

# CLINTON/HELLS KITCHEN NEIGHBORHOOD TRAFFIC STUDY

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City of New York  
Michael R. Bloomberg, Mayor



Department of Transportation  
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A Member of the New York  
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**Hell's Kitchen Neighborhood Traffic Study**  
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## EXECUTIVE SUMMARY

The Clinton/Hell's Kitchen Neighborhood Traffic Study has been undertaken by the New York City Department of Transportation (NYCDOT) with the goals of improving safety, mobility, and the quality of life for all street users (pedestrians, cyclists, transit users and motorists). This report presents recommended improvement measures based on analysis of existing and projected future conditions, as well as community input and feedback.

The Clinton/Hell's Kitchen neighborhood study area extends from West 29<sup>th</sup> Street to West 55<sup>th</sup> Street, and from 8<sup>th</sup> Avenue to the Hudson River. It lies entirely within the boundaries of Manhattan Community Board 4 and includes the entire Hell's Kitchen neighborhood, the Special Clinton District and the western part of the Garment District.

Existing regional transportation facilities within the study area include the Lincoln Tunnel, NYS Route 9A, and the Port Authority Bus terminal (PABT). In addition, there are major trip generators within the study area, including the Javits Convention Center, the Manhattan Cruise Terminal, the USS Intrepid Museum, Theater Row, Restaurant Row, the Hudson River Greenway Bike Path, the Caemmerer Rail Yards, the Quill Bus Depot, the US Postal Service complex, and major distribution centers of three package delivery companies. The study area is also home to about 37,000 residents and 96,000 jobs. Directly adjacent to the study area are the theater district, Times Square, the garment district, Penn Station and Madison Square Garden on the east, the Chelsea neighborhood on the south, and the Upper West Side on the north.

The initiation of this study coincided with a number of major ongoing public and private projects in the study area, including public works projects, rezoning actions, and large-scale private developments. As a result, there is ongoing and growing competition between the various functions of the street, curb, terminal/parking facilities and sidewalk space, by competing street users including pedestrians, bicyclists, transit users, tour buses, delivery trucks, taxis and private autos.

As a result of these competing demands for the use of the street network and in response to congestion-related concerns expressed by the Community Board and local elected officials, NYCDOT is performing this study to address these issues. Problems were identified based on data collection and analyses, field observations and consultation with stakeholders such as residents, local businesses, transportation providers, Community Board members, elected officials, local government agencies and various interest groups. The following is a summary of the major problems that were identified:

- High levels of congestion in the study area network, mainly due to spillback from the Lincoln Tunnel.
- Problematic access and egress points to the Lincoln Tunnel because of bottleneck conditions, especially on 9<sup>th</sup> Avenue.
- Discontinuous sidewalk on west side of 9<sup>th</sup> Avenue between West 36<sup>th</sup> and West 37<sup>th</sup> Streets.
- Pedestrian safety including pedestrian and traffic volumes in certain school zones and conflicts with turning vehicles.

- Conditions of sidewalks, including sidewalk overcrowding, auto repair and other unauthorized parking on sidewalks, and poor condition of roadbed and pavement markings.
- Lack of bicycle facilities.
- Problems caused by transit, charter and tour buses, including unsafe bus turning movements, bus layover and pick-up/drop-off areas and conflicts with pedestrians.

In order to address these identified issues, improvement measures were designed and analyzed. Improvements that have already been implemented are:

- Crosswalks with set-back stop bars.
- Improved signage.
- Relocated bus layover areas and expanded bus stops.
- Signal timing changes, including leading pedestrian intervals (LPIs).

Other improvements planned for later implementation include:

- Expansion of 8<sup>th</sup> and 9<sup>th</sup> Avenue bike lanes
- “Canoe” project to provide expanded, attractive landscaped pedestrian island and provide continuous sidewalk on west side of 9<sup>th</sup> Avenue between West 36<sup>th</sup> and West 37<sup>th</sup> Streets.
- Signal timing changes and turn prohibitions at selected locations to reduce congestion and improve pedestrian and vehicular safety on 9<sup>th</sup> Avenue.
- Select Bus Service (SBS) for 34<sup>th</sup> Street.
- PM peak period contra-flow bus lane on Dyer Avenue to relieve congestion and improve pedestrian safety on 9<sup>th</sup> Avenue.
- Conversion of 11<sup>th</sup> Avenue to one-way north of West 44<sup>th</sup> Street.
- Conversion of 11<sup>th</sup> Avenue to two-way south of West 34<sup>th</sup> Street.
- Split-phases for conflict free crossing of 8<sup>th</sup> and 9<sup>th</sup> Avenues.
- Split-phase for conflict free crossing of West 41<sup>st</sup> Street at 9<sup>th</sup> Avenue.

These improvements have been evaluated and their benefits and costs have been quantified using Synchro/SimTraffic software, where applicable.

## CHAPTER 1 INTRODUCTION

The Clinton/Hell's Kitchen Neighborhood Traffic Study has been undertaken by the New York City Department of Transportation (NYCDOT) with the goals of improving mobility, safety and the quality of life for all street users. The study is consistent with the City's goal of building "Complete Streets" that accommodate all street users including pedestrians, cyclists, transit users and motorists.

As shown in Figure 1.1.1, the study area boundaries are West 29<sup>th</sup> Street on the south, West 55<sup>th</sup> Street on the north, 8<sup>th</sup> Avenue on the east and the Hudson River on the west. It lies entirely within the boundaries of Manhattan Community Board #4 and includes the entire Hell's Kitchen neighborhood, the Special Clinton District and the western part of the Garment District. The study area consists of 131 signalized intersections, three signalized mid-block crosswalks, four signalized driveways and four unsignalized intersections.

Existing transportation facilities that provide regional transportation through the study area include the Lincoln Tunnel, NYS Route 9A, and the Port Authority Bus Terminal (PABT). In addition, there are major trip generators within the study area,

including the Javits Convention Center, the Manhattan Cruise Terminal, the USS Intrepid Museum, Theater Row, Restaurant Row, the Hudson River Greenway Bike Path, the Caemmerer Rail Yards, the Quill Bus Depot, the US Postal Service complex, and major distribution centers of three package delivery companies. The study area is also home to about 37,000 residents and 96,000 workers. Directly adjacent to the study area are the theater district, Times Square, the garment district, Penn Station and Madison Square Garden on the east, the Chelsea neighborhood on the south, and the Upper West Side on the north.

The study area is poised to experience significant growth in residential and commercial development as a result of the Hudson Yards Rezoning & Development Program and the Number 7 Subway Extension actions. This allows and provides for development at increased densities in the area. As a result, there is ongoing and growing competition among the various functions of the street, curb, terminal/parking facilities and sidewalk



Figure 1.1.1: Study Area

space, by several types of users including pedestrians, cyclists, transit users, delivery vehicles, tour buses, taxis and private autos.

The public outreach effort to obtain community input was a critical component throughout the study process. This has involved the participation of elected officials, Community Board 4, transportation/transit providers, merchants/shoppers, and other community groups/civic organizations. Inter-agency coordination was also critical, as various city, state and federal agencies have specific requirements, issues and jurisdictions within the study area. Input from these activities have facilitated the identification of community issues which were incorporated into the development of the various improvement options and the selection of the recommended improvements. A detailed record of the public and agency involvement process and the resulting input on problems to address was regularly documented.

## CHAPTER 2      EXISTING CONDITIONS

As a result of existing transportation facilities that provide regional transportation through the study area – such as the Lincoln Tunnel and the PABT– as well as trip generators within and adjacent to the study area, there is ongoing competition between the various functions of the street, curb, terminal/parking facilities and sidewalk space. Geometric constraints make this study area challenging to provide safe and efficient operations for all street users, including pedestrians, cyclists, transit users, delivery vehicles, taxis and private autos. This chapter summarizes the findings of existing and future without improvements conditions.

### 2.1 Traffic

The main traffic problem to be addressed is the chronic congestion caused by vehicular access to and from the Lincoln Tunnel. This is especially apparent during the weekday PM peak hour, when vehicular demand for the New Jersey-bound (outbound) Lincoln Tunnel exceeds capacity, causing congestion on corridors leading to the tunnel. For this reason, the focus of traffic analysis is on corridors leading to and affected by the Lincoln Tunnel during the weekday PM peak hour. This is not meant to underestimate the traffic problems during other times, but rather to focus the attention on the time that has the worst congestion.

The Lincoln Tunnel contains three tubes which provide two lanes each for a total of six lanes. The south tube is always inbound (New York bound), and the north tube is always outbound (New Jersey bound). The reversible center tube provides two inbound lanes during the weekday AM peak period, two outbound lanes during the weekday PM peak period, and one lane in each direction during all other times. Thus, during the weekday PM peak hour, there are a total of four outbound lanes.

Synchro and SimTraffic software was used to analyze network performance during base year conditions, future without improvements conditions, and to test the effectiveness of improvement packages. The performance measures analyzed include average speed for roadway segments, and delays and queues for individual movements, where applicable.

The model was customized to account for the effects of Lincoln Tunnel backups on individual intersection throughput and overall street network performance. The results of analysis are presented for all or part of the following eight corridors within the study area:

- 8<sup>th</sup> Avenue from West 29<sup>th</sup> to West 43<sup>rd</sup> Streets
- 9<sup>th</sup> Avenue
  - from West 48<sup>th</sup> to West 41<sup>st</sup> Streets
  - from West 41<sup>st</sup> to West 36<sup>th</sup> Streets
  - from West 36<sup>th</sup> to West 29<sup>th</sup> Streets
- 10<sup>th</sup> Avenue from West 29<sup>th</sup> to West 42<sup>nd</sup> Streets
- 11<sup>th</sup> Avenue southbound
  - from West 46<sup>th</sup> to West 40<sup>th</sup> Streets
  - from West 40<sup>th</sup> to West 29<sup>th</sup> Streets

- 11<sup>th</sup> Avenue northbound from West 34<sup>th</sup> to West 40<sup>th</sup> Streets
- West 34<sup>th</sup> Street both directions between 8<sup>th</sup> Avenue and Route 9A
- West 41<sup>st</sup> Street from 8<sup>th</sup> to 11<sup>th</sup> Avenues
- West 42<sup>nd</sup> Street both directions between 8<sup>th</sup> Avenue and Route 9A

Ninth Avenue is broken up as described above because access to the Lincoln Tunnel at West 41<sup>st</sup> and West 36<sup>th</sup> Streets causes this corridor to behave like three distinct segments. Likewise, southbound 11<sup>th</sup> Avenue is divided into two segments at West 40<sup>th</sup> Street.

The analysis of existing conditions was performed for the weekday PM peak hour for two scenarios which differ in the enforcement of a turn prohibition. Signs prohibit the right-turn from 9<sup>th</sup> Avenue to West 41<sup>st</sup> Street for all traffic except buses from 4PM to 7PM weekdays. There is often non-compliance when this is not enforced with a traffic enforcement agent. The first scenario uses the volumes as shown in Figure 2.1.1 when the ban was not enforced, which includes 280 cars and 20 trucks making this turn illegally, in addition to 100 buses that make this turn legally. Figure 2.1.2 presents a schematic diagram of the ramps leading to the Lincoln Tunnel, and the processed volumes under this scenario.

The second scenario represents the condition when the right-turn ban is enforced. The 280 cars are reassigned to the ramp just north of West 36<sup>th</sup> Street that leads to the Lincoln Tunnel (Ramp C), and the 20 trucks are reassigned to the north tube via West 39<sup>th</sup> Street and 11<sup>th</sup> Avenue. This dual-scenario approach was chosen because the presence or absence of cars and trucks making right-turns from 9<sup>th</sup> Avenue onto West 41<sup>st</sup> Street makes a significant difference in overall traffic operations on 9<sup>th</sup> Avenue, especially the segment between West 41<sup>st</sup> and West 36<sup>th</sup> Streets, and for bus flow on West 41<sup>st</sup> Street.

The results of the SimTraffic simulation for the two existing conditions scenarios are displayed in Figure 2.1.3. The model was calibrated so that the speeds reported by the simulation are in the same ranges as actual speeds from field collected travel time and delay runs as well as from taxi GPS data.

As shown in Figure 2.1.3, the biggest difference in operations between the two scenarios is the average travel speed on West 41<sup>st</sup> Street. Under the Ban Not Enforced scenario, in which 280 cars and 20 trucks illegally turn onto West 41<sup>st</sup> Street, the average travel speed is 4.0 mph on the West 41<sup>st</sup> Street segment. Under the Ban Enforced scenario, the average travel speed is 10.9 mph, a noticeable improvement. The reason for the ban is that West 41<sup>st</sup> Street is the principal on-street connection for buses between the Port Authority Bus Terminal and the Lincoln Tunnel. The congestion caused by cars and trucks turning illegally onto West 41<sup>st</sup> Street delays thousands of bus passengers.

On the segment of 9<sup>th</sup> Avenue from West 48<sup>th</sup> to West 41<sup>st</sup> Streets, the average travel speed is 7.5 mph under the Ban Not Enforced scenario. Under the Ban Enforced scenario, the travel speed is slightly lower at 7.4 mph. On the segment of 9<sup>th</sup> Avenue from West 41<sup>st</sup> to West 36<sup>th</sup> Streets, where the entrance to Ramp C is, the differences between the two scenarios are more pronounced. Under the Ban Not Enforced scenario, the average travel speed on this segment is a relatively brisk 13.6 mph, but under the Ban Enforced

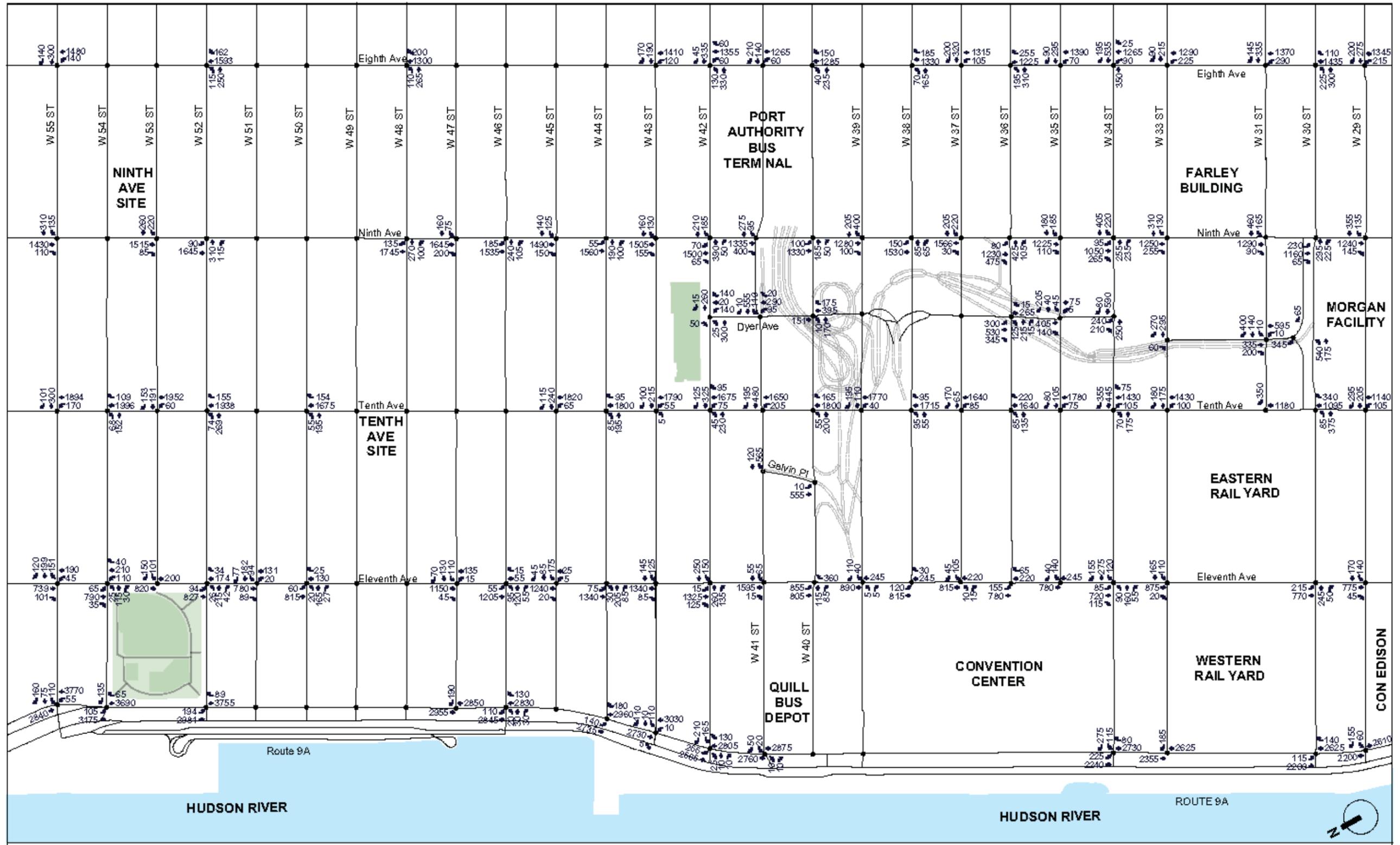


Figure 2.1.1:  
Traffic Volumes – 2008 Base Condition – Weekday PM Peak Hour

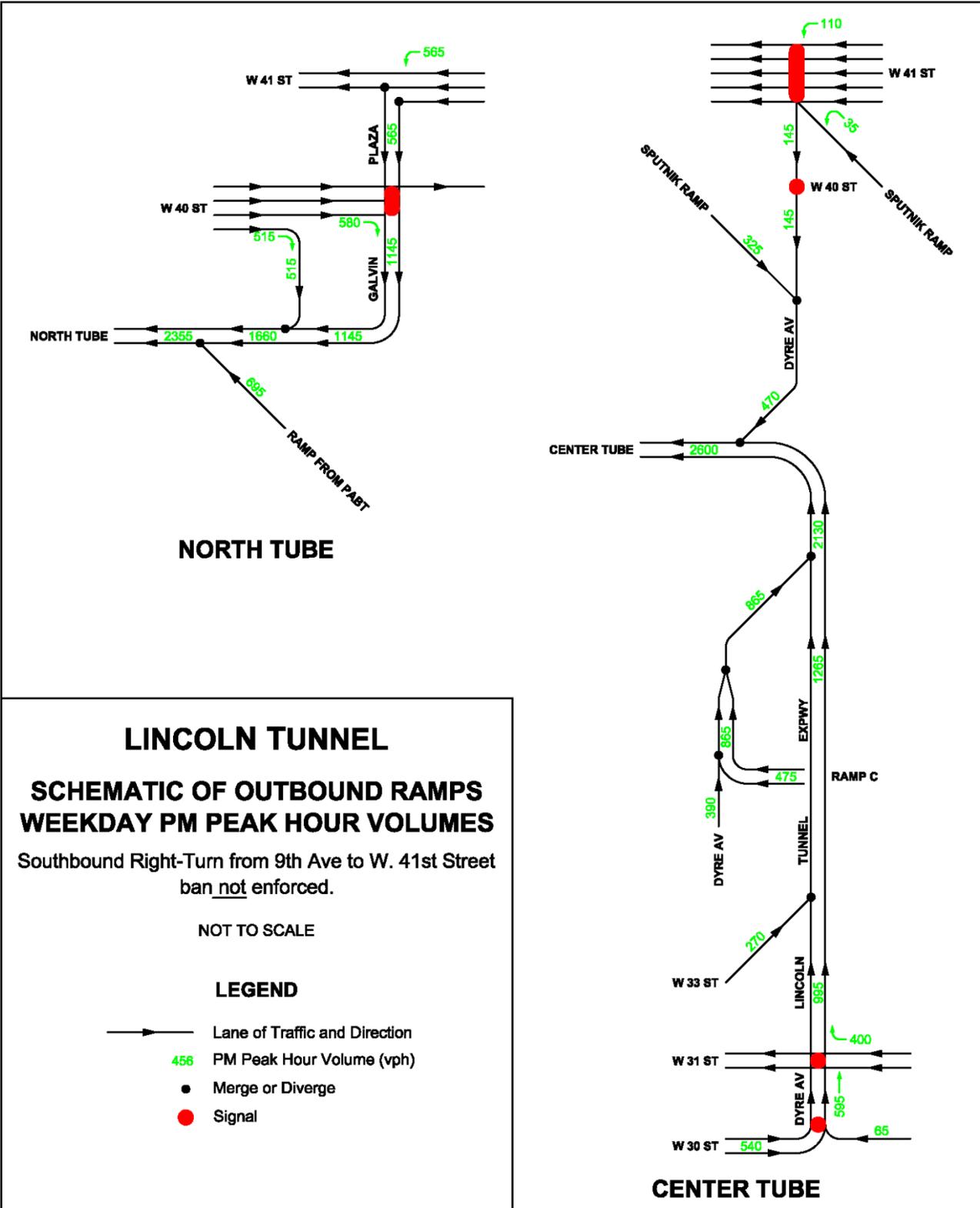
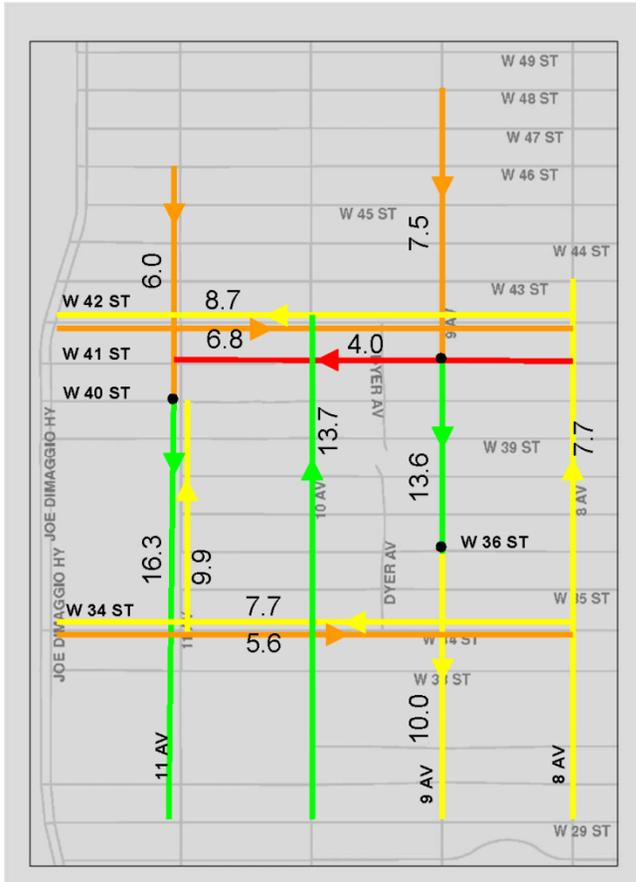


Figure 2.1.2: Schematic of Outbound Ramps to Lincoln Tunnel with PM Peak Hour Volumes



SB RIGHT-TURN FROM 9 AV TO W 41 ST  
**BAN NOT ENFORCED**



SB RIGHT-TURN FROM 9 AV TO W 41 ST  
**BAN ENFORCED**

Figure 2.1.3: Average Travel Speeds – 2008 Base Year – Weekday PM Peak Hour

scenario, it is a plodding 5.5 mph. The increased congestion on this segment of 9<sup>th</sup> Avenue caused by enforcing the turning ban on West 41<sup>st</sup> Street is offset by the reduced person-delay on West 41<sup>st</sup> Street for the higher number of bus passengers.

The segment of southbound 11<sup>th</sup> Avenue from West 46<sup>th</sup> to West 40<sup>th</sup> Streets is better under the Ban Enforced scenario compared to the Ban Not Enforced scenario, 7.2 mph vs. 6.0 mph, respectively, because fewer cars use the north tube under the Ban Enforced scenario. Likewise, 11<sup>th</sup> Avenue northbound from West 34<sup>th</sup> to West 40<sup>th</sup> Streets is slightly better under the Ban Enforced scenario compared to the Ban Not Enforced scenario, 10.6 mph vs. 9.9 mph, respectively. And for the same reason, 10<sup>th</sup> Avenue operates better under the Ban Enforced scenario compared to the Ban Not Enforced scenario, 16.6 mph vs. 13.7 mph, respectively. The difference is the extra delays that result from vehicles wishing to turn left from 10<sup>th</sup> Avenue onto West 41<sup>st</sup> Street under the Ban Not Enforced scenario.

For most other corridor segments, speeds are not affected significantly by whether or not the turn ban is enforced. Ninth Avenue from West 36<sup>th</sup> to West 29<sup>th</sup> Streets operates fairly well at about 10 mph, and 11<sup>th</sup> Avenue southbound from West 40<sup>th</sup> to West 29<sup>th</sup> Streets operates very well at about 16 mph. West 34<sup>th</sup> Street westbound, West 42<sup>nd</sup> Street in both directions, and 8<sup>th</sup> Avenue average travel speeds are in the 8 to 10 mph range. West 34<sup>th</sup> Street eastbound is slower at about 5.6 mph due to lane reduction and congestion east of the study area.

Because change is occurring rapidly in the study area, a seven-year planning horizon was employed for estimating future transportation conditions and needs; hence, the future year for planning purposes is set at 2015. The analysis of future conditions without improvements represents expected traffic conditions if volumes grow as projected, in the absence of any improvements to the transportation system other than those that have already occurred or are planned for implementation by 2015 independent of this study. This analysis is performed for two reasons: to provide a hypothetical estimate of the consequences of doing nothing, and to provide a basis for comparing the potential benefits of various transportation system improvements.

A 4.0% traffic growth rate was assumed from 2008 to 2015, and was assigned uniformly throughout the network. In addition, the future analysis includes the following network changes that took place or will take place by 2015:

- “Green Light for Midtown” – Broadway closed to traffic or reduced to one lane between Columbus Circle and Herald Square. The main consequence of this project to the Clinton/Hell’s Kitchen study area is increased traffic volume to 9<sup>th</sup> and 11<sup>th</sup> Avenues, and reduced volume to 8<sup>th</sup> Avenue.
- West 41<sup>st</sup> Street fully re-opened to traffic between 8<sup>th</sup> and 9<sup>th</sup> Avenues.
- MTA/NYCTA bus route M27 canceled; M10 curtailed to Columbus Circle; M104 cross-town extension eliminated (not analyzed in this study).
- Sidewalk extensions on West 33<sup>rd</sup> Street at 8<sup>th</sup> Avenue (SW corner), 9<sup>th</sup> Avenue (SW and SE corners), 10<sup>th</sup> Avenue (all corners) and 11<sup>th</sup> Avenue (all corners), and on West 31<sup>st</sup> Street at 9<sup>th</sup> Avenue (all corners).

- Widening of selected crosswalks crossing the avenues at West 31<sup>st</sup> and West 33<sup>rd</sup> Streets and Route 9A at West 34<sup>th</sup> Street.

PM peak hour traffic operations for 2015 future without improvements conditions were analyzed using Synchro and SimTraffic software for the same two scenarios as analyzed in the existing conditions. The first scenario is for the condition that the right-turn ban from 9<sup>th</sup> Avenue to West 41<sup>st</sup> Street is not enforced. The second scenario is the condition for which the ban is enforced. The results are shown in Figure 2.1.4. Table 2.1.1 compares these two 2015 future without improvement scenarios to the 2008 base year conditions.

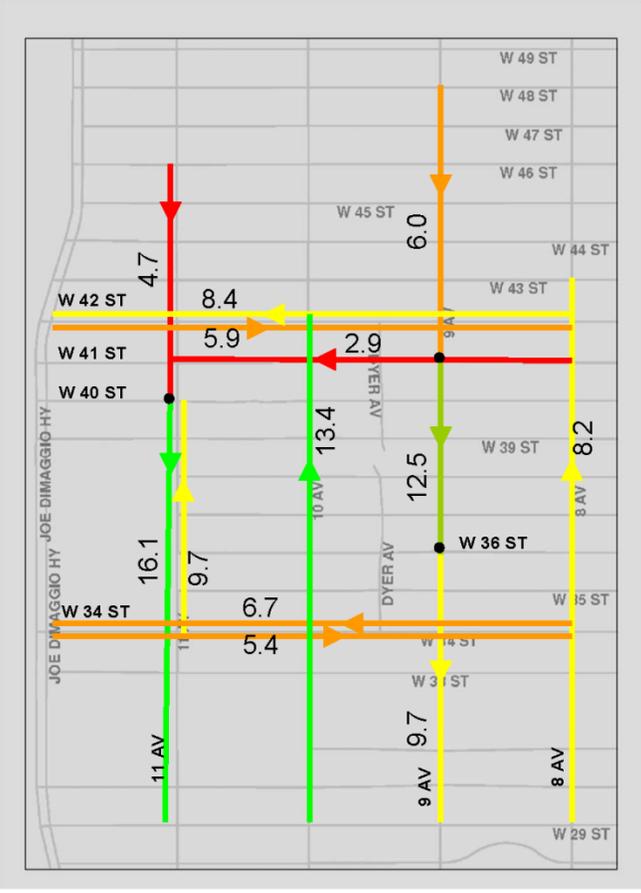
Because of the projected increase in traffic volume from the base year to future year 2015, average speeds are expected to decrease along all corridors, though the degree of impact varies by corridor. Ninth Avenue degradation is more pronounced because of the additional traffic due to the Broadway closure in Times Square. Under the Ban Not Enforced scenario, average travel speed on 9<sup>th</sup> Avenue from West 48<sup>th</sup> Street to West 41<sup>st</sup> Streets is projected to decrease from 7.5 mph in 2008 to 6.0 mph in 2015. Under the Ban Enforced scenario, average travel speed on this segment is expected to decrease from 7.4 mph in 2008 to 5.9 mph in 2015. This is roughly equivalent to traveling about three blocks during each signal cycle.

