for bus customers during at least peak hours when ridership spikes.

Fast and reliable bus service on 14th Street leads to increased traffic on adjacent side streets, where **volume increases an average of 57 vehicles during the AM peak hour and 96 in the PM peak hour** compared to the Do Nothing option. Similarly, **vehicular travel times are modeled to increase by 0.4 minutes in the AM peak hour and 0.6 minutes in the PM peak hour.**

Not reflected in these results, is an inherent uncertainty in the number of bus passengers accommodated by the Busway who would shift to taxi or for hire vehicles (FHV) if the buses are stuck in traffic. With an anticipated 10,000 bus riders in the AM peak hour, if only 3%-5% of those riders choose taxi instead, the "Do Nothing" scenario could actually see worse traffic conditions on the side streets than with the proposed Busway. Similarly in the PM peak hour, if

only 5%-7% of projected bus riders choose a taxi or FHV instead the side streets would have more traffic under "Do Nothing" than with the Busway.

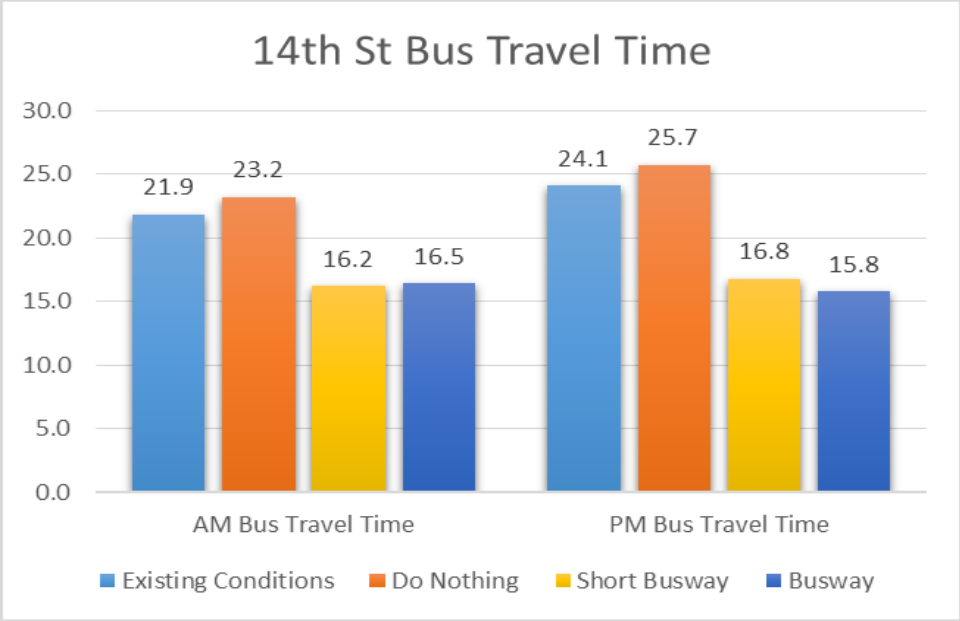
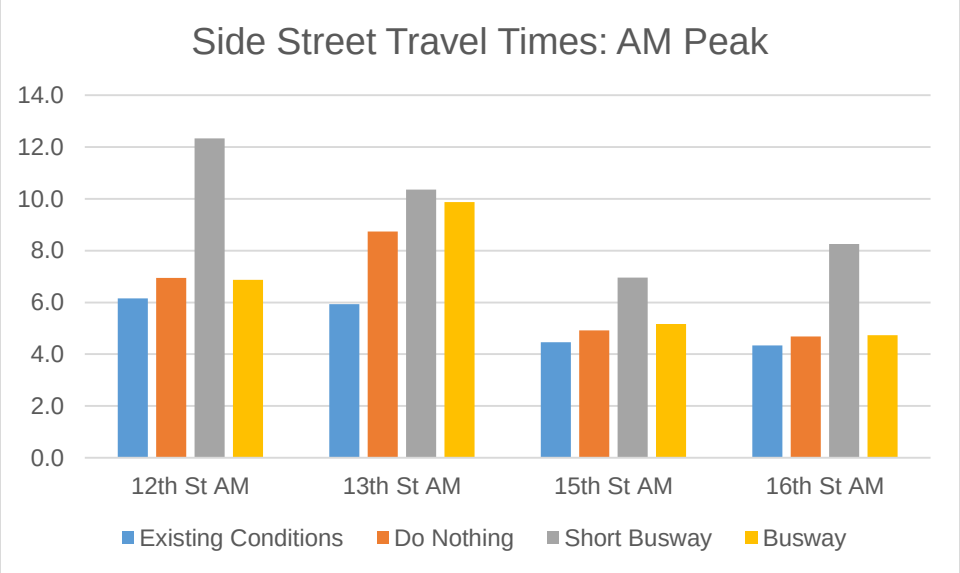


