DRAFT PROJECT SCOPING REPORT

PIN 5528.30

Towns of Amherst & Cheektowaga

Erie County, New York

BUFFALO CORRIDOR STUDY

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DECEMBER 2014

NEW YORK STATE THRUWAY AUTHORITY

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

NEW YORK STATE DEPARTMENT OF TRANSPORTATION
ANDREW M. CUOMO, GOVERNOR JOAN MCDONALD, COMMISSIONER

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EXECUTIVE SUMMARY

The New York State Thruway Authority (NYSTA) and the New York State Department of Transportation (NYSDOT) has long recognized the need to address traffic delays which frequently occur on the urban section of I-90 and the I-290 through the Buffalo area. It has been noted that many of these delays occur at interchanges and divergence areas where traffic is required to perform weaving maneuvers, interacting with existing traffic for access to specific destinations.

This study began in August 2003, which included conducting traffic studies and developing improvement alternatives. In 2007, the Black Rock and Ogden Street toll barriers and associated facilities were removed from I-190. This was made possible due to the maintenance responsibility of I-84 being transferred from the Thruway back to the New York State Department of Transportation. The savings from this transfer of maintenance offset the loss of toll revenue from these barriers, which met the Authority's bond covenants of no impact of net revenues. Tolls remained on I-190 at the north and south Grand Island Bridges. As a result of the removal of the Toll Barrier facilities, it was decided to postpone the study as it was assumed that traffic passing through the study corridor would be significantly affected.

After traffic patterns stabilized, the GBNRTC obtained additional traffic counts and developed and calibrated a new microsimulation traffic model in TransModeler. The TransModeler was then used to reanalyze the existing traffic and project redistribution of traffic as a result of the planned improvements under this study and other adjacent projects, such as the operational improvements to the Williamsville Toll Barrier (WTB), which were initiated in 2014.

The following are the alternatives developed to meet the objectives of the study:

1. Interim Improvements
2. Full Build Improvements – 4 Lane
3. Full Build Improvements – 5 Lane

Interim Improvements include:

- The I-90 EB On-Ramp from NY 33 would be extended and realigned to allow for a continuous 4th lane in the eastbound direction between NY Route 33 (Interchange 51) and I-290 (Interchange 50).
- The I-90 WB On-Ramp from Cleveland Drive would be extended and realigned to allow for a continuous 4th lane in the westbound direction between I-290 (Interchange 50) and NY Route 33 (Interchange 51).
- The I-290 Interchange with Main Street would be significantly modified whereby all the ramps south of Main Street would be eliminated. The ramps north of Main Street would be reconfigured to provide all the movements currently available. The existing slip ramp configurations at Main Street would be converted into two major traffic signal controlled intersections.

- Reduce the number of existing lanes from two to one on the I-290 EB Ramp to I-90 EB (to the WTB EB). This modification is feasible due to the low traffic volume on this ramp and that the existing two-lane ramp already narrows to one-lane just before it reaches the WTB EB. This reduction will provide for three thru-lanes on I-290 EB and one lane on the I-290 EB ramp to I-90 EB. The three thru-lanes on I-290 EB would then reduce to two lanes at the Wehrle Drive overpass. This option would provide a smoother transition from I-290 EB to I-90 WB and simplify the weave/split maneuver to I-90 EB.

The total estimated cost for the Interim Improvements is $15.5 Million (2014 dollars).

The Interim Build Improvements are relatively low cost and would satisfy the study objectives within the vicinity of Interchange 50 up to 2020. However, after 2020, these improvements would not be sufficient to provide the desired LOS at Interchange 50 or anywhere along the study corridor.

Full Build Improvements – 4 Lanes

To build upon the interim improvements developed above and to improve the traffic throughput and level of service throughout the entire study corridor, an additional fourth travel lane in each direction was included between Williams Street and I-290. An additional third travel lane in each direction was included on I-90 between the WTB and Interchange 49 (Transit Road). Interchange 50 would be completely redesigned and I-290 would include an additional travel lane in each direction between I-90 to just west of Main Street. The total estimated cost for the Full Build Improvements – 4 Lanes is $516.6 Million (2014 dollars).

This alternative would provide satisfactory LOS for most of the I-90 corridor for the short term (2020-2040). However, at 2040, these improvements would not be sufficient to provide the desired LOS along the study corridor except for the segment between the WTB and Transit Road (Interchange 49).

Full Build Improvements – 5 Lanes

To provide for more traffic capacity and improved level of service over the Full Build Improvements – 4 Lanes, an additional 5th travel lane was proposed between William Street and I-290. The total estimated cost for the Full Build Improvements – 5 Lanes is $558.1 Million (2014 dollars).

This alternative would provide satisfactory LOS for most of the I-90 corridor for the short term and long term (2040 and beyond). However, at year 2040, the segment of I-90 between NY33 and Cleveland Drive would still have an undesirable (but manageable) LOS E. Also, due to not adding an additional lane along the segment of I-290 between Interchange 50 and Sheridan Drive, this portion of I-290 would have an undesirable (but manageable) LOS E.

RECOMMENDATION

Existing Conditions MOEs indicate congestion occurs throughout the study area with low speeds, high delays, and LOS E/F noted at several locations which is indicative of insufficient capacity and geometrical deficiencies. Mitigation strategies for these types of deficiencies include geometrical improvements and additional lanes which will be implemented in the Build Alternatives.

Recommendations made from this study are based on the stated project objectives which were to:

- Identify structural, capacity, operational, and safety problems that may occur over the next 30 years.
- Improve the traffic conditions within the I-90/I-290 corridor using a cost effective method to provide an acceptable level of service at the design year of 2040.
- Develop properly designed improvement alternatives based on the design year 2040 traffic forecasts and current design standards, which provide adequate capacity to the design year 2040.
- Provide cost effective improvements to I-90, I-290, and adjacent access ramps within the study limits to meet the social demands of the community within the corridor by providing the maximum potential for future economic enhancement to the region of New York State.
- Provide cost effective improvements to I-90, I-290, and adjacent ramps within the study limits using cost effective measures that avoid or reduce highway related nuisance and environmental impacts to the greatest extent practicable.

Interim Build Improvements

To achieve these objectives, it is recommended to initiate the **Interim Build Improvements** as soon as funding is available. These improvements have shown to improve the conditions in and around Interchange 50 and beyond.

Based on the traffic modeling completed under this study for the Interim Build Improvements, the changes noted below are anticipated when compared to the No-Build Alternative for the year 2020. The results of these improvements will be effective and would be realized with a relative low construction cost ($15.5 M). In addition, the Interim Build Improvements would not result in any right-of–way takings and no adverse environmental, social or economic impacts are anticipated.

The following are the improved locations within the corridor as a result of the interim improvements.

Mainline Segments

Reduced congestion along the mainline of I-90 in both the eastbound and westbound directions would be realized between Transit Road (Interchange 49) and NY 33 (Interchange 51). In addition, reduced congestion along the segment of I-290 in both the eastbound and westbound directions would be attained between Sheridan Drive and I-90. Refer to Chapter 6 for details in the improvements gained.

Ramps

Improvements are also projected to occur on the following ramps:

- William Street on ramp to I-90 WB
- I-90 EB off ramp to Walden Avenue EB
- I-90 WB off ramp to Walden Avenue EB
- Walden Avenue WB on ramp to I-90 WB
- I-90 EB off ramp to NY 33 EB
- NY 33 EB on ramp to I-90 EB
- I-90 WB on ramp to NY 33 EB
- NY 33 WB on ramp to I-90 EB
- I-90 EB off ramp to Cleveland Drive
- I-290 EB off ramp to Harlem Road/Sheridan Drive

Full Build Improvements

It is further recommended that preliminary engineering and detailed environmental studies be conducted to determine which Full Build Alternative (4-Lane or 5-Lane) should be advanced as the Preferred Alternative. This determination should be made after additional traffic modeling and analyses using the TransModeler on each of these alternatives have been completed. The Preferred Alternative could then be determined once the full range of MOEs has been compared between the two alternatives, and an evaluation of the construction costs along with the anticipated adverse environmental, social or economic impacts were assessed and documented.

Conclusion

In conclusion, efforts should be made to initiate the **Interim Build Improvements** as soon as possible, as outline above, and to begin more detailed engineering and environmental assessments on the **Full Build Improvements** alternatives to determine which should be progressed as the Preferred Alternative for final design and construction.

CHAPTER 1 – INTRODUCTION

1.A. INTRODUCTION

The New York State Thruway Authority (NYSTA) in conjunction with the New York State Department of Transportation (NYSDOT) proposes to undertake an environmental review process to examine improvements to the area along the New York State Thruway (I-90) between Transit Road - NY-78 (Interchange 49) and I-190 (Interchange 53) located in the Towns of Amherst and Cheektowaga in Erie County. Also included in this process is the area of I-290 between Interchange 50 (I-90/I-290) and Main Street (Interchange 7) in the Town of Amherst.

This study, known as the Buffalo Corridor Study I-90/I-290/NY33, PIN 5528.30, has developed this Project Scoping Report (PSR). This PSR is prepared as the first step in the project scoping process for a project which could have a significant social and/or environmental effect. The PSR, as part of the environmental review process, includes: the project scoping process, identification of the purpose and need, the range of conceptual alternatives, significant issues to be addressed in later phases of the environmental process, and public involvement.

The technical scope of this study identifies the structural, capacity, operational, and safety problems that currently exist or may occur over the next 30 years. A detailed traffic analysis was conducted for each of the three conceptual improvement alternatives developed in this study for; existing (2010) and future conditions (2020/2040), assuming no improvements are made, and future traffic conditions (2020/2040).

The PSR will be available for public review and copying at the New York State Thruway Authority Office in Albany and Buffalo and at the New York State Department of Transportation Office in Buffalo.

Copies of this report can be reviewed and additional information can be obtained from:

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Buffalo, NY 14203
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This study should be identified in all correspondence requiring additional information as:

PIN 5528.30
Buffalo Corridor Study

CHAPTER 2 – PROJECT IDENTIFICATION, EVOLUTION, CONDITIONS, NEEDS AND OBJECTIVES

2.A. PROJECT IDENTIFICATION

2.A.1. Project Type

This study is an interchange and corridor study involving the New York State Thruway (I-90) and adjacent arterials. The study identifies the structural, capacity, operational, and safety issues that currently exist or may occur over the next 30 years on the New York State Thruway (I-90) between Transit Road (Interchange 49) and I-190 (Interchange 53) and on the Youngmann Expressway (I-290) between I-90 and Main Street (Interchange 7). Improvement alternatives were then developed and evaluated on how well they address the identified deficiencies and on their cost effectiveness.

2.A.2. Project Location/Description

The limits for this study include 8.8 miles of the New York State Thruway I-90 between Transit Road (Interchange 49) and I-190 (Interchange 53) and 0.8 miles of the Youngmann Expressway (I-290) between I-90 (Interchange 50) and Main Street (Interchange 7). Within the study area, there are six existing interchanges along I-90 and one at Main Street along I-290. The study location and area are shown in **Figures 2-1, 2-2, and 2-3**. The study area is defined as the area that may be impacted by the identified deficiencies and the developed improvement alternatives.

2.B. PROJECT EVOLUTION

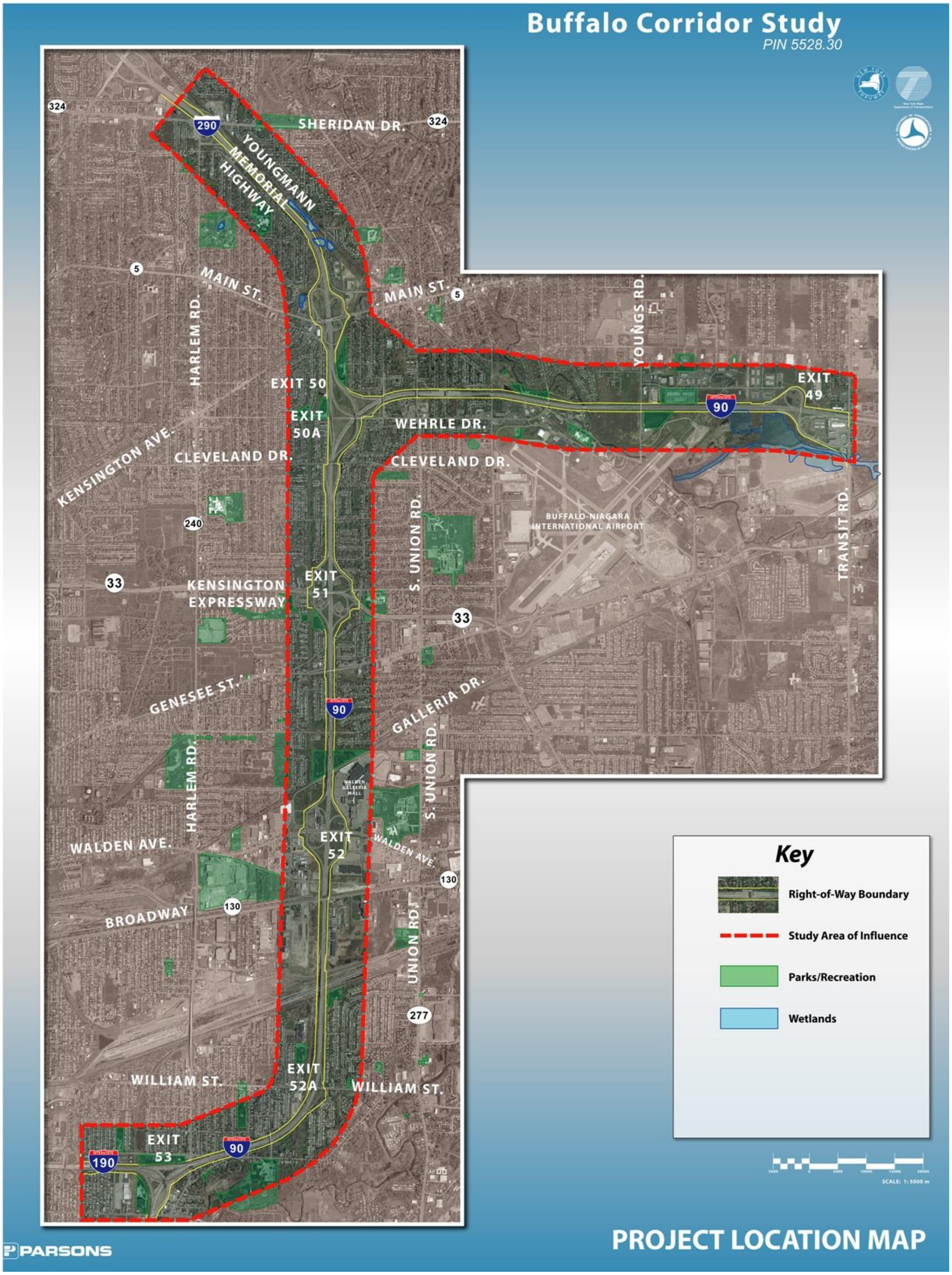
The New York State Thruway Authority (NYSTA) and New York State Department of Transportation (NYSDOT) has long recognized the need to address traffic delays which frequently occur on the urban section of I-90 and the I-290 through the Buffalo area. It has been noted that many of these delays occur at interchanges and divergence areas where traffic is required to perform weaving maneuvers, interacting with existing traffic for access to specific destinations. This Project Scoping Report (PSR) is the first step in this study's evolution.

This study began in August 2003, which included conducting traffic studies and developing improvement alternatives. In 2007, the Black Rock and Ogden Street toll barriers and associated facilities were removed from I-190. This was made possible due to the maintenance responsibility of I-84 being transferred from the Thruway back to the New York State Department of Transportation. The savings from this transfer of maintenance offset the loss of toll revenue from these barriers, which met the Authority's bond covenants of no impact of net revenues. Tolls remained on I-190 at the north and south Grand Island Bridges. As a result of the removal of the Toll Barrier facilities, it was decided to postpone the study as it was assumed that traffic passing through the study corridor would be significantly affected.