The average travel speed on the segment of 9<sup>th</sup> Avenue leading to Ramp C (West 41<sup>st</sup> Street to West 36<sup>th</sup> Street) is projected to remain relatively high at 12.5 mph under the Ban Not Enforced scenario for year 2015, down from 13.6 mph in 2008. Under the Ban Enforced scenario, the average travel speed on this segment is expected to decrease from 5.5 mph in 2008 to 4.0 mph in 2015. This is roughly equivalent to traveling about two blocks during each signal cycle.

Average travel speed on West 41<sup>st</sup> Street under the Ban Not Enforced is expected to decrease from 4.0 mph in 2008 to 2.9 mph in 2015. Under the Ban Enforced scenario, average travel speed on this segment is expected to decrease from 10.9 mph in 2008 to 9.5 mph in 2015.

The average travel speed on 8<sup>th</sup> Avenue is expected to increase slightly from 2008 to 2015, partially because traffic is diverted to 6<sup>th</sup> Avenue as a result of the improvements from the Broadway closure in Herald Square. Under the Ban Not Enforced scenario, the improvement is from 7.7 mph in 2008 to 8.2 mph in 2015. Under the Ban Enforced scenario, the improvement is from 7.9 mph to 8.5 mph.

Because of the importance of preserving the operation of West 41<sup>st</sup> Street for buses that travel from the PABT to the Lincoln Tunnel, NYCDOT supports the enforcement of the turning ban from 9<sup>th</sup> Avenue to West 41<sup>st</sup> Street from 4-7 PM weekdays. All future improvement packages have been tested assuming the ban is enforced.



SB RIGHT-TURN FROM 9 AV TO W 41 ST  
**BAN NOT ENFORCED**



SB RIGHT-TURN FROM 9 AV TO W 41 ST  
**BAN ENFORCED**

Figure 2.1.4: Average Travel Speeds – 2015 Future w/o Improvements – Weekday PM Peak Hour

**Table 2.1.1 – Travel Speeds for 2008 Base Year and 2015 Future w/o Improvements (mph)**

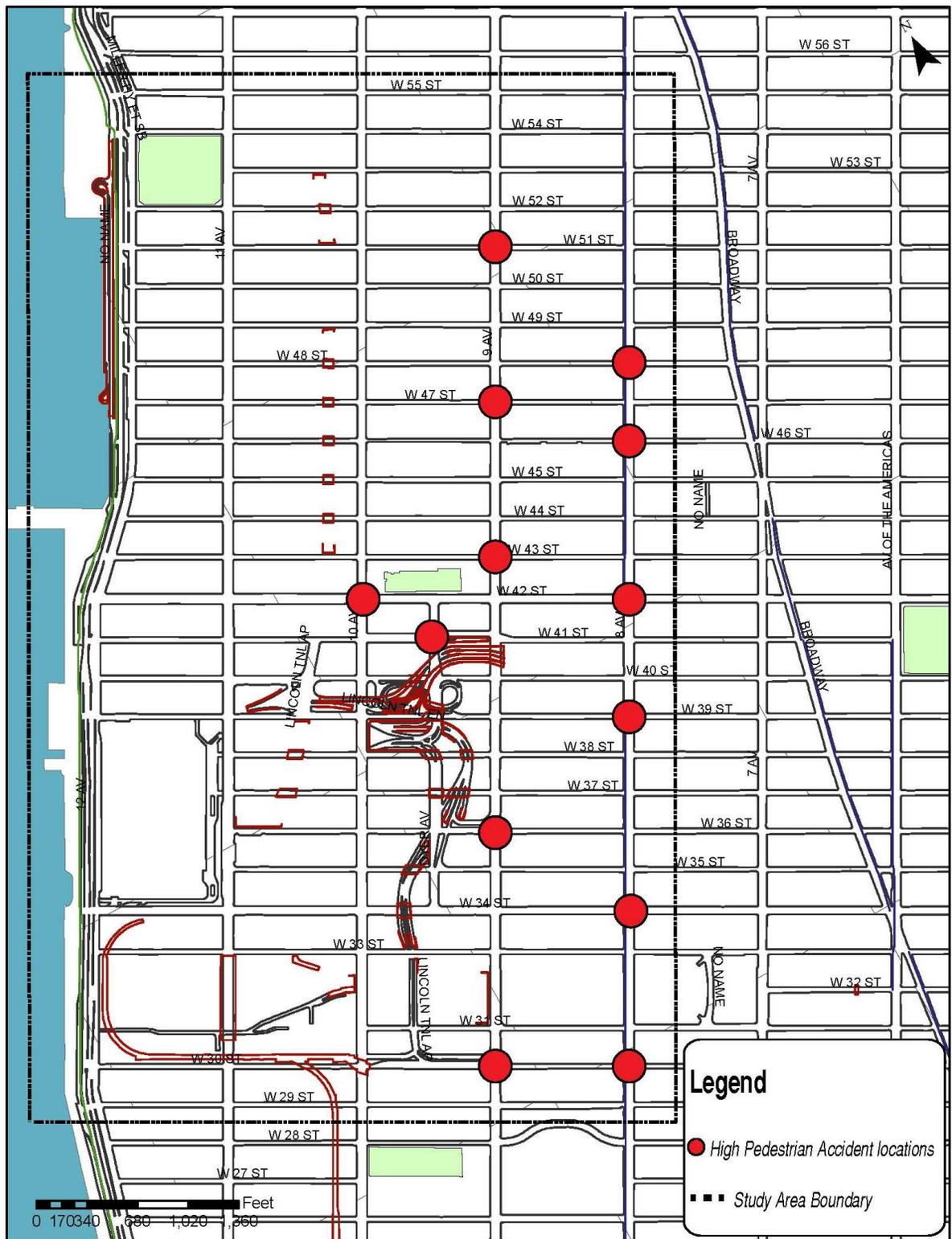
SEGMENT	2008 BASE YEAR		2015 FUTURE WITHOUT IMPROVEMENTS	
	SB-R Turn from 9 Av to W 41 St BAN <u>NOT ENFORCED</u>	SB-R Turn from 9 Av to W 41 St BAN <u>ENFORCED</u>	SB-R Turn from 9 Av to W 41 St BAN <u>NOT ENFORCED</u>	SB-R Turn from 9 Av to W 41 St BAN <u>ENFORCED</u>
9 Av W 48 St to W 41 St	7.5	7.4	6.0	5.9
9 Av W 41 St to W 36 St	13.6	5.5	12.5	4.0
9 Av W 36 St to W 29 St	10.0	9.8	9.7	9.6
W 41 St 8 Av to 11 Av	4.0	10.9	2.9	9.5
Southbound 11 Av W 46 St to W 40 St	6.0	7.2	4.7	6.0
Southbound 11 W 40 St to W 29 St	16.3	16.3	16.1	16.2
Northbound 11 Av W 34 St to W 40 St	9.9	10.6	9.7	10.3
Northbound 8 Av 29 St to 43 St	7.7	7.9	8.2	8.5
Northbound 10 Av 29 St to 42 St	13.7	16.6	13.4	16.4
Eastbound W 34 St 12 Av to 8 Av	5.6	5.6	5.4	5.5
Westbound W 34 St 8 Av to 12 Av	7.7	7.8	6.7	7.7
Eastbound W 42 St 12 Av to 8 Av	6.8	7.5	5.9	6.7
Westbound W 42 St 8 Av to 12 Av	8.7	9.7	8.4	9.2

## 2.2 Safety

After reviewing the entire study area, consisting of 131 intersections, for three-year accident history from 2007-2009, 13 High Pedestrian Crash Locations were identified. A High Pedestrian Crash Location is an intersection where 5 or more pedestrian crashes are recorded in one year. Figure 2.2.1 shows them on a study area map.

There were a total of 181 pedestrian injuries at the 13 High Pedestrian Crash Locations during the three year period. The worst intersection was West 42<sup>nd</sup> Street and 8<sup>th</sup> Avenue with 50 pedestrian injuries. The next worst were West 42<sup>nd</sup> Street and 9<sup>th</sup> Avenue, and West 34<sup>th</sup> Street and 8<sup>th</sup> Avenue with 24 and 23 pedestrian injuries, respectively. About 44% of all 181 injuries occurred when the pedestrian had the right of way, as opposed to crossing against the signal.

Fatal crash locations were also identified. There were 9 fatal crashes in the study area resulting in 10 deaths. Figure 2.2.2 shows the locations on a study area map. Most of the fatal crashes were recorded on the 9th Avenue corridor. Two motorcyclists were killed in a single fatal crash in 2008 at the intersection of West 30<sup>th</sup> Street and 12<sup>th</sup> Avenue. All other fatal crashes involved pedestrians. Most of the pedestrian fatalities involved pedestrians crossing an avenue. None involved vehicles turning from an avenue onto a side street.



**Figure 2.2.1: High Pedestrian Crash Locations (2007-2009)**



**Figure 2.2.2: Fatal Crash Locations (2007-2009)**

## 2.3 Pedestrians

The most deficient pedestrian location in the study area is along the west side of 9<sup>th</sup> Avenue between West 37<sup>th</sup> and West 36<sup>th</sup> Streets where the sidewalk is discontinuous. As shown in the aerial view of Figure 2.3.1, there is a sidewalk on the west side of 9<sup>th</sup> Avenue south of West 37<sup>th</sup> Street, but it abruptly ends just north of Ramp C. There is no crosswalk across Ramp C.



*Figure 2.3.1: Aerial View of 9<sup>th</sup> Ave between West 37<sup>th</sup> and West 36<sup>th</sup> Streets*

Figure 2.3.2 shows 9<sup>th</sup> Avenue traffic at West 37<sup>th</sup> Street separated by cones. Vehicles on the far side of the cones - the two western-most lanes of the roadway - are channeled to Ramp C. A fence along the west curb of 9<sup>th</sup> Avenue physically prevents pedestrians from using the west sidewalk to cross Ramp C.



*Figure 2.3.2: West 37<sup>th</sup> Street, Looking West towards 9<sup>th</sup> Avenue*

Figure 2.3.3 shows a view looking south on the west sidewalk towards Ramp C where the sidewalk ends. Pedestrians have been observed to walk down here, only to realize they must turn around, walk back up towards West 37<sup>th</sup> Street, and cross 9<sup>th</sup> Avenue to continue walking south. Pedestrians coming from the south have been observed to use the west crosswalk to cross West 36<sup>th</sup> Street walking northbound, then jaywalk across Ramp C. Since the fence prevents them from getting to the sidewalk on the other side, they are observed to walk in the travel lanes, a very dangerous condition. This is shown in Figures 2.3.4 and 2.3.5.



*Figure 2.3.3: West Sidewalk of 9<sup>th</sup> Avenue, Looking South towards Ramp C*



*Figure 2.3.4: Pedestrian Jaywalking Across Ramp C, Facing North*



*Figure 2.3.5: Fence Forces Jaywalking Pedestrian into Traffic Lanes*

The next most deficient pedestrian facility is the west crosswalk of West 41<sup>st</sup> Street and 9<sup>th</sup> Avenue. The west leg is 39 feet wide, wider than the normal 30-32 feet for a minor cross street. There is heavy traffic volume, especially buses, making the southbound right turn from 9<sup>th</sup> Avenue onto West 41<sup>st</sup> Street towards the Lincoln Tunnel and Quill Bus Depot. During the weekday PM peak hour, about 100 buses make this turn. As mentioned in Section 2.1, this turn is prohibited except for buses from 4PM to 7PM weekdays, but when it is not enforced with a traffic enforcement agent, about 280 cars and 20 trucks illegally turn here, for a total volume of 400 vehicles per hour. Turning volumes during other times during the week when it is legal for all vehicles reach as much as 350 vehicles per hour. This turning traffic conflicts with pedestrians in the west crosswalk. Pedestrian crossing volumes are moderate, about 150 pedestrians per hour during peak periods, but this is expected to increase with completion of nearby development projects. A seven second leading pedestrian interval (LPI) is provided to give pedestrians a head start into the crosswalk so as to deter aggressive “jump starts” by turning motorists, but the conflict still exists during the simultaneous 9<sup>th</sup> Avenue green time and the west crosswalk WALK time. This crosswalk has often been pointed out by the community as being perilous. In February 2013, a pedestrian in the west crosswalk was killed by a southbound right-turning vehicle.



***Figure 2.3.6: Pedestrians Crossing West Crosswalk at West. 41<sup>st</sup> Street and 9<sup>th</sup> Avenue, Facing North.***

Of all the crosswalks analyzed in the study area, 15 operate with unacceptable LOS during the AM period, 17 during midday and 29 during the PM. These locations are

mainly concentrated along 8th Avenue in the vicinity of the Port Authority Bus Terminal and Penn Station, where pedestrian volumes and conflicting vehicle volumes are highest.

## 2.4 Trucks

Figure 2.4.1 shows the official truck route network in the study area. While the network includes the Lincoln Tunnel Expressway and ramps between West 30<sup>th</sup> Street and the south and center tubes, that route is presently closed to outbound trucks. Signs direct trucks to use 10<sup>th</sup> and 11<sup>th</sup> Avenues to get to the north tube at West 40<sup>th</sup> Street.

Truck volumes are higher during the weekday AM and midday peak hours than during the weekday PM peak hour. Saturday midday peak hour truck volumes are lower than any of the three weekday peak hours, but not far below the weekday PM peak hour.

Concern has been expressed about trucks using neighborhood streets that are not designated as truck routes. West 55<sup>th</sup> Street and West 43<sup>rd</sup> have been specifically mentioned in this regard. The lack of east-west truck routes north of West 42<sup>nd</sup> Street and south of West 57<sup>th</sup> Street may be causing some trucks to use in-between streets. For further analysis regarding curbside usage, please see the Section 2.7 Parking.



Figure 2.4.1: Truck Routes

## 2.5 Transit

The eastern edge of the study area is presently served by the A, C and E lines of the 8<sup>th</sup> Avenue Subway, with stations at 34<sup>th</sup> Street/Penn Station, 42<sup>nd</sup> Street/PABT and 50<sup>th</sup> Street. An underground walkway provides transfers to the Nos. 1, 2, 3, 7, N, Q and R lines at the Times Square Station. Construction has begun on a City-funded extension of the Number 7 subway line west under West 41<sup>st</sup> Street and south under 11<sup>th</sup> Avenue. The terminal station for the extension will be at West 34<sup>th</sup> Street and 11<sup>th</sup> Avenue.

Figure 2.5.1 presents local bus service provided by MTA/NYCT to and within the study area. North-south service is provided by the M11 along 9<sup>th</sup> and 10<sup>th</sup> Avenues, and the M20 and M104 along 9<sup>th</sup> and 10<sup>th</sup> Avenues. Cross-town service is provided by the

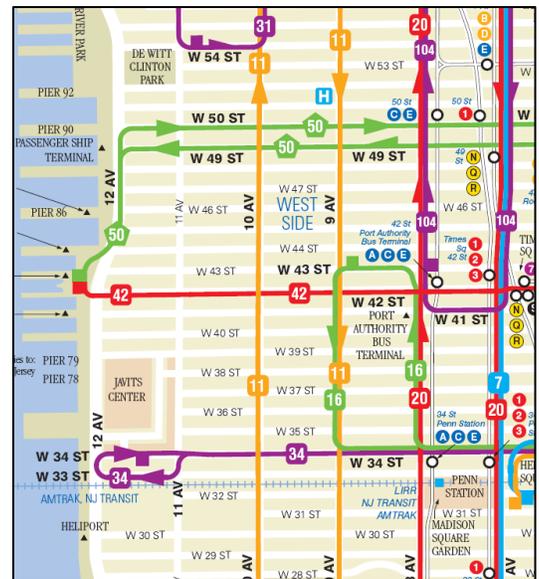


Figure 2.5.1: Bus Routes

M34 on West 34<sup>th</sup> Street, the M42 on West 42<sup>nd</sup> Street and the M50 on West 49<sup>th</sup> and West 50<sup>th</sup> Streets. The M34 and M42 provide direct access to and from the Javits Center. In addition, several MTA/NYCT bus routes connect the areas near PABT and Penn Station with other parts of Manhattan and the outer boroughs.

The M104, which travels along 7<sup>th</sup> and 8<sup>th</sup> Avenues has the highest ridership in the study area, with the M11 having the second highest. Overcrowding on these buses sometimes results in buses bypassing waiting passengers. In addition, many of these riders transfer to or from the subway, adding to the heavily used sidewalks, crosswalks and corners.

The MTA/NYCT Quill Bus Depot, located at West 40<sup>th</sup> Street and 11<sup>th</sup> Avenue, serves a crucial function for transit operations, though it is not directly used by riders. A half-block long layover area is designated for NYCT buses on West 43<sup>rd</sup> Street between 8<sup>th</sup> and 9<sup>th</sup> Avenues, and a layover zone for MTA Bus Company express buses is designated on West 54<sup>th</sup> Street between 10<sup>th</sup> and 11<sup>th</sup> Avenues.

The PABT serves a vast network of suburban and inter-city bus routes. Because most of those buses travel directly to and from the Lincoln Tunnel via special ramps, the main influence of the PABT on the study area transportation system consists of pedestrians, transit passengers and taxis going to and from the terminal. A key operational issue is the long queue of buses waiting to enter the Port Authority Bus Terminal from 10<sup>th</sup> Avenue before and during the evening peak period. Problematic bus turning movements at certain locations with high levels of pedestrian activity are also considered herein.

Penn Station, though not within the study area boundaries, is directly adjacent to it. As with the PABT, the main influence of Penn Station on the study area transportation system consists of pedestrians, transit passengers and taxis going to and from the station.

Both Penn Station and PABT are hubs not only for the trains and buses, respectively, that use those two facilities, but also for numerous other private bus and jitney services that pick up and drop off passengers on the streets immediately surrounding those facilities.

Ferry transportation is also a presence in the study area. Commuter ferry service is provided to and from seven New Jersey locations via a ferry terminal at West 39<sup>th</sup> Street on the Hudson River. An extensive shuttle bus system provides access to the ferry terminal via West 34<sup>th</sup>, 42<sup>nd</sup>, 44<sup>th</sup>, 49<sup>th</sup> and 50<sup>th</sup> Streets, also traveling on Route 9A and portions of 8<sup>th</sup> and 10<sup>th</sup> Avenues within the study area.

Because the study area is close to major tourist attractions, tour buses of many kinds are a major presence on the streets of the study area. As they pick up and drop off customers at many points within the study area, they also must lay over when not carrying sightseers or charter passengers. Portions of 11 block faces around the study area are designated for on-street layover for tour buses, as shown in Figure 2.5.2. During peak times, the demand exceeds the number of designated on-street layover zones, resulting in a significant level of illegal charter/tour bus parking, most egregiously on residential streets, in school zones and in NYCT bus stops.

Another bus-layover issue is the effect of the many private bus/van services that stop on the north side of West 42<sup>nd</sup> Street between 8<sup>th</sup> and 9<sup>th</sup> Avenues, which is designated as a PM peak period bus-only lane. The long dwell times of these vehicles (observed to

consistently be longer than the three minutes allowed) does not allow for the lane to function as a moving lane for buses.

Another bus operation issue that affects traffic flow is the number of buses turning left from westbound West 42<sup>nd</sup> Street onto 9<sup>th</sup> Avenue and then tuning right onto West 41<sup>st</sup> Street to get to the Lincoln Tunnel. During the PM peak hour, about 60 buses perform this awkward “zig-zag” maneuver, often tying up through traffic on 9<sup>th</sup> Avenue.

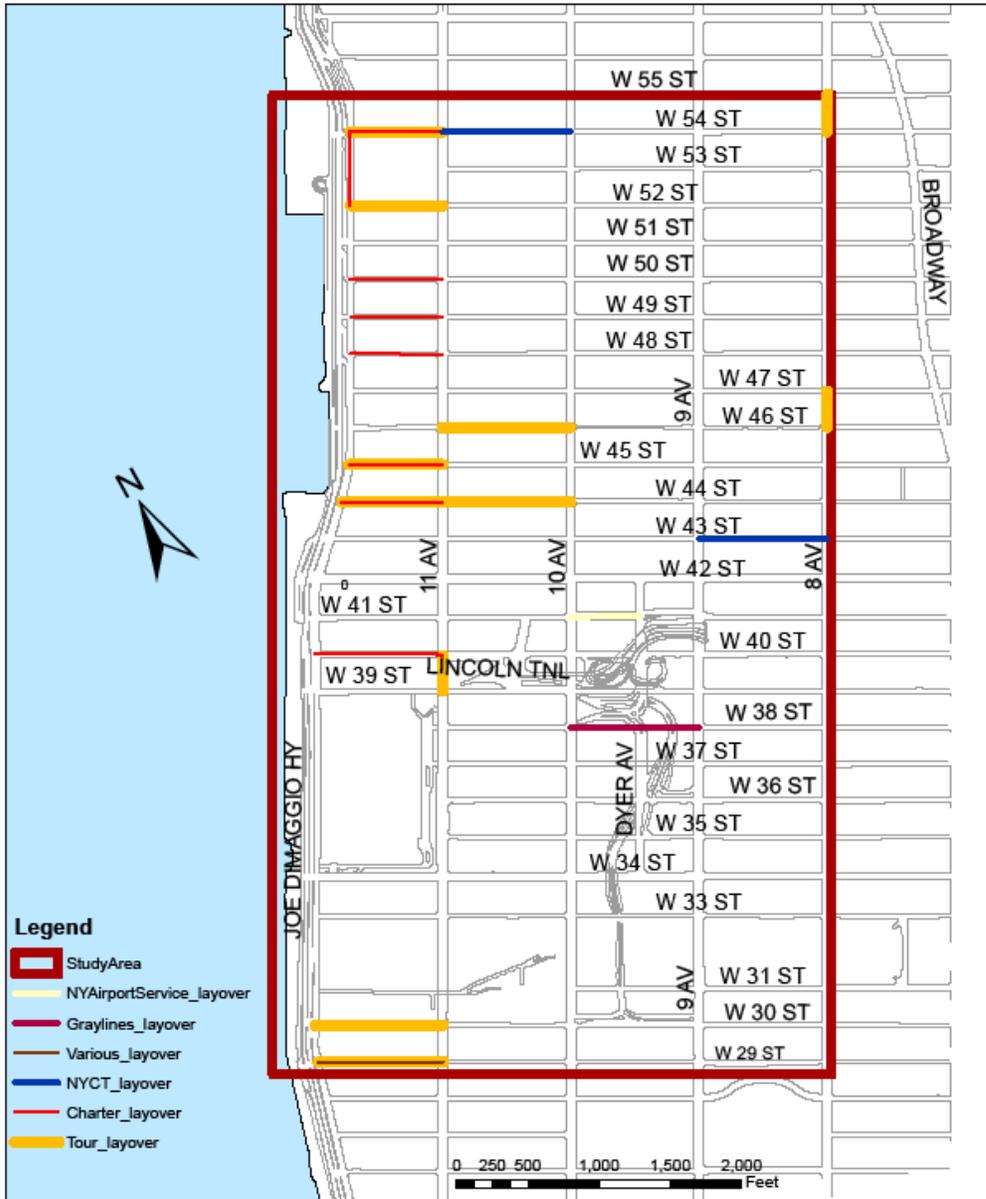


Figure 2.5.2: Bus Layover Areas

## 2.6 Bicycles

During the base year of this project, there were no bike lanes in the study area. However, the Hudson River Greenway, located just west of route 9A, provides a protected bicycle path. Bicycle volumes were analyzed for twenty intersections for the weekday AM, midday, PM and Saturday midday peak traffic hours, with the midday and PM hours resulting in the highest bicycle volumes. During the PM peak hour, bicycle volumes were noticeably higher on 8<sup>th</sup> and 9<sup>th</sup> Avenues, compared to 10<sup>th</sup> and 11<sup>th</sup> Avenues, presumably because of the existing bike lane south of West 34<sup>th</sup> Street. The Hudson River Greenway bike path carries more bikes than any of the avenues. Bicycle volumes on the avenues crossing the West 50<sup>th</sup> Street screenline are shown in Table 2.6.1:

**Table 2.6.1 – 2008 Base Year Bicycle Volumes on Selected Avenues at West 50<sup>th</sup> Street**

<b>ROADWAY</b>	<b>8-9 AM</b>	<b>12-1 PM</b>	<b>5-6 PM</b>
8 <sup>th</sup> Ave	25	71	75
9 <sup>th</sup> Ave	51	132	136
10 <sup>th</sup> Ave	30	64	27
11 <sup>th</sup> Ave	38	98	67
Hudson River Greenway	179	181	278

## CHAPTER 3 IMPROVEMENT MEASURES – IMPLEMENTED

In order to address the concerns of the community as well as the issues found in the analysis of the existing and future without improvement conditions, improvement measures were identified. NYCDOT implemented several early action measures identified during the course of the study. This section describes improvements that have already been implemented.

### 3.1 Crosswalks with Set-Back Stop Bars

The conflict between vehicles and pedestrians crossing at every intersection is a major concern. Installing these pavement markings alert drivers to stop at a far enough distance for pedestrian to cross freely and makes the pedestrian aware of the space they should be using. These have been installed at the following locations:

- 8<sup>th</sup> Avenue, at West 30<sup>th</sup>, 31<sup>st</sup> and 34<sup>th</sup> Streets
- 9<sup>th</sup> Avenue, at West 31<sup>st</sup>, 34<sup>th</sup>, 38<sup>th</sup> and 40<sup>th</sup> Streets
- 10<sup>th</sup> Avenue and West 42<sup>nd</sup> Street
- Dyer Avenue and West 34<sup>th</sup> Street



### 3.2 Signage

“Don’t Block the Box” signs have been installed at several locations. When drivers enter but do not get through the entire intersection, the cross-street vehicles are blocked, and their green time is wasted, causing major delays. These signs enforce and remind drivers that there is a penalty to for this infraction. They have been implemented at intersections that often have queues leading up to the Lincoln Tunnel, specifically at:

- 9<sup>th</sup> Avenue, at West 42<sup>nd</sup>, 43<sup>rd</sup> and 44<sup>th</sup> Streets



### 3.3 Left-Turn Only Lane at 42<sup>nd</sup> & 9<sup>th</sup>

On westbound West 42<sup>nd</sup> Street approaching 9<sup>th</sup> Avenue, an unmarked shared through-left lane, which behaved as a de-facto left-turn lane, was converted to an exclusive left-turn lane. This measure will facilitate the conversion of the westbound left-turn phase from permitted/protected to protected only in order to protect pedestrians in the south crosswalk. Further improvements related to this intersection’s signal timing plan are described in later sections.



### 3.4 Bike Lanes on 8<sup>th</sup> & 9<sup>th</sup> Avenue – Phase I

As a result of a previous phase of the 8<sup>th</sup> and 9<sup>th</sup> Avenue bike lane project, parking protected bike lanes have been installed on 8<sup>th</sup> Avenue up to West 34<sup>th</sup> Street, and on 9<sup>th</sup> Avenue up to West 31<sup>st</sup> Street, affecting the lower part of the Hell’s Kitchen study area. General purpose travel widths have been narrowed, and left-turn bays have been created for 9<sup>th</sup> Avenue at West 30<sup>th</sup> Street, and 8<sup>th</sup> Avenue at West 29<sup>th</sup>, 31<sup>st</sup>, 33<sup>rd</sup> and 34<sup>th</sup> Streets. All but one of these locations were implemented with “mixing zones,” where left-turning vehicles share the same green time as the bikes, and must therefore yield to the bikes on their left, as well as the pedestrians in the crosswalk they are turning into. Mixing zones are described in more detail in Section 3.8.