Figure 6: Bus travel time across studied options



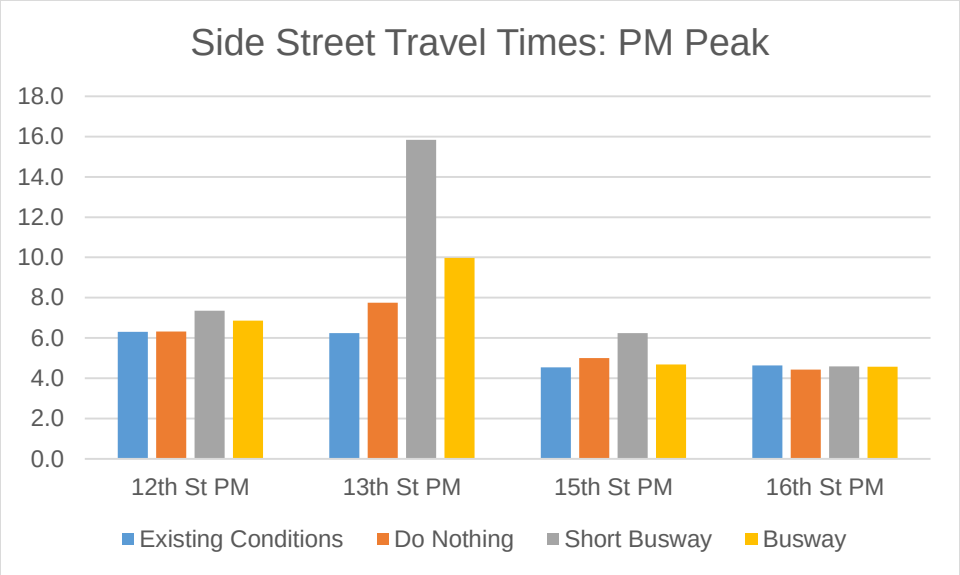


Figure 7: Side streets travel time across studied options

Projected Volume Changes

Traffic Volume 8:00 - 9:00 AM				
	Existing to Busway		Do Nothing to Busway	
	Car	Bus	Car	Bus
*14th	-405	90	-284	36
12th	122		68	
13th	145		126	
15th	47		35	
16th	41		-1	
Side Sts Average	89		57	

*total for both directions

Traffic Volume 5:00 - 6:00 PM				
	Existing to Busway		Do Nothing to Busway	
	Car	Bus	Car	Bus
14th	-542	92	-277	41
12th	61		91	
13th	111		179	
15th	53		76	
16th	32		38	
Side Sts Average	64		96	

Table 1: Peak-hour modeled traffic volume changes

Traffic Volume 8:00 - 9:00 AM								
	Existing (Base)		Do Nothing (L closed)		Short Busway (3Av - 6Av)		Busway (3rd Av - 8th/9th Av)	
	Car	Bus	Car	Bus	Car	Bus	Car	Bus
14th	584	41	463	96	156	126	179	131
12th	172	0	226	0	339		294	0
13th	232	0	251	0	361		377	0
15th	132	0	143	0	178		178	0
16th	157	0	199	0	197		197	0
Side Sts	693	0	819	0	1075		1047	0

Traffic Volume 5:00 - 6:00 PM								
	Existing (Base)		Do Nothing (L closed)		Short Busway (3Av - 6Av)		Busway (3rd Av - 8th/9th Av)	
	Car	Bus	Car	Bus	Car	Bus	Car	Bus
14th	650	30	385	81	108	126	108	122
12th	209	0	178	0	316		270	0
13th	296	0	228	0	394		407	0
15th	151	0	127	0	192		204	0
16th	179	0	173	0	211		211	0
Side Sts	834	0	708	0	1113		1092	0