Figure 2-1 – Study Location Map

Figure 2-2 – Study Area Map

Figure 2-3 – Study Area Map



After traffic patterns stabilized, the GBNRTC obtained additional traffic counts and developed and calibrated a new microsimulation traffic model in TransModeler. The TransModeler was then used to reanalyze the existing traffic and project redistribution of traffic as a result of the planned improvements under this study and other adjacent projects, such as the operational improvements to the Williamsville Toll Barrier (WTB), which were initiated in 2014.

2.C. CONDITIONS AND NEEDS

2.C.1. Transportation Conditions, Deficiencies and Engineering Considerations

2.C.1.a. Functional Classification and National Highway System (NHS)

The New York State Thruway (I-90) from the I-190 Interchange to Transit Road and I-290 between I-90 and I-190 are classified as *Interstates*. Both are listed on the National Highway System and are Qualifying Highways on the National Network of Designated Truck Access Highways.

The Buffalo Section of I-90, which includes the study area, is not part of the 16.0 ft vertical clearance network. See Appendix 2C of the *New York State Department of Transportation Bridge Manual* for details of an existing agreement with the Federal Highway Administration (FHWA) concerning vertical clearance over the New York State Thruway (I-90) and revised 16.0 ft clearance network.

2.C.1.b. Ownership and Maintenance Jurisdiction

The NYSTA owns and maintains I-90 and I-190. The NYSDOT owns and maintains I-290, NY33 and all other adjacent major arterials within the study area.

2.C.1.c. Culture, Terrain and Climatic Conditions

Culture

The study area located in Erie County is contained in the Towns of Amherst, Cheektowaga, Lancaster, and West Seneca, along with the Villages of Depew and Williamsville. Adjacent lands along the studied arterials are suburban communities with mixed land use of residential, commercial and industrial areas.

Terrain

Located approximately 656.0 ft above sea level, the terrain in the study area is considered rolling, with existing highway grades reaching 3%.

Climatic Conditions

Climate conditions for the study area include warm summers and cold winters, with generally high humidity year round. Winter conditions can vary considerably. They can range from heavy lake-effect snows caused by cold air crossing relatively warm lake waters forming bands of clouds and precipitation downwind to periods of frequent thaws and rain. Monthly mean temperatures fall below 30 °F December through February, and rise above 60 °F June through September. Average annual precipitation in the area is approximately 39 inches.

2.C.1.d. Control of Access

The New York State Thruway Interstate Highway (I-90), Youngmann Memorial Highway (I-290) and Kensington Expressway (NY33) are expressway type highways with full control of access. All other arterials within the study area have uncontrolled access.

2.C.1.e. Existing Highway Section

I-90, between Transit Road and I-290 is primarily a four-lane divided limited access highway. I-90 between I-290 and I-190 is a six-lane limited access divided highway. I-290, from Main Street to I-90 (Interchange 50) is a six-lane limited access divided highway.

Lane widths throughout the study limits are 12.0 ft travel with 4.0 ft left shoulders and 10.0 ft right shoulders.

Clear zone widths vary within the study area. Guide rail is present at areas where objects are placed within the clear zone and where side slopes are abnormally steep.

The average right-of-way width along I-90 is 300.0 ft. The right-of-way also varies and widens, as necessary, to accommodate the interchanges.

Table 2-1 lists descriptive information about the New York State Thruway (I-90) and I-290 mainlines within the study area.

Table 2-1 - Existing Mainline Conditions
New York State Thruway (I-90) & I-290

Design Element		Existing Conditions
1.	Design Speed (Urban)	70 mph
2.	Lane Width (Min)	12.0 ft
3.	Shoulder Width	
	Right Shoulder (Min)	10.0 ft
	Left Shoulder (Min)	4.0 ft
4.	Bridge Roadway Width (Min)	Approach Roadway Width
5.	Maximum Grade	4%
6.	Minimum Horizontal Curvature (e_{max} = 6%)	2,040.0 ft
7.	Maximum Superelevation	Assumed 6%
8.	Stopping Site Distance	
	Minimum	Not Available
	Desirable	Not Available
9.	Lateral Clearance (Min)	Not Available
10.	Vertical Clearance	14.0 ft
11.	Pavement Cross Slope	Assumed
	Minimum	1.5%
	Maximum	2%
12.	Rollover	Assumed
	Between Travel Lanes (Max)	<4%
	At Edge of Pavement (Max)	<8%
13.	Structural Capacity	Assumed
	Bridge Rehabilitation (Min)	HS-20 or Greater
	New & Replacement Bridges (Min)	
14.	Level of Service (LOS)	Varies
15.	Control of Access	Full
16.	Pedestrian Accommodations	None
17.	Median Width	
	Unrestricted Areas (Min)	NA
	Restricted Areas (Min)	10.0 ft

2.C.1.f. Abutting Highway Segments and Future Plans for Abutting Highway Segments

Abutting highway sections include I-90 east of Interchange 49 and west of I-190 and I-290 north of Main Street all having 12.0 ft travel lanes in each direction with 4.0 ft left shoulders and 10.0 ft right shoulders. Vertical and horizontal alignments are generally straight or gentle curves and level with grades of less than 3%. The posted speed limits along I-90 east of Interchange 49 and west of Interchange 53 are 65 mph and 55 mph respectively. The posted speed limit along I-290 north of Main Street is 55 mph. South of the study area, I-90 was widened from 6 lanes to 8 lanes in 2003 between I-190 and NY-400.

The existing Williamsville Toll Barrier (WTB) is located within the study limits. All alternatives developed under the Buffalo Corridor Study will assume the WTB remains in its current location with minor improvements as described in **Section 2.C.1.h (2)**. It is also assumed that tolls will remain on the section of I-90 between the WTB and Interchange 49.

2.C.1.g. Speeds and Delays

Existing travel speeds and delays vary depending on traffic conditions, highway geometrics, and weather conditions. During October of 2003, a Travel Speed / Delay Study was conducted along I-90 between Interchange 49 at Transit Road and Interchange 53 at I-190. Also included in the Travel Speed / Delay Study is the area along I-290 from the interchange at I-90 to the Main Street exit on I-290.

During the study, both posted and actual travel speeds were recorded. The posted speed limit within the project area is 55 mph. See **Appendix B** - *"Travel Time Delay Studies Report"*, Section II, Speed Limit Posting. The 85th percentile data indicates daytime off-peak traffic travels at speeds between 58 and 63 mph. Actual speeds were recorded using a calibrated radar gun at specific locations and from that 85th percentile speed estimates were generated. See **Appendix B** - *"Travel Time Delay Studies Report"*, Section III, 85th percentile Determinations.

Within the study area, traffic delays and congestion on I-90 generally occur between the I-290 interchange (Interchange 50) and William Street (Interchange 52A), with the heaviest congestion normally occurring between I-290 and Walden Avenue (Interchange 52). Frequent delays and heavy congestion also occurs on I-290 between Interchange 50 and the Main Street interchange.

In the eastbound direction, the primary congestion occurs along I-90 between Walden Avenue (Interchange 52) and the I-290 westbound interchange (Interchange 50) and continues along I-290 to Main Street. The close proximity of interchanges at NY33, Cleveland Drive, I-290 and Main Street introduce traffic to merging and weaving maneuvers in a relatively short distance resulting in increased congestion during peak hour traffic flows. In the eastbound direction, additional congestion along I-90 is evident at the William Street and Walden Avenue interchanges, Interchanges 52A and 52.

In the I-90 westbound direction, the primary congestion occurs as eastbound I-290 traffic attempts to merge with westbound I-90. At this location, I-290 traffic merges with traffic entering from Main Street and must also cope with a lane reduction after I-290 and I-90 merge just north of the NY-33 interchange.

Traffic traveling eastbound on I-290 merging to I-90 eastbound experiences significantly less congestion than the connection between I-290 eastbound and I-90 westbound. Traffic volumes merging from I-290 eastbound to I-90 eastbound are approximately one-third that of the I-90 westbound merge. In addition, the lane configuration along I-290 eastbound allows the traffic continuing eastbound on I-90 to occupy the far left lane which avoids the heaviest congestion heading eastbound on I-290 merging with I-90 westbound.

2.C.1.h. Traffic Volumes

2.C.1.h (1) Existing Traffic Volumes

Traffic volume data was provided by the Greater Buffalo Niagara Regional Transportation Council (GBNRTC). The GBNRTC has a library of Turning Movement Counts (TMC) and freeway link counts covering the I-90/I-290 study area. Using count data from 2007 through 2009, the GBNRTC developed Existing (2010) peak hour traffic volumes for this study. The peak hours are:

- AM Peak: 7:30 – 8:30 AM
- PM Peak: 4:30 – 5:30 PM

The peak hour volumes for the I-90 and I-290 corridors are summarized in **Table 2-2** located in **Section 2.C.1.h. (2)**. Existing Segment peak hour volumes are included in **Appendix C**.

2.C.1.h (2) Future No-Build Traffic Volumes

The forecasted design years for this study are:

- Estimated Time of Completion (ETC) 2020
- ETC+20 2040.

The GBNRTC developed Future No-Build traffic volumes for the design years using their Regional TransCAD Model and TransModeler.

For the Future No-Build conditions, it is assumed that the Williamsville Toll Barrier (WTB) and tolls at Interchange 49 are left in place and that the following improvements (completed prior to 2020) will be incorporated:

- WTB Improvements
    - Either-or-Lane at Interchange 50
    - Add Plaza Lane 12
    - Shift Median Barrier
    - Add Third Approach Lane

Table 2-2 provides a summary of the Existing and Future No-Build peak hour volumes for the I-90 and I-290 corridors.

Table 2-2 – Existing and Forecast Traffic Volumes

Corridor	Existing 2010		ETC 2020		ETC+20 2040	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
I-90 EB West of Interchange 50	5,210	5,115	5,350	5,295	5,275	4,725
I-90 EB East of Interchange 50	2,200	2,500	2,250	2,650	2,350	2,650
I-90 WB West of Interchange 50	3,805	5,555	4,255	5,690	4,465	4,285
I-90 WB East of Interchange 50	1,400	2,350	1,650	2,650	2,100	2,950
I-290 EB	4,800	4,350	4,850	4,400	4,900	3,200
I-290 WB	4,150	5,250	4,150	4,950	4,400	4,450

Note: ETC is the Estimated Time of Completion

Table 2-2 shows that volumes are projected to generally increase over time from Existing to ETC to ETC+20. However, decreases in volumes were noted at the following locations:

- I-290 WB: ETC and ETC+20 – PM peak
- I-90 EB West of Interchange 50: ETC+20 – AM and PM peaks
- I-90 WB West of Interchange 50: ETC+20 – PM peak
- I-290 EB: ETC+20 - PM peak

These decreases may be due to significant congestion that hinders the number of vehicles that can travel on the expressways during the peak travel hours.

Segment peak hour volumes are included in **Appendix C**.

2.C.1.i. Operational Measures of Effectiveness

To assess the operations of the roadways within the BCS study area, traffic modeling was conducted by the GBNRTC.

2.C.1.i (1) Modeling Methodology

The GBNRTC's analyses in the Buffalo Corridor Study required utilization of two interactive models. The initial assessments were performed with the GBNRTC regional transportation model, a TransCAD four step model developed by Caliper Corporation. The regional model is used for macroscopic analysis of traffic on a regional basis, and is the EPA accepted model for use in regional air quality conformity analysis. The regional model is based on existing highway networks and documented population and employment data. Household travel surveys provide needed data on travel destination, trip purpose, time of travel, etc., to form the basis for traffic generation. This model was used in this study to initially examine network demand, providing traffic volumes on links in the regional road network.

Subsequently, a sub tier model, the Microscopic model, also a Caliper product in TransModeler was used to examine traffic diversions at a much more detailed level and to forecast impacts of proposed interim improvements. This model retains the origins and destinations in the region model, but provides dynamic simulation capabilities at the sub regional level. Networks are much more detailed and refined, traffic will reroute based on backups and queues in the system in a dynamic manner.

The model sets had previously been calibrated and reviewed and concurred by GBNRTC members. In 2008, the regional model was updated and a validation process completed. A calibration report compared the model traffic estimates to historical and recent ground count data, presenting system wide statistics, including estimated flows across screen lines and comparison of flows on selected routes. When comparison of observed daily traffic counts to model estimated traffic flows were done by facility type, all of the categories met FHWA criteria for model performance. The same was found for comparisons by volume group.

In addition, comparison of observed daily traffic count totals to model estimated traffic flows across a set of screen lines were developed and all of the screen lines were within 10 percent of the observed flows. Also, comparison of observed mean daily traffic counts to model estimated traffic flows for a set of routes of regional significance showed estimated Vehicle Miles Traveled (VMT) for all of the routes are within 15 percent of observed data.

The AM and PM Microscopic simulation models were calibrated in accordance with the criteria developed for this study based on the Guidelines for Applying Traffic Microsimulation Modeling Software and standard microsimulation traffic modeling industry practices. Action at the March 7, 2012 GBNRTC Planning and Coordinating Committee (PCC) meeting, documented concurrence with calibration of microsimulation in the I-90 and I-290 corridors as evident in the Calibration Reports distributed to PCC and presented on January 4, 2012. It was noted that all federal calibration targets were met or exceeded for both AM and PM models. On February 16, 2012, representatives of NYSTA and NYSDOT had met to review and discuss in more detail with staff and consultants. Results presented within the Regional Microscopic Model Calibration report show that the model is valid and stable; therefore, it can be used as the basis for development of horizon year models and individual test scenarios. The Study Team recommendation was to proceed to utilization of the models for planning studies.

2.C.1.i (2) Measures of Effectiveness

To document peak hour operations on the BCS study roadway, a series of Measures of Effectiveness (MOEs) to be generated from the GBNRTC's traffic models were established. These MOE's are:

- **VMT (Vehicle Miles Traveled):** The sum total distance traveled by all vehicles.
- **VHT (Vehicle Hours Traveled):** The sum total travel time experienced by all vehicles.
- **Average Travel Time (sec/veh):** Travel time from beginning of segment to its end, averaged over all vehicles.
- **Average Speed (mph):** Travel speed averaged over all vehicles.
- **Total Delay (Hours):** Total difference between experienced travel time and free flow travel time, summed over all vehicles.
- **Average Delay (sec/veh):** Total difference between experienced travel time and free flow travel time, averaged over all vehicles.

- **Average Stopped Time (sec/veh):** Total stopped time experienced during a trip, averaged over all vehicles.
- **Average Number of Stops per Vehicle:** Total number stops experienced during a trip, averaged over all vehicles.
- **Average Density (veh/mi/lane):** Average density on the segment, derived from the number of vehicles on the segment averaged over all observations made.
- **Level of Service (LOS):** Qualitative measure describing operating traffic conditions based on Average Density.
- **Queues:** Average and Maximum vehicle queues on segment, measured in both length (feet) and number of vehicles.

2.C.1.i (3) Existing Conditions MOEs

The models used in the BCS analyses produced a reasonable representation of how traffic flows would appear on the road network in existing conditions. The Existing Conditions models generated MOEs that were used to establish base conditions for future scenario operational comparisons.

Existing Conditions MOEs indicate congestion throughout the study area with low speeds, high delays, and LOS E/F noted at several locations which is indicative of insufficient capacity and geometrical deficiencies. Mitigation strategies for these types of deficiencies include geometrical improvements and additional lanes which will be implemented in the Build Alternatives.

The Peak Hour LOS is summarized in **Table 3-11** in **Section 3.C.2.b. (2.1)**. The Total Study Area Model Output is summarized in **Table 2-3** in **Section 2.C.1.i. (4)**. Detailed Existing Conditions MOEs for study area mainline segments, ramps, arterials, and intersections are included in **Appendix C**.