### 3.5 34<sup>th</sup> Street Select Bus Service – Phase I

The 34<sup>th</sup> Street Select Bus Service (SBS) project addresses three major issues facing the corridor: slow bus service, crowded sidewalks, and projected population and employment growth. The project also provides the opportunity to expand curb access and loading for residents, businesses, and institutions on 34<sup>th</sup> Street. NYCDOT has developed a design that meets these goals, and has incorporated changes based on community feedback.

The first phase of the 34<sup>th</sup> Street Select Bus Service was implemented on November 13, 2011 and included off-board fare collection, and renaming the M34 and M16 buses to the M34 SBS and M16, respectively. These changes have been made to improve passenger communication. The service frequency and routes remain the same. In addition, video camera enforcement has been expanded for the existing bus lanes.

The second phase of the project will be implemented in 2013. This is described in Section 4.5.

### 3.6 Other Bus Operations

Both public and private bus operations have a significant presence in the Hell’s Kitchen study area. While they are an efficient method of transportation because of their large capacity, they can also pose other problems like blocking traffic, wide turning movements and noise. The following improvements address these issues:

- The Grayline bus layover has been relocated from its former location on a residential street near a school to West 41<sup>st</sup> Street between 8<sup>th</sup> and 9<sup>th</sup> Avenues.
- More tour bus layover locations have been created in 2009 west of 11<sup>th</sup> Avenue.
- The far side bus stop of eastbound West 42<sup>nd</sup> Street at 9<sup>th</sup> Avenue has been extended eastward, creating more room for multiple buses to



maneuver in and out.

- NYPD Operation 8/42 has been instrumental in removing illegal jitneys from West 42nd Street near the Port Authority Bus Terminal, thereby decreasing bus blockages.

### 3.7 Signal Timing

Signal timing changes are summarized in Table 3.7.1. Most of the signal timing changes fall into one of the following categories:

- Leading pedestrian intervals (LPIs) have been provided to give pedestrians a head start into the crosswalk so as to deter aggressive turning movements by motorists.
- Green time was allocated from the avenues to the cross streets at several locations on 9<sup>th</sup> and 11<sup>th</sup> Avenues to give more time for pedestrians to cross the avenues.
- Offsets have been changed to improve progression.
- The green time on 9<sup>th</sup> Avenue north of 42<sup>nd</sup> Street has been “feathered” to discourage blocking the box. Previously, there was a sharp drop in green time from 55 seconds at West 45<sup>th</sup> Street to 40 seconds at West 42<sup>nd</sup> Street. The feathering provides a more gradual drop in green time approaching the West 42<sup>nd</sup> Street bottleneck as follows:
  - 40 seconds for West 42<sup>nd</sup>, West 43<sup>rd</sup> and West 44<sup>th</sup> Streets
  - 45 seconds for West 45<sup>th</sup>, West 46<sup>th</sup> and West 47<sup>th</sup> Streets
  - 50 seconds for West 48<sup>th</sup>, West 49<sup>th</sup> and West 50<sup>th</sup> Streets.

The effect of these signal timing changes, in combination with all other improvements previously mentioned, is presented in Figure 3.7.2. It is compared to the 2015 Future without Improvements condition for the Ban Enforced scenario. While most of these improvements are geared towards the safety of all street users, they are expected to have a small impact on traffic as compared to the 2015 Without Improvements condition.

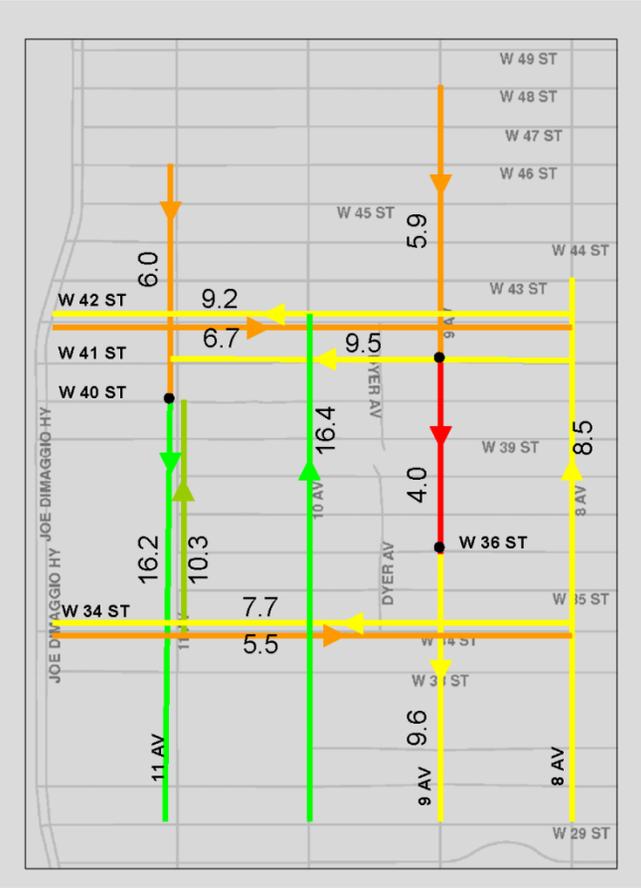
The feathering action on 9<sup>th</sup> Avenue described in the 4<sup>th</sup> bullet of the previous section has the effect holding back traffic and thus decreasing average travel speed on the segment between West 48<sup>th</sup> and West 41<sup>st</sup> Streets, from 5.9 mph to 5.3 mph. However, this is partially offset by an increase in speed between West 41<sup>st</sup> and West 36<sup>th</sup> Streets from 4.0 to 4.5 mph. The travel times for both segments combined is changed very little, because the ultimate bottleneck is Ramp C.

The effect of the reduction in green time for 11<sup>th</sup> Avenue is to decrease average travel speed northbound from West 34<sup>th</sup> to West 40<sup>th</sup> Streets (towards the Lincoln Tunnel) from 10.3 mph to 9.8 mph. The decrease in speed southbound from West 40<sup>th</sup> to West 29<sup>th</sup> Streets (away from the tunnel) is more pronounced – from 16.2 mph to 13.4 mph. Considering the number of pedestrians that the Javits Center generates, the reduced travel speeds for vehicles is justified by providing safer crossing for pedestrians.

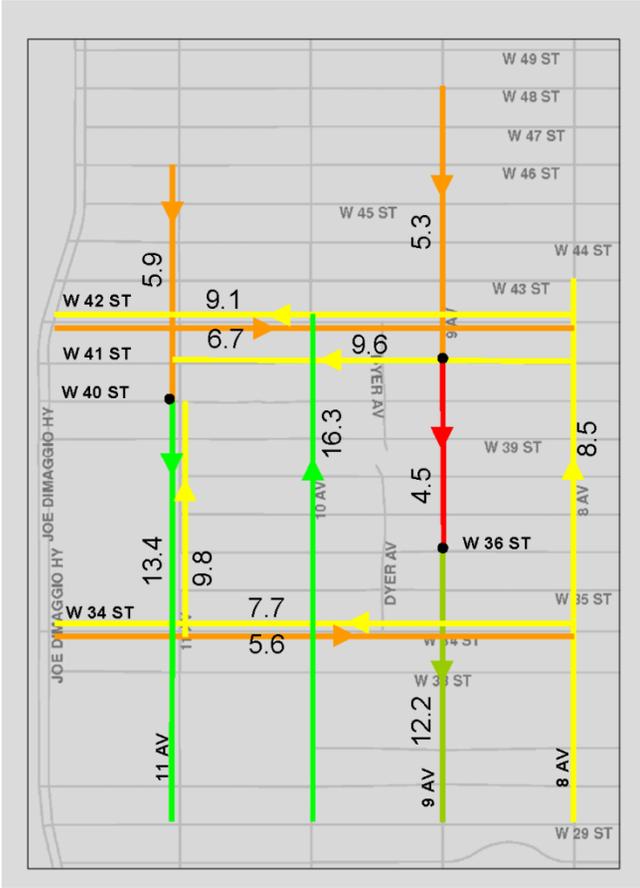
The most noticeable difference is the improved speed of 9<sup>th</sup> Avenue between West 36<sup>th</sup> Street and West 29<sup>th</sup> Street – from 9.6 mph to 12.2 mph – mainly due to an offset adjustment at West 33<sup>rd</sup> Street.

**Table 3.7.1**  
**SIGNAL PHASING, TIMING AND OFFSET CHANGES**  
OFFSET REFERENCED TO START OF GREEN ON MAJOR STREET  
MAJOR STREET LISTED FIRST

LOCATION	PHASING CHANGE	TIMING CHANGE	OFFSET CHANGE
8 Av & W 42 St	-	Previous: NB 40, EB-L 20, E-W 30 Revised: NB 38, EB-L 18, E-W 34	-
8 Av & W 47 St	Add SB pre-empt for FDNY	Previous: NB 55, WB 35 Revised: NB 55, WB 35, SB-Pre-empt 50	-
9 Av & W 30 St	Add LPI	SB-T 50 (SB-LPI 8, SB-L 42), EB-LPI 7, EB 33	-
9 Av & W 33 St	-	-	Previous: 43 Revised: 3
9 Av & W 38 St	Add LPI	Previous: SB 55, EB 35 Revised: SB 52, EB 31, LPI 7	-
9 Av & W 39 St	-	Previous: SB 55, WB 35 Revised: SB 50, WB 40	-
9 Av & W 40 St	-	Previous: SB 55, EB 35 Revised: SB 50, EB 40	-
9 Av & W 41 St	Add LPI	Previous: SB 50, WB 40 Revised: SB 50, WB 33, LPI 7	-
9 Av & W 43 St	-	Previous: SB 45, WB 45 Revised: SB 40, WB 50	-
9 Av & W 44 St	-	Previous: SB 45, EB 45 Revised: SB 40, EB 50	-
9 Av & W 45 St	-	Previous: SB 55, WB 35 Revised: SB 45, WB 45	-
9 Av & W 46 St	-	Previous: SB 55, EB 35 Revised: SB 45, EB 45	-
9 Av & W 47 St	Add LPI	Previous: SB 55, WB 35 Revised: SB 45, WB 38, LPI 7	-
9 Av & W 48 St	-	Previous: SB 55, EB 35 Revised: SB 50, EB 40	-
10 Av & W 33 St	Add LPI	Previous: NB 53, WB 37 Revised: NB 50, WB 33, LPI 7	-
11 Av & W 33 St	-	Previous: N-S 60, WB 30 Revised: N-S 59, WB 31	-
11 Av & W 36 St	-	Previous: N-S 63, Ped 27 Revised: N-S 59, Ped 31	-
11 Av & W 37 St	-	Previous: N-S 63, E-W 27 Revised: N-S 58, E-W 32	-
11 Av & W 40 St	-	Previous: N-S 63, EB 27 Revised: N-S 61, EB 29	-
11 Av & W 43 St	-	Previous: N-S 63, WB 27 Revised: N-S 59, WB 31	-
11 Av & W 44 St	-	Previous: N-S 63, EB 27 Revised: N-S 59, EB 31	-
11 Av & W 45 St	-	Previous: SB 63, WB 27 Revised: SB 59, WB 31	-
11 Av & W 46 St	-	Previous: SB 63, EB 27 Revised: SB 59, EB 31	-
11 Av & W 47 St	-	Previous: SB 63, WB 27 Revised: SB 59, WB 31	-
11 Av & W 48 St	-	Previous: SB 63, EB 27 Revised: SB 59, EB 31	-
12 Av & W 29 St	-	Previous: N-S 119, EB 31 Revised: N-S 118, EB 32	-
12 Av & W 42 St	Add bike signals	N-S 91, N-S+SB-L+WB-R12, SB-L+WB-R 8, E-W 39	-
Dyer Ave & W 30 St	-	-	Previous: 32 Revised: 6
Dyer Ave & W 31 St	-	-	Previous: 68 Revised: 11
Dyer Ave & W 35 St	-	Previous: N-S 30, WB 34, NB 26 Revised: N-S 30, WB 32, NB 28	-
Dyer Ave & W 41 St	-	Previous: NB 36, Ramp 12, WB 27, LPI 15 Revised: NB 36, Ramp 12, WB 35, LPI 7	-
43 St betw 8 & 9 Avs	New Signal	WB: 60, Crosswalk & Parking Exit: 30	30



**2015 FUTURE W/O IMPROVEMENTS**



**2015 FUTURE WITH IMPROVEMENTS:**  
 • Signal Timing Improvements as of 2012

*Figure 3.7.2: Average Travel Speeds – 2015 Future w/ Signal Timing Improvements – Weekday PM Peak Hour*

### 3.8 Bike Lanes on 8<sup>th</sup> and 9<sup>th</sup> Avenues – Phase II

As mentioned in Section 3.4, the first phase of the 8<sup>th</sup> and 9<sup>th</sup> Avenue bike lanes extended as far north as West 34<sup>th</sup> Street on 8<sup>th</sup> Avenue and West 31<sup>st</sup> Street on 9<sup>th</sup> Avenue. During the 2<sup>nd</sup> half of 2012, they have been expanded north to Columbus Circle on 8<sup>th</sup> Avenue and to West 59<sup>th</sup> Street on 9<sup>th</sup> Avenue. A typical section at minor cross streets is shown in Figure 3.8.1. They are continuations of the parking protected design, with the bike lane adjacent to the left curb, protected by floating parking lanes. The design retains four general travel lanes, but they are narrower by one or two feet from 12 feet to 10 or 11 feet. Left turn bays are provided where left turns are permitted. Concrete pedestrian islands are provided as shown, effectively reducing the crossing distance across 8<sup>th</sup> and 9<sup>th</sup> Avenues. Parking is retained on the right side, but the left-turn bays and concrete islands necessitate the removal of about 76 parking spaces each on 8<sup>th</sup> and 9<sup>th</sup> Avenues. An outreach effort to merchants assures that loading zones will be provided where needed.

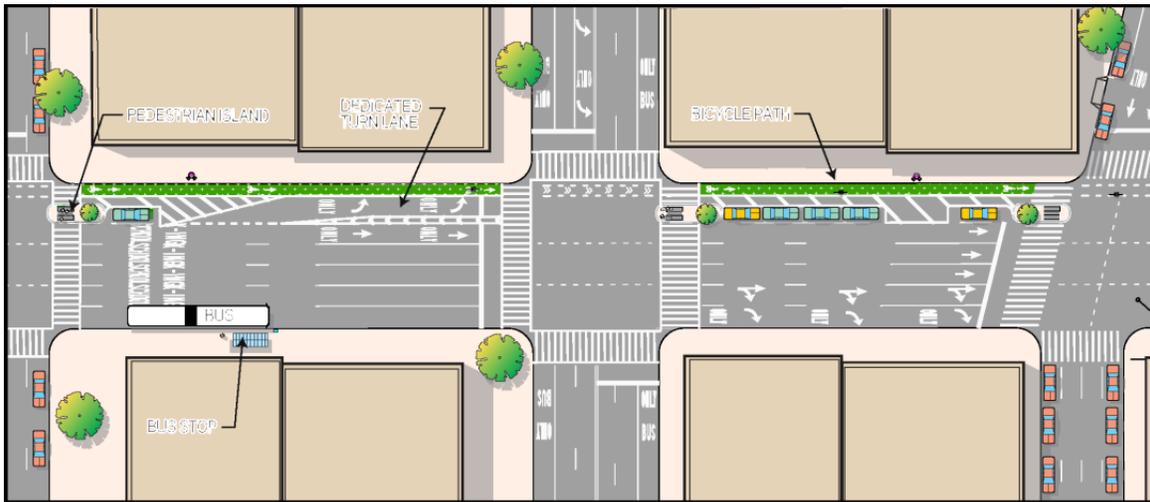


*Figure 3.8.1: Typical Plan for 8<sup>th</sup> and 9<sup>th</sup> Avenue Bike Lanes with Mixing Zones at Minor Cross Streets.*

As shown in Figure 3.8.1, “mixing zones” are provided at minor cross streets where left turns are permitted. Under this design, the left-turning vehicles share the same green time as bikes, and must therefore yield to the bikes and pedestrians on their left, as well as the pedestrians in the crosswalk they are turning into. At the approach to cross streets where left turns are permitted, the green bike lane is interrupted with shared markings to emphasize that this is a shared space where vehicles “mix” with bicycles. There is no need for signal timing changes with mixing zone layout.

At major cross streets along 9<sup>th</sup> Avenue – West 34<sup>th</sup>, West 42<sup>nd</sup>, and West 57<sup>th</sup> Streets – split phases will be used. Under this design, the 9<sup>th</sup> Avenue green time will be split into two parts. In the first part, the bike lane has a green indication, and the conflicting crosswalk has the WALK display, while the left-turning vehicles are held with a red left-arrow to provide conflict-free crossing. In the second part of the split phase, the bike lane has a red indication, and the conflicting crosswalk displays the steady hand, while the left-turn bay has a green arrow for conflict-free turning. During both parts of the split phase, the avenue has a ball green display for through traffic, and the non-conflicting

crosswalk has the WALK display. Figure 3.8.2 shows the split phase layout, where the bike lane and turning bay retain separate space up to the crosswalk, as opposed to the mixing zone design.



**Figure 3.8.2: Typical Plan for 9<sup>th</sup> Avenue Bike Lanes with Split Phase at Major Cross Streets.**

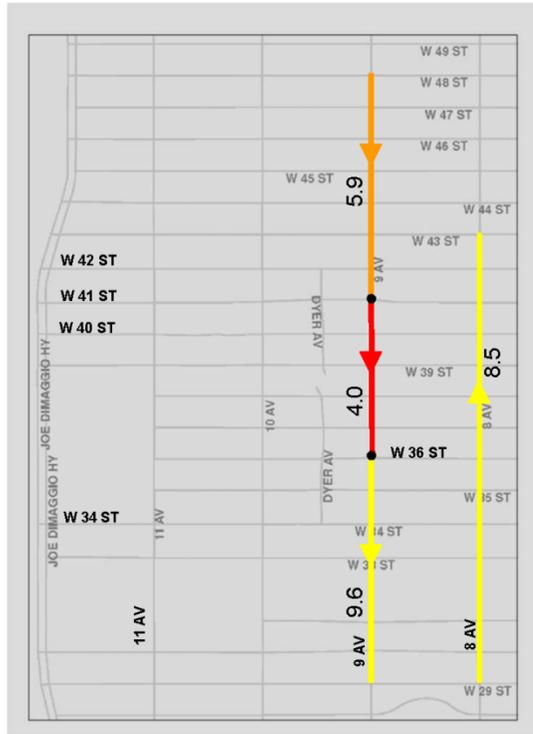
Because of the taxi stand on 8<sup>th</sup> Avenue in front of the Port Authority Bus Terminal, the bike lane is not parking protected on 8<sup>th</sup> Avenue between West 39<sup>th</sup> and West 42<sup>nd</sup> Streets. The design for this section is shown in Figure 3.8.3.



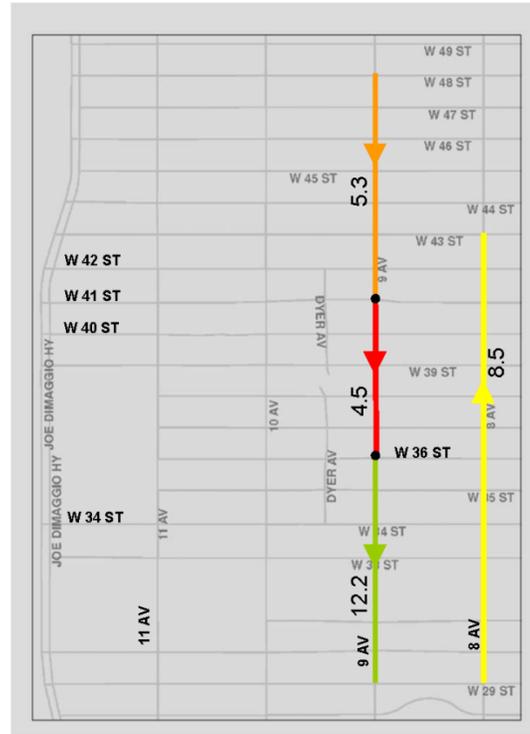
**Figure 3.8.3: Bike Lane on 8<sup>th</sup> Avenue in front of PABT.**

The 8<sup>th</sup> and 9<sup>th</sup> Avenue bike lanes have been implemented in 2012, except for the new split phase signals. This is discussed in Section 3.10.

Figure 3.8.6 presents future projected average travel speeds on 8<sup>th</sup> and 9<sup>th</sup> Avenues with the bike lanes, compared to the future condition with no improvements, and the future condition with improvements previously mentioned. The effects of the bike lanes are to slightly reduce average travel speeds by about 2 to 4 percent. The reduction in lane widths that make the bike lanes possible is roughly offset by the benefit of the left-turn bays.

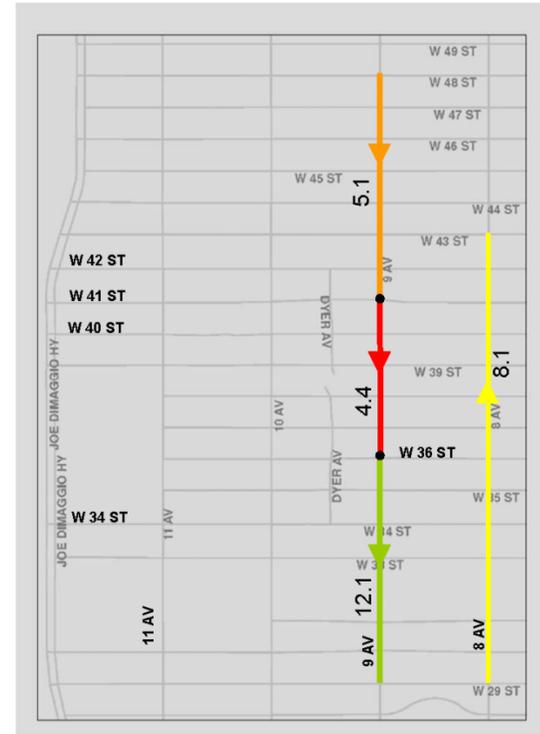


**2015 FUTURE W/O IMPROVEMENTS**



**2015 FUTURE WITH IMPROVEMENTS:**

- Signal Timing Improvements as of 2012



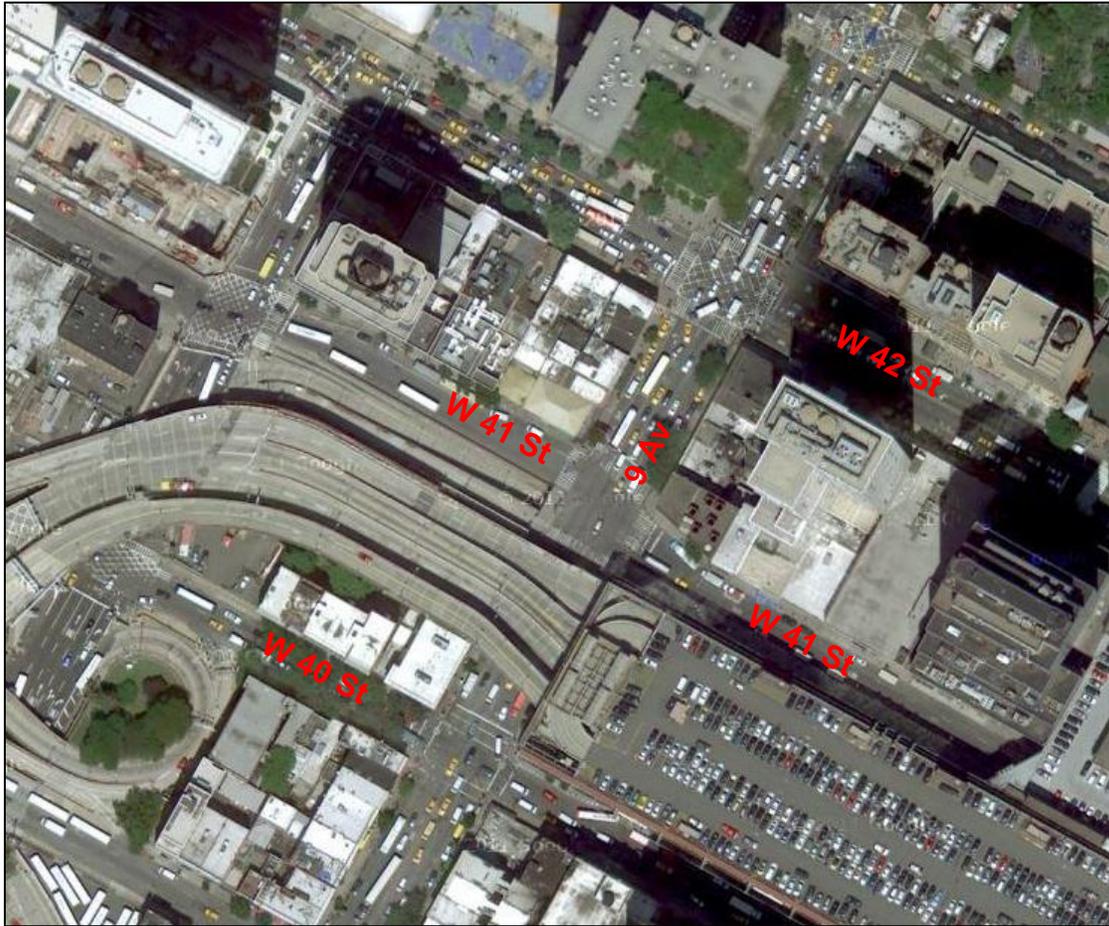
**2015 FUTURE WITH IMPROVEMENTS:**

- Signal Timing Improvements as of 2012
- 8<sup>th</sup> and 9<sup>th</sup> Avenue Bike Lanes

**Figure 3.8.6: Average Travel Speeds – 2015 Future with and without 8<sup>th</sup> and 9<sup>th</sup> Avenue Bike Lanes – Weekday PM Peak Hour**

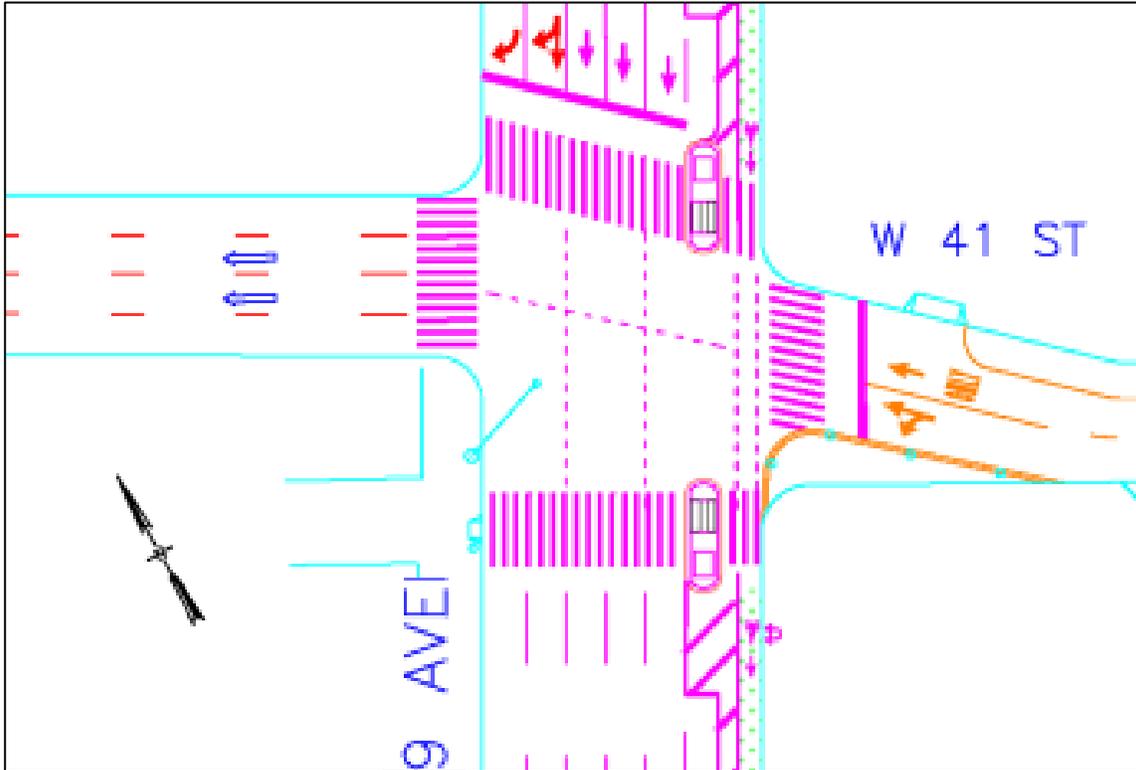
### 3.9 Curb Extension at West 41<sup>st</sup> Street and 9<sup>th</sup> Avenue

Because of “Sputnik” ramps from the PABT, West 41<sup>st</sup> Street between 9<sup>th</sup> Avenue and Dyer Avenue is shifted north from its natural position on the Manhattan street grid. This causes a misalignment as West 41<sup>st</sup> Street crosses 9<sup>th</sup> Avenue. This is shown in the aerial view of Figure 3.9.1.