Table 2: Peak-hour modeled traffic volumes

Travel Time 8:00 - 9:00 AM								
	Existing (Base)		Do Nothing (L closed)		Short Busway (3Av - 6Av)		Busway (3rd Av - 8th/9th Av)	
	Car	Bus	Car	Bus	Car	Bus	Car	Bus
14th	9.6	21.7	16.7	22.6	8.1	16.7	5.5	17.1
12th	6.2		7.0		12.3		6.9	
13th	5.9		8.7		10.4		9.9	
15th	4.5		4.9		7.0		5.2	
16th	4.3		4.7		8.3		4.7	
Side Sts	5.2		6.3		9.5		6.7	

Travel Time 5:00 - 6:00 PM								
	Existing (Base)		Do Nothing (L closed)		Short Busway (3Av - 6Av)		Busway (3rd Av - 8th/9th Av)	
	Car	Bus	Car	Bus	Car	Bus	Car	Bus
14th	10.5	23.2	16.2	21.3	6.8	16.8	4.8	15.8
12th	6.3		6.3		7.4		6.9	
13th	6.2		7.7		15.8		10.0	
15th	4.5		5.0		6.2		4.7	
16th	4.6		4.4		4.6		4.6	
Side Sts	5.4		5.9		8.5		6.5	

Table 3: Average peak-hour travel time change, from Avenue C to Eighth Avenue (Note: for streets that are not contiguous from Avenue C to Eighth Av, only the blocks within those extents are modeled)

*"Car" volumes and travel times along 14th Street in the Busway analysis only reflect permitted uses.

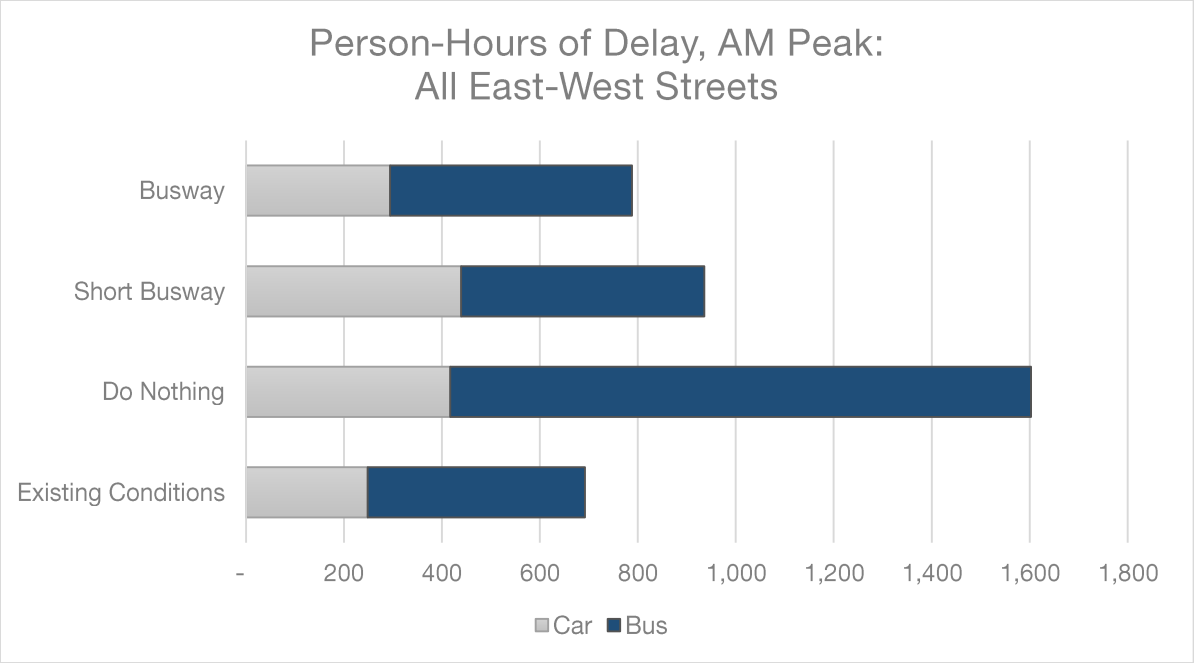
Measuring People, Not Cars

While changes in traffic volume can affect travel patterns and times across a corridor – and certainly is felt by businesses and residents of that street – simply measuring vehicle numbers without accounting for the people inside the vehicles can lead to a skewed analysis that underrepresents those who travel in more efficient, higher-capacity vehicles.