Significant and persistent queues from the Existing Condition models were observed on the following segments:

- I-90 EB:
  - Route 33 EB On-Ramp to Route 33 WB Off-Ramp (AM & PM Peaks)
  - Route 33 WB Off-Ramp to Route 33 WB ON-Ramp (PM Peaks)
- I-290 EB:
  - Harlem Road On-Ramp to Main Street WB Off-Ramp (AM & PM Peaks)
  - Main Street WB Off-Ramp to Main Street WB On-Ramp (AM & PM Peaks)
  - Main Street WB On-Ramp to Main Street EB Off-Ramp (AM & PM Peaks)
  - Main Street EB Off-Ramp to I-90 Ramps (AM & PM Peaks)

The I-90/I-290 Corridor Simulation AM & PM Calibration reports identify the causes for the queues noted above. The major southbound bottleneck is caused by the reduced number of lanes on the southbound I-290 connector to westbound I-90, along with the merge of I-90 westbound traffic with Cleveland Drive traffic and, during the AM peak only, the volume of vehicles exiting at Route 33. The queuing on the I-90 eastbound is caused by congestion from the weave between Route 33 and the I-90/I-290 interchange. These locations are the problem areas within the study area.

Detailed queuing information is included in **Appendix C.**

2.C.1.i (4) Future No-Build MOEs

The Future No-Build conditions models for ETC (2020) and ETC+20 (2040) assumed that the Williamsville Toll Barrier (WTB) and tolls at Interchange 49 will be left in place and that the following improvements (completed prior to 2020) will be incorporated:

- WTB Improvements as described in **Section 2.C.1.h (2)**.

The Future No-Build models projected continued degradation of operations within the study area due to congestion. The Peak Hour LOS is summarized in **Table 3-11** in **Section 3.C.2.b. (2.1)**. **Table 2-3** provides a summary of the Total Study Area Model Output from the traffic models.

Table 2-3 – Existing and No-Build Total Study Area Model Output

Year	AM Peak			PM Peak		
	VMT	VHT	Total Delay (hrs)	VMT	VHT	Total Delay (hrs)
Existing	227,556	7,900	3,185	276,656	12,374	4,855
No-Build ETC (2020)	234,436	8,212	3,365	274,619	13,320	5,880
No-Build ETC+20 (2040)	240,219	9,617	4,612	226,353	14,649	8,152

This output shows degradation in operations with increases in VHT and delay as time progresses. It also indicates, during the PM peak, that after delays reach a certain threshold, the VMT will decrease. This is consistent with the decrease in traffic volumes noted in **Section 2.C.1.h (2)**. The significant increases in VHT and delay, paired with the reduction in peak hour traffic volumes, indicate that significant congestion is impacting the flow of traffic on the expressway.

Detailed Future No-Build Conditions MOEs for study area mainline segments, ramps, arterials, and intersections are included in **Appendix C**.

Long queue lengths will persist for the following segments:

- I-90 EB:
  - Route 33 EB On-Ramp to Route 33 WB Off-Ramp (AM & PM Peaks)
  - Route 33 WB Off-Ramp to Route 33 WB On-Ramp (AM & PM Peaks)
  - Route 33 WB On-Ramp to Cleveland Drive Off-Ramp (PM Peak)
- I-290 EB:
  - Harlem Road On-Ramp to Main Street WB Off-Ramp (AM & PM Peaks)
  - Main Street WB Off-Ramp to Main Street WB On-Ramp (AM & PM Peaks)
  - Main Street WB On-Ramp to Main Street EB Off-Ramp (AM & PM Peaks)
  - Main Street EB Off-Ramp to I-90 Ramps (AM & PM Peaks)

Detailed queuing information is included in **Appendix C**.

2.C.1.j. Nonstandard Features and Non-Conforming Features

Roadway geometrics along existing I-90 and I-290 were evaluated to determine the extent of improvements that would be necessary to correct nonstandard features if a major reconstruction or widening project were to be implemented to increase the capacity. Roadway geometrics along existing I-90 and I-290 currently meet design standards for an urban expressway. However, many of the interchanges within the study area contain horizontal curves and/or lane widths that are nonstandard. These locations are summarized in **Table 2-4.** This does not mean that the current highway is unsafe or requires any safety improvements. It only means that if reconstruction or widening were to be undertaken in areas containing known nonstandard features, improvements to upgrade those features to meet standards would need to be considered. A detailed evaluation of the nonstandard and nonconforming features will be conducted as part of a later design phase to determine where nonstandard features can be reduced or removed.

Table 2-4 - Existing Nonstandard Geometric Features
(I-90 and I-290 Interchange Ramps)

Type of Feature	Location	Standard	Existing Value
Horizontal Curve Radii	Ramp, I-90 WB to William St	485.0 ft	328.0 ft
Horizontal Curve Radii	Ramp, I-90 WB to Walden Ave WB	485.0 ft	351.0 ft
Horizontal Curve Radii	Ramp, I-90 WB to Walden Ave WB	485.0 ft	141.0 ft
Lane Width	Ramp, I-90 WB to Walden Ave WB	18.0 ft	16.0 ft – 18.0 ft
Lane Width	Ramp, I-90 WB to Walden Ave EB	24.0 ft	18.0 ft
Lane Width	Ramp, Walden Ave WB to I-90 WB	24.0 ft	18.0 ft
Horizontal Curve Radii	Ramp, Walden Ave EB to I-90 WB	485.0 ft	144.0 ft
Horizontal Curve Radii	Ramp, Walden Ave EB to I-90 WB	485.0 ft	236.0 ft
Lane Width	Ramp, Walden Ave EB to I-90 WB	18.0 ft	14.0 ft – 18.0 ft
Lane Width	Ramp, I-90 EB to Walden Ave WB	24.0 ft	18.0 ft
Horizontal Curve Radii	Ramp, I-90 EB to Walden Ave EB	485.0 ft	295.0 ft
Horizontal Curve Radii	Ramp, I-90 EB to Walden Ave EB	485.0 ft	197.0 ft
Horizontal Curve Radii	Ramp, Walden Ave WB to I-90 EB	485.0 ft	131.0 ft
Horizontal Curve Radii	Ramp, Walden Ave WB to I-90 EB	485.0 ft	230.0 ft
Lane Width	Ramp, Walden Ave WB to I-90 EB	18.0 ft	14.0 ft – 18.0 ft
Lane Width	Ramp, Walden Ave EB to I-90 EB	24.0 ft	18.0 ft
Horizontal Curve Radii	Ramp, I-90 WB to NYY33 WB	485.0 ft	223.0 ft
Horizontal Curve Radii	Ramp, I-90 WB to NYY33 WB	485.0 ft	230.0 ft
Lane Width	Ramp, I-90 WB to NYY33 WB	18.0 ft	16.0 ft – 18.0 ft
Lane Width	Ramp, I-90 WB to NYY33 EB	21.0 ft	18.0 ft
Lane Width	Ramp, NY33 WB to I-90 WB	21.0 ft	18.0 ft
Horizontal Curve Radii	Ramp, NY33 EB to I-90 WB	485.0 ft	226.0 ft
Horizontal Curve Radii	Ramp, NY33 EB to I-90 WB	485.0 ft	246.0 ft
Lane Width	Ramp, I-90 EB to NY33 WB	18.0 ft	14.0 ft – 18.0 ft
Lane Width	Ramp, NY33 EB to I-90 WB	21.0 ft	14.0 ft – 18.0 ft
Horizontal Curve Radii	Ramp, I-90 EB to NY33 EB	485.0 ft	246.0 ft
Horizontal Curve Radii	Ramp, I-90 EB to NY33 EB	485.0 ft	200.0 ft
Lane Width	Ramp, I-90 EB to NY33 EB	18.0 ft	16.0 ft – 18.0 ft
Horizontal Curve Radii	Ramp, NY33 WB to I-90 EB	485.0 ft	249.0 ft
Lane Width	Ramp, NY33 WB to I-90 EB	18.0 ft	14.0 ft
Lane Width	Ramp, NY33 EB to I-90 EB	21.0 ft	18.0 ft
Lane Width	Ramp, I-90 WB to Transit Rd	18.0 ft	13.0 ft – 14.0 ft
Lane Width	Ramp, Transit Rd to I-90 WB	18.0 ft	13.0 ft – 14.0 ft
Lane Width	Ramp, Transit Rd to I-90 EB	18.0 ft	13.0 ft – 14.0 ft
Lane Width	Ramp, I-290 WB to Main St WB	21.0 ft	13.0 ft – 14.0 ft
Lane Width	Ramp, I-90 EB to Transit Rd	18.0 ft	14.0 ft
Horizontal Curve Radii	Ramp, I-90 EB to Transit Rd	485.0 ft	184.0 ft
Type of Feature	Location	Standard	Existing Value
Horizontal Curve Radii	Ramp, I-90 EB to Transit Rd	485.0 ft	302.0 ft
Horizontal Curve Radii	Ramp, I-290 WB to Main St EB	485.0 ft	200.0 ft

Horizontal Curve Radii	Ramp, Main St WB to I-290 WB	485.0 ft	151.0 ft
Horizontal Curve Radii	Ramp, Main St WB to I-290 WB	485.0 ft	233.0 ft
Horizontal Curve Radii	Ramp, Main St WB to I-290 WB	485.0 ft	351.0 ft
Horizontal Curve Radii	Ramp, Main St WB to I-290 WB	485.0 ft	230.0 ft
Lane Width	Ramp, Main St WB to I-290 WB	18.0 ft	15.0 ft – 17.0 ft
Lane Width	Ramp, Main St EB to I-290 WB	21.0 ft	16.0 ft – 17.0 ft
Horizontal Curve Radii	Ramp, I-290 EB to Main St WB	485.0 ft	295.0 ft
Horizontal Curve Radii	Ramp, I-290 EB to Main St WB	485.0 ft	118.0 ft
Lane Width	Ramp, I-290 EB to Main St WB	18.0 ft	14.0 ft – 15.0 ft
Lane Width	Ramp, Main St WB to I-290 EB	21.0 ft	15.0 ft – 17.0 ft
Horizontal Curve Radii	Ramp, Main St EB to I-290 EB	485.0 ft	125.0 ft
Lane Width	Ramp, Main St EB to I-290 EB	18.0 ft	14.0 ft

2.C.1.k. Safety Considerations, Accident History and Analysis

2.C.1.k (1) Accident History

2.C.1.k (1.1) Accident Screening

The original accident analysis for this study was conducted in 2004. An accident screening was conducted in 2014 to confirm that accident patterns within the study area have generally remained consistent with those identified previously in the original analysis. The results of the 2014 accident screening concluded that the accident patterns have remained, generally consistent. The following is the original full accident analysis.

2.C.1.k (1.2) Detailed Accident Analysis - 2004

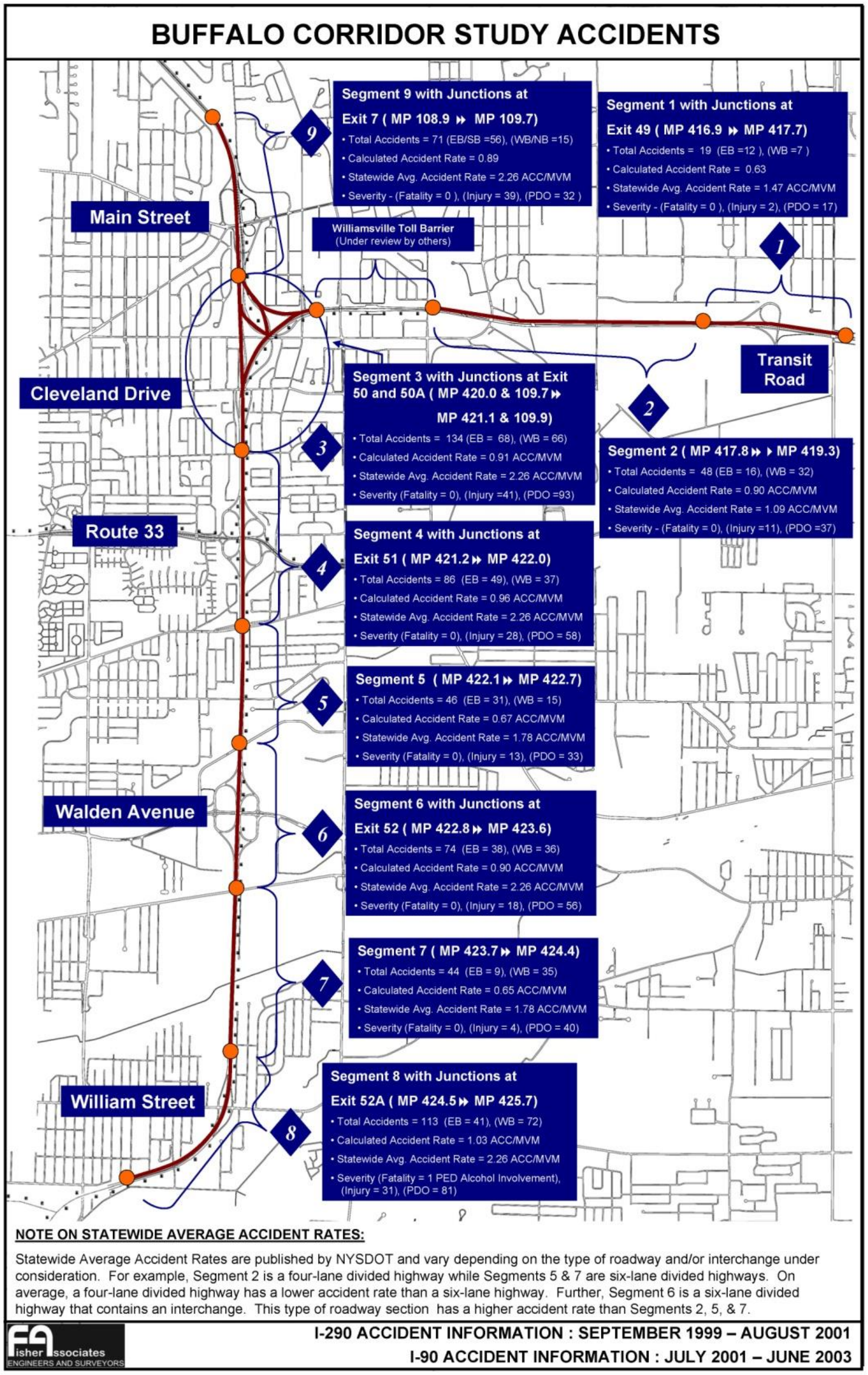
Accident reports for the study corridor were investigated for number, location, type, and cause. The accidents included in this review were collected from two different sources; the NYSTA, in database format; and the NYSDOT, as individual reports. Accident data was collected for the most recent two-year time period available; July 2001 through June 2003, for the Thruway sections (MP 416.9 to MP 417.7 and MP 420.0 to MP 424.5) and September 1999 to August 2001 for the I-290 section (MP 108.9 to MP 109.9).

During the above periods, 564 accidents were documented on I-90 and 71 accidents were documented on I-290 for a total of 635 accidents. Of the 635 accidents, about 30% involved injuries and 70% involved only property damage. One of the 635 accidents included a fatality involving the use of alcohol.

The study area was broken down into nine segments based upon concentration of accidents, location of interchanges, and significant changes in traffic volumes. These roadway segments were investigated to identify potentially high incident areas and possible trends and causes of the accidents. The following, **Figure 2-4,** shows for each segment, total number of accidents, number of accidents in each direction, severity of the accidents, a calculated accident rate and the statewide average accident rate for a similar facility type.

Statewide average accident rates for roadway segments without junctions i.e. interchange ramps and average accident rates for roadway segments with junctions were used in this analysis as a basis of comparison. The accident rates are based upon accident data collected by the NYSDOT from June 2000 to May 2002 involving facilities with controlled access and an urban functional classification on a 4-lane or 6-lane divided highway. All segment accident rates shown on **Figure 2-4** are shown in accidents per million vehicle miles (ACC/MVM). The average accident rate as calculated by the NYSTA is 108.14 accidents per 100 million vehicle miles traveled (VMT). This rate was not used for comparison in this assessment. It was determined that a better comparison could be made using the calculated accident rate and comparing to the NYSDOT statewide average rates given the number of interchanges that comprise the study area and that the junction between I-90 and I-290 is essentially a single large interchange.

Figure 2-4 - Buffalo Corridor Study Accidents



General Project Review

As shown in **Figure 2-4**, none of the segments had a calculated accident rate above the statewide average. However, the number of accidents and accident type does lend itself to revealing the potential for distinguishable accident patterns that may be mitigated. **Table 2-5** below shows a breakdown of the accident totals by type and segment.