*Figure 3.9.1: Misalignment of West 41<sup>st</sup> Street Across 9<sup>th</sup> Avenue.*

In order to correct this misalignment, and also to create extra pedestrian space, the east leg was realigned in 2012. A curb extension was added at the southeast corner. Figure 3.9.2 presents the new design. The southeast corner is shown in Figure



*Figure 3.9.2: Realignment of East Leg of West 41<sup>st</sup> Street and 9<sup>th</sup> Avenue*



*Figure 3.9.3: Curb Extension at Southeast Corner of West 41<sup>st</sup> Street and 9<sup>th</sup> Avenue*

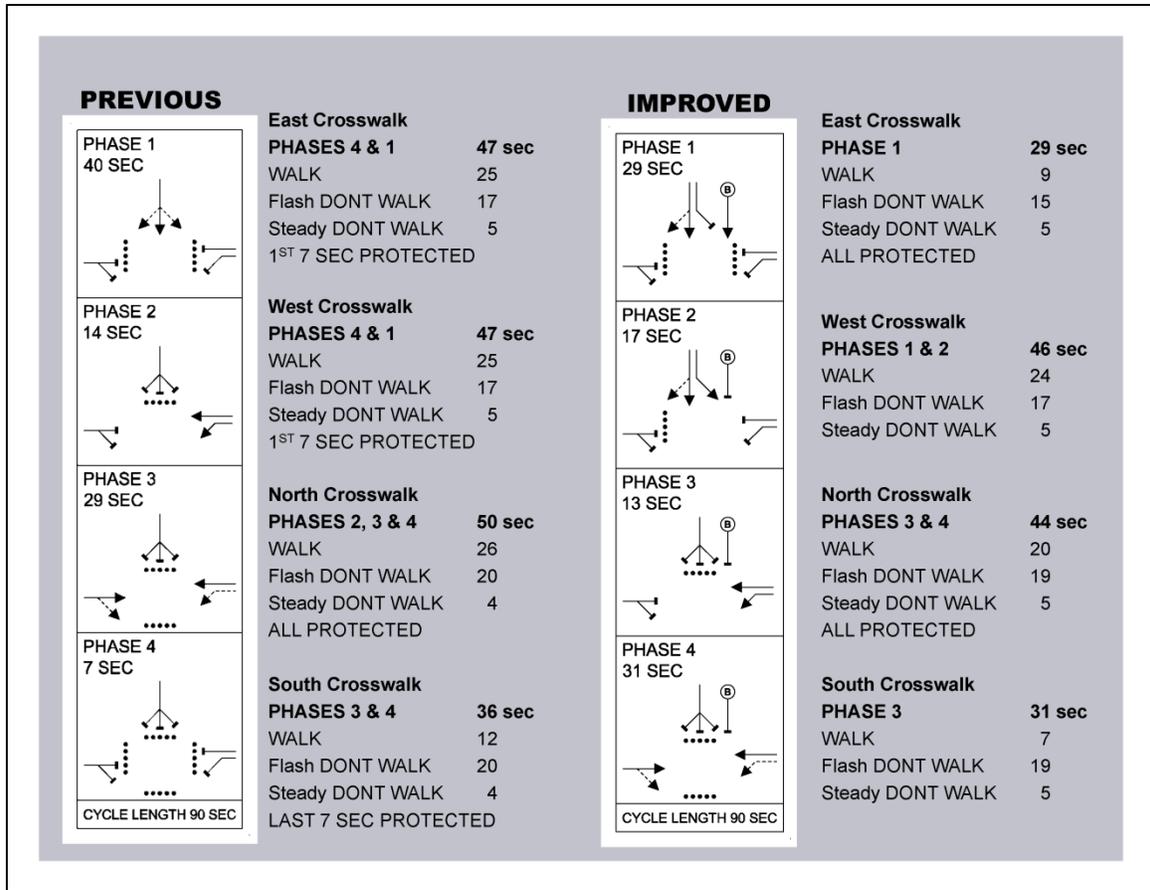
### 3.10 Split Phase for Bikes and Increased Green Time for 9<sup>th</sup> Avenue

Analysis indicates that a major cause of traffic congestion on 9<sup>th</sup> Avenue, in addition to the spillback from traffic funneling into the Lincoln Tunnel at West 41<sup>st</sup> Street and at Ramp C, is the bottleneck at West 42<sup>nd</sup> Street. The previous timing plan for this intersection is presented on the left side of Figure 3.10.1. The signal operated as four phases: in addition to ball green phase for 9<sup>th</sup> Avenue (Phase 1) and for West 42<sup>nd</sup> Street (Phase 3), there was an overlapping LPI along 9<sup>th</sup> Avenue for crossing West 42<sup>nd</sup> Street where all traffic was stopped (Phase 4), and a leading westbound protected left-turn phase (Phase 2). The green time for Phase 1 for 9<sup>th</sup> Avenue traffic including yellow and all red was 40 seconds out of a 90 second cycle (35 seconds actual green, 3 seconds yellow, and 2 seconds all red). The green time for 9<sup>th</sup> Avenue at West 43<sup>rd</sup> and West 44<sup>th</sup> Streets (simple two-phase operations) was also 40 seconds. At all other intersections along 9<sup>th</sup> Avenue north of West 37<sup>th</sup> Street in the study area, the green time for 9<sup>th</sup> Avenue is at least 45 seconds, with most of them 50 to 55 seconds. In addition to causing congestion, this discrepancy encouraged blocking the box, which made it difficult and dangerous for pedestrians to cross 9<sup>th</sup> Avenue, especially at West 43<sup>rd</sup> and West 44<sup>th</sup> Streets.

To remedy this bottleneck situation, and to facilitate the split phase for bikes described in Section 3.8, ball green time for 9<sup>th</sup> Avenue traffic was increased from 40 seconds to 46 seconds at West 42<sup>nd</sup> Street, and from 40 to 45 seconds at West 43<sup>rd</sup> and West 44<sup>th</sup> Streets. The right side of Figure 3.10.1 presents the details of the signal timing change for West 42<sup>nd</sup> Street and 9<sup>th</sup> Avenue. The green time for 9<sup>th</sup> Avenue traffic is split into two phases – 29 seconds for Phase 1, and 17 seconds for Phase 2. During Phase 1, the bike lane has a green indication, and the east crosswalk has the WALK display, while the southbound left-turning vehicles are held with a red left-arrow to provide conflict-free crossing. During Phase 2, the bike lane has a red indication, the east crosswalk displays the steady hand, while the southbound left-turn bay has a green arrow for conflict-free turning. During both parts of the split phase (Phases 1 and 2 combined), 9<sup>th</sup> Avenue has a ball green display for through and right-turning traffic, and the west crosswalk has the WALK display.

This required the removal of the existing LPI for the east and west crosswalks. Because of the split phase for bikes, the east crosswalk will receive protected crossing free of conflict from turning vehicles, and therefore does not need an LPI. This crosswalk receives less crossing time than it previously did, but all of the time is free of conflicting vehicles – a favorable tradeoff that is common to all split phase operations. The west crosswalk receives the same amount of crossing time as previous, but does not get the seven second LPI that it previously did – all of its time is concurrent with right-turning vehicles. This is the downside to the revised timing plan. However, the number of conflicting vehicles that make the southbound right-turn into the west crosswalk is less than 100 vehicles per hour for any time period. This is far less than the informal standard of 200 vph to trigger the need for an LPI.

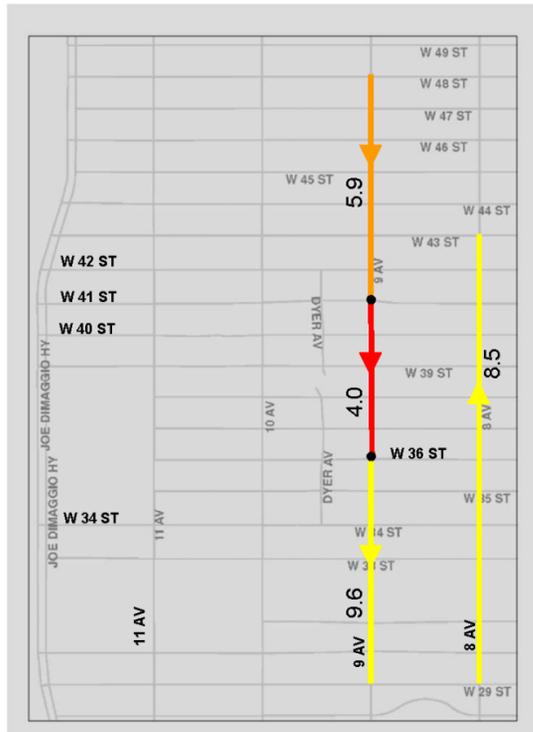
The north crosswalk continues to receive more than adequate time to cross the street, all of it free from conflicting vehicles. The south crosswalk receives five seconds less crossing time than previous, but the crossing distance is reduced by a comparable amount because of the pedestrian island.



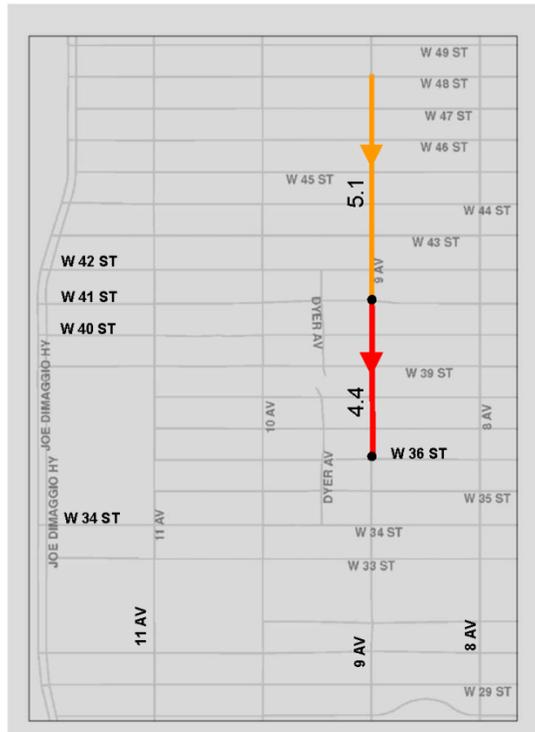
**Figure 3.10.1: Signal Timing for West 42<sup>nd</sup> Street and 9<sup>th</sup> Avenue with Split Phase for Bikes**

As mentioned earlier, the green time for 9<sup>th</sup> Avenue at West 43<sup>rd</sup> and West 44<sup>th</sup> Streets was increased from 40 to 45 seconds. These intersections operate as simple two-phase, and the five seconds were merely reallocated from the cross streets to 9<sup>th</sup> Avenue.

These timing changes were implemented in July 2013. Figure 3.10.2 presents the effect on traffic with and without the split phase for bikes and increased green time for 9<sup>th</sup> Avenue described in this section, in combination with all improvements in the previous sections. The increased green time for 9<sup>th</sup> Avenue at West 42<sup>nd</sup> through West 44<sup>th</sup> Streets is projected to result in increased average travel speed on the upper section of 9<sup>th</sup> Avenue from 5.1 to 5.7 mph, about a 12% improvement. It is also anticipated that blocking the box at West 43<sup>rd</sup> and West 44<sup>th</sup> Streets will be reduced, making it easier for pedestrians to cross 9<sup>th</sup> Avenue at those locations.

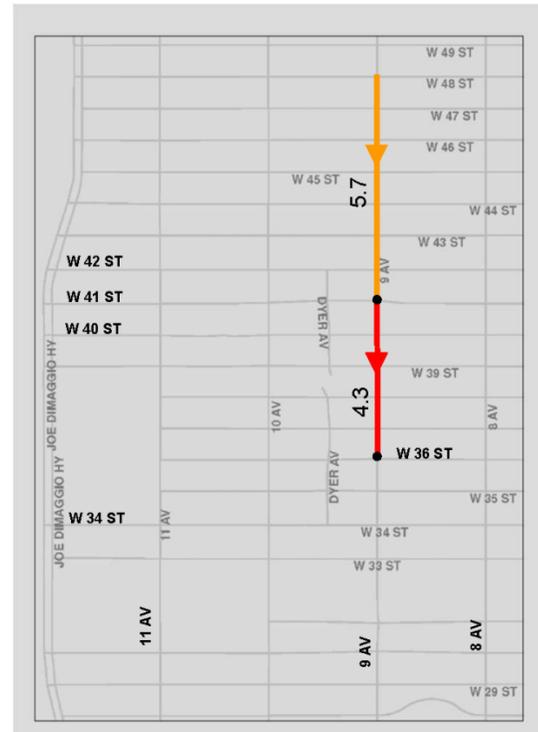


**2015 FUTURE W/O IMPROVEMENTS**



**2015 FUTURE WITH IMPROVEMENTS:**

- Signal Timing Improvements as of 2012
- 8<sup>th</sup> and 9<sup>th</sup> Avenue Bike Lanes



**2015 FUTURE WITH IMPROVEMENTS:**

- Signal Timing Improvements as of 2012
- 8<sup>th</sup> and 9<sup>th</sup> Avenue Bike Lanes
- Split Phase for Bikes and Increased Green Time for 9<sup>th</sup> Avenue

*Figure 3.10.2: Average Travel Speeds – 2015 Future with and without Split Phase for Bikes – Weekday PM Peak Hour*

## CHAPTER 4 IMPROVEMENT MEASURES – FUTURE

This chapter describes the improvement measures that are not yet implemented. Some are planned for implementation in 2013. Others are more long term.

### 4.1 Canoe Project

As mentioned in Section 2.3, the biggest pedestrian deficiency in the study area is the discontinuity in the sidewalk on the west side of 9<sup>th</sup> Avenue between West 36<sup>th</sup> and West 37<sup>th</sup> Streets. This is caused by free right-turn of the two right-most lanes from 9<sup>th</sup> Avenue onto Ramp C. The “Canoe” project addresses this deficiency.

The existing traffic island that is bounded by 9<sup>th</sup> Avenue on the east, Dyer Avenue on the west, Ramp C on the north, and West 36<sup>th</sup> Street on the south is currently occupied by vehicles that park illegally, causing an eyesore. Under the Canoe project, southern edge of the raised island will be expanded by 13 feet, taking up what is now the north parking lane on West 36<sup>th</sup> Street. The eastern edge will also be expanded. In Figure 4.1.1, the dark grey is the existing raised island, and the light grey shows the expanded raised sections. A canoe shaped landscaped area will be created, with plantings on the edges and a sidewalk down the middle. As shown in Figure 4.1.1, the existing pedestrian fence along the west curb of 9<sup>th</sup> Avenue will be removed, and a new signalized crosswalk across Ramp C will be provided. The “Qwik Curb” delineators that separate the two right lanes, which are channeled to Ramp C, from the 9<sup>th</sup> Avenue through traffic were installed in 2012 as part of the bike lane project described in Section 4.1

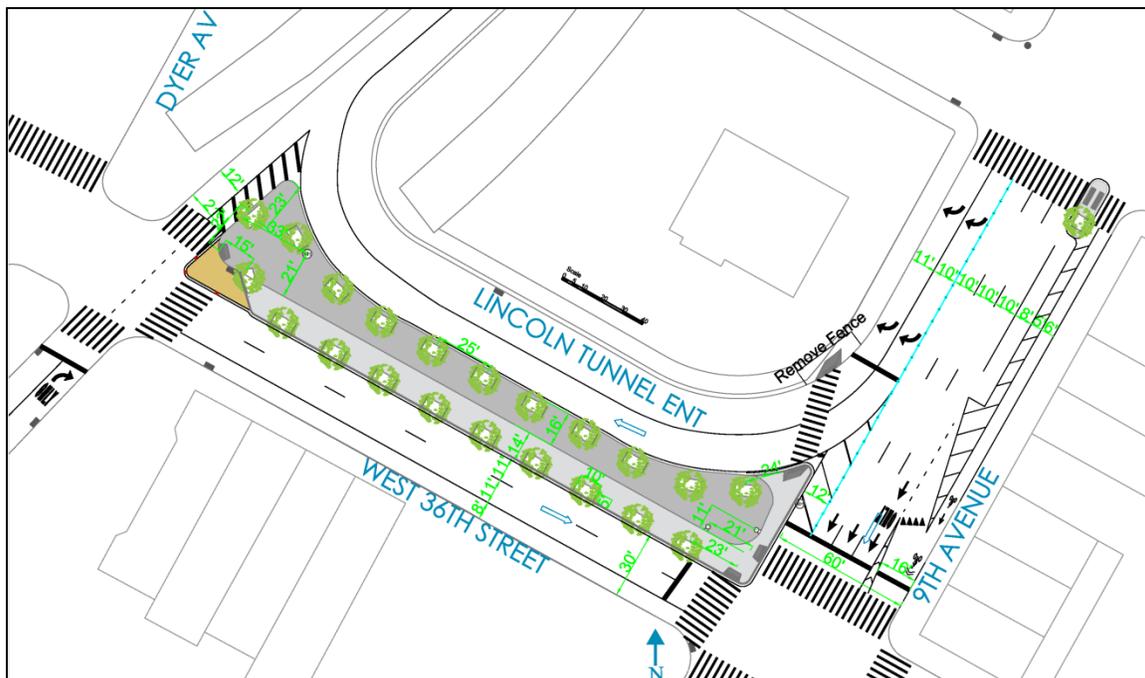


Figure 4.1.1: “Canoe” Design with New Signalized Crosswalk

Figure 4.1.2 presents the existing and proposed signal timing. Under the current two-phase operation, there is 55 seconds green time (including yellow and all-red) for southbound 9<sup>th</sup> Avenue approaching West 36<sup>th</sup> Street (Phase 1), and 35 seconds for West

36<sup>th</sup> Street (Phase 2). The right turn onto Ramp C is free, meaning it effectively has 100% green time during both phases. There is currently no crosswalk for crossing Ramp C.

Under the proposed arrangement, green time for 9<sup>th</sup> Avenue approaching West 36<sup>th</sup> Street (Phase 1) will be the same as existing – 55 seconds. Green time for West 36<sup>th</sup> Street (Phases 2 and 3) will also be the same as existing – 35 seconds. The crossing time for all four crosswalks at West 36<sup>th</sup> Street and 9<sup>th</sup> Avenue will also remain unchanged. The difference is that vehicles in the two right lanes that will be channeled to Ramp C will encounter a separate signal, in which they will receive 65 seconds of green time out of a 90 second cycle to turn right (Phases 3 and 1). The remaining 25 seconds will be for pedestrians to cross Ramp C at the new crosswalk (Phase 2).

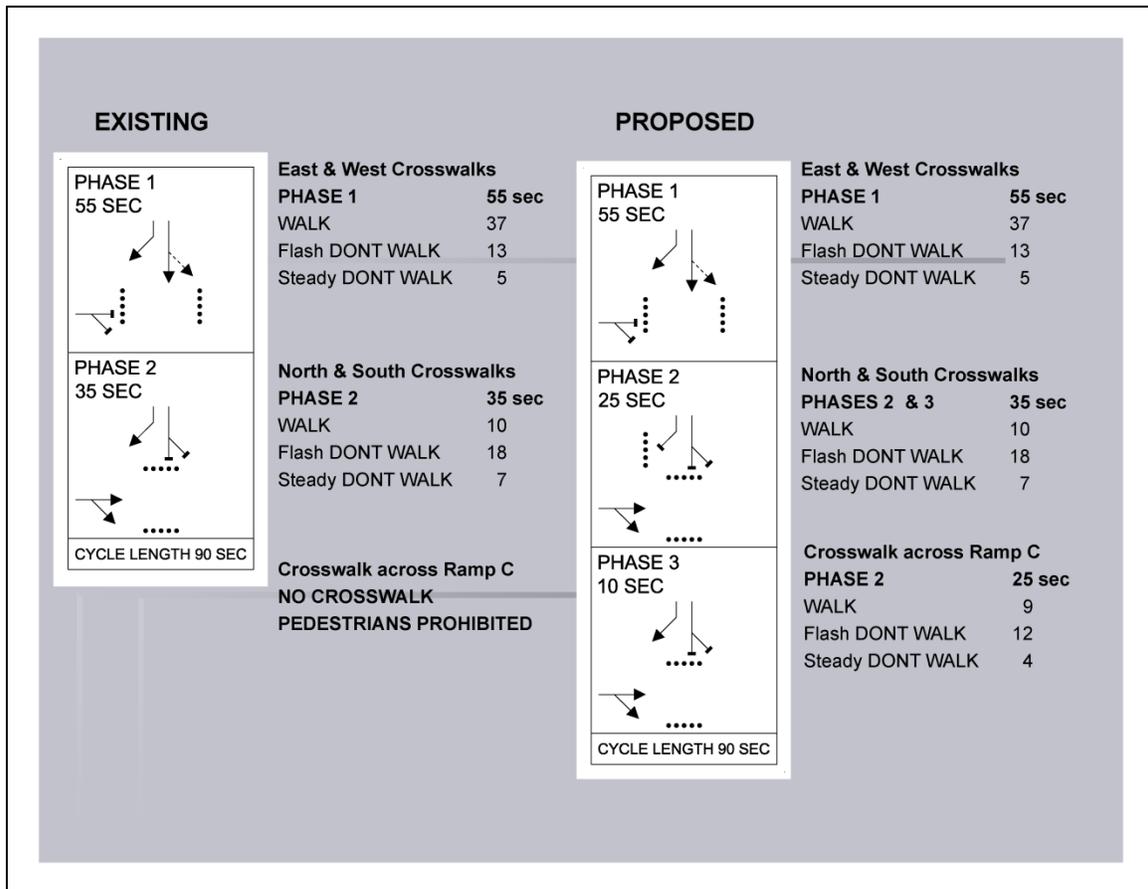
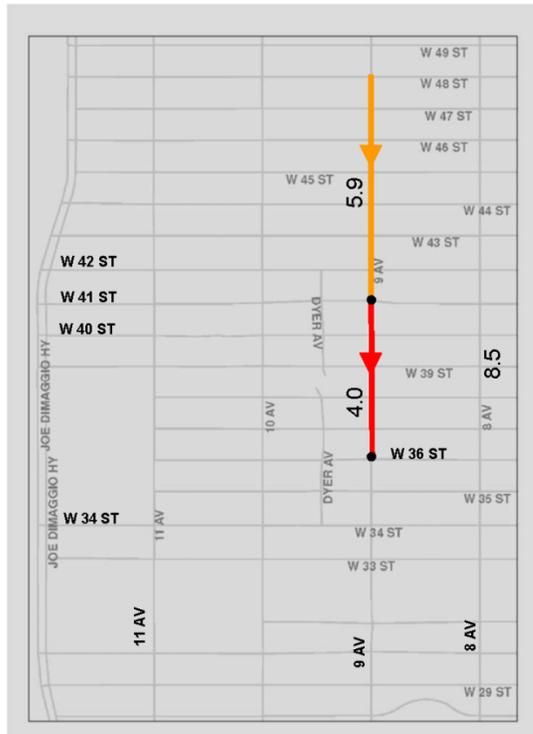


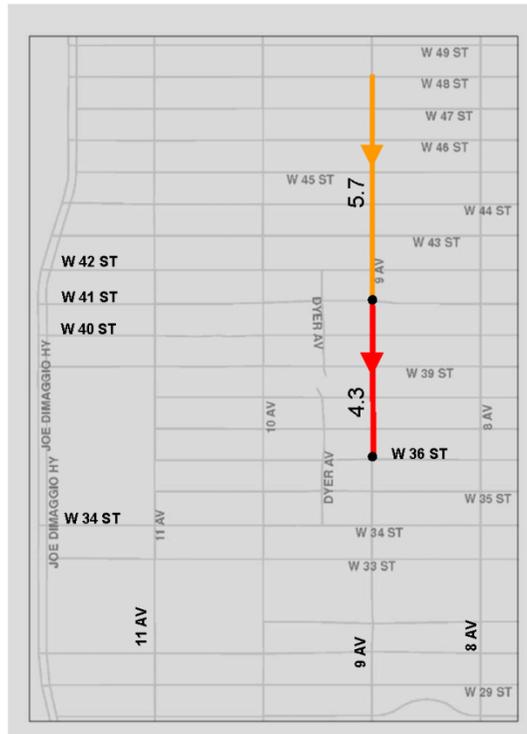
Figure 4.1.2: Existing and Proposed Signal Timing for 9<sup>th</sup> Ave, W. 36<sup>th</sup> St and Ramp C

The resulting delays for 9<sup>th</sup> Avenue are not expected to increase very much during peak periods, because drivers using Ramp C encounter delays anyway as this traffic merges with Dyer Avenue and the Lincoln Tunnel Expressway further downstream. Figure 4.1.3 presents the effect on traffic for the affected corridors with and without the Canoe project in combination with all improvements in the previous sections. The pedestrian operational and safety benefits of these improvements will be enormous.

The Canoe Project is scheduled to be implemented in September 2013.