To account for the variance in passengers, the model results of the different scenarios evaluated "person delay." This analysis provides a more complete picture of the effects on people's trips, not just counts of vehicles. This metric is a more broad-based approach to analyzing the effects of possible changes to our city streets.

Analyzing the 14th Street corridor as a network of several streets, and measuring changes for people traveling in the right of way, provides a more comprehensive view. The results show the busway providing a **decrease in person delay of 51%** during peak periods compared to the Do Nothing option.

Moreover, the total delay for just people in cars is greater in the Do Nothing option than in the Busway, both in the AM and PM peaks. In other words, while individual blocks may vary, there would be less total auto congestion for the corridor taken as a whole with the Busway.This may seem counter-intuitive, but is possible because a large portion of current auto demand would avoid the corridor altogether.



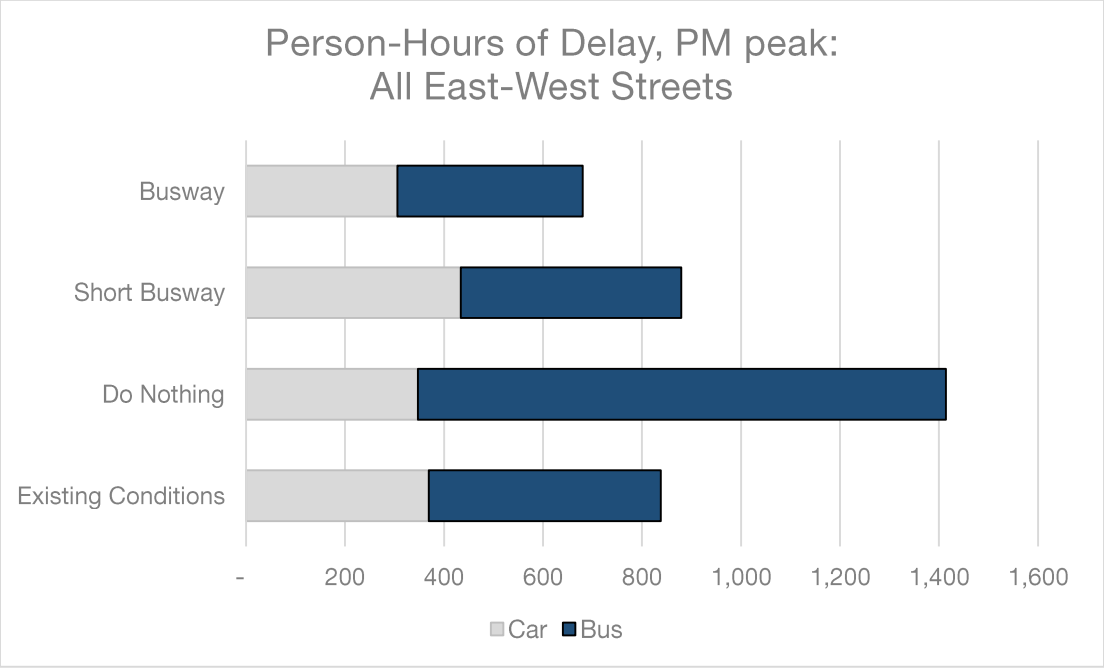


Figure 8: Peak-hour modeled person-hours delay

Market Segment	Sub-Market	Current Riders	Use Busway During Shutdown	% of Current Market Using Busway
Bus	M14	30,000	30,000	100%
Intra-Manhattan L Riders	1 Av	25,000	18,500	74%
	Other	25,000	10,000	40%
	Total	50,000	28,500	57%
Brooklyn-Manhattan L Riders	To/From 14th St Destinations	64,000	23,300	36%
	Other Destinations	161,000	2,200	1%
	Total Along 14th	225,000	25,500	11%
Total Riders 14th St	To/From 14th St Destinations	144,000	81,800	57%
	Total Along 14th	**305,000**	**84,000**	**28%**