Table 2-5 - Accident Totals by Type and Segment

Seg.	Loc.	Milepost (MP)		Accident Type and Number of Accidents*									
		From	To	Rear End	Over taking	Fixed Object	Side swipes	Pedestrian	Backing	Run off the Road	Animal	Other	Total
1	I-90	416.9	417.7	2	0	0	7	0	1	4	2	3	19
2	I-90	417.8	419.3	9	0	5	2	0	1	21	5	5	48
3	I-90	420.0	421.1	53	0	3	40	0	0	30	3	5	134
4	I-90	421.2	422.0	42	0	3	21	0	0	13	1	6	86
5	I-90	422.1	422.7	22	0	0	10	0	0	9	0	5	46
6	I-90	422.8	423.6	31	0	3	18	0	0	19	2	1	74
7	I-90	423.7	424.4	18	0	0	7	0	0	7	3	9	44
8	I-90	424.5	425.7	52	0	0	26	1	0	22	4	8	113
9	I-290	108.9	109.7	53	4	5	5	0	0	1	1	2	71
			Total =	**282**	4	19	**136**	1	2	**126**	21	44	635

* I-90 accidents (2001-2003), I-290 accidents (1999-2001)

As depicted above, there are three predominant accident types (Rear Ends, Sideswipes, and Run off the Road) happening within the study area. These predominant types consist of approximately 85% of all of the accidents within the study limits. A review of the accident reports and data indicates that the majority of these accidents took place during the morning or evening commuter periods when traffic congestion and delays occur, causing drivers to contend with abrupt slowing or stopping conditions.

The review of the accident reports and data also revealed the following:

Segments One and Two do not appear to have notable areas where accidents commonly occur. Accidents throughout these sections appear to be fairly distributed along the I-90. However, in Segment two the majority of the accident occurred in the westbound direction.

Within Segment Three, there are three areas where traffic accidents most commonly occur. Accidents are prevalent in the section of I-90 near MP 90-5301-421.0, west of Cleveland Drive (Interchange 50A), where lanes transition and a notable number of weaving maneuvers occur both eastbound and westbound. They are also prevalent near where I-290 eastbound and I-90 westbound merge. This is a known area where capacity constraints are observed frequently. The third area where accidents are prevalent in Segment Three is on I-90 eastbound where traffic diverges to I-290 westbound. Through this area of I-90, vehicles interact with other vehicles each negotiating weaving maneuvers to access desired locations. Also through this area higher speeds were observed.

Segments Four and Five show a notable pattern based on accident history. Accident history in Segment Four shows more accidents are taking place in the eastbound direction as vehicles are approaching

Cleveland Drive. This same pattern is true in Segment Five. As eastbound traffic approaches NY33 (Interchange 51) toward Cleveland Drive, there is a higher incident of traffic accidents. This pattern coincides with the accident pattern in Segment Three.

Segment Six, Seven, and Eight do not appear to have a single area within the sections where accidents predominantly occur. However, in Section Six, it does appears that the greatest number of accidents occur in the merge and diverge areas of the Walden Avenue interchange (Interchange 52) and in Section Seven and Eight, it appears the westbound direction experiences more accidents than the eastbound.

Segment Nine is located along the I-290 between I-90 and Main Street (Interchange 7). In Segment Nine, it appears that the greater proportion of accidents occurs immediately north of the I-90/I-290 Interchange and about 79% of the rear accidents are taking place in the southbound direction. This pattern coincided with the accident pattern in Segment Three where vehicles are accessing the I-90.

In addition to the number and type of accidents occurring in the study area, a safety assessment was performed to evaluate accident severity. The percent of accidents involving injury and property damage within each segment was compared to the statewide average. Also included in accidents per million vehicle miles, are accidents on wet roads and fixed object accidents for each segment. **Table 2-6** below shows a breakdown of accident severity by segment.

Table 2-6 - Accident Severity Comparison

		Milepost (MP)		Fatal / Injury (%)		Property Damage Only (%)		Accidents on Wet Roads (Acc/MVM)		Fixed Object Accidents (Acc/MVM)	
Seg.	Loc.	From	To	Calculated	NYSDOT	Calculated	NYSDOT	Calculated	NYSDOT	Calculated	NYSDOT
1	I-90	416.9	417.7	10.53	33.47	89.47	66.53	0.10	0.22	0.00	0.20
2	I-90	417.8	419.3	22.92	33.35	77.08	66.65	0.34	0.17	0.09	0.16
3	I-90	420.0	421.1	30.60	33.57	69.40	66.53	0.27	0.22	0.02	0.20
4	I-90	421.2	422.0	32.56	33.57	67.44	66.53	0.28	0.22	0.03	0.20
5	I-90	422.1	422.7	28.26	33.35	71.74	66.65	0.26	0.22	0.00	0.20
6	I-90	422.8	423.6	24.32	33.57	75.68	66.53	0.33	0.22	0.04	0.20
7	I-90	423.7	424.4	9.09	33.35	90.91	66.65	0.18	0.22	0.00	0.20
8	I-90	424.5	425.7	28.32	33.57	71.68	66.53	0.25	0.22	0.00	0.20
9	I-290	108.9	109.7	54.93	33.57	47.07	66.53	0.25	0.22	0.06	0.20

The safety assessment included one fatality in Segment Eight where a pedestrian was hit by two vehicles under a dark road unlighted condition. It was also noted that alcohol was involved.

In Segments One through Eight, the percent of accidents involving injury is lower than the statewide average. Segment Nine appears to have a higher percentage of accidents involving injury than that of the statewide average. However, the accident data did not reveal a specific reason for the higher percentage.

Accidents involving property damage and occurring on wet roads are higher than the statewide average in most segments of the study area. Accidents involving fixed objects throughout the study area are well below statewide averages.

Related Assessments by Others

Williamsville Toll Barrier Study

The Williamsville Toll Barrier area includes the Toll Barrier itself as well as a mainline segment of I-90 between Interchange 48A (Pembroke) through Interchange 49 (Transit Road). The Buffalo Corridor Study includes a segment of I-90 from Interchange 49 to about a half-mile east of the Williamsville Toll Barrier and resumes after the toll barrier at I-290 (Interchange 50). Operational improvements from the Williamsville Toll Barrier project are reflected in this study.

Kensington Expressway Study

The Kensington Expressway (NYS Route 33) forms an interchange with I-90, Interchange 51. Traffic volumes served by I-90 through this area of Interchange 51 is about 135,000 –140,000 AADT and is some of the highest volumes in the study area. This location also has one of the highest calculated accident rates in the study area. However, it is not above the statewide average rate. A review of the Kensington Expressway study in conjunction with the present study indicates that congestion and traffic operations on I-90 could be contributing to some of the accident history on NYS Route 33. There is a potential for traffic that is entering I-90 in the eastbound and westbound directions to spill back on the ramp and onto NYS Route 33 causing traffic to slow or stop suddenly or make erratic lane changes and maneuvers. This in turn could result in some of the rear end type collisions that are were reported on NYS Route 33. Additionally, field observation found that the weave sections on NYS Route 33 that serve the I-90 ramps in addition to heavy traffic volumes may also contribute to the accident history in this area on NYS Route 33.

Suspect causes are outlined below in **Section 2.C.1.k. (2)** Potential Accident Causes. Actual countermeasures available for feasible alternatives, and their anticipated effects on accident reduction, are discussed in **Section 3.C.2.b.** (Safety Considerations).

2.C.1.k (2) Potential Accident Causes

Field investigations involving peak hour observations were employed at each of the nine segments, previously identified in **Section 2.C.1.k**. The purpose of these investigations was to expand upon potential causative factors found in the accident data that could be attributed to the highway facility. Based on field investigations and accident data, the following accident causes are offered for consideration.

Potential Accident Causes

1. *Conflict points.*
2. *Unnecessary weaving maneuvers.*
3. *Limited capacity.*
4. *Roadway surface degradation under wet conditions*.

2.C.1.l. Pavement and Shoulder Conditions

A *"Pavement Condition Assessment and Evaluation Report"* was prepared for the study area. General pavement and shoulder conditions are described in the above report which is included as part of **Appendix D**.

The New York State Thruway (I-90), within the corridor study area, was originally constructed in the 1950's and other than the section between the Williamsville Toll Barrier to Interchange 50A, has not incurred full-depth reconstruction of the original concrete pavement. The concrete pavement when originally placed was designed to have a service life of 35 years. To date, with proper maintenance treatments, the concrete pavement has been in service for approximately 50 years.

The types of distress observed are typical of concrete pavement that is 50 years old. Some of the segments within the study area had already been improved as part of a surface rehabilitation project. The inspection of the pavement was limited to visual observations in a moving vehicle and review of data taken from automated collectors. The extent of distress and deterioration to the underlying pavement layers is unknown. However, due to the age of the concrete pavement, it is concluded that the underlying layers of the pavement structure have deteriorated.

This study is evaluating the need for alignment and capacity improvements which could lead to additional mainline lanes and interchange reconfigurations. Any reconfigurations would create a new or widened pavement 'footprint' through much of the study area. Combining new required pavement areas with the age of the existing pavement would leave reconstruction as the likeliest viable option.

2.C.1.m. Guide Railing, Median Barrier, Impact Attenuators

Within the study corridor, there are many sections of guide rail along both I-90 and I-290. Locations include: at bridges; culverts; where abnormally steep side slopes exist; and where objects have been placed inside the clear zone. Median barrier is installed throughout the study corridor consisting of either concrete or guide rail median barrier. Barrier types include W-beam, box beam, and concrete barrier. Guide rail throughout the study area is generally in good to very good condition.

2.C.1.n. Traffic Control Devices

I-90, I-290, and NY33 are limited access highways. Traffic signs and Vehicle Message signs (VMS) are the only traffic control devices located along their mainlines.

Access ramps for I-90 and I-290 have traffic signals at the following locations: both William Street exit ramps; I-90 eastbound exit to Walden Avenue eastbound; I-90 eastbound exit to Cleveland Drive; and I-290 eastbound exit at Main Street. All other ramp termini are controlled using traffic signs.

2.C.1.o. Structures

Locations of the 34 bridges within the study area are shown on **Figure 2-5,** with bridge information and current conditions summarized on **Table 2-7**. See **Appendix E** for additional information on structures. Structures are inspected by the NYSTA and NYSDOT approximately every two years. Conrail regularly inspects both railroad and highway bridges, although the procedures and inspection criteria used differ substantially from those employed in the inspection of highway bridges by the NYSDOT. All components are inspected and rated, with a weighting applied according to its importance to the overall integrity of the bridge. A weighted condition rating is developed ranging from 1 (very poor) to 7 (new condition). Two of the thirty-four bridges have condition ratings below 5.000, which indicates they are structurally deficient and in need of repair (BIN 551200, Cleveland Drive over I-90 & BIN 5042639, I-90 over Harlem Road).