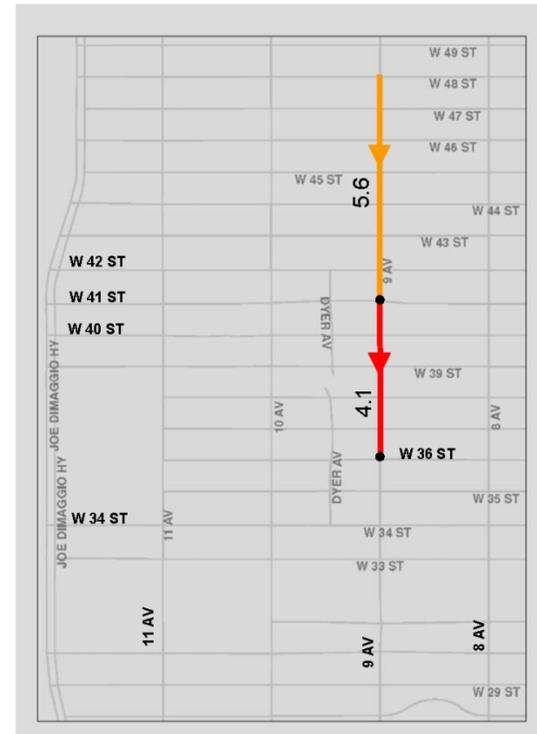


**2015 FUTURE W/O IMPROVEMENTS**



**2015 FUTURE WITH IMPROVEMENTS:**

- Signal Timing Improvements as of 2012
- 8<sup>th</sup> and 9<sup>th</sup> Avenue Bike Lanes
- Split Phase for Bikes and Increased Green Time for 9<sup>th</sup> Avenue



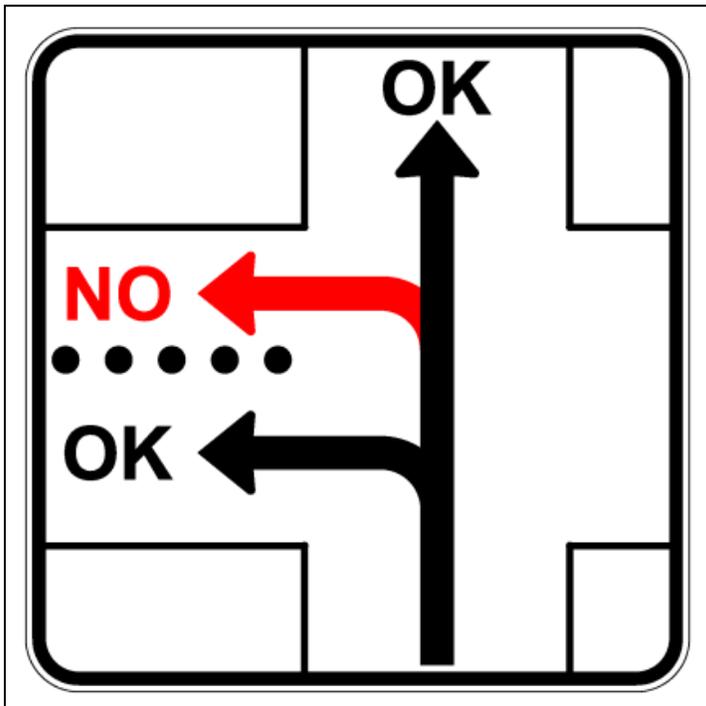
**2015 FUTURE WITH IMPROVEMENTS:**

- Signal Timing Improvements as of 2012
- 8<sup>th</sup> and 9<sup>th</sup> Avenue Bike Lanes
- Split Phase for Bikes and Increased Green Time for 9<sup>th</sup> Avenue
- Canoe Project with New Signalized Crosswalk

**Figure 4.1.3: Average Travel Speeds – 2015 Future with and without Canoe Project – Weekday PM Peak Hour**

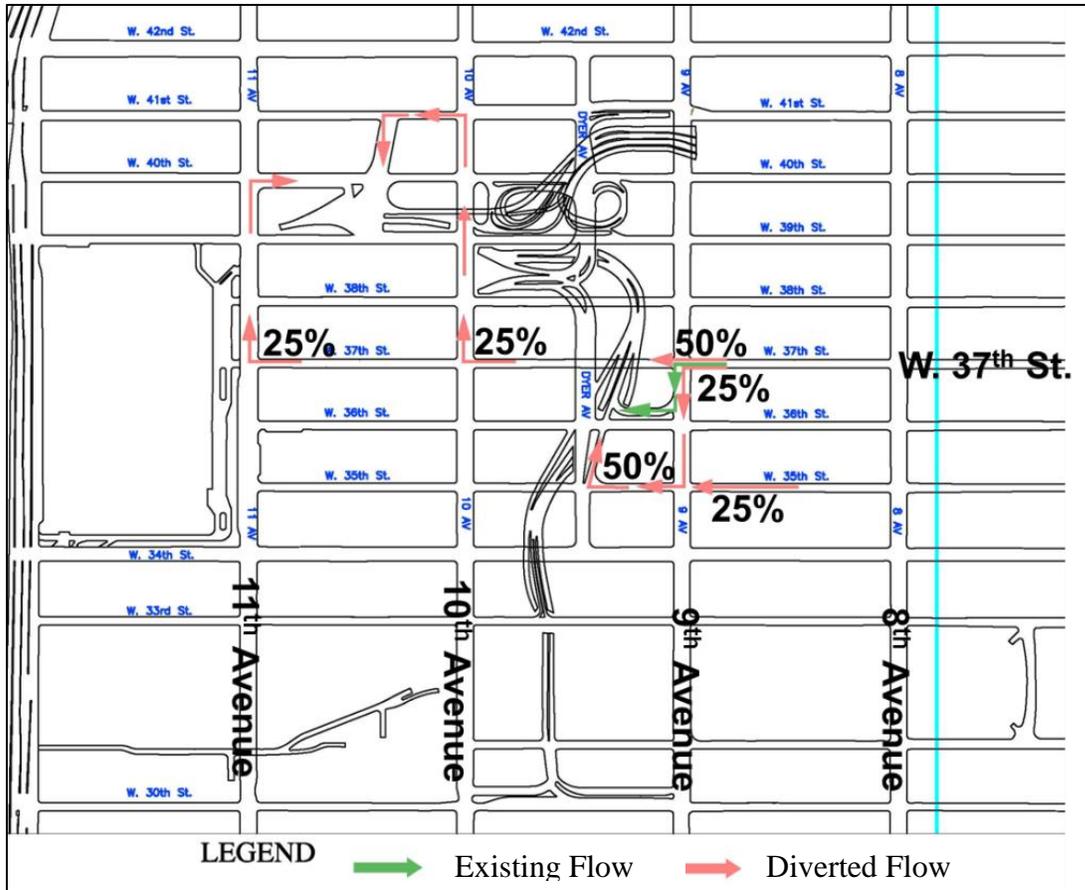
## 4.2 Turn Ban from West 37<sup>th</sup> Street to Ramp C

During 2012, permanent “Qwik Curb” delineators were installed on 9<sup>th</sup> Avenue between West 38<sup>th</sup> Street and West 36<sup>th</sup> Street to separate the two right lanes, which are channeled to Ramp C, from 9<sup>th</sup> Avenue through traffic, as opposed to the cones that the police previously set up every afternoon. These are shown in Figure 4.1.1 on Page 37. A proposed turn ban will prohibit vehicles from West 37<sup>th</sup> Street approaching 9<sup>th</sup> Avenue from turning left into Ramp C (right side of delineators), but will continue to allow the left turn onto southbound 9<sup>th</sup> Avenue (left side of delineators). The sign that drivers will encounter on West 37<sup>th</sup> approaching 9<sup>th</sup> Avenue is shown in Figure 4.2.1. Additional trailblazing signage will be posted at West 37<sup>th</sup> Street approaching 9<sup>th</sup>, 10<sup>th</sup> and 11<sup>th</sup> Avenues to inform drivers that the route to the Lincoln Tunnel is to continue through on West 37<sup>th</sup> Street to 11<sup>th</sup> Avenue, then turn right.



*Figure 4.2.1: Proposed Sign on W.37<sup>th</sup> St approaching 9<sup>th</sup> Avenue*

The expected diversions as a result of this left-turn ban are shown in Figure 4.2.2. During the weekday PM peak hour, about 125 vehicles turn from West 37<sup>th</sup> Street into Ramp C. It is projected that 50% will continue through on West 37<sup>th</sup> Street. Of those, about half (25% of the total) will turn right onto 10<sup>th</sup> Avenue, and the other half (25% of the total) will turn right onto 11<sup>th</sup> Avenue. Another 25% of the total will turn left from West 37<sup>th</sup> Street onto 9<sup>th</sup> Avenue (left side of the delineators), and access the Lincoln Tunnel by turning right onto West 35<sup>th</sup> Street. The remaining 25% would be diverted to westbound West 35<sup>th</sup> Street further east.



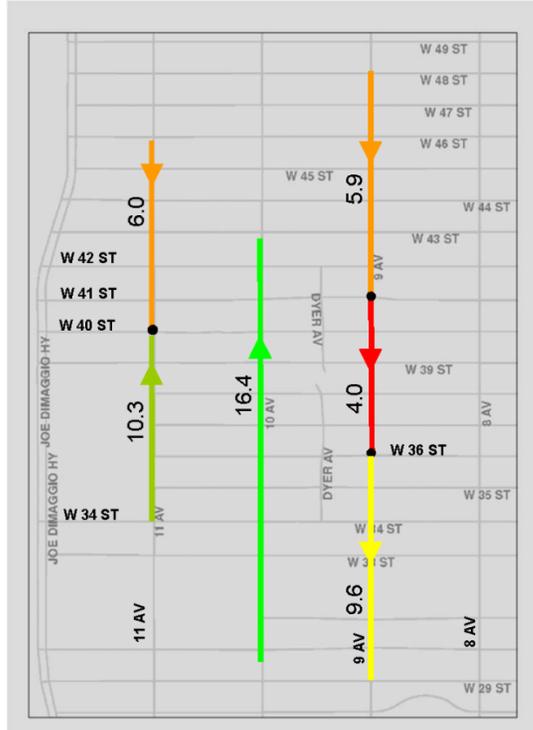
**Figure 4.2.2: Projected Diversion from Turn Ban from West 37<sup>th</sup> Street to Ramp C**

The benefits of this turning ban to 9<sup>th</sup> Avenue operations are projected to be significant. The results are shown in Figure 4.2.3. It is projected that during the weekday PM peak hour, the average travel speed on 9<sup>th</sup> Avenue between West 48<sup>th</sup> and West 41<sup>st</sup> Street will improve from 5.6 mph to about 7.4 mph. The segment between West 41<sup>st</sup> Street and West 36<sup>th</sup> Street is expected to improve from 4.1 mph to 6.1 mph. These results are cumulative in that they also figure in all improvements in the previous sections.

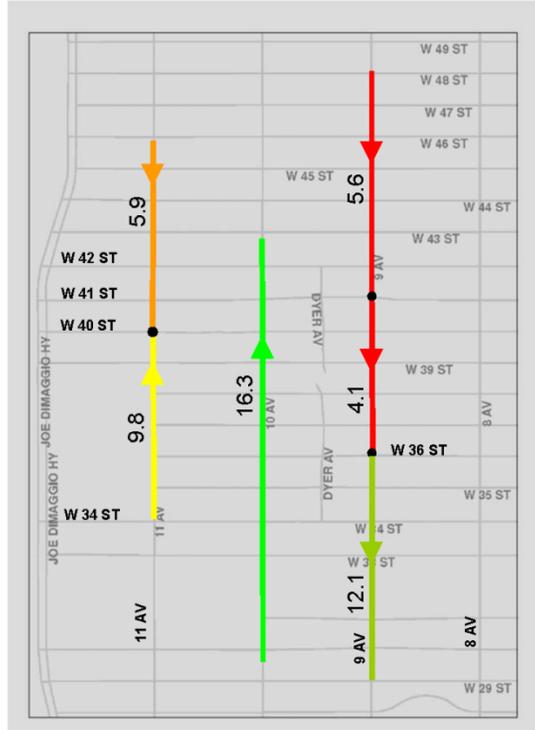
The downside is that 10<sup>th</sup> Avenue is projected to experience a small decrease in average travel speed from 16.3 mph to 15.9 mph, while the projected reduction in average travel speed on northbound 11<sup>th</sup> Avenue is noticeable from 9.8 mph to 7.7 mph. This is a result of vehicles being diverted to northbound 10<sup>th</sup> and 11<sup>th</sup> Avenues. Southbound 11<sup>th</sup> Avenue from West 46<sup>th</sup> to West 40<sup>th</sup> Streets would be indirectly affected, because more vehicles would use the north tube. Average travel time on this segment is projected to decrease from 5.9 mph to 5.7 mph. Also, the delay at westbound West 35<sup>th</sup> Street approaching 9<sup>th</sup> Avenue is projected to increase from about 48 seconds to about 67 seconds.

Another factor to consider is that for this project to be effective, there must be diligent enforcement, especially during the weekday PM peak period.

The turn ban from West 37<sup>th</sup> Street to Ramp C is scheduled to be implemented in September 2013.

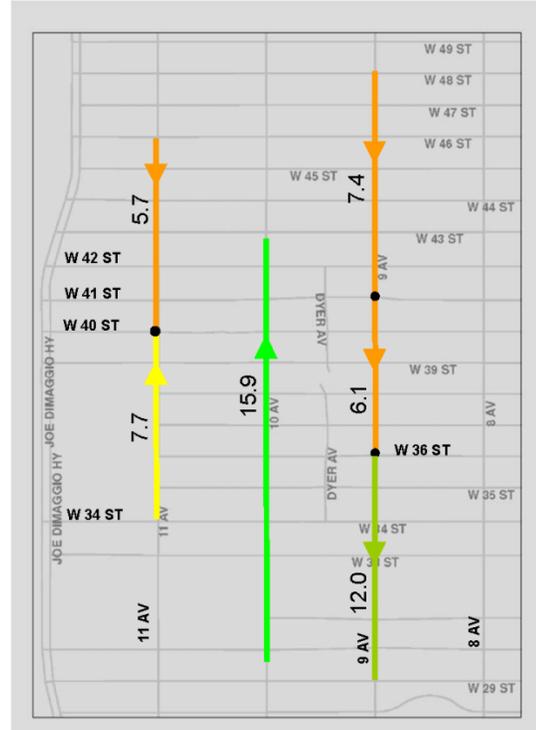


**2015 FUTURE W/O IMPROVEMENTS**



**2015 FUTURE WITH IMPROVEMENTS:**

- Signal Timing Improvements as of 2012
- 8<sup>th</sup> and 9<sup>th</sup> Avenue Bike Lanes
- Split Phase for Bikes and Increased Green Time for 9<sup>th</sup> Avenue
- Canoe Project with new Signalized Crosswalk



**2015 FUTURE WITH IMPROVEMENTS:**

- Signal Timing Improvements as of 2012
- 8<sup>th</sup> and 9<sup>th</sup> Avenue Bike Lanes
- Split Phase for Bikes and Increased Green Time for 9<sup>th</sup> Avenue
- Canoe Project with New Signalized Crosswalk
- Turn Ban from W. 37<sup>th</sup> St to Ramp C

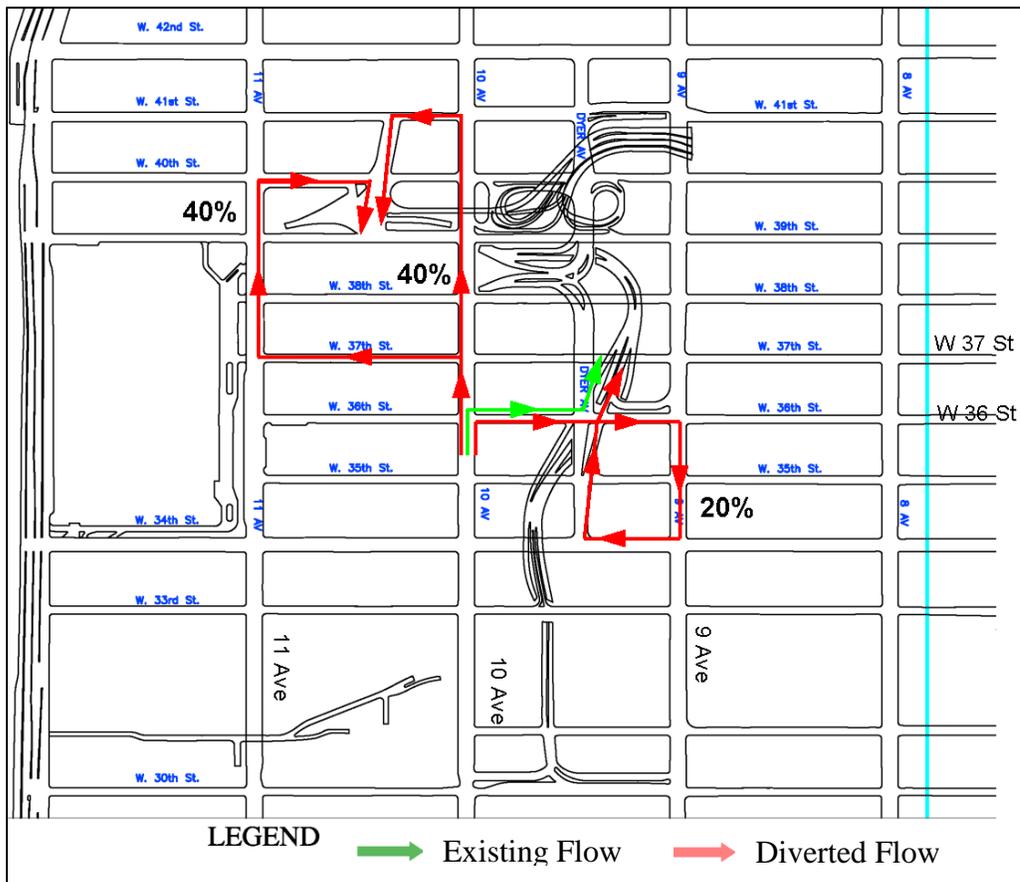
**Figure 4.2.3: Average Travel Speeds – 2015 Future with and without Turn Ban from W. 37<sup>th</sup> St to Ramp C – Weekday PM Peak Hour**

### 4.3 Turn Ban from West 36<sup>th</sup> Street to Dyer Avenue

Another turn ban that is proposed in order to improve operations is the left turn from eastbound West 36<sup>th</sup> Street onto Dyer Avenue. Currently, about 125 vehicles make this turn during the weekday PM peak hour, competing with vehicles from northbound Dyer Avenue, and ultimately with vehicles from Ramp C. These left-turning vehicles often block the intersection by trying to force their way through when there is no room to complete the turn.

Figure 4.3.1 presents the assumed diversion as a result of this turn ban. It is preferred that vehicles originating from northbound 10<sup>th</sup> Avenue turn left onto West 37<sup>th</sup> Street and use 11<sup>th</sup> Avenue to access the Lincoln Tunnel, instead of turning right onto West 36<sup>th</sup> Street to Dyer Avenue. It is assumed that about 40% will be diverted to this preferred route. Good signage will be needed for motorists to get the message that it is not possible to access the tunnel by turning right onto West 36<sup>th</sup> Street. As with all such turn bans, diligent enforcement is necessary to be effective.

It is assumed that another 40% of the diverted motorists will continue northbound on 10<sup>th</sup> Avenue to West 40<sup>th</sup> Street. Finally, it is conservatively assumed that the remaining 20% will turn right from 10<sup>th</sup> Avenue onto West 36<sup>th</sup> Street despite the signage, only to discover that the left turn onto Dyer Avenue is banned, and will have to travel around the block to West 35<sup>th</sup> Street as shown in Figure 4.3.1 to get to Dyer Avenue.

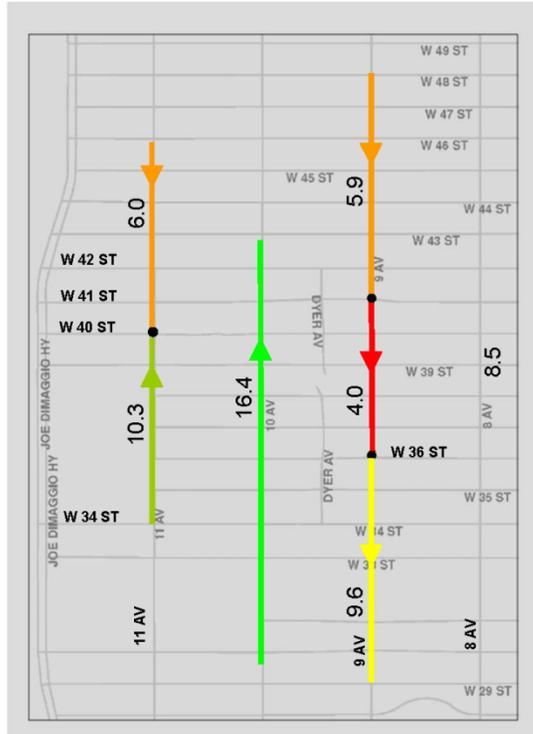


**Figure 4.3.1: Projected Diversion from Turn Ban from West 36<sup>th</sup> Street to Dyer Avenue**

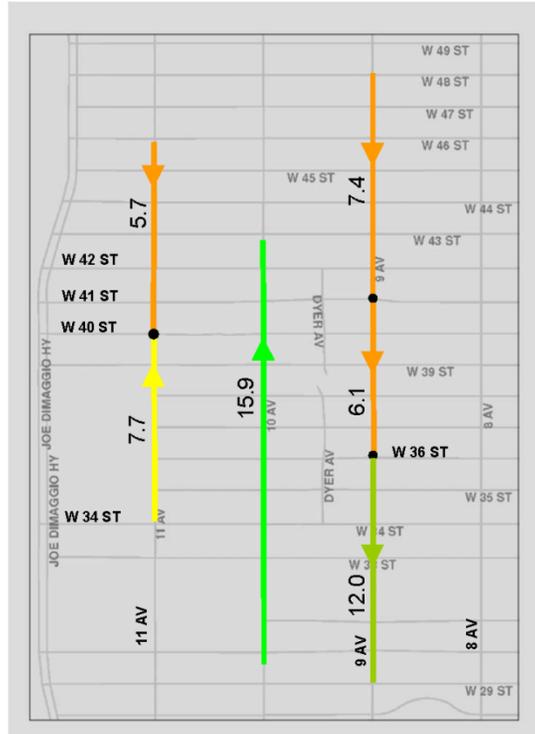
The benefits of this turning ban to 9<sup>th</sup> Avenue operations are projected to be significant. The results are shown in Figure 4.3.2. It is projected that during the weekday PM peak hour, the average travel speed on 9<sup>th</sup> Avenue between West 48<sup>th</sup> and West 41<sup>st</sup> Street will improve from 7.4 mph to about 8.9 mph. The segment between West 41<sup>st</sup> Street and West 36<sup>th</sup> Street is expected to improve from 6.1 mph to 8.6 mph. These results are cumulative in that they also figure in all improvements in the previous sections.

Similar to the turn ban described in the previous section, the downside is that 10<sup>th</sup> Avenue is projected to experience a small decrease in average travel speed from 15.9 mph to 15.5 mph, while the projected reduction in average travel speed on northbound 11<sup>th</sup> Avenue is from 7.7 mph to 6.8 mph. This is a result of vehicles being diverted to northbound 10<sup>th</sup> and 11<sup>th</sup> Avenues. Southbound 11<sup>th</sup> Avenue from West 46<sup>th</sup> to West 40<sup>th</sup> Streets would be indirectly affected, because more vehicles would use the north tube. Average travel time on this segment is projected to decrease from 5.7 mph to 5.5 mph.

The turn ban from West 36<sup>th</sup> Street to Dyer Avenue is scheduled to be implemented in September 2014.

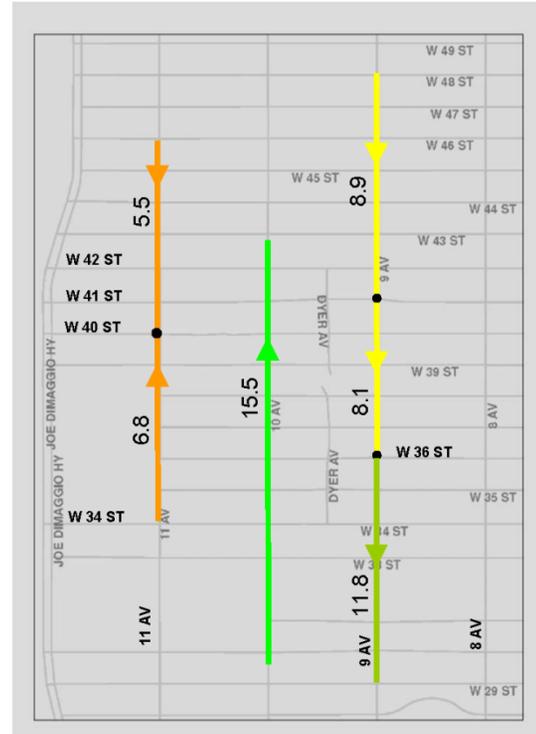


**2015 FUTURE W/O IMPROVEMENTS**



**2015 FUTURE WITH IMPROVEMENTS:**

- Signal Timing Improvements as of 2012
- 8<sup>th</sup> and 9<sup>th</sup> Avenue Bike Lanes
- Split Phase for Bikes and Increased Green Time for 9<sup>th</sup> Avenue
- Canoe Project with new Signalized Crosswalk
- Turn Ban from W. 37<sup>th</sup> St to Ramp C



**2015 FUTURE WITH IMPROVEMENTS:**

- Signal Timing Improvements as of 2012
- 8<sup>th</sup> and 9<sup>th</sup> Avenue Bike Lanes
- Split Phase for Bikes and Increased Green Time for 9<sup>th</sup> Avenue
- Canoe Project with New Signalized Crosswalk
- Turn Ban from W. 37<sup>th</sup> St to Ramp C
- Turn Ban from W. 36<sup>th</sup> St to Dyer Ave

**Figure 4.3.2: Average Travel Speeds – 2015 Future with and without Turn Ban from W. 36<sup>th</sup> St to Dyer Ave – Weekday PM Peak Hour**

#### 4.4 Signage for 9<sup>th</sup> Avenue Approaching Ramp C.

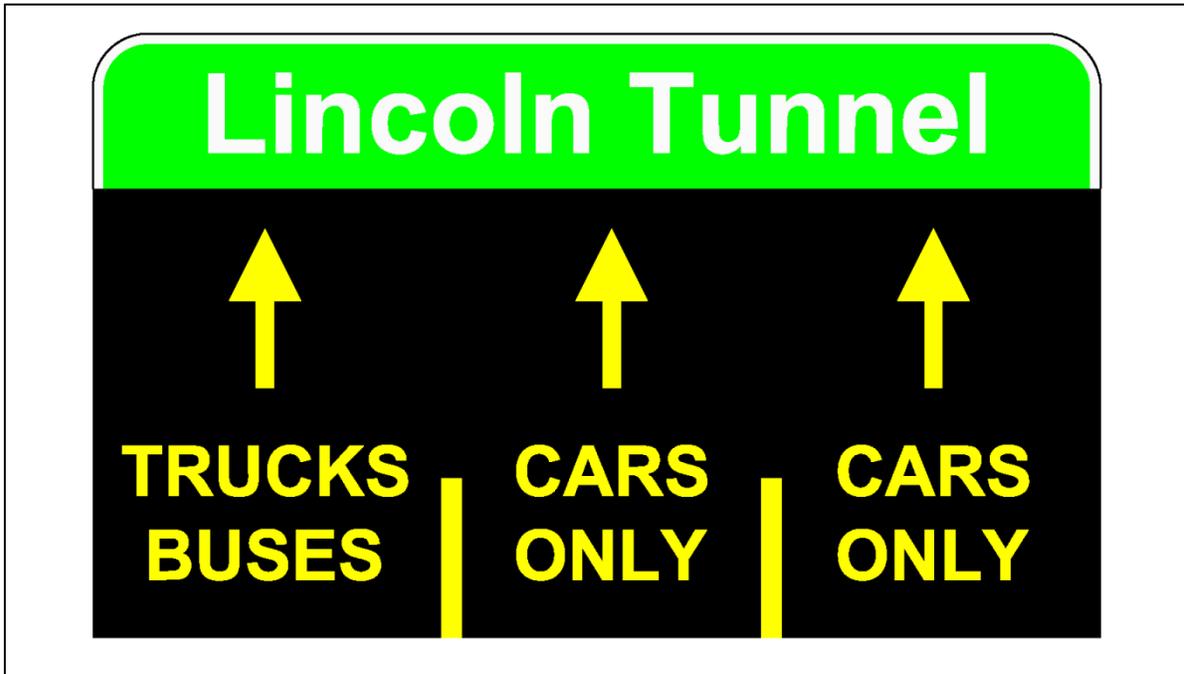
As shown in Figure 4.1.1 on Page 37, “Qwik Curb” delineators on 9<sup>th</sup> Avenue separate the two right lanes, which are channeled to Ramp C, from southbound 9<sup>th</sup> Avenue through traffic on the left. These delineators start about 50 feet south of West 38<sup>th</sup> Street. Therefore, at West 38<sup>th</sup> Street, drivers need to know to stay to the left of the delineators for through traffic, and to the right for the Lincoln Tunnel via Ramp C. Currently there is little signage to provide such guidance.

Figure 4.4.1 shows a Port Authority of New York and New Jersey owned variable message sign on 9<sup>th</sup> Avenue approaching West 39<sup>th</sup> Street. At the time the sign was erected, West 39<sup>th</sup> Street was an entrance to the Lincoln Tunnel that was open during certain hours, and the sign led drivers to either West 39<sup>th</sup> Street or Ramp C, depending on when the West 39<sup>th</sup> Street entrance was open. Since the west 39<sup>th</sup> Street entrance has been permanently closed for several years, this sign has not been used.

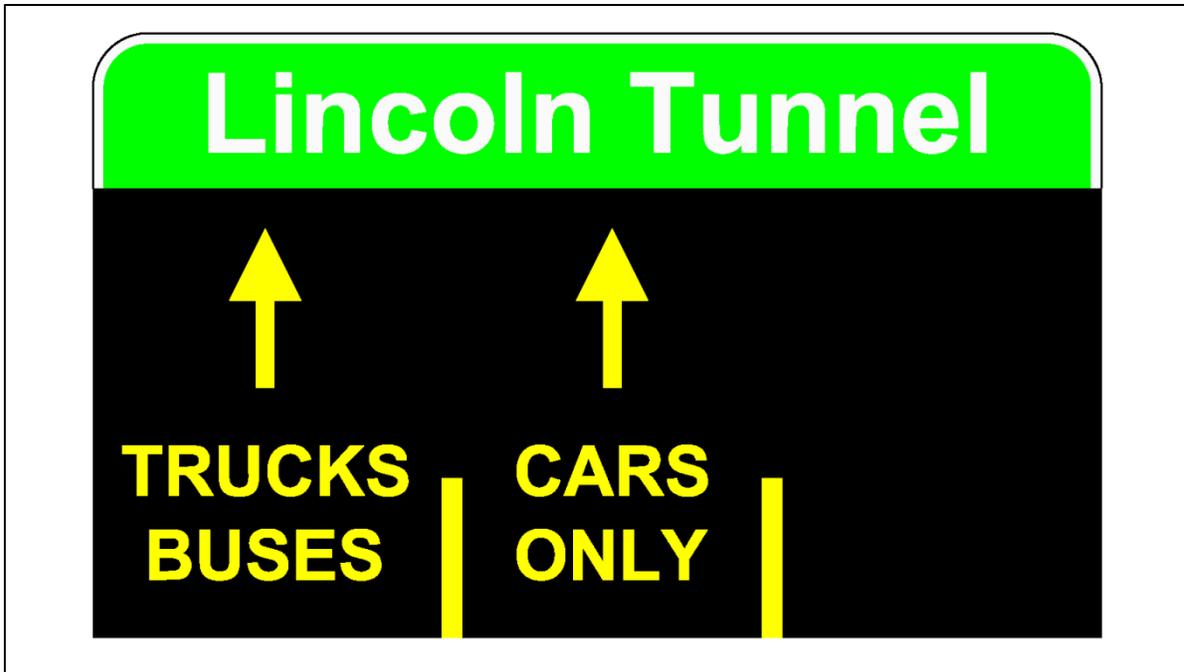


*Figure 4.4.1: Variable Message Sign on 9<sup>th</sup> Avenue Looking South towards West 39<sup>th</sup> Street.*

It is proposed that this sign displays a message to inform drivers that the two right lanes are channelized for cars only to the Lincoln Tunnel ahead. On weekdays from 7AM to 10AM and from 4PM to 7PM, when there are no standing regulations for the right curb lane, the sign would look as shown in Figure 4.4.2. During all other times, when the right curb lane is a loading zone or free parking, the sign would look like Figure 4.4.3. The Port Authority is currently investigating whether it is feasible to program such messages on the existing variable message sign within the existing sign dimensions.