Table 4: 14th Street bus ridership projections

L Train AM Peak Destinations

Corridor	Riders	Share
Wall/Broad	5,065	2%
Fulton	2,479	1%
Chambers Park Pl	4,764	2%
Canal St/Delancey	4,732	2%
Spring-Houston	8,711	4%
Downtown	**25,750**	**11%**
W4 - 8 St	3,619	2%
14 St	64,026	28%
18 St	279	0.10%
23 St	12,776	6%
28 St	5,755	3%
Valley	**86,454**	**38%**
34 St	22,060	10%
42 St	26,359	12%
49-53 St	15,566	7%
57-63 St	14,822	7%
Midtown	**78,807**	**35%**
N of 63rd (Uptown and Bronx)	**31,139**	**14%**
Brooklyn	2,624	1%
Queens	225	0.10%
Total	**225,000**	**100%**

Table 5: Existing AM peak L Train subway station destinations

	Estimated	2017 14th St Origins/Destinations		Combined
Hour	M14-SBS Ridership	M14A Ridership	M14D Ridership	14th St Ridership
0	292	34	53	379
1	111	15	29	155
2	55	15	18	88
3	29	11	15	55
4	58	30	92	180
5	360	82	272	714
6	1,284	292	848	2,424
7	3,314	771	1,950	6,035
8	6,992	806	2,271	10,069
9	5,288	479	1,198	6,965
10	2,658	394	872	3,924
11	2,258	389	843	3,489
12	2,418	439	892	3,749
13	2,514	466	1,067	4,047
14	2,691	597	1,325	4,613
15	3,090	675	1,640	5,405
16	3,494	663	1,663	5,820
17	5,434	731	1,633	7,799
18	4,853	672	1,386	6,910
19	2,750	467	1,040	4,257
20	1,597	334	829	2,760
21	1,177	247	610	2,034
22	825	168	508	1,501
23	498	138	364	1,000
Average Weekday	*54,039*	*8,915*	*21,417*	*84,370*

Table 6: Projected hourly 14th Street bus ridership

Projected 14th Street Bus Frequencies			
Hour	M14 A/D	M14SBS	Total
0100-0200	2	3	5
0200-0300	2	3	5
0300-0400	2	3	5
0400-0500	2	3	5
0500-0600	6	6	12
0600-0700	11	8	19
0700-0800	23	17	40
0800-0900	25	33	58
0900-1000	18	25	43
1000-1100	15	19	34
1100-1200	13	17	30
1200-1300	13	18	31
1300-1400	13	20	33
1400-1500	16	20	36
1500-1600	17	22	39
1600-1700	18	20	38
1700-1800	15	34	49
1800-1900	15	32	47
1900-2000	13	18	31
2000-2100	13	17	30
2100-2200	12	13	25
2200-2300	11	9	20
2300-2400	8	6	14
2400-0100	7	6	13

Table 7: Projected hourly 14th Street bus frequency in peak direction

Next Steps

Ongoing Corridor Design

DOT and NYCT will continue to refine street configurations and service plans to best meet the needs of a variety of stakeholders. DOT will continue to work with businesses and residents on adjacent streets regarding traffic-calming strategies and curb access needs ahead of implementation, and will continue to respond to concerns once the L train closure begins.

Outreach

DOT and NYCT are committed to ongoing community outreach and dialogue throughout the planning and implementation of this project. Updates and further information can be found at http://web.mta.info/sandy/rebuildingCanarsieTunnel.html, where questions and concerns can be submitted.

Implementation

L train service between Brooklyn and Manhattan, as well as intra-Manhattan service, will be suspended starting in April 2019. The shutdown is anticipated to last 15 months.

DOT plans to begin implementation of the proposed street treatments beginning in late summer 2018, with substantial completion expected in winter 2018. The anticipated start date of restricted traffic access along 14th Street is still pending, and is largely dependent on NYCT's launch date of M14 SBS.