Figure 2-5 - Bridge Location Map

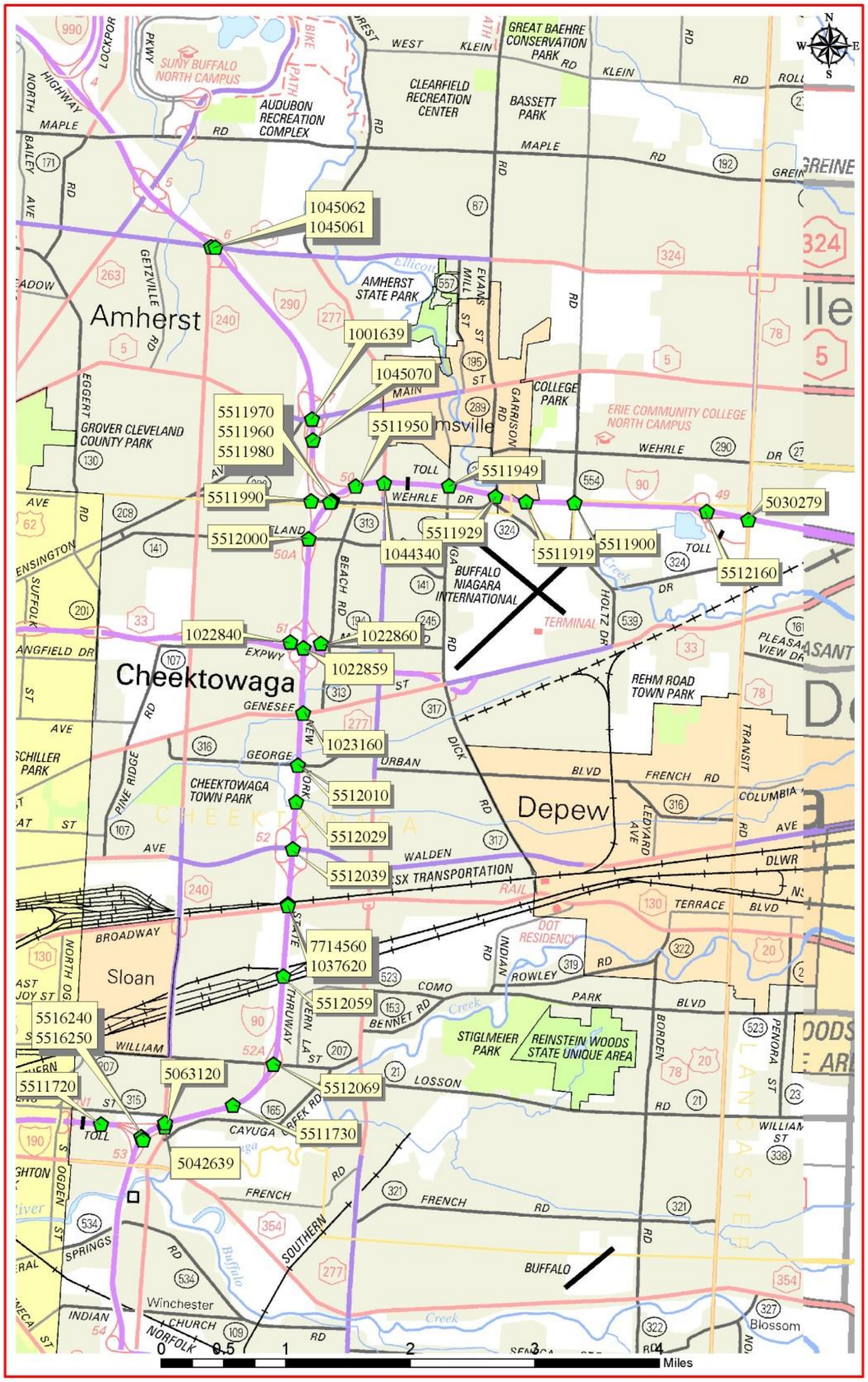


Table 2-7 – Bridge Summary

Bridge Information					Bridge Dimensions		Inspection Information	
BIN	MP	Feature Carried	Feature Crossed	Year Constr	Bridge Length	Out-Out Width	Inspection Date	Condition Rating
5030279	416.94	I-90	Route 78	1957	161	125	7/23/2012	4.16
5512160	417.27	Interchange 49 Ramp	I-90	1953	208	43	7/29/2012	5
5511900	418.35	Youngs Road	I-90	1953	197	39	5/2/2013	5.3
5511919	418.73	I-90	Ellicott Creek	1953	124	111	6/29/2012	4.42
5511929	418.98	I-90	Wehrle Drive	1952	136	113	10/30/2012	4.75
5511939	419.14	L.V.R.R.	I-90	Structure Removed and No Longer Existing				-----
5511949	419.37	I-90	Cayuga Drive	1953	133	113	8/22/2012	4.82
1044340	419.89	NY 277/Union Road	I-90	1954	198	60.3	10/29/2012	4.69
5511950	420.12	Forest Road	I-90	1988	265	40	6/6/2012	5.35
5511970	420.33	E.B. Ramp from I-290	I-90, I-90 EB to I-290	1953	279	35.3	7/6/2012	4.92
5511960	420.34	I-90 ramp to I-290	Wehrle Drive	1953	332	35.4	10/5/2012	4.88
5511980	420.35	Wehrle Drive	I-90, I-90 EB to I-290	1953	283	62.3	7/8/2012	4.42
5511990	420.36	I-290	Wehrle Drive	1953	152	35.3	9/14/2012	4.31
5512000	420.70	Cleveland Drive	I-90	1950	238	64.4	4/17/2012	3.53
1022859	421.57	NY 33	I-90	1949	224	89.8	6/29/2012	4.49
1023160	422.10	Genesee Street	I-90	1951	203	66.3	8/21/2012	4.92
5512010	422.52	George Urban Blvd	I-90	1950	204	36.5	5/17/2012	4.68
5512029	422.80	I-90	Galleria Drive, Scaj. Ck	1950	251	137.3	7/3/2013	4.51
5512039	423.19	Walden Ave.	I-90	1950	224	91	11/7/2012	4.56
7714560	423.63	CSX Transportation	I-90	1951	202	68.8	6/14/2012	4.64
1037620	423.64	Broadway	I-90	1954	200	57	6/14/2012	4.08
5512059	424.21	I-90	Norfolk Southern RR	1951	1027	113.3	11/25/2013	4.46
5512069	424.92	I-90	William Street	1950	147	113.3	10/25/2012	4.51
5511730	425.40	Henry Street	I-90	1996	223	42	11/23/2012	6.42
5042639	425.97	I-90	Harlem Ave.	2002	133	129.3	3/20/2013	6.52
5063120	425.98	I190 SB to I90 EB	Harlem Ave.	1957	188	35.3	7/5/2012	5.54
5516250	426.17	190I SB to 90I EB	I-90	1957	285	35.3	10/19/2012	4.9
5516240	426.18	I90EB to 190NB	I-90	1957	319	35.3	10/9/2012	4.96
5511720	900.37	Rossler Avenue	I-190	1956	199	38.3	10/24/2012	4.75
1045070	N/A	Exit Ramp to Main St.	I-290	1964	227	35.3	5/2/2012	4.86
1001639	N/A	NY 5 / Main Street	I-290	1963	213	122	12/14/2012	4.86
1045061	N/A	I-290	NY 324 Sheridan Dr.	1964	306	45	8/8/2012	4.984
1045062	N/A	I-290	NY 324 Sheridan Dr.	1964	317	68.2	8/8/2012	4.953
1022840	N/A	Pedestrian Bridge	Ramp LE	1968	246	9.8	3/13/2012	4.042
1022860	N/A	Pedestrian Bridge	Ramp H	1968	257	10	7/9/2012	4.31

2.C.1.p. Hydraulics of Bridges and Culverts

Hydrologic and hydraulic information contained in Flood Insurance Studies (FIS) performed for the Federal Emergency Management Agency (FEMA) in the Towns of Cheektowaga and Williamsville, were reviewed and combined with the Thruway's Biennial Inspection reports and field site visits, to comprise the basis for this hydraulic assessment. The original FIS hydrologic and hydraulic analyses for Ellicott Creek and Scajaquada Creek, in the Town of Cheektowaga, were completed in December 1979 by the U.S. Army Corps of Engineers for FEMA. The Town of Cheektowaga flood insurance study was most recently updated in March 1984. Data was compiled from various sources in order to compute the peak discharges and high water flood elevations shown in the FIS, at various points along both creeks.

Since that time, zoning ordinances and building codes have been establish to restrict development within the floodplain of Ellicott Creek. Scajaquada Creek and portions of its tributaries have been improved to provide additional protection of developments within that floodplain.

All elevations used in the Flood Insurance Study (FIS) are referenced to the National Geodetic Vertical Datum of 1929 (NVGD). Information contained within the 1984 FIS precedes the construction of, and drainage improvements associated with the detention system constructed in the late 1980's in conjunction with the Walden Galleria Mall.

<u>BIN 5511919, I-90 over Ellicott Creek (MP 418.73)</u>

Ellicott Creek is a major drainage feature that crosses under the Thruway at MP 418.73, along the border between the Towns of Cheektowaga and Amherst. Ellicott Creek flows in a northwesterly direction to where it eventually joins Tonawanda Creek in the City of Tonawanda. The average channel slope in the vicinity of the bridge is approximately 0.3% and the watershed can be characterized as flat.

The bridge at MP 418.73 is a two span multi-girder, with the center pier having an average thickness of nearly 5.0 ft. The stream alignment is nearly perfectly parallel with the 328 degree skew of the substructures. The perpendicular clear span between abutments is about 96.0 ft, with the hydraulic opening reduced to 91.0 ft by the 5.0 ft pier width. During high flows, the bridge represents a significant constriction, and the center pier represents an additional obstruction to flow, however no local or constriction scour is indicated from the most recent biennial bridge inspection. This appears likely since the channel is fairly flat and the average channel velocity is estimated at less than 8.0 ft/sec based on information provided in the FIS.

During the most recent Biennial Bridge Inspection, the report indicates Stream Alignment was rated "7" and the waterway opening, channel erosion, and bank protection were all rated "6", suggesting no problems are present. The Begin & End Abutment Scour and Pier Scour items were all rated "5", suggesting local erosion of a minor nature. As such, a reassessment for Hydraulic Vulnerability was not recommended.

The existing pavement elevation at MP 418.73 is at elevation 692.0 ft, and the bottom of the fascia girders (Low Structural Member) is at approximately elevation 688.0 ft. Available freeboard to the low structural member is approximately 3.5 ft for the 100 year flood and 4.0 ft for the 50 year flood. The channel velocities in the vicinity upstream of the structure was 3.8 ft/sec as reported in the FIS, with the average velocity through the structure is estimated at 7.4 ft/sec. The peak discharges for 50 and 100 year recurrence intervals, as well as other pertinent hydraulic data, are tabulated below.

HYDRAULIC DATA - MP 418.73 I-90 over ELLICOTT CREEK		
Drainage Area = 76 sq. mi.	Basic Flood	Design Flood
Recurrence Interval (yrs)	100	50
Peak Discharge (cfs)	7,000	6,100
High Water Elevation @ Structure (ft)	684.5	684
Avg. Velocity Thru Structure @ 100 Year Flood (ft/s)	7.4 (Approx.)	

Note: Information tabulated above was obtained from the FEMA Flood Insurance Study, Town of Cheektowaga, March 15, 1984.

BIN 5512029, I-90 over Scajaquada Creek (MP 422.80)

Scajaquada Creek drains a smaller watershed that crosses the Thruway at MP 422.80, also in the Town of Cheektowaga. Scajaquada Creek flows in a westward direction through the Town and after flowing through a series of underground conduits in the City of Buffalo, eventually discharges into Lake Erie, about 9 miles west of the Thruway. Scajaquada Creek has a drainage area, upstream of the Thruway, of approximately 11.5 square miles. The FIS for Cheektowaga studied the 3.7 miles of the Creek immediately upstream of the Thruway. The average channel slope in the vicinity of the bridge is approximately 0.2% and the watershed can be characterized as “very flat”.

The bridge at MP 422.80 is a four span multi-girder, with only Span 2 spanning over the Creek. None of the adjacent piers are within the main channel and from the site assessment performed; the piers would likely not be within the channel even during high flows. Based on comparison to the original plans, the channel appears to have been realigned slightly to the south during the construction of the Walden Galleria Mall, so that the channel was centered between Pier 1 and Pier 2. The substructures are skewed at 32.28 degrees, but are virtually parallel to the alignment of the Creek. In the vicinity of the bridge, the channel banks are lined with stone fill scour protection. No local or constriction scour was reported during the most recent biennial bridge inspection. Site visits confirm this, which would be expected since the channel is fairly flat, alignment is straight and the average channel velocity is approximately 4.0 ft/sec according to the FIS.

During the most recent Biennial Bridge Inspection Report, the bridge, Stream Alignment, Channel Erosion, and Bank Protection were all rated “6”, suggesting no problems are present with these elements. Waterway Opening was rated “5” suggesting minor problems with hydraulic capacity, constriction or more likely high water concerns for Galleria Drive that parallels the Creek. The Pier Scour item was rated “6”, for both adjacent piers suggesting that no local erosion problems exist. As such, the bridge was not recommended for a Hydraulic Vulnerability reassessment.

The bridge is a high level bridge with the superstructure being over 19.0 ft above the 100-year water surface, thus there are no freeboard or hydraulic capacity concerns. The peak discharges for 50 and 100 year recurrence intervals, as well as other pertinent hydraulic data, are tabulated below.

HYDRAULIC DATA - MP 422.80 I-90 over SCAJAQUADA CREEK		
Drainage Area = 11.5 sq. mi.	Basic Flood	Design Flood
Recurrence Interval (yrs)	100	50
Peak Discharge (cfs)	2,600	2,300
High Water Elevation @ Structure (ft)	651.5	650.6
Avg. Velocity Thru Structure @ 100 Year Flood (ft/s)	4.1	

Note: Information tabulated above was obtained from the FEMA Flood Insurance Study, Town of Cheektowaga, March 15, 1984.

2.C.1.q. Drainage Systems

For the majority of the study length, surface water drainage along I-90 is collected by roadside ditches which discharge into natural watercourses. There are closed drainage systems owned and maintained by NYSDOT and local municipalities along adjacent roadways within the corridor study area.

Transit Road (MP 416.90) to Ellicott Creek (MP 418.73)

The Thruway runs in an east to west direction and storm water is collected via an open system of ditches adjacent to the east and westbound travel lanes and also along the median. Ellicott Creek travels in a northwesterly direction from just south of the Thruway at Transit Road to where it crosses the Thruway at MP 416.90. The natural slope of the terrain is approximately 0.5% and drains toward Ellicott Creek. Between Transit Road and Youngs Road (MP 418.35), runoff along the north side of the Thruway is conveyed to the south side via a series of ditches and culvert pipes, where it eventually discharges into minor tributaries of Ellicott Creek. From Youngs Road to where Ellicott Creek crosses the Thruway, runoff is conveyed west via the open ditches and outlets to the creek.

Ellicott Creek (MP 418.73) to South Cayuga Road (MP 419.35)

Drainage along the Thruway in this section is by an open system of ditches and culverts. The natural slope of the terrain allows the runoff to flow northeasterly towards Ellicott Creek.

South Cayuga Road (MP 419.35) to Cleveland Drive (MP 420.70)

This section of the Thruway continues to run westerly towards South Forest Road and then bends approximately 90 degrees in a north to south direction. The eastbound lanes travel northerly and the westbound lanes travel southerly. The drainage consists of an open and closed system. A storm sewer trunk line in the median between the eastbound and westbound lanes collects surface runoff from the travel lanes and median. Storm water collected in the south side ditches and within the median is eventually conveyed to the north side ditches of the Thruway through cross culverts and then discharges either directly into Ellicott Creek or one of its minor tributaries. As the creek gets farther away from the Thruway, the open system of ditches utilizes the closed drainage system in nearby developed areas along the Thruway to convey the storm water, in order to reach the creek.

The Youngmann Memorial Highway (Interstate 290) joins the New York State Thruway near Cleveland Drive (MP 420.70). The highway runs in a northwesterly direction towards Sheridan Drive (MP 1077). Runoff for this section of highway is conveyed to the north to Ellicott Creek through both a system of open ditches and culverts, and a closed network of pipes.

Cleveland Drive (MP 420.70) to Scajaquada Creek (MP 422.80)

This section of Thruway travels in a north to south direction and uses an open and closed system to convey storm drainage. The open system consists of ditches running adjacent to the eastbound and westbound lanes and they are interconnected though a series of culverts pipes. The closed system is in the median, also part of the trunk line mentioned above, and continues south to Genesee Street (MP 422.10). The natural slope of the terrain drains in a southerly direction towards Scajaquada Creek. Runoff travels via open ditches and drains either directly or indirectly into Scajaquada Creek or minor tributaries of the creek.

Scajaquada Creek (MP 422.80) to Walden Avenue (MP 423.40)

Storm water is conveyed north along this section of Thruway through an open system of ditches and culverts. Runoff is conveyed north from the Walden Avenue interchange to where it outlets directly into Scajaquada Creek. Scajaquada Creek runs in an east to west direction and eventually discharges into Lake Erie, in the City of Buffalo.

Walden Avenue (MP 423.40) to Buffalo River (MP 426.70)

In this section, the Thruway continues in a north to south direction where it eventually crosses over the Buffalo River. From Walden Avenue to the river, the terrain slopes southerly towards the Buffalo River. An open system of ditches and culverts, adjacent to the Thruway, conveys the runoff either directly into the river or indirectly utilizing a closed drainage system in residential areas adjacent to the Thruway. The Buffalo River begins just east of the Thruway where Cayuga Creek and Buffalo Creek join together just east of Harlem Road. Generally, along the eastbound side of the Thruway storm water will discharge into Cayuga Creek and on the westbound side, the Buffalo River.

2.C.1.r. Soil and Foundation Conditions

After review of the Soil Survey of Erie County, New York it became evident that it is not practical to define the soil in the study area as a single soil group due to the study length and variability of the soils in Erie County.

Along I-290 between Main Street and the I-90 Interchange there are three main classifications of soil: Wassaic; Lima; and Churchville Series. Wassaic and Lima Series soils are classified Hydrological Group B. They consist of deep to moderately deep moderately well drained soils formed in glacial till deposits derived mostly of limestone. Churchville Series soils are classified Hydrologic Group D. They contain sandy loam and are somewhat poorly drained.

Along I-90 from Transit Road to the I-290 Interchange, soil classification groups vary. The majority of the soil groups can be classified as Udorthents, Ilion, Wassaic, Ovid and Churchville Series. These soils are in Hydrologic Groups C. D, B, C, and D respectively. Soil characteristics in this area range from moderately deep well drained soils to sandy loam somewhat poorly drained soils.

From the I-290 Interchange west to I-190, the majority of soils groups can be classified as Churchville, Lima, Odessa, and Niagara Series. These soils are in Hydrologic Groups D, B, D, and C respectively. Soil characteristic in this area also range from moderately deep well drained soils to sandy loam somewhat poorly drained soils.

No comprehensive investigations have been performed to determine specific requirements for foundation design. Subsurface investigations may be needed in many locations during final design to verify preliminary design assumptions and to determine foundation requirements for bridges.

2.C.1.s. Utilities

A substantial installation of electrical transmission lines is located within the study area. They cross I-90 south of William Street and run parallel along the west side of I-90, through the west side of the Walden Avenue Interchange eventually crossing over I-290 north of Interchange 50. Also located on the west side of I-90 at Interchange 50 is the Amherst water tower. **Table 2-8** lists utility companies with services located in the study area.

2.C.1.t. Railroads

There are two (2) railroad facilities currently operating within the study area, CSX Corporation and Norfolk Southern Railroad. CSX Corporation operates a multitrack facility bridging over the I-90, directly adjacent to the north side of Broadway at MP 423. Norfolk Southern Railroad also operates a multitrack facility which runs under the I-90 north of William Street at MP 424.

2.C.1.u. Visual Environment

The study area includes 8.8 miles of the New York State Thruway (I-90) through the towns of Amherst and Cheektowaga and 0.8 miles of the Youngmann Expressway located in the Town of Amherst. Land uses and landscapes in the area are complex suburban communities with densely packed residential areas and a multitude of commercial sectors, scattered industrial parcels, and vacant land.

Views along the corridor vary. Starting from the east near Transit Road (Interchange 49), views consist of varied commercial properties, the Buffalo Airport runway, large parcels of vacant land some of which have been reclaimed hazardous waste disposal sites. Traveling west along I-90 from Cayuga Road to George Urban Boulevard, views of suburban residential neighborhoods with some recreational facilities dominate the landscape. Near Walden Avenue (Interchange 52) heading west, the landscape views consist of commercial properties including a shopping mall, industrial properties, and vacant land. Near William Street (Interchange 52A), the landscape again becomes populated with suburban residential neighborhoods. The I-90, from Interchange 50 to Interchange 52A, is also bordered on the west side of the highway by a corridor of large transmission towers.