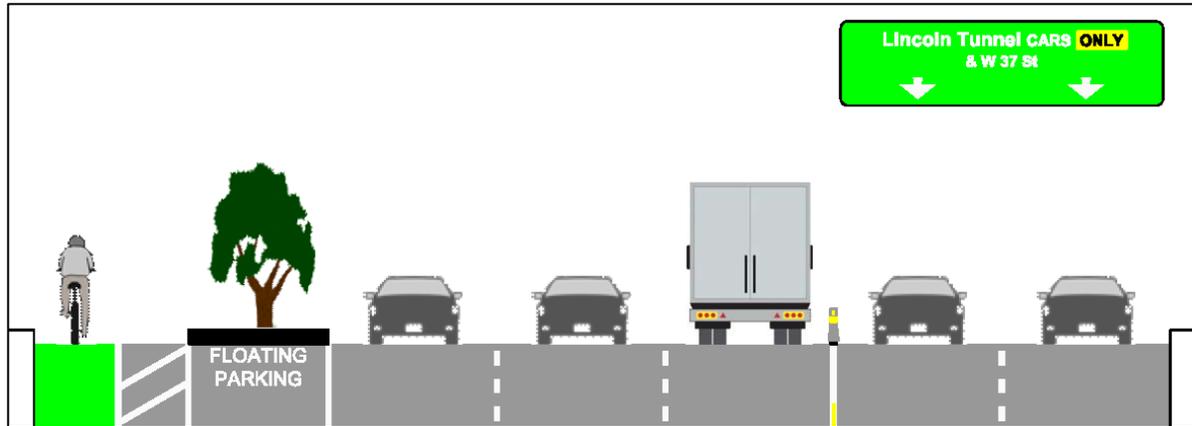


*Figure 4.4.2: Proposed Variable Message Sign for 9<sup>th</sup> Avenue Approaching West 39<sup>th</sup> Street When No Standing Regulations in Effect for Right Curb Lane 7-10 AM and 4-7 PM Mon-Fri*



*Figure 4.4.3: Proposed Variable Message Sign for 9<sup>th</sup> Avenue Approaching West 39<sup>th</sup> Street When Loading or Parking Permitted in Right Curb Lane All Other Times*

Another location that is being considered for a fixed cantilevered gantry sign is 9<sup>th</sup> Avenue near West 38<sup>th</sup> Street, just before the start of the delineators. This sign emphasizes that through traffic should not be to the right of the delineators. This location is being investigated to determine if a foundation for poles for such a mount is feasible. The proposed sign to be hung from this mount is shown in Figure 4.4.4.



*Figure 4.4.4: Proposed to be Hung from Cantilever Gantry Mount on 9<sup>th</sup> Avenue Near West 38<sup>th</sup> Street*

#### 4.5 34<sup>th</sup> Street Select Bus Service – Phase II

The 34<sup>th</sup> Street Select Bus Service project seeks to improve bus speeds, pedestrian safety and curb access on a corridor that extends for two miles from 12<sup>th</sup> Avenue to the FDR Drive. The corridor is served by the crosstown M16 and M34 bus routes, which together carry over 17,000 passengers daily, but their average speed is only about 4.5 miles per hour. The street is also used by commuter buses that carry over 16,000 passengers daily. During weekday peak hours, over 100 transit buses an hour traverse 34<sup>th</sup> Street, and hundreds of tour buses use the street over the course of a typical day.

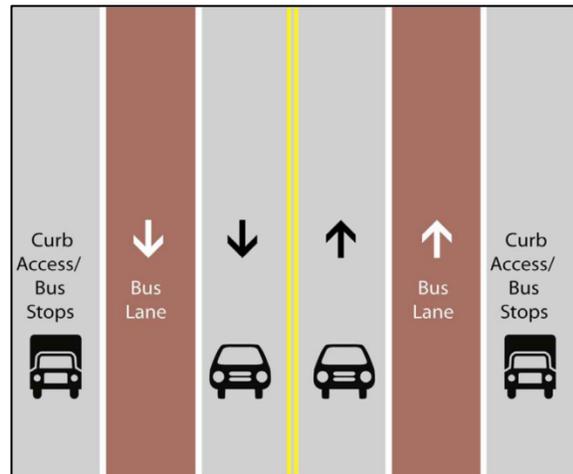
As mentioned in Section 3.5, the first phase of the project has already been implemented. Fare prepayment began on November 13, 2011. The M34 was renamed the M34 SBS, and the M16 was renamed the M34A SBS. In addition, video camera enforcement has been expanded for the existing bus lanes.

During the second phase, NYCDOT will create improved offset bus lanes along 34<sup>th</sup> Street, as well as bus bulbs at many station stops, and sidewalk expansion to address pedestrian safety. The improved bus lanes will also benefit the express and tour buses that use the corridor. At the same time, NYCDOT will implement transit signal priority and other signal improvements to improve bus speeds and general traffic flow. Curbside loading zones will be expanded.

The following is a description of the typical treatments for the study area section of West 34<sup>th</sup> Street between 12<sup>th</sup> and 8<sup>th</sup> Avenues.

The section between 12<sup>th</sup> Avenue and 11<sup>th</sup> Avenue will remain the same as today, with two travel lanes and parking in each direction. There will be no bus lanes in this section.

In the section between 11<sup>th</sup> Avenue and 9<sup>th</sup> Avenue, where the curb to curb roadway width is 60 feet, there are currently two travel lanes and a curbside bus lane in each direction, with no parking. The proposed plan features one travel lane, an offset bus lane, and a parking lane in each direction. Figure 4.5.1 illustrates the proposed typical treatment. Offset bus lanes are located next to the parking lane, instead of next to the curb, reducing the conflict with stopped vehicles. The parking lanes on both sides will provide



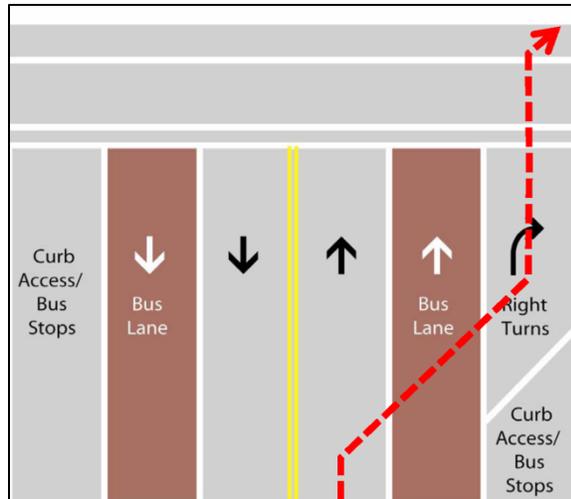
**Figure 4.5.1: Proposed Treatment, West 34<sup>th</sup> Street between 11<sup>th</sup> & 9<sup>th</sup> Avenues**

24 hour loading zones, which do not currently exist. At bus stops, bus bulbs will provide wider sidewalks. The sidewalk will be expanded for the length of the bus stop into the parking lane, so that buses will not need to pull over at bus stops, and pedestrians have more space to walk and wait. The curb lanes will be used for right-turn bays at approaches where right-turns are permitted, as shown in Figure 4.5.2. This treatment will also be used for the section east of 3<sup>rd</sup> Avenue, outside the study area.

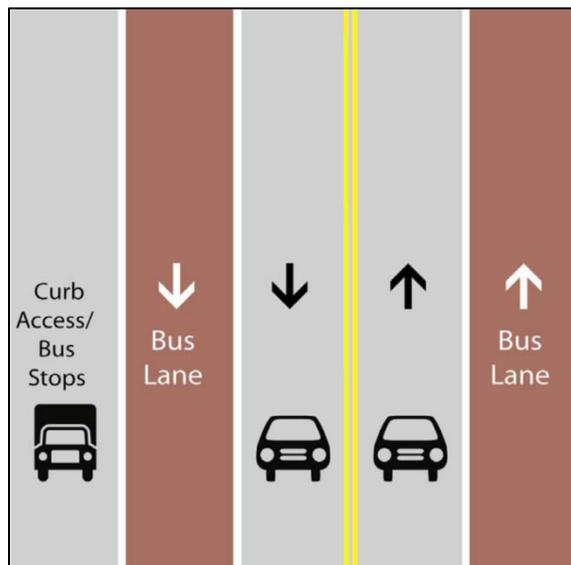
In the section between 9<sup>th</sup> Avenue and 8<sup>th</sup> Avenue, where the curb to curb roadway width is 52 feet, there are currently two westbound travel lanes, one eastbound travel lane, and a curbside bus lane in each direction, with no parking. The proposed plan features one travel lane in each direction, a westbound curbside bus lane, an eastbound offset bus lane, and an eastbound parking lane. Figure 4.5.3 illustrates the proposed typical treatment. The eastbound parking lane will provide 24 hour loading zones, which do not currently exist. At bus stops, bus bulbs will provide wider sidewalks. This treatment will also be used for the section between 8<sup>th</sup> Avenue and 3<sup>rd</sup> Avenue, outside the study area.

The proposal will improve bus reliability and increase bus speeds for over 33,000 daily riders. Corridor wide, it will add 18,000 square feet of new pedestrian space, reducing sidewalk crowding and improving pedestrian safety. It will also increase daytime loading from 32 to 258 spaces, with a loading zone on one side of every block between 8<sup>th</sup> and 3<sup>rd</sup> Avenues, and on both sides of every block west of 9<sup>th</sup> Avenue and east of 3<sup>rd</sup> Avenue.

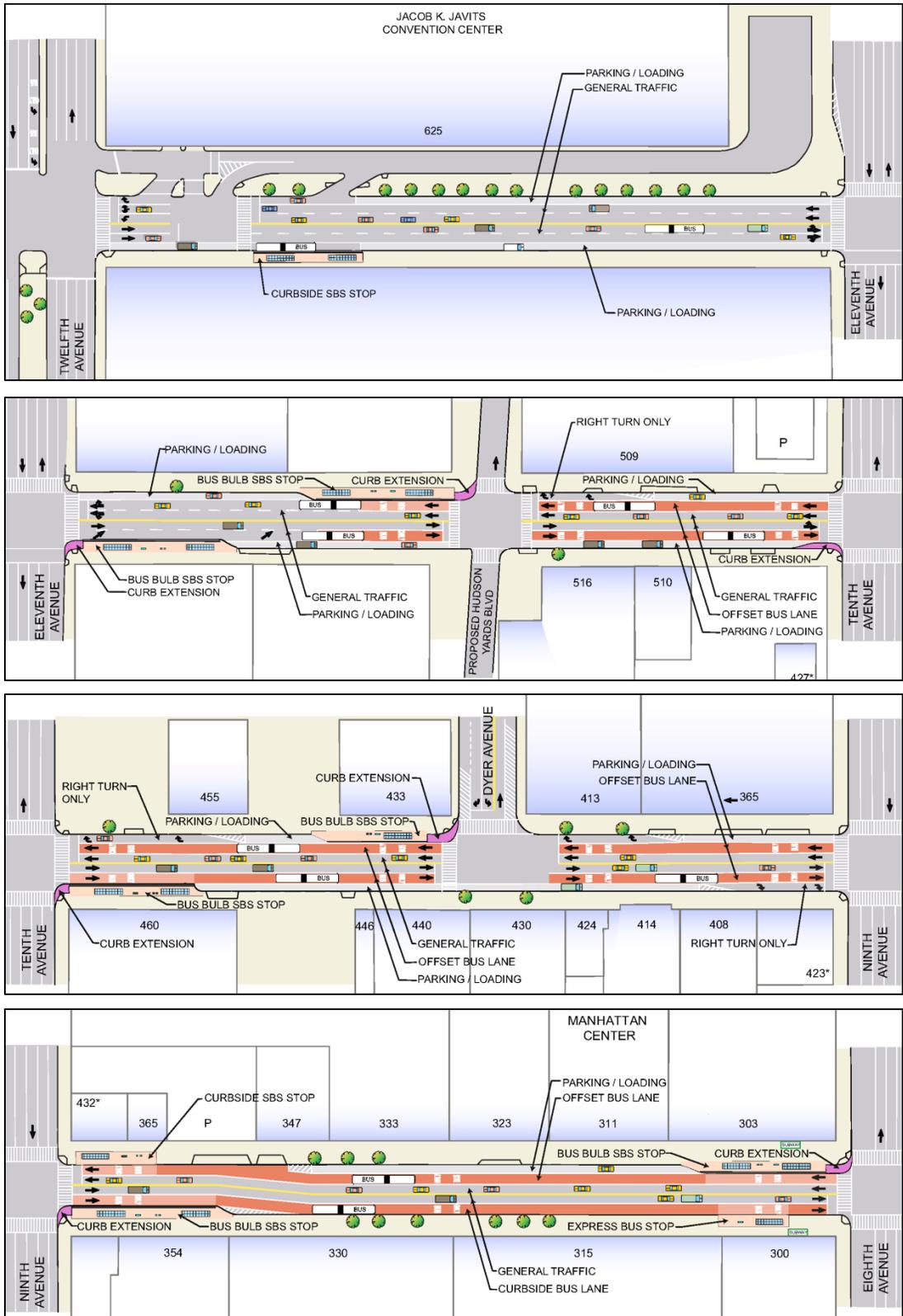
Figures 4.5.4 presents the proposed layout of West 34<sup>th</sup> Street between 12<sup>th</sup> and 8<sup>th</sup> Avenue, showing the travel lanes, bus lanes, parking lanes, bus stops and bulbouts. Existing and proposed views are shown in Figures 4.5.5 and 4.5.6, respectively.



**Figure 4.5.2: Proposed Right-Turn Bays**



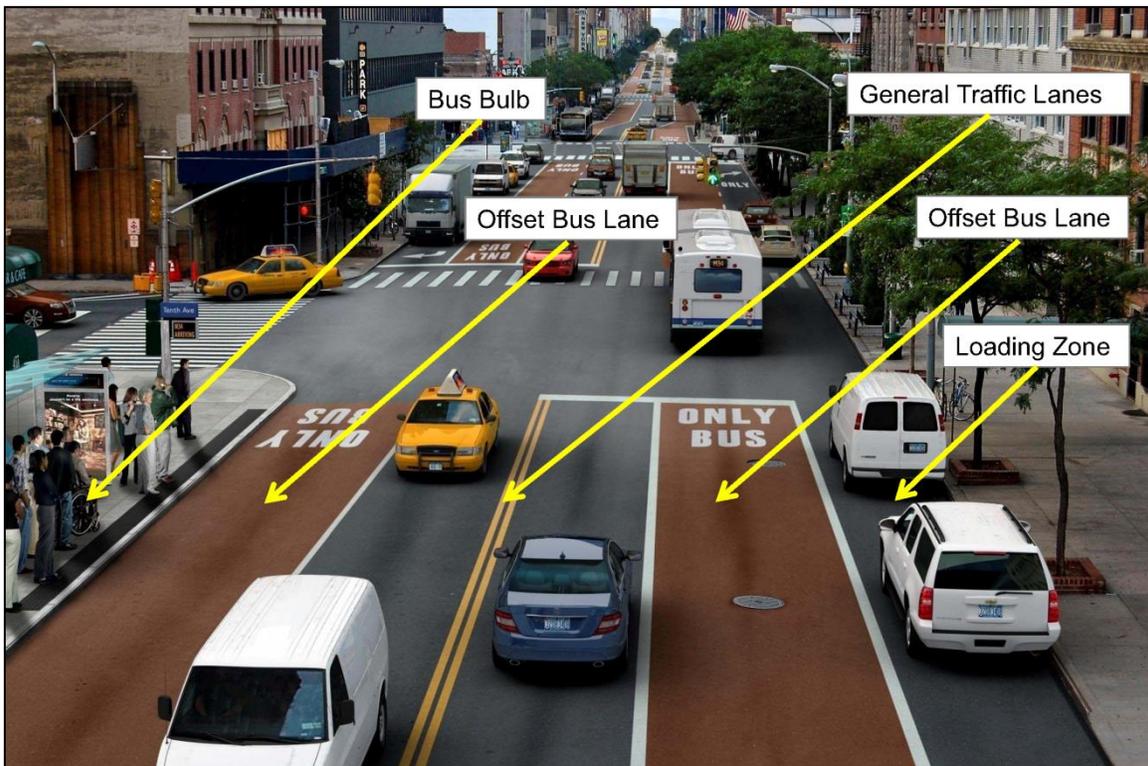
**Figure 4.5.3: Proposed Treatment, West 34<sup>th</sup> Street between 9<sup>th</sup> and 8<sup>th</sup> Avenues**



**Figure 4.5.4: Proposed Bus Lane Layout on W. 34<sup>th</sup> St between 12<sup>th</sup> and 8<sup>th</sup> Avenues**



*Figure 4.5.5: Existing View, West 34<sup>th</sup> Street Looking East from Dyer Avenue*



*Figure 4.5.6: View of West 34<sup>th</sup> Street Looking East from Dyer Avenue with Proposed Treatments*

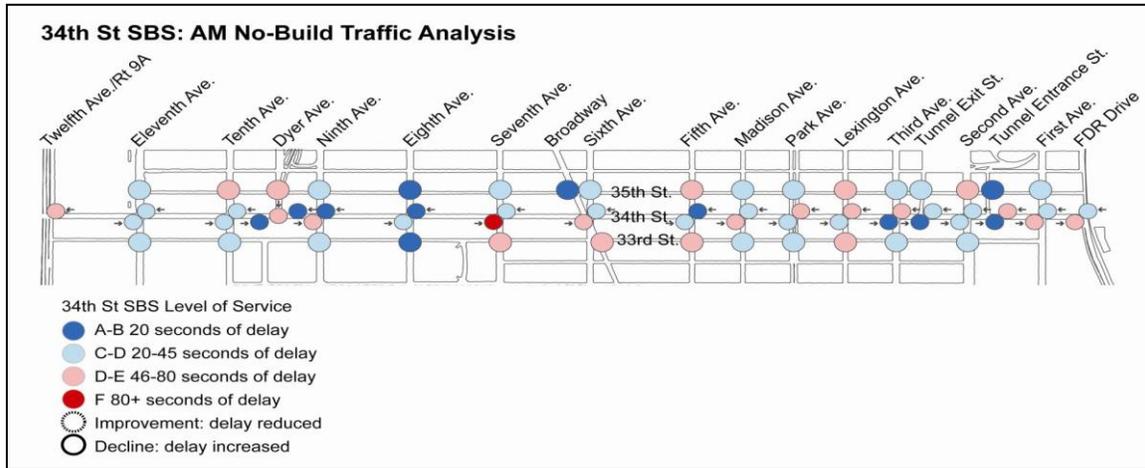
The following measures are proposed to address the effects of lane reduction on traffic operations:

- Ban the westbound left turn from West 34<sup>th</sup> Street onto 9<sup>th</sup> Avenue.
- Ban the westbound right turn from West 34<sup>th</sup> Street onto 8<sup>th</sup> Avenue.
- Signal timing changes to provide more green time to West 34<sup>th</sup> Street. They are summarized in Table 4.5.1.

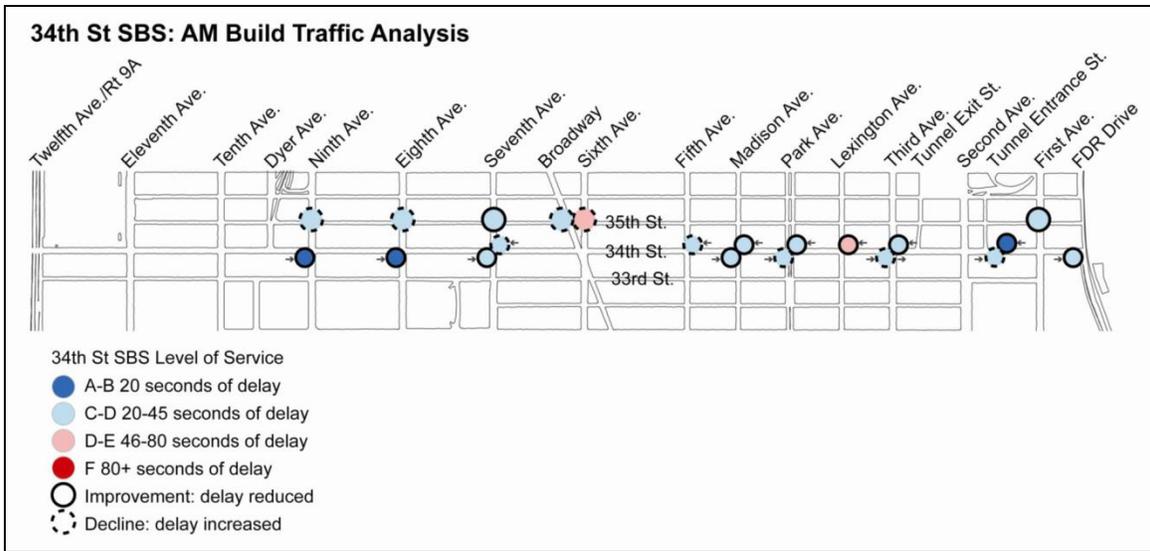
**Table 4.5.1  
SIGNAL TIMING CHANGES FOR 34 ST SBS**

LOCATION	CHANGE
11 Av & W 34 St	Change protected E-W dual LT to protected WB+L (14 sec)
10 Av & W 34 St	Reallocate 5 sec from NB to EB-WB
9 Av & W 34 St	Remove protected WB-L (because it will be banned), add to EB (15 sec)
8 Av & W 34 St	Remove LPI (because turns from W 34 St will be banned), give extra 7 sec to E-W.
10 Av & W 35 St	Reallocate 2 sec from NB to WB

Overall, it is projected that traffic delays will remain roughly the same as existing. The right turn bays, turning bans, and increased green time for West 34<sup>th</sup> Street will offset the lane reduction. The offset bus lanes, which will be blocked less often than curbside bus lanes, will be able to carry more buses. Figures 4.5.7 and 4.5.8 presents projected level of service for 34<sup>th</sup> Street from 12<sup>th</sup> Avenue to the FDR Drive for future with and without the bus lanes, respectively for the weekday AM peak hour.



**Figure 4.5.7: 2015 Future Level of Service on West 34<sup>th</sup> Street w/o Bus Lane Improvements – Weekday AM Peak Hour**



**Figure 4.5.8: 2015 Future Level of Service on West 34<sup>th</sup> Street with Bus Lane Improvements – Weekday AM Peak Hour**

The 34<sup>th</sup> Street Select Bus Service is scheduled to be implemented in 2013.

#### 4.6 PM Peak Period Contra-flow Bus Lane on Dyer Avenue from West 41<sup>st</sup> to West 42<sup>nd</sup> Streets

As mentioned earlier, the intersection of West 42<sup>nd</sup> Street and 9<sup>th</sup> Avenue is critical for both pedestrians and traffic. It has often been suggested that the westbound left-turn be banned at this location. Currently a 14 second leading protected left-turn phase eats up valuable green time. Prohibiting this turn would allow reallocation to provide extra time for pedestrian and traffic movements, and would remove a dangerous pedestrian/traffic conflict. However, at this time, banning the left turn would push the problem elsewhere. Origin-destination surveys indicate that as many as 60 buses per hour make this left-turn, then turn right one block downstream onto westbound West 41<sup>st</sup> Street. To ban this turn without causing bigger problems, accommodations need to be made for these buses.

Currently, Dyer Avenue is one way northbound between the south Lincoln Tunnel tube and West 42<sup>nd</sup> Street during most times. During the weekday PM period (approximately 4-7 PM), the two western lanes are reversed for southbound buses. These contra-flow lanes accommodate buses departing the PABT from three locations: the Sputnik ramp at West 41<sup>st</sup> Street, the West 41<sup>st</sup> Street ramp just east of 9<sup>th</sup> Avenue, and the ramp to Dyer Avenue just south of West 41<sup>st</sup> Street.

If the PM contra-flow lane were extended one block north to West 42<sup>nd</sup> Street, it would eliminate the need for 60 buses to turn left from West 42<sup>nd</sup> Street onto 9<sup>th</sup> Avenue. This could facilitate banning this left turn, or at least converting from a protected-permitted left-turn to protected only operation. The diversion of the proposed ban is shown in Figure 4.6.1.

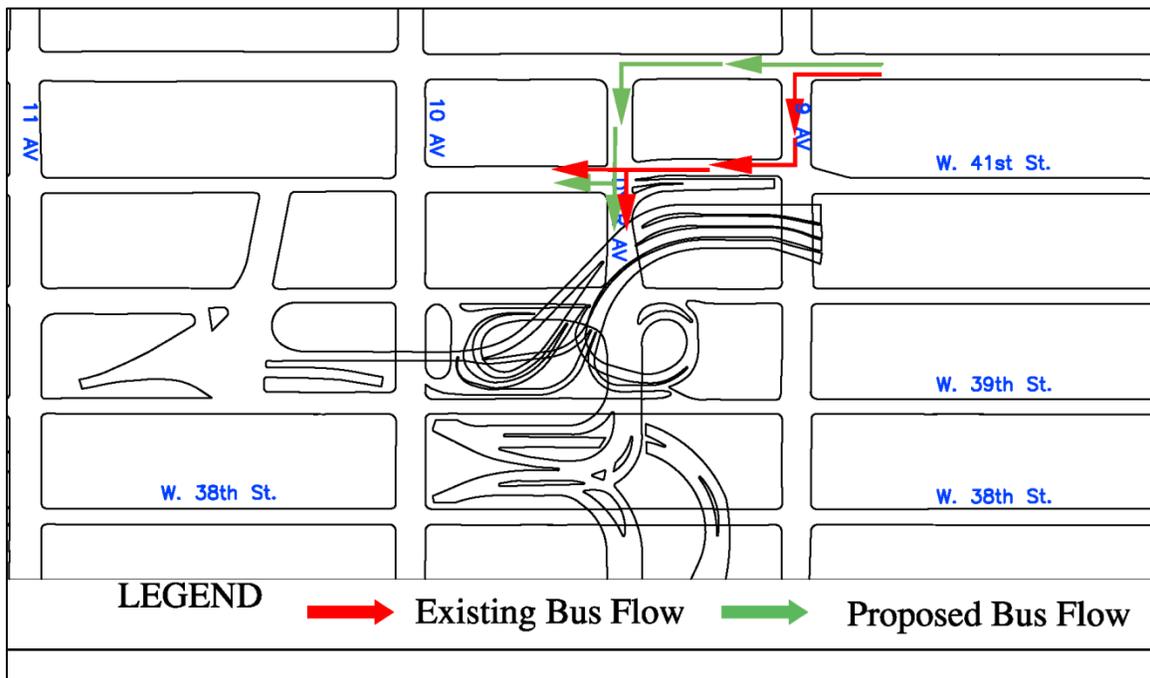


Figure 4.6.1: Bus Diversion with Extended PM Peak Period Dyer Ave Contra-Flow Lane

To implement this improvement measure, the following needs to be considered:

- It would have to be made clear that the westbound left-turn from West 42<sup>nd</sup> Street to Dyer Avenue is permitted only from 4-7 PM, and then only for buses.
- Preliminary analysis indicates that buses can make this turn without a protected arrow, but if this proves to be necessary, it would only apply to buses during only three hours a weekday.
- The contra-flow lane would have to be set up during the specified times.
- The intersection of West 41<sup>st</sup> Street and Dyer is currently three phase, with separate phases for Dyer Avenue, West 41<sup>st</sup> Street, and the Sputnik ramp from the PABT. Southbound traffic would need its own phase to eliminate the conflict with northbound left traffic. Preliminary analysis indicates that this is possible without degrading to unacceptable levels of service.
- There are possible turning radius problems for buses that turn right from Dyer Avenue onto West 41<sup>st</sup> Street.