DOT and NYCT were planning to install the M14 SBS route with bus priority and pedestrian safety enhancements typically implemented on SBS routes before the L train shutdown was scheduled. Any other traffic restrictions, including the 13th Street bike lanes, are temporary measures during the closure of the L train. If DOT decides to consider making them permanent, DOT would conduct further evaluation.

Continued Analysis

As DOT and NYCT refine street designs and service plans, and as both agencies weigh community feedback on the draft plan, additional traffic analysis will be conducted to analyze and refine for planned operations. Both agencies are committed to monitoring the performance of 14th Street as well as adjacent side streets as the closure begins and make any necessary adjustments.

Traffic Analysis FAQ

What is a traffic model?

A traffic model is a computer program used to estimate a project's effects on the volume and speed of vehicles. Two types of traffic models were used in the analysis of the L train shutdown and development of alternative service plans and traffic management:

1) Regional Model: DOT and MTA utilized the New York Metropolitan Transportation Council's Best Practice Model (BPM) to look at the effects of the L train shutdown at a broad scale, including how people may change their mode or route of travel. However, this model does not estimate exactly how much traffic might use any individual street.
2) Local Models: DOT and MTA utilized *Aimsun* software to examine the traffic effects of transit service plans and traffic management strategies on individual streets and intersections, including 14th Street, nearby parallel streets and intersecting avenues. These models help to illustrate changes in local traffic volumes and travel times but do not look at changes in travel mode or destination.

As the L train closure and potential traffic and transit solutions may have both local and regional effects, both types of models have been used to help DOT and NYCT plan any street changes. The models work together: the regional model estimates how many people would change their travel patterns or switch from subway to car or bus (or vice versa), those results were then used to update the local traffic model.

Do traffic models tell us exactly what will happen?

No. These models provide DOT and the MTA with a basic understanding of travel patterns, and are useful tools to help us make informed policy decisions to best keep New Yorkers moving while minimizing local access challenges. It is not a 'hard and fast' indicator of what should be done, but rather gives an idea of relative traffic effects that help shape planning decisions informed by community involvement.

The models are also a high-level, theoretical snapshot of street design and operational planning. Based on these coarse results, planners can fine-tune roadway geometry, signal timing and service patterns to optimize desired results.

For an unprecedented event such as the L train tunnel shutdown, DOT and NYCT will closely monitor traffic management and transit service plans once the Canarsie Tunnel goes out of service and will adjust policies based on observed demand and congestion.

What scenarios were studied, and how were they measured?

The MTA and NYC DOT first analyzed an **Existing Conditions** traffic condition that included assumed growth for a 2019 build year, with L train subway service in operation. The agencies then modeled a **Do Nothing** scenario with the L train shut down, alternative bus service provided, and no changes made to street design or traffic management. From there, a typical Select Bus Service (**SBS**) scenario was considered with bus priority lanes and through traffic on 14th Street. Two more expansive bus priority streets were measured in detail: a **Short Busway** that restricts general through traffic from Third through Sixth Avenues; and a more robust **Busway** that extends from Third to Eighth Avenue in the westbound direction and Ninth Avenue/Hudson Street to Third Avenue in the eastbound direction.

Each of these scenarios was evaluated for bus travel time, bus reliability, and side street traffic effects. Pedestrian safety and bus operational needs were also considered in the street design and service plans, but are not reflected in this summary.

Which streets were analyzed?

The micro-simulation focused on 12th to 16th Street, end-to-end, with traffic data collected for all needed intersections in that area. Similarly, north-south traffic was collected and modeled between Ninth Avenue and Avenue C.

While the extent of this network may seem limited, the chosen streets are representative of overall network effects, allowing DOT to evaluate traffic changes on other streets as well. Additionally, the regional simulation model provides input regarding traffic volume changes beyond this immediate study area.

The areas north and south of the analyzed streets will see spillover traffic effects begin to taper off, particularly in the West Village, where the grid is broken up and the ability for traffic to travel through is greatly diminished. North of 14th Street, through traffic is generally diminished by the diversion around Union Square Park.