2.C.1.v. Provisions for Pedestrians and Bicyclists

The I-90, I-290 and NY33 are limited access highways prohibiting pedestrians and bicyclists. However, accessibility requirements meeting ADA Standards would be addressed for planned improvements off the mainline during final design, and incorporated in any future construction contracts for any areas currently not meeting standards.

Table 2-8 – Local Utility Companies

Utility	Owner
Water	Erie County Water Authority
Telephone	New York Telephone Co.
	Verizon
	NYTEL
Storm	Town Of Cheektowaga
	Seacoast Construction Co.
	Stimm Associates, Inc.
Sanitary	Erie County Sewers
	Aero Drive Limited Partnership
	Town Of Amherst
	Town Of Cheektowaga
	Herbert F. Darling Co.
	Roosevelt Heights Corp.
Oil	Ashland Oil & Refining Co.
	Lakehead Pipeline Co.
	Kiantone Pipeline Corp.
Gas	Iroquois Gas Corp.
	Otis Eastern Service
	National Fuel Gas Distribution Corp.
Fiber Optic	Fiber Tech
	TC Systems
	International Cable
	International Cablevision Inc.
	Williams Communications
	AT&T Communications
	Verizon
	Telergy Joint Venture
Electric	N.Y.S. Electric & Gas Corp.
	Niagara Mohawk Power Corp.
	N.Y.S Electric & Gas Corp.
	Federal Aviation Administration
Misc.	N.Y.S.D.O.T.
	Town Of Cheektowaga
	William W. Kimmins & Sons, Inc.

2.C.1.w. Planned Development for the Area

In general, the areas in and adjacent to the study corridor are 80 to 100% developed. Additional development in the area would likely consist of commercial or retail expansion with the property near Walden Avenue, the Walden Galleria Mall, and the area between Broadway and the Norfolk Southern Rail Yard having the greatest potential for new development.

2.C.1.x. System Elements and Conditions

The New York State Thruway (I-90) carries a large portion of the east-west interstate traffic. It is a direct route connecting the major cities of Buffalo, Rochester and Albany.

In the Buffalo area, the urban sections of I-90 are heavily used by local commuter traffic interacting with through traffic for access to specific destinations. Through this area, the close proximity of interchanges introduces traffic to merging and weaving maneuvers in a relatively short distance. During peak hours, these urban sections of I-90, through Buffalo, frequently become congested and experience traffic delays resulting in inefficient transportation operations within the Buffalo area.

2.C.1.y. Environmental Integration

The I-90, I-290 and NY33 are controlled access highways prohibiting pedestrians and bicyclists. At this time, no areas within the study limits have been identified for environmental enhancements beyond normal mitigation measures.

2.C.1.z. Miscellaneous

2.C.1.z (1) Street Lighting

The I-90 mainline, I-290 mainline and adjoining ramps within the study area do not contain street lighting. However, street lighting is present at the Williamsville Toll Plaza and the toll plaza at Interchange 49 (Transit Road).

At interchanges along William Street, Walden Avenue, Cleveland Drive, and Main Street, street lighting is present within the interchange areas. Street lighting along the NY33 near I-90 is limited, starting in the center median, on the west side of the bridge crossing I-90 and continuing west toward the City of Buffalo. There is no street lighting present along NY33 from the west side of the bridge crossing I-90, east through the study area.

2.C.1.z (2) Pedestrian Overpass

There exists a pedestrian overpass north of NY33 crossing over the New York State Thruway and ramps.

2.C.1.z (3) New York State Police Station

Located within the northwest quadrant of the I-90/NY33 interchange is a New York State Police Station. Access to I-90 will be required for continued police services.

2.C.1.z (4) Recreation and Tourist Attractions

There are 13 parks and recreation areas located within the study area. These parcels consist of several small school parks, two town parks, an area of vacant land owned by the Town of Cheektowaga, and a privately held picnic area. Except for the Walden Galleria Mall there are no tourist attractions within the study limits.

2.C.2. Needs

2.C.2.a. Project Level Needs

Capacity Needs

The I-90 mainline from Interchange 52A at William Street to Interchange 50 at the I-90/I-290 Interchange and along the I-290 from the I-90/I-290 Interchange to Main Street frequently experience traffic delays during peak hour operations. During peak hours, many of the areas within this corridor slow to an unacceptable operating level of service of E or F.

Safety Needs

None of the segments along the I-90 and I-290, within the corridor, had a calculated accident rate above the statewide average. However, the number of accidents and accident type does reveal the potential for distinguishable accident patterns that may be mitigated.

System Needs

Interchanges along I-90, between Interchange 52 and Interchange 50, are located in close proximity to one another causing traffic to perform weaving maneuvers and compete for access to desired locations, resulting in travel delays. Reconfiguration of existing access ramps at specific interchanges would reduce unnecessary weaving and improve traffic flow. Also noted is many of the existing access ramps contain nonstandard features which would be addressed as alternatives are developed.

2.C.2.b. Area or Corridor Level Needs

The New York State Thruway is a main east/west traffic corridor in the region providing a transportation system connecting the cities of Erie, Buffalo, Rochester, Syracuse and Albany. The study area includes I-90 from the I-190 Interchange to Transit Road and functions as part of the east/west corridor, as well as, an access highway for daily commuters in the Buffalo area. Providing an efficient highway system reduces the cost of transportation and provides an attractive environment for future economic enhancement.

2.C.2.c. Transportation Plans

This Project Scoping Report (PSR) evaluates the existing and future traffic conditions within the study limits, which includes the I-90/I-290 Interchange, as a working transportation corridor. Improvement alternatives described and evaluated in this PSR include the I-90/I-290 Interchange along with other locations, which will improve the efficiency of the highway system as a corridor.

2.D. Study Objectives

Based on the needs listed above, the objectives of this study are:

Identify structural, capacity, operational, and safety problems that may occur over the next 30 years.

Improve the traffic conditions within the I-90/I-290 corridor using a cost effective method to provide an acceptable level of service at the design year of 2040.

Develop properly designed improvement alternatives based on the design year 2040 traffic forecasts and current design standards, which provide adequate capacity to the design year 2040.

Provide cost effective improvements to I-90, I-290, and adjacent access ramps within the study limits to meet the social demands of the community within the corridor by providing the maximum potential for future economic enhancement to the region of New York State.

Provide cost effective improvements to I-90, I-290, and adjacent ramps within the study limits using cost effective measures that avoid or reduce highway related nuisance and environmental impacts to the greatest extent practicable.

CHAPTER 3 – ALTERNATIVES

3.A. DESIGN CRITERIA

3.A.1. Design Standards

The design criteria proposed for this study are based on the 2011 AASHTO **_A Policy on Geometric Design of Highways and Streets_**; the NYSDOT **_Highway Design Manual_**; the NYSDOT **_Bridge Manual_**; and NYSTA. The project area is considered "rolling" terrain, and the maximum superelevation rate of 6% is standard for urban freeways. The design speed for I-90 is 70 mph, typical for freeways in urban areas. Other design criteria are located in **Section 3.A.2**.

3.A.2. Critical Design Elements

The following series of tables list critical design elements to be used in the development of the project alternatives. **Tables 3-1** and **3-2** define roadway classifications within the study area. **Table 3-3** lists the design criteria for improvements to the Mainline (I-90). **Table 3-4** lists the design criteria for improvements to access ramps; adjoining the I-90 Mainline, I-290 and NY33. **Table 3-5** list the design criteria for improvements to I-290 and NY33. **Tables 3-6** and **3-7** lists design criteria for Urban Arterials and Collectors respectively.

Table 3-1 - Definitions for Roadway Classifications

Classification	Road Type	Design Speed
I-1	Interstate	70 mph
UC-1	Urban Collector	40 mph
UA-1	Urban Arterial	40 mph
UA-2	Urban Arterial	40 mph
UA-3	Urban Arterial	45 mph
UA-4	Urban Arterial	50 mph
PA-1	Principle Arterial Expressway	55 mph
PA-2	Principle Arterial Interstate	60 mph

Table 3-2 - Project Area Roadways and Their Classifications

Highway	Existing Speed Limit (mph)	Design Speed (mph)	Designated Qualifying & Access Highways [1]	Roadway Classification
I-90	55	70	Qualifying	I-1
Transit Road	45	50	Access	UA-4
Cayuga Drive	30	40	Not Listed [2]	UA-1
Union Road	40	45	Access	UA-3
I-290 (Youngmann Memorial Hwy)	55	60	Qualifying	PA-2
Main Street	40	45	Access	UA-3
Wehrle Drive	35	40	Not Listed [2]	UA-1
Cleveland Drive	35	40	Not Listed [2]	UC-1
NY Route 33	50	55	Qualifying	PA-1
Walden Ave	45	50	Qualifying	UA-4
Broadway	45	50	Access	UA-4
William Street	35	40	Not Listed [2]	UA-1
Harlem Road	35	40	Access	UA-2

1. Highways listed as Qualifying and Access Highways are highways designated for use by special dimension vehicles.
2. The noted roadways are allowed for the operation of special dimension vehicles as long as the operations of such vehicles are within one mile of a Qualifying Highway.

Table 3-3 - NYSTA, Mainline Design Criteria (I-90)

Design Element	Urban Freeway Standard	Information Source
1. Design Speed (Urban)	70 mph	NYSTA, HDM Section 2.7.1.1A
2. Lane Width (Min)	12.0 ft	NYSTA, HDM, Section 2.7.1.1B
3. Shoulder Width Right Shoulder (Min) Left Shoulder (Min)	 10.0 ft 4.0 ft	NYSTA, HDM, Section 2.7.1.1C, Exhibit 2-2
4. Bridge Roadway Width (Min)	Approach Roadway Width	NYSDOT Bridge Manual Section 2.3.3
5. Maximum Grade	4%	NYSTA, HDM Section 2.7.1.1E
6. Minimum Horizontal Curvature (e_{max}=6%)	2,040 ft	HDM, Section 2.7.1.1F
7. Superelevation (Max)	6% [1]	HDM, Section 2.7.1.1G
8. Stopping Site Distance (Min)	730 ft	HDM, Section 2.7.1.1H
9. Horizontal Clearance (Min) Without Barrier With Barrier	 15.0 ft Shoulder Width [2]	HDM, Section 2.7.1.1I
10. Vertical Clearance [3]	16.0 ft Minimum; 16.5 ft Desired	NYSTA, NYSDOT Bridge Manual, Section 2.4.1
11. Pavement Cross Slope Minimum Maximum	 1.5% 2%	HDM, Section 2.7.1.1K
12. Rollover Between Travel Lanes (Max) At Edge of Pavement (Max)	 4% 8% [4]	HDM, Section 2.7.1.1L
13. Structural Capacity Bridge Rehabilitation (Min) New & Replacement Bridges (Min)	 AASHTO HS-20 AASHTO HL-93 live load and NYSDOT Design Permit Vehicle	NYSTA, NYSDOT BM Section 2.6.2 Section 2.6.1
14. Level of Service (Min)	D (or better)	HDM, Section 2.7.1.1N
15. Control of Access	Fully Controlled	HDM, Section 2.7.1.1O
16. Median Width	10.0 ft (4 lanes), 22.0 ft (6+ lanes), or preferably 26.0 ft (6+ lanes with truck DDHV > 250 v/h)	NYSTA, HDM, Section 2.7.1.1P AASHTO Chapter 8

1. 8% maximum. A superelevation of 6% maximum may be used in urban and suburban areas to minimize the effect of negative side friction during peak periods with low travel speeds.
2. Horizontal clearance is equal to shoulder width but not less than 4.0 ft, except: on bridges where the NYSDOT Bridge Manual allows less than 4.0 ft; or in depressed sections where the minimum is the shoulder width plus 2.0 ft.
3. Vertical clearance for pedestrian bridges shall be 1.0 ft greater (17.0 ft minimum and 17.5 ft desirable).
4. When the superelevation exceeds 6%, a maximum rollover rate of 10% at the edge of the traveled way may be permitted. Refer to the NYSDOT HDM, Chapter 3, Section 3.2.5.1 “Shoulder Cross Slopes and Rollover Limitations: for further guidance.

Table 3-4 - Ramp Design Criteria - NYSTA (I-90) & NYSDOT (I-290 and NY33)

Design Element	Ramp Classification				Information Source
	(Loop)	(Jug Handle / Semi-direct)	(Diagonal / Outer Connection)	(Direct Connection)	
1. Ramp Design Speed	25 mph [1]	30 mph	40 mph	40 mph	HDM, Section 2.7.5.2 A
2. Lane Width (Min)	See HDM, Exhibit 2-9a	See HDM, Exhibit 2-9a	See HDM, Exhibit 2-9a	See HDM, Exhibit 2-9a	HDM, Section 2.7.5.2 B, Exhibit 2-9a
3. Shoulder Width Right Shoulder (Min) Left Shoulder (Min)	6.0 ft [2] 3.0 ft	6.0 ft [2] 3.0 ft	6.0 ft [2] 3.0 ft	6.0 ft [2] 3.0 ft	HDM, Section 2.7.5.2 C, Exhibit 2-10
4. Bridge Roadway Width (Min)	Lane & Shoulder Width [3]	Lane & Shoulder Width [3]	Lane & Shoulder Width [3]	Lane & Shoulder Width [3]	HDM, Section 2.7.5.2 D,
5. Maximum Grade	7% [4]	7% [4]	6% [4]	6% [4]	HDM, Section 2.7.5.2 E, Exhibit 2-10
6. Horizontal Curvature (Min) (e_{max}=6%)	144 ft	231 ft	485 ft	485 ft	HDM, Section 2.7.5.2 F, Exhibit 2-10
7. Superelevation (Max)	6% [5]	6% [5]	6% [5]	6% [5]	HDM, Section 2.7.5.2 G
8. Stopping Site Distance (Min)	155 ft	200 ft	305 ft	305 ft	HDM, Section 2.7.5.2 H, Exhibit 2-10
9. Horizontal Clearance (Min) Right Side Left Side	6.0 ft 3.0 ft	6.0 ft 3.0 ft	6.0 ft 3.0 ft	6.0 ft 3.0 ft	HDM, Section 2.7.5.2 I, Exhibit 2-10
10. Vertical Clearance	16.0 ft Min 16.5 ft Desired	16.0 ft Min 16.5 ft Desired	16.0 ft Min 16.5 ft Desired	16.0 ft Min 16.5 ft Desired	NYSTA, NYSDOT Bridge Manual
11. Pavement Cross Slope Minimum Maximum	1.5% 2.0%	1.5% 2.0%	1.5% 2.0%	1.5% 2.0%	HDM, Section 2.7.5.2 K
12. Rollover Between Travel Lanes (Max) At Edge of Pavement (Max)	4% 8%	4% 8%	4% 8%	4% 8%	HDM, Section 2.7.5.2 L
13. Structural Capacity Bridge Rehabilitation (Min) New & Replacement Bridges (Min)	AASHTO HS-20 AASHTO HL-93 live load & NYSDOT Design Permit Vehicle	AASHTO HS-20 AASHTO HL-93 live load & NYSDOT Design Permit Vehicle	AASHTO HS-20 AASHTO HL-93 live load & NYSDOT Design Permit Vehicle	AASHTO HS-20 AASHTO HL-93 live load & NYSDOT Design Permit Vehicle	NYSTA, NYSDOT Bridge Manual Section 2.6.2 Section 2.6.1
14. Level of Service (Min)	D (or Better)	D (or Better)	D (or Better)	D (or Better)	HDM, Section 2.7.5.2 N
15. Control of Access	Fully Controlled	Fully Controlled	Fully Controlled	Fully Controlled	HDM, Section 2.7.5.2 O
16. Pedestrian Accommodations	HDM, Chapter 18 & ADA	HDM, Chapter 18 & ADA	HDM, Chapter 18 & ADA	HDM, Chapter 18 & ADA	HDM, Section 2.7.5.2 P

1. Upper range values for design speed generally are not attainable on loop ramps due to large areas required for construction which are costly and rarely available in urban areas. Therefore, minimum values usually control.
2. For direct connection, ramps with design speeds over 40 mph, use 8.0 ft minimum right shoulders.
3. Lane and shoulder widths shall be carried across all ramp structures.
4. Upgrades from stopped or slowed condition (e.g. through a toll booth) should be limited to a 3% maximum (desirable), especially in areas of heavy truck traffic (NYSTA).
5. 8% maximum. A superelevation of 6% maximum may be used in urban and suburban areas to minimize the effect of negative side friction during peak periods with low travel speeds.