NYCDOT and PANYNJ have started and will continue to address these problems.

#### **4.7 Conversion of 11<sup>th</sup> Avenue to Two-Way South of West 37<sup>th</sup> Street**

New development along 11th Avenue in the West 30s, associated with the Hudson Yards Rezoning, the extension of the Number 7 subway line, and the Eastern and Western Railyards projects, will change this former manufacturing district into a more residential and retail neighborhood. The potential for two-way operation between West 24<sup>th</sup> and West 37<sup>th</sup> Streets has been examined which would better allow 11<sup>th</sup> Avenue to accommodate needed vehicular access to these planned uses.

The portion of 11<sup>th</sup> Avenue between West 30<sup>th</sup> and West 33<sup>rd</sup> Streets is currently being redeveloped into the Eastern and Western Railyards, which will be part of mixed use developments situated on top of the Long Island rail Road's West Side Yard. In addition, the Javits Center is located just north of this area on the west side of 11<sup>th</sup> Avenue between West 34<sup>th</sup> and West 38<sup>th</sup> Streets. Between West 30<sup>th</sup> and West 24<sup>th</sup> Streets, new developments have also been undertaken, replacing auto repair shops and other similar uses.

From a traffic viewpoint, 11<sup>th</sup> Avenue is underutilized in its current one-way southbound configuration between West 24<sup>th</sup> and West 37<sup>th</sup> Streets. Current volumes are similar to 11<sup>th</sup> and West End Avenues between West 55<sup>th</sup> and West 66<sup>th</sup> Streets, which already operates with two-way flow. This Upper West Side section of 11<sup>th</sup> and West End Avenues serves the similar land uses to 11<sup>th</sup> Avenue between West 24<sup>th</sup> and West 37<sup>th</sup> Streets. Converting the segment from West 24<sup>th</sup> to West 37<sup>th</sup> Streets to two-way traffic will make its operation consistent with the rest of the avenue and allow for better circulation with the new developments at Hudson Yards. It will also allow the installation of pedestrian refuge islands on certain blocks in order to make pedestrian crossings safer and provide esthetic improvements with tree planters which would also supplement the development at Hudson Yards. A feasibility study that has recently been completed concludes that signal timing modifications to the intersections within this segment of 11<sup>th</sup> Avenue would greatly improve the level of service and therefore it is recommended that this portion of 11<sup>th</sup> Avenue be converted to two-way operation.

Figure 4.7.1 presents the design for the two-way layout. The conversion is scheduled to be implemented during late summer 2014.

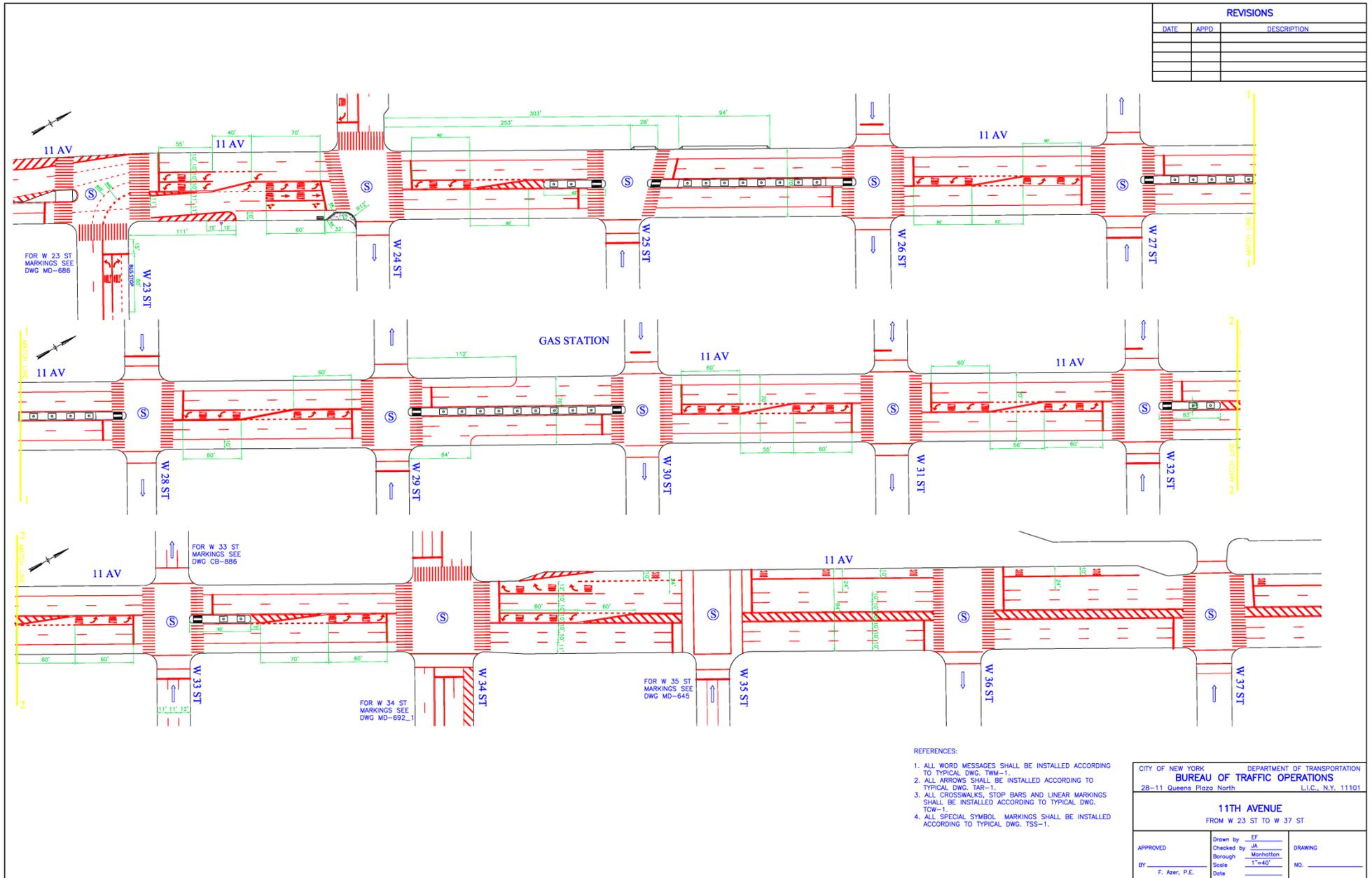
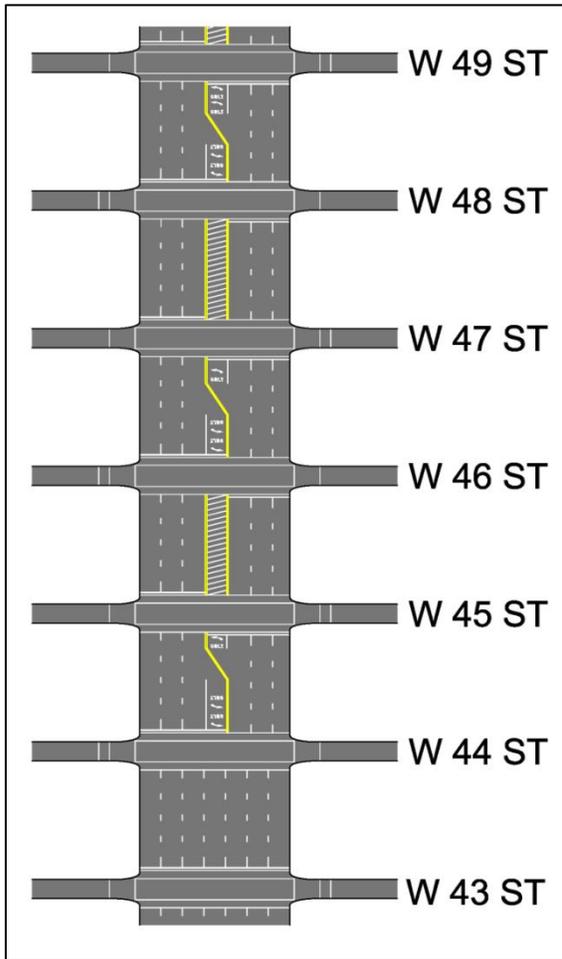


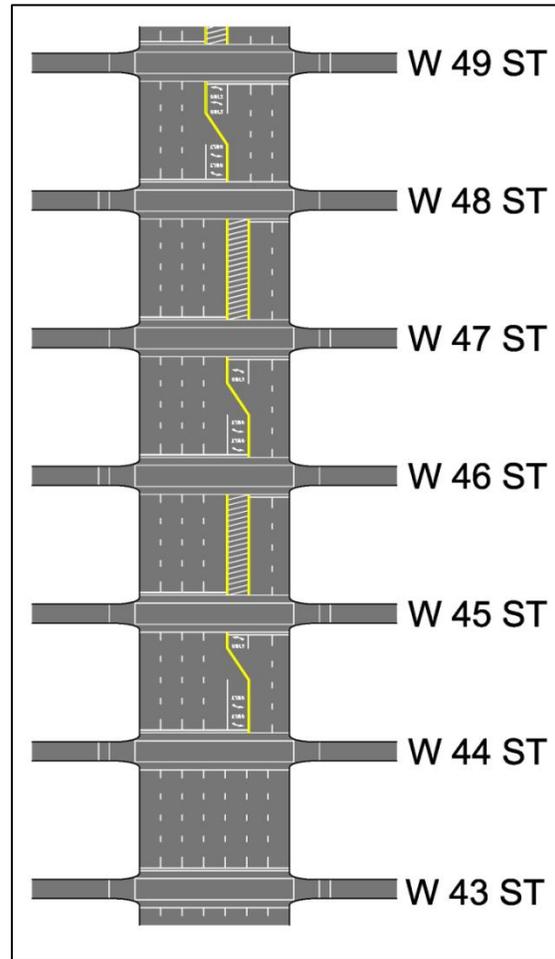
Figure 4.7.1: Design for Two-Way Layout of 11<sup>th</sup> Avenue South of West 37<sup>th</sup> Street

#### 4.8 Alternative Configurations for 11<sup>th</sup> Avenue North of West 44<sup>th</sup> Street

Currently 11<sup>th</sup> Avenue is two-way north of West 44<sup>th</sup> Street, with two travel lanes and parking on both sides, and left-turn bays in the median. South of West 44<sup>th</sup> Street, it becomes one-way southbound, with a sudden increase in the number of southbound lanes from three to seven, including parking. See Figure 4.8.1. The northbound lanes are underused, while the southbound lanes experience heavy congestion with Lincoln Tunnel bound traffic. If the median were shifted to the east for four or more blocks, an extra southbound lane would be created to provide more storage for the heavy southbound traffic and a more gradual transition. Figure 4.8.2 illustrates the proposal.

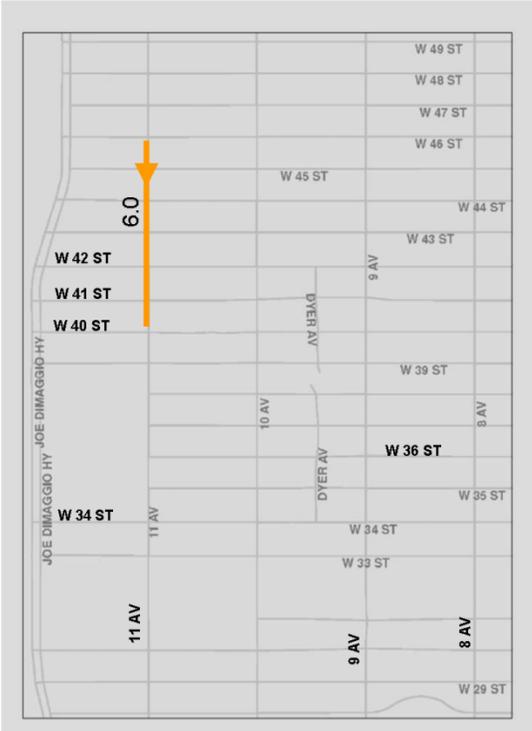


*Figure 4.8.1: Existing Layout of 11<sup>th</sup> Avenue from West 43<sup>rd</sup> to West 49<sup>th</sup> Street*

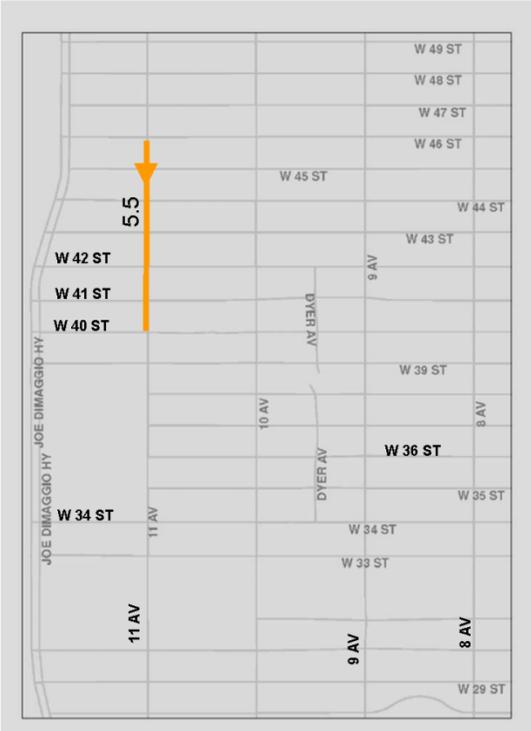


*Figure 4.8.2: Layout of 11<sup>th</sup> Avenue from West 43<sup>rd</sup> to West 49<sup>th</sup> Street with Shifted Median*

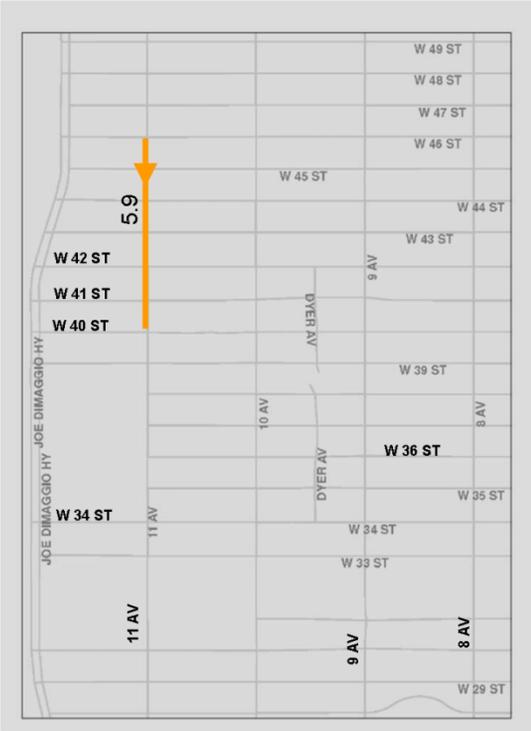
As shown in Figure 4.8.3, analysis indicates that southbound travel speeds on 11<sup>th</sup> Avenue would show a modest improvement from 5.5 mph to 5.9 mph. Non-Lincoln Tunnel traffic would have room to separate from Lincoln Tunnel traffic by keeping right. Queues would not extend as far north because of the extra storage, which could entice traffic from overused 9<sup>th</sup> Avenue.



**2015 FUTURE W/O IMPROVEMENTS**



- 2015 FUTURE WITH IMPROVEMENTS:**
- Signal Timing Improvements as of 2012
  - 8<sup>th</sup> and 9<sup>th</sup> Avenue Bike Lanes
  - Split Phase and Increased Green Time for 9<sup>th</sup> Avenue
  - Canoe Project with new Signalized Crosswalk
  - Turn Ban from W. 37<sup>th</sup> St to Ramp C
  - Turn ban from W. 36<sup>th</sup> St to Dyer Ave



- 2015 FUTURE WITH IMPROVEMENTS:**
- Signal Timing Improvements as of 2012
  - 8<sup>th</sup> and 9<sup>th</sup> Avenue Bike Lanes
  - Split Phase and Increased Green Time for 9<sup>th</sup> Avenue
  - Canoe Project with New Signalized Crosswalk
  - Turn Ban from W. 37<sup>th</sup> St to Ramp C
  - Turn Ban from W. 36<sup>th</sup> St to Dyer Ave
  - Median Shift of 11<sup>th</sup> Avenue between W.44<sup>th</sup> and W. 48<sup>th</sup> Sts.

*Figure 4.8.3: Average Travel Speeds – 2015 Future with and without Median Shift on 11<sup>th</sup> Ave – Weekday PM Peak Hour*

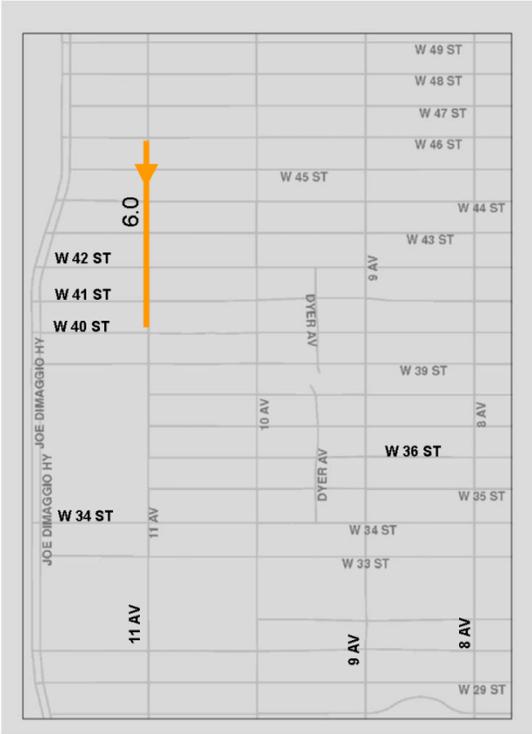
The downside of this proposal is that the few vehicles that wish to turn left from northbound 11<sup>th</sup> Avenue onto West 45<sup>th</sup> or 47<sup>th</sup> Street (about 10 and 20, respectively, during the weekday PM peak hour) would have as many as four lanes to turn against.

A more radical, modified plan to provide more storage for Lincoln Tunnel bound traffic on 11<sup>th</sup> Avenue would be to convert 11<sup>th</sup> Avenue from two-way to one way as far north as West 57<sup>th</sup> Street, with no transition. As shown in Figure 4.8.4, analysis indicates that southbound travel speeds on 11<sup>th</sup> Avenue would show a modest improvement over the median shift proposal depicted in Figure 4.8.2, from 5.5 mph to 6.2 mph instead of 5.9 mph – an extra gain of 0.3 mph.

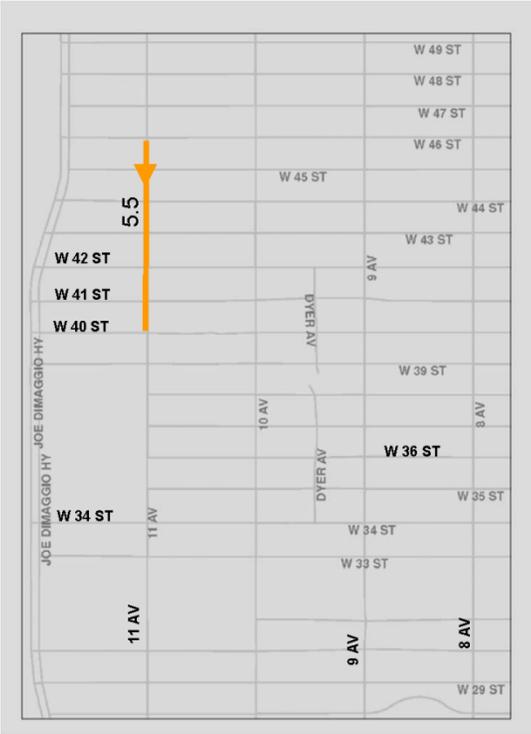
Maintaining 11<sup>th</sup> Avenue as two-way with median shift north of West 44<sup>th</sup> Street offers significant circulation benefits that may outweigh the additional 0.3 mph gained from the one-way conversion. 11<sup>th</sup> Avenue is an edge road and significantly impacts circulation patterns on the west side of Manhattan. Eliminating the northbound option on 11<sup>th</sup> Avenue will force more traffic onto 10<sup>th</sup> and 12<sup>th</sup> Avenues and require more circuitous travel on the network to access locations on 11<sup>th</sup> Avenue previously reached using 11<sup>th</sup> Avenue's northbound lanes. Other major edge roads in Manhattan operate as two-way, including West End Avenue, East End Avenue, York Avenue and Avenue C.

Additionally, the 11<sup>th</sup> Avenue thoroughfare begins at West 106<sup>th</sup> Street as West End Avenue and runs bi-directional for 62 blocks. As mentioned in the previous section, NYCDOT is planning to convert 11<sup>th</sup> Avenue from one-way southbound to two-way from West 37<sup>th</sup> Street to West 24<sup>th</sup> Street, in part to create continuity with the operation of the northern majority of the corridor.

For the section north of West 44<sup>th</sup> Street, NYCDOT is considering the shifted median alternative and the one-way conversion alternative. A decision will be made later in 2013, after investigating deliveries and other access issues.

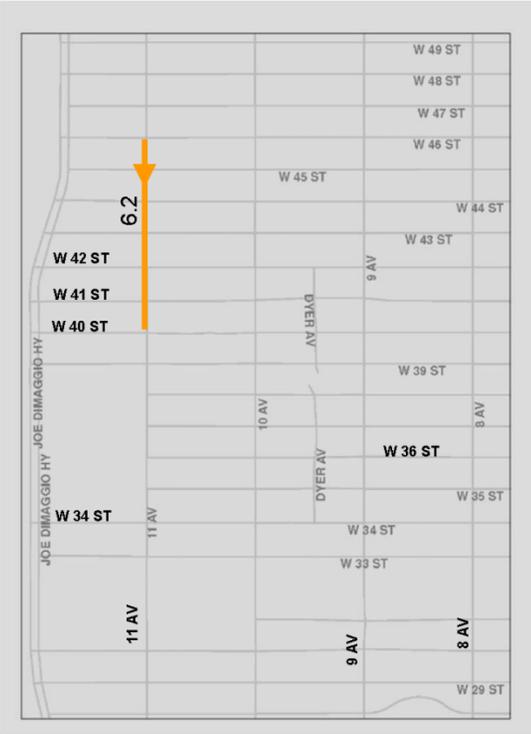


**2015 FUTURE W/O IMPROVEMENTS**



**2015 FUTURE WITH IMPROVEMENTS:**

- Signal Timing Improvements as of 2012
- 8<sup>th</sup> and 9<sup>th</sup> Avenue Bike Lanes
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**2015 FUTURE WITH IMPROVEMENTS:**

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- Turn Ban from W. 37<sup>th</sup> St to Ramp C
- Turn Ban from W. 36<sup>th</sup> St to Dyer Ave
- Conversion of 11<sup>th</sup> Ave to One-Way Southbound between W. 44<sup>th</sup> & W. 57<sup>th</sup> Sts

*Figure 4.8.4: Average Travel Speeds – 2015 Future with and without One-Way Conversion on 11<sup>th</sup> Ave – Weekday PM Peak Hour*

#### **4.9 Safe Crossing of 8<sup>th</sup> and 9<sup>th</sup> Avenues North of West 42<sup>nd</sup> Street**

As mentioned earlier, the conflict between pedestrians crossing 9<sup>th</sup> Avenue at south crosswalks, and 8<sup>th</sup> Avenue at north crosswalks, while vehicles concurrently turn from the cross streets onto these avenues, is a problem that has been brought up by the community. Split phases have been requested, in which green time for the cross streets would be split into two parts. In the first part, the south crosswalk at 9<sup>th</sup> Avenue intersections (north crosswalk for 8<sup>th</sup> Avenue intersections) would have the WALK display, while the turning vehicles are held with a red arrow to provide conflict-free crossing. In the second part of the split phase, the south crosswalk for 9<sup>th</sup> Avenue intersections (north crosswalk for 8<sup>th</sup> Avenue intersections) displays the steady hand, while the turning vehicles have a green arrow for conflict-free turning. During both parts of the split phase, the cross street displays through-arrow green for through traffic, and the opposite crosswalk displays the WALK indication.

Figure 4.9.1 presents the advantages and disadvantages of LPIs vs. split phases for crossing a wide one-way avenue like 8<sup>th</sup> or 9<sup>th</sup> Avenues. A prerequisite for split phases for cross streets is that the south curb for 9<sup>th</sup> Avenue, or the north curb for 8<sup>th</sup> Avenue, be available for turn bays of sufficient length to store turning vehicles. NYCDOT is agreeable to converting metered spaces to No Standing Anytime regulations in order to improve pedestrian safety, but would not want to remove any loading/unloading spaces for merchants.

Table 4.9.1 summarizes all intersections on 8<sup>th</sup> and 9<sup>th</sup> Avenues from West 43<sup>rd</sup> Street to West 50<sup>th</sup> Street of the suitability for split phases. Unfortunately, only seven of the 16 locations are suitable. The most requested location, West 43<sup>rd</sup> Street and 9<sup>th</sup> Avenue, is currently not suitable. In addition to the loading zone on the south curb at the West 43<sup>rd</sup> Street approach to 9<sup>th</sup> Avenue, there is a bus stop for the M34A bus on the north curb. It would be impossible for the bus to turn from the south curb lane. To rectify this, there are preliminary plans to move the bus stop to a nearby midblock location, and to move the loading zone to the space vacated by the bus stop. Priority will be given to convert this intersection to a split phase.

The pedestrian islands that have been installed as part of the bike lane project will greatly enhance pedestrian safety. NYCDOT will continue to look to ways to come up with a comprehensive plan to provide additional safety for pedestrians crossing 8<sup>th</sup> and 9<sup>th</sup> Avenues.