Table 3-5 - NYSDOT, Principle Arterial Interstate/Expressway Design Criteria (I-290 and NY33)

Design Element	Roadway Classification		Information Source
	PA-1	PA-2	
1. Design Speed	55 mph	60 mph	HDM, Section 2.7.1.1
2. Lane Width Travel Lanes (Min)	12.0 ft	12.0 ft	HDM, Section 2.7.1.1B
3. Shoulder Width Right Shoulder Minimum Left Shoulder Minimum	10.0 ft 6.0 ft	10.0 ft 6.0 ft	HDM, Section 2.7.1.1 Exhibit 2-2
4. Bridge Roadway Width (Min) Uncurbed	Approach Roadway Width	Approach Roadway Width	NYSDOT BM, Section 2.3.3
5. Maximum Grade	5%	4%	HDM, Section 2.7.1.1E Exhibit 2-2
6. Minimum Horizontal Curvature (e_{max}=6%)	1,060 ft	1,330 ft	HDM, Section 2.7.1.1F Exhibit 2-2
7. Maximum Superelevation	6% [1]	6% [1]	HDM, Section 2.7.1.1G
8. Stopping Site Distance (Min)	495 ft	570 ft	HDM, Section 2.7.1.1H Exhibit 2-2
9. Horizontal Clearance Without Barrier Provided (Min) With Barrier Provided Min)	15.0 ft Shoulder Width [2]	15.0 ft Shoulder Width [2]	HDM, Section 2.7.1.1I
10. Vertical Clearance [3] Bridge Rehabilitation (Min) New & Replacement Bridges (Min)	16.0 ft (Min) 16.5 ft (Desired)	16.0 ft (Min) 16.5 ft (Desired)	NYSDOT Bridge Manual Section 2.4.1
11. Pavement Cross Slope Travel Lanes Minimum Maximum	1.5% 2.0%	1.5% 2.0%	HDM, Section 2.7.1K
12. Rollover Between Travel Lanes (Max) At Edge of Pavement (Max)	4% 8% [4]	4% 8% [4]	HDM, Section 2.7.1.1L
13. Structural Capacity Bridge Rehabilitation (Min) New & Replacement Bridges (Min)	AASHTO HS-20 AASHTO HL-93 live load & NYSDOT Design Permit Vehicle	AASHTO HS-20 AASHTO HL-93 live load & NYSDOT Design Permit Vehicle	NYSDOT BM Section 2.6.2 Section 2.6.1
14. Level of Service (Min)	D (or Better)	D (or Better)	HDM, Section 2.7.1.1N
15. Control of Access	Fully Controlled	Fully Controlled	HDM, Section 2.7.1.1O
16. Median Width (Min)	10.0 ft	10.0 ft	HDM, Section 2.7.1.1

1. 8% maximum. A 6% maximum superelevation may be used in urban and suburban areas to minimize the effect of negative side friction during peak periods with low travel speeds.
2. Horizontal clearance is equal to shoulder width but not less than 4.0 ft, except: on bridges where the NYSDOT Bridge Manual allows less than 4.0 ft; or in depressed sections where the minimum is the shoulder width plus 2.0 ft.
3. Vertical clearance for pedestrian bridges shall be 1.0 ft greater (17 ft minimum and 17.5 ft desirable).
4. When the superelevation rate exceeds 6%, a maximum rollover rate of 10% at the edge of the traveled way may be permitted. Refer to Chapter 3 of the NYS Highway Design Manual, Section 3.2.5.1 “Shoulder Cross Slopes and Rollover Limitations” for further guidance.

Table 3-6 - NYSDOT, Urban Arterial Design Criteria

Design Element	Roadway Classification				Information Source
	UA-1	UA-2	UA-3	UA-4	
1. Design Speed	40 mph	40 mph	45 mph	50 mph	HDM, Section 2.7.2.2 A
2. Lane Width Travel Lanes (Min) Turning Lanes (Min) (truck volume >2%) Continuous Median Left Turn Lanes (Min) Parking Lanes (Min) (no future provisions for turn lanes)	 11.0 ft 11.0 ft 11.0 ft 8.0 ft	 11.0 ft 11.0 ft 11.0 ft 8.0 ft	 11.0 ft 11.0 ft 11.0 ft 8.0 ft	 12.0 ft 11.0 ft 11.0 ft 8.0 ft	HDM, Section 2.7.2.2 B Exhibit 2-4
3. Shoulder Width Right Shoulder Curb Not Provided (Min) (> 2000 ADT) Right Shoulder Curb Provided (Min) Left Shoulder (Min)	 8.0 ft 6.0 ft 0.0 ft	 8.0 ft 6.0 ft 0.0 ft	 8.0 ft 6.0 ft 0.0 ft	 8.0 ft 6.0 ft 0.0 ft	HDM, Section 2.7.2.2 C Exhibit 2-3 Exhibit 2-4
4. Bridge Roadway Width (Min) Uncurbed If non-mountable curbs are provided (Min)	Approach Roadway Width Curb to Curb Width	Approach Roadway Width Curb to Curb Width	Approach Roadway Width Curb to Curb Width	Approach Roadway Width Curb to Curb Width	NYSDOT BM, Section 2.3.3
5. Maximum Grade	8%	8%	7%	7%	HDM, Section 2.7.2.2 E Exhibit 2-3
6. Minimum Horizontal Curvature (e_{max}=4%)	533 ft	533 ft	711 ft	926 ft	HDM, Section 2.7.2.2 F Exhibit 2-4
7. Maximum Superelevation	4%	4%	4%	4%	HDM, Section 2.7.2.2 G
8. Stopping Site Distance (Min)	305 ft	305 ft	360 ft	425 ft	HDM, Section 2.7.2.2 H Exhibit 2-4
9. Horizontal Clearance With Barrier Provided (Min) Without Barrier Provided (Min) At Intersections (Min)	 0.0 ft 1.5 ft 3.0 ft	 0.0 ft 1.5 ft 3.0 ft	 0.0 ft 1.5 ft 3.0 ft	 0.0 ft 1.5 ft 3.0 ft	HDM, Section 2.7.2.2 I
10. Vertical Clearance	16.0 ft (Min) 16.5 ft (Desired)	16.0 ft (Min) 16.5 ft (Desired)	16.0 ft (Min) 16.5 ft (Desired)	16.0 ft (Min) 16.5 ft (Desired)	NYSDOT BM Section 2.4.1 Table 2-1
11. Pavement Cross Slope Travel Lanes Minimum Maximum Parking Lanes Minimum Maximum	 1.5% 2.0% 1.5% 5.0%	 1.5% 2.0% 1.5% 5.0%	 1.5% 2.0% 1.5% 5.0%	 1.5% 2.0% 1.5% 5.0%	HDM, Section 2.7.2.2 K
12. Rollover Between Travel Lanes (Max) At Edge of Travelway (Max)	 4% 8%	 4% 8%	 4% 8%	 4% 8%	HDM, Section 2.7.2.2 L

13. Structural Capacity Bridge Rehabilitation (Min) New & Replacement Bridges (Min)	AASHTO HS-20 AASHTO HL-93 live load & NYSDOT Design Permit Vehicle	AASHTO HS-20 AASHTO HL-93 live load & NYSDOT Design Permit Vehicle	AASHTO HS-20 AASHTO HL-93 live load & NYSDOT Design Permit Vehicle	AASHTO HS-20 AASHTO HL-93 live load & NYSDOT Design Permit Vehicle	NYSDOT Bridge Manual Section 2.6.2 Section 2.6.1
14. Pedestrian Accommodations	HDM, Chapter 18 & ADA	HDM, Chapter 18 & ADA	HDM, Chapter 18 & ADA	HDM, Chapter 18 & ADA	HDM, Section 2.7.2.2 N
15. Level of Service (Min)	D (or Better)	D (or Better)	D (or Better)	D (or Better)	HDM, Section 2.7.1.1N

Table 3-7 - NYDOT, Urban Collector Design Criteria

Design Element	Roadway Classification UC-1	Information Source
1. Design Speed	40 mph	AASHTO 2001 - Chapter 6 HDM, Section 2.7.3.2 A
2. Lane Width Travel Lanes (Min) Curbed (residential & commercial) Uncurbed Turning Lanes (Min) (truck volume >2%) Two-way Left Turn Lanes (Min) (truck volume >2%) Parking Lanes (Min) Commercial / Industrial Residential	10.0 ft [1] 12.0 ft 11.0 ft 11.0 ft 8.0 ft 7.0 ft	HDM, Section 2.7.3.2 B Exhibit 2-5 Exhibit 2-6
3. Shoulder Width Right Shoulder (Min) Curbed (for bicycles & lateral offsets) Uncurbed (> 2000 ADT) Left Shoulder (Min)	5.0 ft 8.0 ft 0.0 ft	HDM, Section 2.7.3.2 C Exhibit 2-5 Exhibit 2-6
4. Bridge Roadway Width (Min) Uncurbed If non-mountable curbs are provided (Min)	Traveled Way Plus Surfaced Shoulders Full Curb to Curb Width	NYSDOT BM, Section 2.3.3, Table 2-1
5. Maximum Grade	10%	HDM, Section 2.7.3.2 E Exhibit 2-5
6. Minimum Horizontal Curvature (e_{max}=4%)	533 ft	HDM, Section 2.7.3.2 F Exhibit 2-6
7. Maximum Superelevation	4%	HDM, Section 2.7.3.2 G
8. Stopping Site Distance Minimum	305 ft	HDM, Section 2.7.3.2 H Exhibit 2-6
9. Horizontal Clearance With Barrier Provided (Min) Without Barrier Provided (Min) At Intersections (Min)	0.0 ft 1.5 ft 3.0 ft	HDM, Section 2.7.3.2 I
10. Vertical Clearance [2] (Non-NHS)	14.0 ft (Min) 14.5 ft (Desired)	NYSDOT BM Section 2.4.1 Table 2-2
11. Pavement Cross Slope Travel Lanes Minimum Maximum Parking Lanes Minimum Maximum	1.5% 2% 1.5% 5%	HDM, Section 2.7.3.2 K
12. Rollover Between Travel Lanes (Max) At Edge of Pavement (Max)	4% 8%	HDM, Section 2.7.3.2 L
13. Structural Capacity Bridge Rehabilitation (Min) New & Replacement Bridges (Min)	AASHTO HS-20 AASHTO HL-93 live load & NYSDOT Design Permit Vehicle	NYSDOT Bridge Manual Section 2.6.2 Section 2.6.1
14. Pedestrian Accommodations	HDM, Chapter 18 & ADA	HDM, Section 2.7.3.2 N
15. Level of Service (Min)	D (or Better)	HDM, Section 2.7.1.1N

1. Wide travel lanes may be used in low-speed (< 45 mph) segments. Refer to Chapter 17 of the NYSDOT Highway Design Manual for bicycle accommodations.
2. The minimum vertical clearance for all pedestrian bridges is 1.0 ft over the minimum vertical clearance.

3.B. ALTERNATIVES CONSIDERED

Project Alternatives have been developed using the engineering design criteria in **Section 3.A** of this report. All reasonable alternatives were considered.

With input from the Project Advisory Committee and the public the following alternatives were developed to address the project's goals and objectives, existing system deficiencies, and future needs.

3.B.1. No Build Alternative

The No Build Alternative includes only the maintenance of the highway as it exists today. It does not include any specific safety or capacity improvement projects that would change the existing highway. Extensive maintenance would be necessary to maintain the pavement and the existing bridges would continue to deteriorate. Travel times for commuters and through traffic would continue to increase leading to lost revenue at local businesses and lost personal time for travelers. Even though the No Build Alternative fails to meet the project objectives it will be carried forward for comparison to the potential build alternatives.

3.B.2. Build Alternatives

The Improvement Alternatives are described in **Section 3.C.1**. These alternatives were developed from various combinations of mainline and interchange options to satisfy the traffic demands as projected using the Macroscopic TransCad Regional Transportation Model (RTM) and the Microsimulation model TransModeler (TM) recently developed by the GBNRTC. Mainline widening and reconstruction options are presented in **Section 3.B.2.a**. Individual interchange reconstruction alternatives are described in **Section 3.B.2.b.**

The RTM provided existing and future traffic forecasts for each alternative, accounting for the effects of regional demographic and economic growth and major transportation improvements including those identified in the Transportation Implementation Plan (TIP) and those associated with the given build alternative. From the RTM traffic forecasts, growth rates were developed and applied to the TM to further refine and simulate traffic operations at interchanges and intersections within the study area.

In addition to traffic operations, social and environmental impacts were also estimated and evaluated for the improvement alternatives. An assessment of the effects of each alternative on the social, economic, and natural environment are contained in **Chapter 4** of this report.

3.B.2.a. Mainline Widening

To facilitate the increased traffic demand along the I-90, additional through lanes were considered. The number of additional lanes required was based on the comparison of the Measures of Effectiveness (MOE) including a Level of Service analysis.

3.B.2.b. Interchange Reconstruction Alternatives

The Improvement Alternatives described in **Section 3.C.1** are a combination of some mainline widening and selected interchange reconstruction options from the list below. Individual interchange reconstruction options considered feasible for this study are as follows. These interchange options were developed through a series of workshops/meetings between the NYSTA, NYSDOT and the Design Team during the summer 2006. Note these options may be modified or additional options developed during future phases of preliminary design and detailed environmental analyses.

1. **William Street**

   Modify existing William Street ramp configuration to accommodate added travel lanes along I-90. The 1-90 exit ramps onto William Street would be one lane wide and then quickly widen to three lanes as the interchange is currently configured.

2. **Broadway**

   Adding a partial interchange at Broadway is being considered in an effort to reduce traffic backups at the William Street Interchange. The interchange would be a half diamond design with an east bound I-90 exit ramp and a westbound entrance ramp. Additional ramp configurations are also under consideration to increase accessibility.

3. **Walden Avenue**

   Modify/reconstruct the Walden Avenue Interchange to allow the widening of the I-90 mainline. Individual ramps at this location will be evaluated during future phases of preliminary design and detailed environmental analyses to determine if there are any non-standard features that may need to be removed. In general the ramp type and configuration would be similar to the existing.

4. **NY 33**

   At the NY 33 interchange several configurations were evaluated to accommodate widening of the thruway, reduce congestion and improve safety at this location. From the configurations two reconstruction options are presented here.

   4.a. The first alternative for reconstruction of the NY 33 interchange includes reconfiguration of the existing ramp system to accommodate mainline widening. The general configuration of the interchange would remain as a typical clover leaf pattern. Non-standard geometric features including radii, acceleration lane length and weaving distance would be evaluated during future phases of preliminary design and detailed environmental analyses.

   4.b. The second alternative is based on construction of a direct connection (ramp) from the NY 33 east bound to I-90 east bound. The ramp would be a "fly-over" type configuration. Depending on weaving requirements and configuration of Interchange 50 the ramp may be located on the inside or outside edge of pavement along the I-90. The south east quadrant of the existing interchange would be reconfigured to eliminate the existing on-ramp and increase the radius of the off-ramp. The remaining ramps at this location would be evaluated during future phases of preliminary design and detailed environmental analyses to determine if any other widening/reconfigurations are warranted to correct non-standard conditions.

5. **Cleveland Drive**

Maintaining access to Cleveland Drive in addition to complete closure of the Cleveland Drive Interchange to extend the available weaving distance between the NY 33 and I-290 interchanges is being considered. Note that the Cleveland Drive Bridge over I-90 is scheduled to be replaced in 2015.

6. **I-290**

At the existing I-90/I-290 Interchange (Interchange 50) mainline traffic split between I-290 and I-90. Currently the interchange is configured as if the I-90 movement is primary and the I-290 movement is secondary. Current traffic patterns indicate that 80 percent of the I-90 east bound traffic continues to the I-290. To reduce the congestion and improve the capacity, this interchange would be reconfigured to provide the most direct connection between the portion of I-90 south of Interchange 50 and the I-290. The best configuration for this location appears to be a directional three leg interchange.