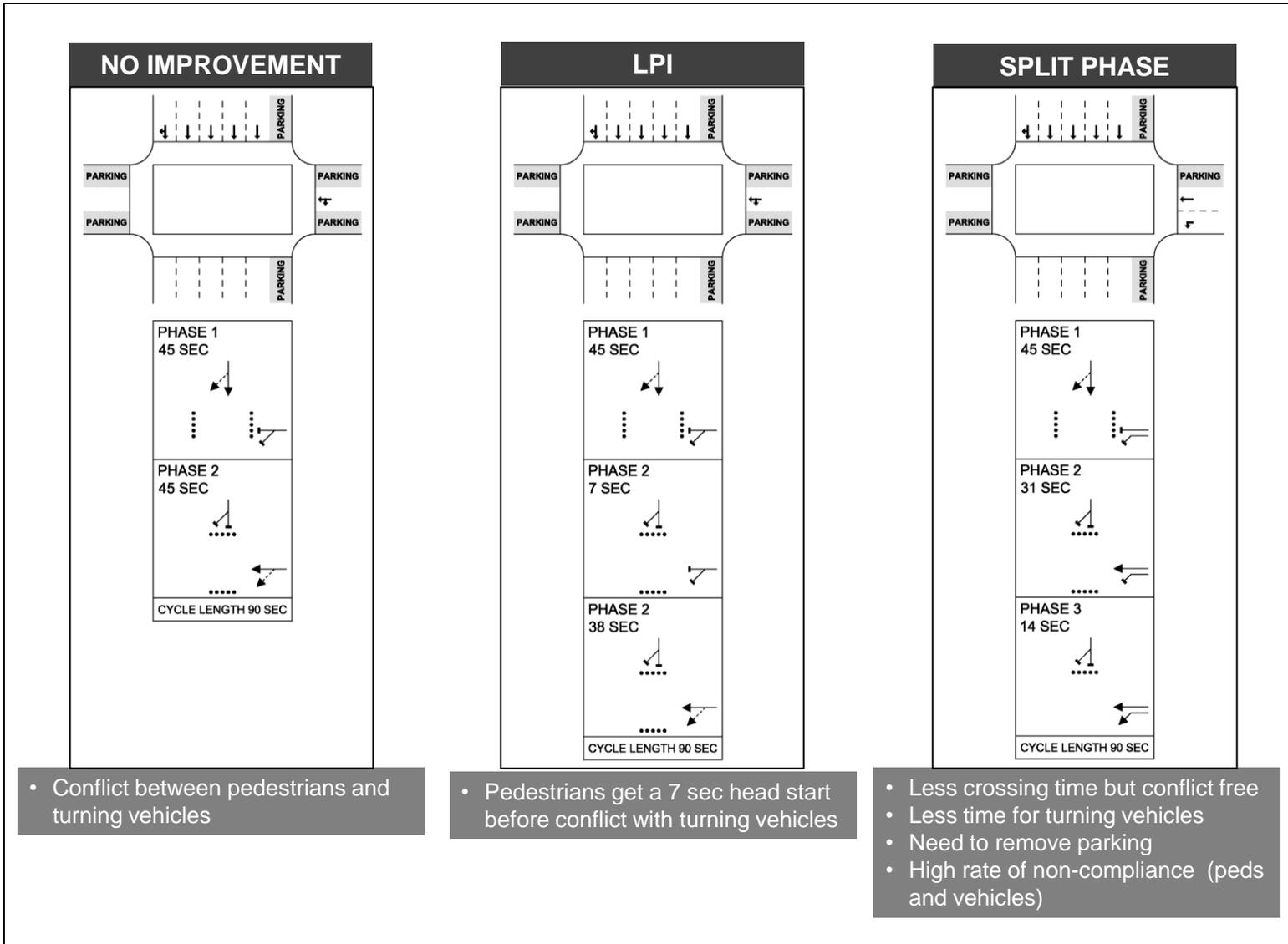


Figure 4.9.1: Comparison of LPI vs. Split Phase for Providing Safe Crossing

**Table 4.9.1  
Availability of Turning Lane for Split Phase**

<b>Avenue</b>	<b>Cross Street</b>	<b>Curb Available for Turning Lane?</b>	<b>If No, Why Not?</b>
8th Ave	West 43rd St	Yes	
8th Ave	West 44th St	No	Authorized Vehicle Parking
8th Ave	West 45th St	No	Loading Zone
8th Ave	West 46th St	Yes	
8th Ave	West 47th St	Yes	
8th Ave	West 48th St	No	Fire Dept. Parking
8th Ave	West 49th St	Yes	
8th Ave	West 50th St	No	Authorized Vehicle Parking
9th Ave	West 43rd St	No	Loading Zone, Bus Stop
9th Ave	West 44th St	Yes	
9th Ave	West 45th St	No	Loading Zone
9th Ave	West 46th St	No	Curb Extension
9th Ave	West 47th St	Yes	
9th Ave	West 48th St	Yes	
9th Ave	West 49th St	No	Loading Zone
9th Ave	West 50th St	No	Bus Stop

#### 4.10 Split Phase for West 41<sup>st</sup> Street at 9<sup>th</sup> Avenue

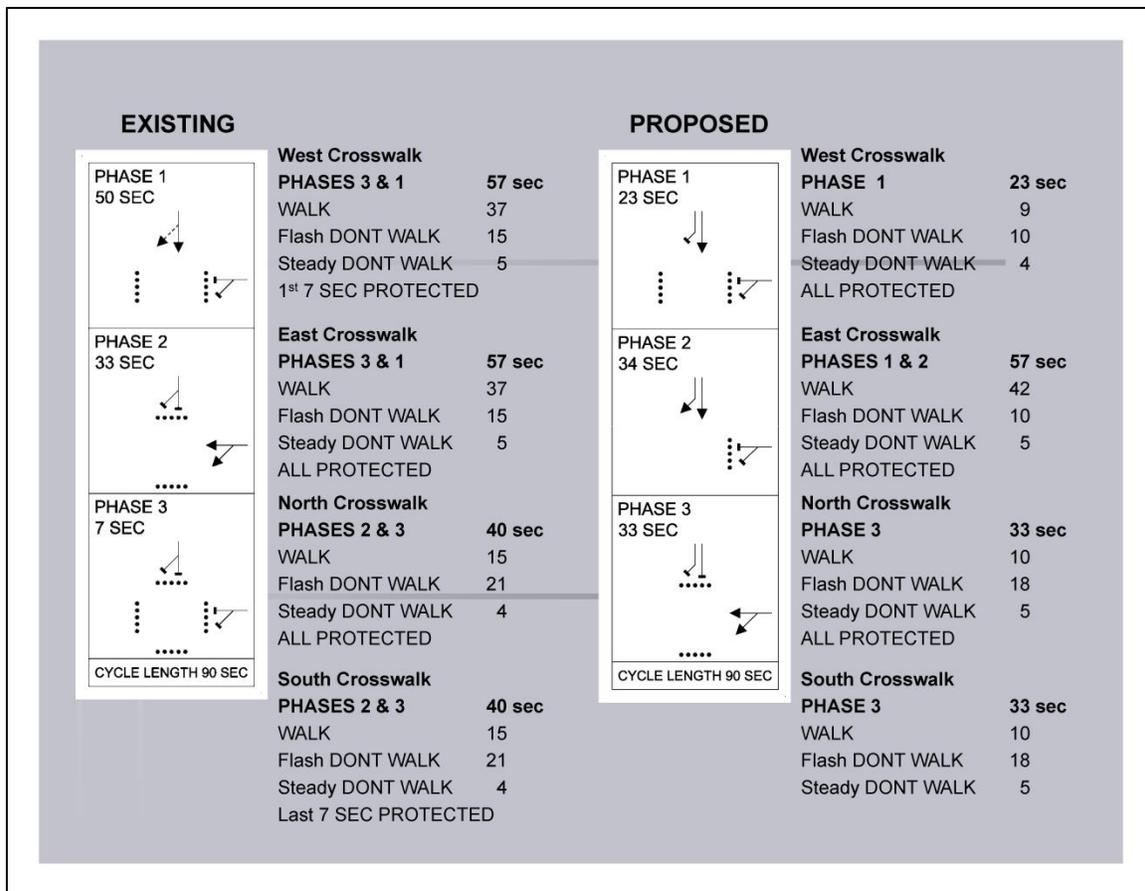
Another location considered for a split phase is for the west crosswalk at West 41<sup>st</sup> Street and 9<sup>th</sup> Avenue. The west leg is 39 feet wide, wider than the normal 30-32 feet for a minor cross street. There is heavy traffic volume, especially buses, turning right from 9<sup>th</sup> Avenue into this crosswalk bound for the Lincoln Tunnel and Quill Bus Depot. An LPI is already provided for this crossing. This crosswalk has often been pointed out by the community as being perilous, and is expected to get worse with nearby future development. A fatal accident occurred in February 2013 when a southbound right-turning vehicle struck a pedestrian in the west crosswalk.

Figure 4.10.1 presents the existing and proposed split phase signal timing. Currently, there is 50 seconds green time (including yellow and all-red) for southbound 9<sup>th</sup> Avenue traffic (Phase 1), 33 seconds for westbound West 41<sup>st</sup> street (Phase 2), and a 7 second LPI for crossing 9<sup>th</sup> Avenue (Phase 3). The west crosswalk gets a total of 57 seconds crossing time (Phases 3 and 1) – 37 WALK, 15 FDW and 5 DW. The first seven seconds of WALK time is the LPI during Phase 3 where there is no conflict with turning vehicles. The remaining 50 seconds is during Phase 1 where conflict exists during the simultaneous 9<sup>th</sup> Avenue ball green time.

Under the proposed arrangement, green time for 9<sup>th</sup> Avenue traffic would be split into two phases – 23 seconds for Phase 1, and 34 seconds for Phase 2. During Phase 1, the west crosswalk has the WALK display, while the southbound right-turning vehicles are held with a red right-arrow to provide conflict-free crossing. During Phase 2, the west crosswalk displays the steady hand, while the right-turning vehicles have a green arrow for conflict-free turning. During both parts of the split phase (Phases 1 and 2 combined), 9<sup>th</sup> Avenue has a through-arrow green display, and the east crosswalk has the WALK display.

The west crosswalk would get a total of 23 seconds for conflict free crossing – 9 WALK, 10 FDW and 4 DW. This compares with 57 seconds time under existing conditions – 37 WALK, 15 FDW, and 4 DW. As with all split phase operations, pedestrians would have less time to cross, but all of it is protected from turning vehicles, as opposed to just the first seven seconds in the current operation.

Southbound through traffic vehicles would get 57 seconds of green time (including yellow and all-red), seven seconds more than the existing 50 seconds. The southbound right-turning vehicles would get 34 seconds of conflict-free turning time (including yellow and all red), as compared to 50 seconds under existing conditions where they must yield to pedestrians. The 34 seconds would be adequate to handle the turning volume, even during the weekday PM peak hour when the turn ban for cars and trucks is not enforced, though it would be close to capacity under this extreme condition. Westbound 41<sup>st</sup> Street traffic would get the same green time as existing.

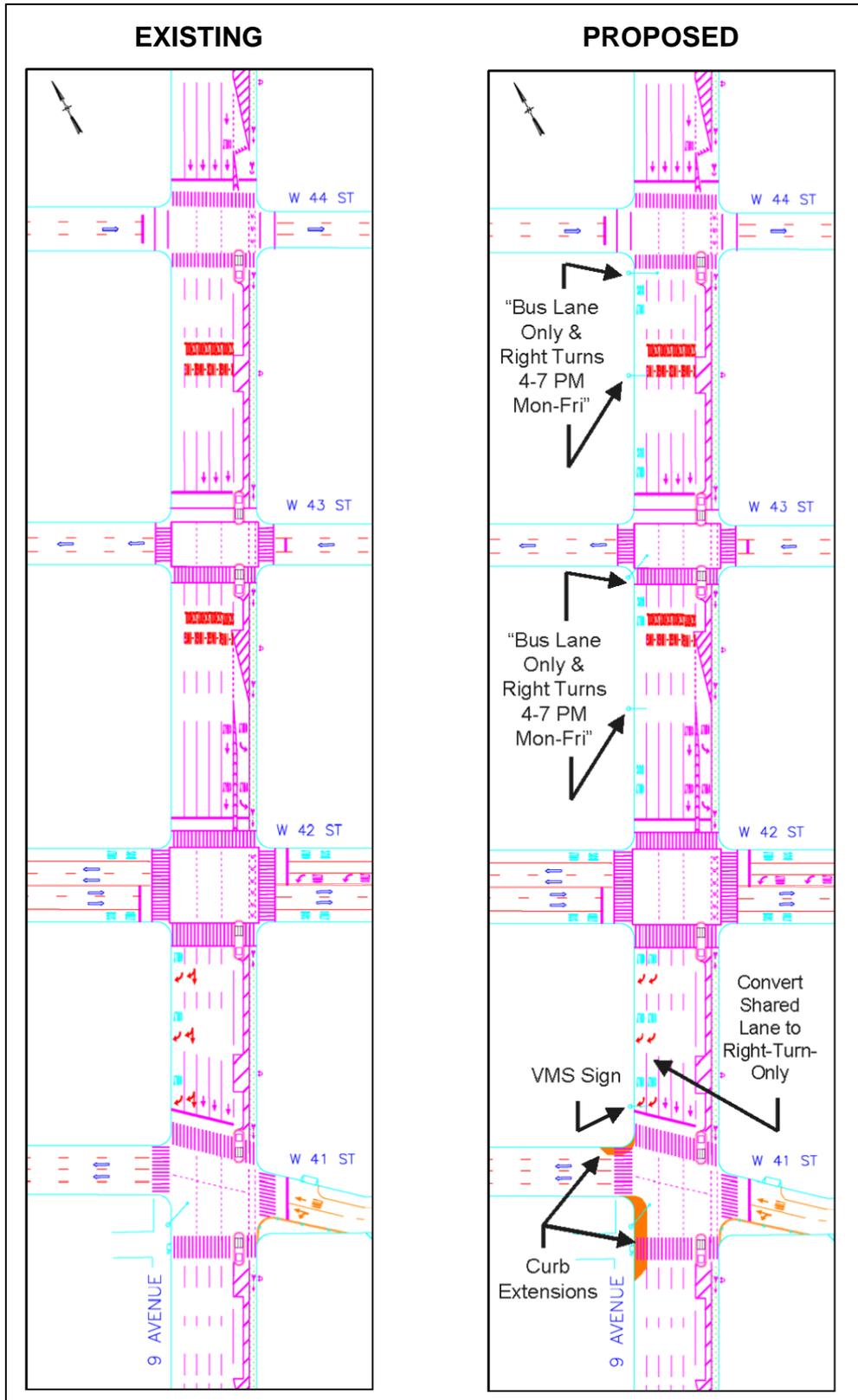


**Figure 4.10.1: Existing and Proposed Signal Timing for West 41<sup>st</sup> Street and 9<sup>th</sup> Avenue**

Currently, the lane arrangement for the southbound approach is one right-only lane, one shared through-right lane, and three through lanes, as shown in the existing layout on the left side of Figure 4.10.2. A necessary condition for implementation of the split phase is that the shared through-right lane must be converted to right-only, so that the lane arrangement would be two right-turn-only lanes, and three through lanes, as shown in the proposed layout on the right side of Figure 4.10.2. Also shown in the proposed layout are curb extensions that would reduce the crossing distance and thus the amount of WALK time needed for the west and south crosswalks.

The downside to this proposal is that the M11 and M34A buses, which currently stop at the next upstream block on 9<sup>th</sup> Avenue approaching West 42<sup>nd</sup> Street, would have to cut across two lanes to get around the two right-turn-only lanes. NYCDOT is currently working with New York City Transit to overcome this possible problem.

A broader challenge is the signage difficulties due to the double right-turn-only lanes, and the southbound right-turn ban except for buses from 4PM to 7PM weekdays. Lincoln Tunnel bound cars on 9<sup>th</sup> Avenue in the low 40s should not keep right during the PM peak period turn ban at West 41<sup>st</sup> Street for cars and trucks, but it is okay to do so during all other times. It is the goal of NYCDOT to get this message across without the use of imposing highway type guide signs.



**Figure 4.10.2: Existing and Proposed Markings, Signs and Curb Extensions for 9<sup>th</sup> Avenue between West 44<sup>th</sup> and West 41<sup>st</sup> Streets**

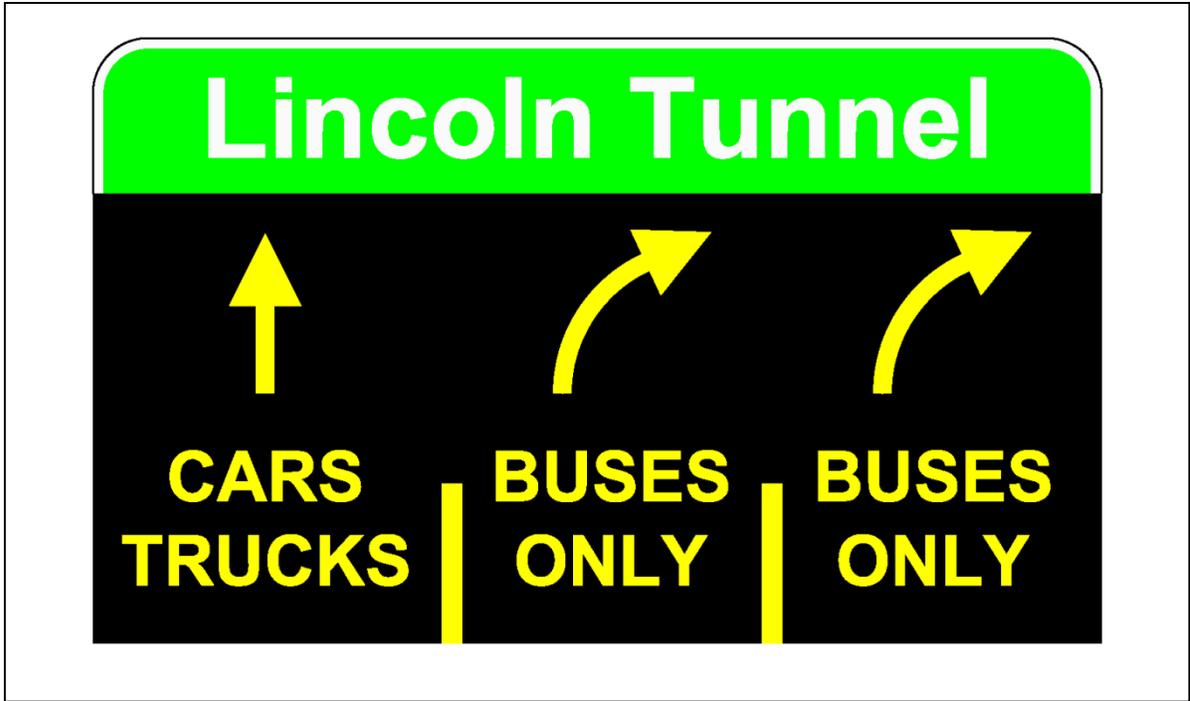
Figure 4.10.3 shows an existing Port Authority owned VMS sign located on 9<sup>th</sup> Avenue approaching West 41<sup>st</sup> Street. The message displayed in the photo is during the weekday 4PM to 7PM period when the right turn is banned except for buses.



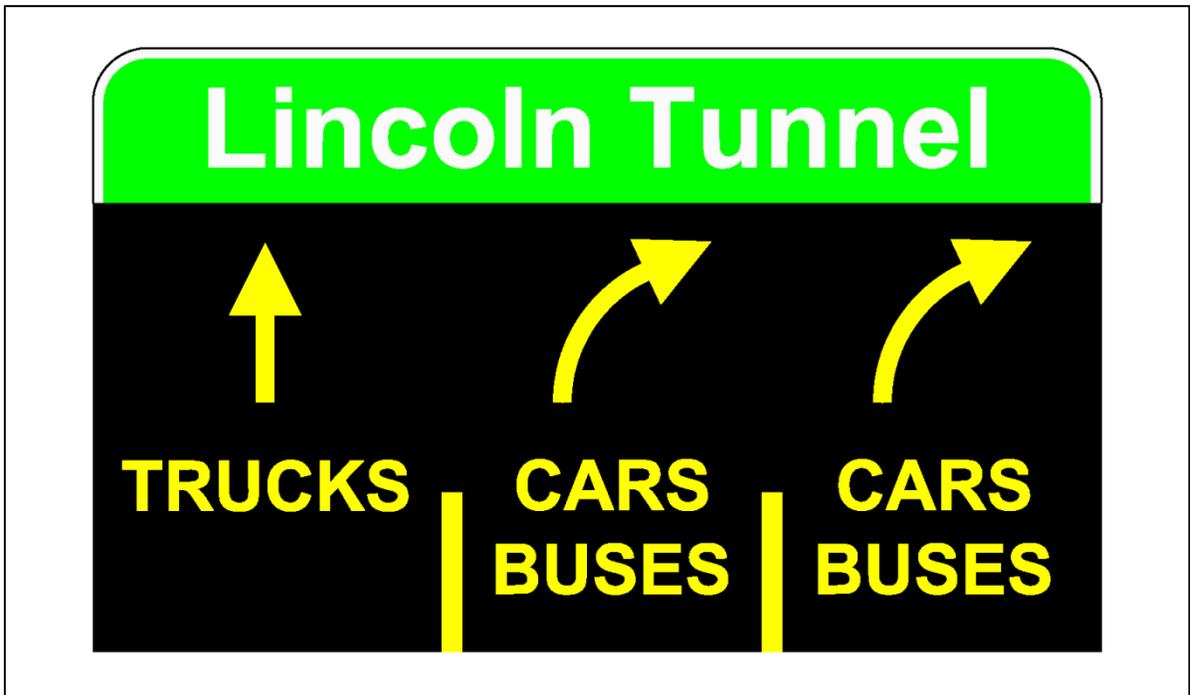
*Figure 4.10.3: Existing VMS Sign on 9<sup>th</sup> Avenue Looking South towards West 41<sup>st</sup> Street*

This sign is sufficient for current operations. However, under the split phase operation when the second lane is converted to a right-turn-only lane, it is proposed that this sign display a message to inform drivers of the lane arrangement as well as the correct route to the Lincoln Tunnel. On weekdays from 4PM to 7PM, when the right turn is banned except for buses, the sign would look as shown in Figure 4.10.4. During all other times, when the right turn is permitted and would be the logical route for cars to the Lincoln Tunnel, the sign would look like Figure 4.10.5. During all times, Lincoln Tunnel bound trucks should follow the truck route to West 34th Street.

In a further attempt to keep Lincoln Tunnel bound cars out of the right curb lane further upstream between West 44<sup>th</sup> and West 42<sup>nd</sup> Streets, it is proposed to mark the right curb lane as a bus lane, and to mount cantilevered gantry signs with the message “Bus Lane & Right Turn Only 4-7 PM Mon-Fri.” Proposed sign locations are shown in Figure 4.10.2. The Port Authority is currently investigating whether it is feasible to program such messages on the existing variable message sign within the existing sign dimensions.

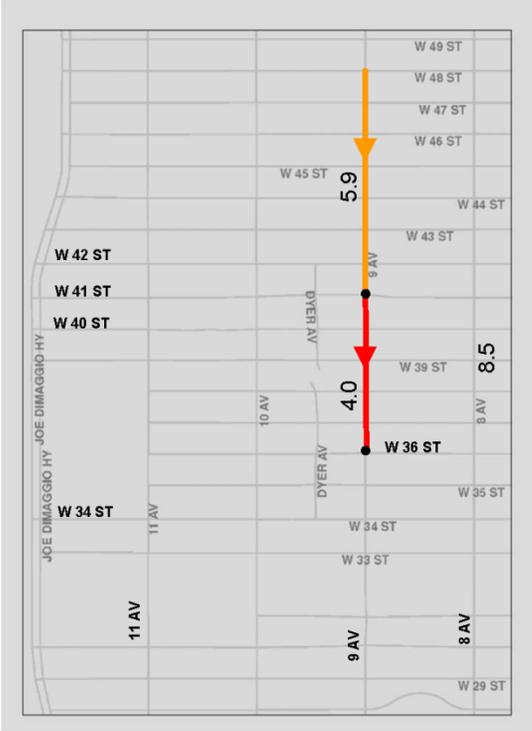


*Figure 4.10.4: Proposed Variable Message Sign for 9<sup>th</sup> Avenue Approaching West 41<sup>st</sup> Street When Turn Ban Except Buses in Effect 4-7 PM Mon-Fri*



*Figure 4.10.5: Proposed Variable Message Sign for 9<sup>th</sup> Avenue Approaching West 41<sup>st</sup> Street When Turn Ban Not in Effect All Other Times*

The effect on 9<sup>th</sup> Avenue traffic of the signal timing, lane arrangement, marking and sign changes is shown in Figure 4.10.6. The projected average travel speed on the upper segment of 9<sup>th</sup> Avenue is projected to be reduced from 8.9 mph to 7.6 mph due to the reduced number of through lanes, wiping out some of the improvement from the turn bans from West 37<sup>th</sup> Street to Ramp C (Section 4.2), and from West 36<sup>th</sup> Street to Dyer Avenue (Section 4.3). However, there would still be significant improvement over the Future without Improvements condition, in which the average travel speed is projected to be 5.9 mph.

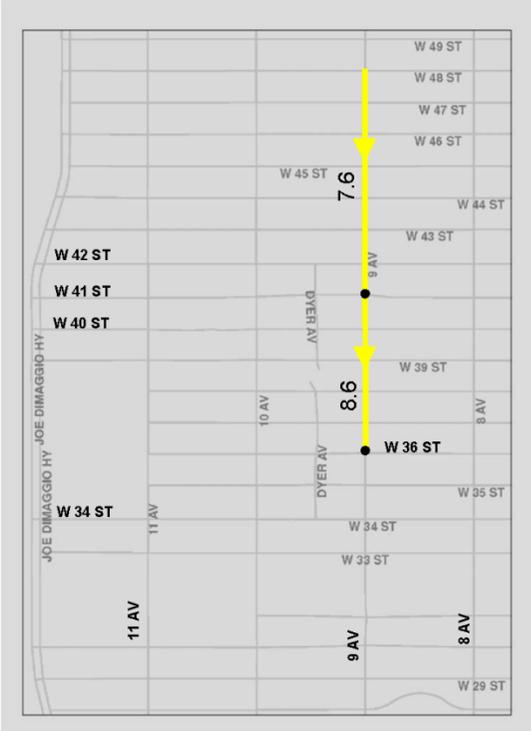


**2015 FUTURE W/O IMPROVEMENTS**



**2015 FUTURE WITH IMPROVEMENTS:**

- Signal Timing Improvements as of 2012
- 8<sup>th</sup> and 9<sup>th</sup> Avenue Bike Lanes
- Split Phase for Bikes and Increased Green Time for 9<sup>th</sup> Avenue
- Canoe Project with new Signalized Crosswalk
- Turn Ban from W. 37<sup>th</sup> St to Ramp C
- Turn Ban from W. 36<sup>th</sup> St to Dyer Ave



**2015 FUTURE WITH IMPROVEMENTS:**

- Signal Timing Improvements as of 2012
- 8<sup>th</sup> and 9<sup>th</sup> Avenue Bike Lanes
- Split Phase and Increased Green Time for 9<sup>th</sup> Avenue
- Canoe Project with New Signalized Crosswalk
- Turn Ban from W. 37<sup>th</sup> St to Ramp C
- Turn Ban from W. 36<sup>th</sup> St to Dyer Ave
- Split Phase for W. 41<sup>st</sup> St and 9<sup>th</sup> Ave

*Figure 4.10.6: Average Travel Speeds – 2015 Future with and without Split Phase at West 41<sup>st</sup> Street and 9<sup>th</sup> Avenue – Weekday PM Peak Hour*

## CHAPTER 5 IMPLEMENTATION

As mention in Chapter 3, several short term improvements for the Clinton/Hell's Kitchen Neighborhood Study have already been implemented. These include:

- Crosswalks with set-back stop bars.
- Improved signage.
- Bike lanes on 8<sup>th</sup> and 9<sup>th</sup> Avenues.
- Relocated bus layover areas and expanded bus stops.
- Signal timing changes, including leading pedestrian intervals (LPIs), increased time to cross wide avenues, offset changes to improve progression, and “feathering” of green time for 9<sup>th</sup> Avenue north of West 42<sup>nd</sup> Street.
- Curb extension at West 41<sup>st</sup> Street and 9<sup>th</sup> Avenue.
- Split phase for bikes and increased green time for 9<sup>th</sup> Avenue.

Implementation schedules for other improvements are as follows:

- The “Canoe” project is scheduled to be implemented in 2013.
- A turn prohibition at West 37<sup>th</sup> Street and 9<sup>th</sup> Avenue to reduce congestion on 9<sup>th</sup> Avenue is expected to be implemented in 2013.
- A turn prohibition at West 36<sup>th</sup> Street and Dyer Avenue is expected to be implemented in 2013.
- Signage for 9<sup>th</sup> Avenue approaching Ramp C is still being investigated, implementation uncertain.
- Select Bus Service (SBS) for 34<sup>th</sup> Street geometric improvements expected to be implemented in 2013.
- PM peak period contra-flow bus lane on Dyer Avenue is still be investigated, implementation uncertain.
- Conversion of 11<sup>th</sup> Avenue to two-way south of West 37<sup>th</sup> Street is expected to be implemented in 2014.
- Alternative configurations of 11<sup>th</sup> Avenue north of West 44<sup>th</sup> Street is still being investigated, implementation uncertain.
- Split-phases for conflict free crossing of 8<sup>th</sup> and 9<sup>th</sup> Avenues Avenue is still being investigated, implementation uncertain. Priority will be given to West 43<sup>rd</sup> Street and 9<sup>th</sup> Avenue.
- Split phase and other measures for West 41<sup>st</sup> Street at 9<sup>th</sup> Avenue planned to be implemented in 2014.

## **CHAPTER 6      CONCLUSION**

In the development of improvements, every attempt was made to include as many multimodal elements as is practically possible because of the conflicting needs of street users. Following the Complete Street concept, emphasis is placed on safety and operation of all street users, including pedestrians, cyclists, transit users, and motorists.

Improvement measures have been developed, evaluated and proposed for implementation within the confines of existing constraints. Community feedback was instrumental in identifying problems and refining solutions. It is anticipated that the improvements will benefit all users in the Clinton/Hell's Kitchen neighborhood.

For the recommended improvements to yield optimal benefits, stepped-up enforcement of traffic laws and regulations will be necessary. While traffic enforcement is not under the jurisdiction of NYCDOT, agency coordination and cooperation involving NYCDOT, NYPD, MTA, PANYNJ and other key agencies will be critical to ensure that maximum benefits are achieved from implementation.

The improvement measures will be monitored after implementation of improvement measures scheduled for 2013.