The interchange would be reconstructed to provide direct system level connections (ramps) for the I-90 east bound to I-290 west bound and the I-290 east bound to I-90 west bound movements. Ramps for these movements would be designed with the least curvature possible. The remaining I-90 to I-290 movements and the I-90 through movement would be accommodated as direct connection on typical curved ramps. The resulting interchange would likely be a triple level design with the lesser movements traveling the elevated or depressed pavement sections.

7. **Youngs Road**

The addition of an interchange at Youngs Road was initially considered. The configuration of this interchange would likely be a combination of a half diamond and a partial clover leaf. However, there is insufficient right-of-way to include toll collection facilities at this location, the inclusion of a Youngs Road Interchange will not be carried forward under this study.

8. **Transit Road**

The interchange at Transit Road could be improved. One possible option is to reconstruct this interchange in a configuration similar to the one in place today.

Another option under consideration is providing access to Aero Drive and Wehrle Drive. However, there is insufficient right-of-way to include toll collection facilities that incorporate connections to Aero Drive and Wehrle Drive, the inclusion of a major modification at this interchange will not be carried forward under this study.

9. I-290/Main Street

The I-290 at Main Street Interchange would be reconstructed. The configuration of this interchange will be dependent on the available weaving distance between this interchange and Interchange 50. It is anticipated that the configurations in the northerly quadrants would be similar to the existing. Configuration of the southerly quadrants will be significantly modified or removed.

3.B.3. Other Corridor Improvements

3.B.3.a. TSM Enhancements

Transportation System Management (TSM) improvements are used to increase the efficiency of the existing transportation system by improving the performance of its individual components. Examples of TMS devices include Incident Management Systems and/or Motorist Information Systems such as Highway Advisory Radio or Dynamic Information Signs.

Within the study limits, along I-90, I-290, and NY33, there are currently a number of Intelligent Transportation System (ITS) elements including Transmit Readers, Closed Circuit Television (CCTV) Cameras, Loop Detectors, Variable Message Signs (VMS), Advanced Traffic Controllers (ATC), and a fiber optic communications system. As appropriate, additional devices can be added to enhance the existing ITS system.

Other TSM measures could include the use of special purpose lanes such as express lanes, high-occupancy vehicle (HOV) lanes, or high-occupancy toll (HOT) lanes.

Express lanes are freeway lanes designed to bypass areas where congestion is known to occur. They are generally isolated from general-purpose lanes to eliminate weaving maneuvers causing express lane traffic to slow. Ideally the traffic targeted would be through traffic, traffic passing through the area, and not requiring access to the interchanges. Unfortunately, during peak hours within the study area, only a small percentage of the traffic is through traffic continuing along the I-90. With through traffic accounting for approximately 20% of the total peak hour volume it is likely that an designated express lane would be under-utilized. An additional area of concern, is the safety of merging maneuvers into or out of the express lane.

The other express lane option would be to target the local commuter traffic. The area where congestion is known to occur along the I-90 contains five (5) interchanges within a 4.6-mile stretch of highway. During peak-hour(s) the I-90 exhibits many of the same characteristics as arterials due to the heavy commuter traffic and the close proximity of the interchange spacing. Commuter vehicles are continuously entering and exiting the I-90 throughout this section of highway. An attempt to isolate commuter traffic to an express lane would require multiple express lane access points causing excessive weaving maneuvers resulting in additional delays and even unsafe conditions.

Another type of special purpose lane is the high-occupancy vehicle (HOV) lane. HOV lanes are freeway lanes designed for vehicles traveling with more than a preset number of occupants; such vehicles often include buses, taxies, and carpools. HOV lanes generally provide unlimited access for vehicles meeting the HOV users criteria. This would be easier to implement however would require additional weaving maneuvers for motorists desiring access to the HOV lane. Another controlling aspect of HOV lane usage is the delay time in the general-purpose lanes. As the delay in the general-purpose lanes increases, the incentive to carpool increases. Even though existing conditions along the I-90 experience delay, minor delays would not likely be incentive enough for most motorists to form carpools.

Like HOV lanes, high-occupancy toll (HOT) lanes are freeway lanes designed for vehicles traveling with more than a preset number of occupants but may also be used by solo drivers who are willing to pay for the privilege to drive in the HOT lane. HOT lanes often have solo driver restrictions based on the operating speed of the HOT lane at a particular time. HOT lanes unlike HOV lanes require controlled access for toll collection. Local commuter traffic would require multiple HOT lane access points causing additional weaving maneuvers and during peak hour entry back into the general-purpose lanes is likely to be difficult resulting in delay to both the HOT lane and general-purpose lanes. Minor delays would not likely motivate motorists to form carpools or pay tolls for use of the HOT lane.

Studies show under the right conditions adding HOV/HOT lanes can have a positive impact reducing travel delay time. The costs associated with HOT lanes are higher than that of HOV lanes because HOT lanes require controlled access and toll collection equipment. Adding a HOV or HOT lane is higher cost than adding a general-purpose lane due to the specialty lane separation from the general-purpose lanes and the enforcement of the occupancy requirement.

3.B.3.b. Transit System Enhancements

The Niagara Frontier Transportation Authority (NFTA) is the largest transit operator in the Western New York region. The NFTA owns and operates the Light Rail Rapid Transit (LRRT) system in the City of Buffalo, and the Metro Bus system which serves the City of Buffalo, the City of Niagara Falls and the surrounding suburbs. They also own the Greater Buffalo International Airport, the Niagara Falls International Airport, and large tracts of waterfront land which were once part of the Port of Buffalo.

Metro Bus service between residential communities surrounding Buffalo and strategic locations including downtown Buffalo is currently in place. Use of the public transportation system requires individuals to walk or drive to pickup locations along designated Metro bus or rail routes as well as requiring riders to adhere to metro transportation schedules. Travel time associated with public transportation generally increases slightly over private modes. Use of public transportation also limits an individual’s ability to remain flexible in their work environment. Responsibilities of many professionals today requires them to tailor their daily work schedule to meet the demands of their work environment, making adhering to public transportation schedules unattractive and nearly impossible and forces them to provide their own transportation. The wide availability of free or low cost parking and limited service beyond the first ring suburbs also hinders implementation of transit improvements.

3.B.3.c. Multi-Modal Enhancements

Multi-Modal enhancements focus on improving interfaces between existing modes of transportation, which in turn may improve the overall efficiency of the regional transportation system. Transportation modes include all means of moving people and goods, including automobile, truck, bus, train, transit, aircraft and boats. The most predominant modes of transportation in the study area are automobiles, trucks, buses, Metro Rail, and freight trains. This alternative could include a truck to rail transfer facility, park and ride lots, bus shelters and other options. Several of these options are discussed below.

One option is to improve access to the Cheektowaga truck to rail transfer facility. The improved access may help reduce the number of trucks traveling along the corridor. However, the reduction may be small because many of these trucks access the interchanges within the corridor for local pickup and delivery and would not use the truck to rail facility.

Another multi-modal option that is often considered are park and ride lots to encourage car pooling and increase numbers of passengers per automobile. Bus shelters could be located there to also encourage increase use of bus service, both for excursions and for commuting. There are currently a number of park and ride lots throughout the Buffalo area. New park and ride lots could also be considered. These lots could serve multiple purposes and could include a number of enhancements such as a Trip Matching Service for car poolers, or real time arrival/departure boards for buses.

It is unlikely that any of the above options would remove a substantial number of vehicles. However, several of the options such as the park and ride lots could be included in feasible alternatives as an enhancement to improve conditions during construction and for future transportation efficiency.

3.C. FEASIBLE ALTERNATIVES

3.C.1. Description of Feasible Alternatives

3.C.1.a. No Build Alternative

This alternative would continue normal maintenance activities of the existing highway system and bridges. For example, these activities would include, patching and overlaying the pavement, cleaning culverts and ditches, re-decking bridges and replacing damaged guiderail.

This only includes maintaining the expressway as it exists today. It does not include any specific safety or capacity improvement projects that would widen or add lanes, or otherwise change the geometry of the existing highway. However, it would be reasonable to assume that some other improvement projects would separately be constructed along the highway during the future 20-year planning period (2020-2040) for this study. They would be similar in scope to those constructed over the last 20 years, including ramp widening, guide rail upgrades and pavement overlays. However, each separate project may require an environmental review process and could have adverse impacts.

3.C.1.b. Build Alternatives

Build Alternatives suggested for this project are combinations of mainline widening/reconstruction, realignment of Interchange 50, and some combination of the remaining interchange reconstruction options listed previously. The development of the following alternatives was based primarily on the traffic capacity analysis and the goal to remove significant geometric deficiencies within the study area.

Interim Build Improvements

Results of the modeling efforts by the GBNRTC using the TransModeler on the existing and future No-Build condition indicated that the most congested area of the study area is within the vicinity of Interchange 50. As a result of several team workshops is was determined that minor improvements on I-90 at the interchanges with NY33 and Cleveland Drive and a simplification of the interchange between I-290 and Main Street could yield significant improvements in the traffic throughput and level of service within this area at a relatively low construction cost.

Under this alternative the following changes would be made:

- The I-90 EB On-Ramp from NY 33 would be extended and realigned to allow for a continuous 4th lane in the eastbound direction between NY Route 33 (Interchange 51) and I-290 (Interchange 50).
- The I-90 WB On-Ramp from Cleveland Drive would be extended and realigned to allow for a continuous 4th lane in the westbound direction between I-290 (Interchange 50) and NY Route 33 (Interchange 51).
- The I-290 Interchange with Main Street would be significantly modified whereby all the ramps south of Main Street would be eliminated. The ramps north of Main Street would be reconfigured to provide all the movements currently available. The existing slip ramp configurations at Main Street would be converted into two major traffic signal controlled intersections.
- Reduce the number of existing lanes from two to one on the I-290 EB Ramp to I-90 EB (to the WTB EB). This modification is feasible due to the low traffic volume on this ramp and that the existing two-lane ramp already narrows to one-lane just before it reaches the WTB EB. This reduction will provide for three thru-lanes on I-290 EB and one lane on the I-290 EB ramp to I-90 EB. The three thru-lanes on I-290 EB would then reduce to two lanes at the Wehrle Drive overpass. This option would provide a smoother transition from I-290 EB to I-90 WB and simplify the weave/split maneuver to I-90 EB.

A set of plans illustrating the construction work included under the Interim Build Improvements is included in **Appendix A.**

Full Build Improvements – 4 Lanes

To build upon the interim improvements developed above and to improve the traffic throughput and level of service throughout the entire study corridor, an additional fourth travel lane in each direction was included between Williams Street and I-290. An additional third travel lane in each direction was included on I-90 between the WTB and Interchange 49 (Transit Road). I-290 would include an additional travel lane in each direction between I-90 to just west of Main Street.

<u>Interchanges</u>

I-90/I-290

In addition to the added travel lanes, the interchange of I-90 and I-290 (Interchange 50) would be completely realigned to provide direct system level connections (ramps) for the high volume I-90 east bound to I-290 west bound and the I-290 east bound to I-90 west bound movements. Ramps for these movements would be designed with the least curvature possible. The remaining I-90 to I-290 movements and the I-90 through movement would be accommodated as direct connection on typical curved ramps. The resulting interchange would be a triple level design with the lesser movements traveling the elevated or depressed pavement sections.

I-290/Main Street

The improvements to the Main Street interchange with I-290 constructed under the Interim Build Alternative would remain.

William Street/Walden Ave./ NY33 Cleveland Drive/Transit Road

The I-90 interchanges with William Street, Walden Avenue, NY33, Cleveland Drive, and Transit Road would be modified as necessary to accommodate mainline widening. The general configuration of the existing interchange would remain as they currently exist today.

Broadway/Youngs Road

No new interchanges are planned for Broadway or Youngs Road. The traffic analyses conducted for a Broadway interchange indicated that it will not improve the conditions along I-90. An interchange at Youngs Road will not be considered feasible for the reasons stated in **Section 3.B.2.b.7**.

A plan of the improvements proposed for the Full Build - 4 Lanes is included in **Appendix A**.

<u>Full Build Improvements – 5 Lanes</u>

To provide for more traffic capacity and improved level of service over the Full Build Improvements – 4 Lanes, an additional 5th travel lane is proposed between William Street and I-290. All interchange configurations would be generally the same as under the Full Build Improvements – 4 Lanes with the exception that each would need to be modified to accommodate the additional 5th lane.

A plan of the improvements proposed for the Full Build - 4 Lanes is included in **Appendix A**.

3.C.2. Engineering Considerations of the Feasible Alternatives

3.C.2.a. Special Geometrics Features

"Nonstandard" features as listed in **Table 2-3** are features that do not meet minimum design criteria for the project, including lane, shoulder, bridge widths, grades, horizontal curvatures and stopping sight distances. A "nonconforming" feature, while not violating any design criteria, does not conform to normally accepted design practices and should be avoided. These include lack of regular passing zones on two-lane highways, inadequate climbing lane lengths, short or no tangent distances between curves in the same direction, and other items.

All improvement alternatives meet or exceed the design criteria given for Urban Freeways as listed in **Table 3-3** and Principal Arterial Expressways as listed in **Table 3-5**. Where possible, the design of ramps and adjacent Urban Arterials has been progressed to meet the criteria in **Tables 3-4, 3-6, and 3-7**.

3.C.2.b. Traffic Forecasts, Measures of Effectiveness and Safety Considerations

3.C.2.b. (1) Design Year Traffic Volume Projections

The GBNRTC developed traffic volumes for the design years using their Regional TransCAD Model and TransModeler. **Table 3-8** provides a summary of the design year peak hour volumes for the I-90 and I-290 corridors.

Table 3-8 – Design Year Traffic Volumes

Corridor	No-Build		Interim Build		Four Lane Full Build		Five Lane Full Build	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
ETC 2020								
I-90 EB West of Interchange 50	5,350	5,295	5,485	5,355	5,995	5,665	6,065	5,810
I-90 EB East of Interchange 50	2,250	2,650	2,250	2,800	2,180	2,510	2,200	2,560
I-90 WB West of Interchange 50	4,255	5,690	4,330	5,900	4,785	6,145	4,860	6,325
I-90 WB East of Interchange 50	1,650	2,650	1,600	2,650	1,885	2,565	1,900	2,615
I-290 EB	4,850	4,400	5,150	4,650	5,535	5,130	5,440	4,995
I-290 WB	4,150	4,950	4,150	5,450	4,865	5,410	4,700	5,275
ETC+20 2040								
I-90 EB West of Interchange 50	5,275	4,725	5,315	5,660	6,515	6,210	6,595	6,365
I-90 EB East of Interchange 50	2,350	2,650	2,450	3,150	2,430	3,020	2,455	3,130
I-90 WB West of Interchange 50	4,465	4,285	4,655	5,045	5,105	6,730	5,155	6,960
I-90 WB East of Interchange 50	2,100	2,950	2,150	3,150	2,200	3,110	2,215	3,225
I-290 EB	4,900	3,200	5,300	4,250	5,700	5,455	5,625	5,345
I-290 WB	4,400	4,450	4,500	4,700	5,230	5,715	5,085	5,615

Note: ETC is the Estimated Time of Completion

Table 3-8 shows that volumes are projected to generally increase after the implementation of the Interim Build and Full Build Alternatives.

Table 3-9 shows the percent change in peak hour traffic volumes (from **Table 3-8**) for the I-90 and I-290 corridors between No-Build conditions and the three build alternatives.

Table 3-9 – Percent Change in Peak Hour Traffic Volumes

Corridor	2020: NB to Interim		2040: NB to Interim		2020: NB to 4-Lane FB		2040: NB to 4-Lane FB		2020: NB to 5- Lane FB		2040: NB to 5-Lane FB	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
I-90 EB West of Interchange 50	2.5%	1.2%	0.8%	19.8%	12.1%	7.0%	23.5%	31.4%	13.4%	9.7%	25.0%	34.7%
I-90 EB East of Interchange 50	0.0%	5.7%	4.3%	18.9%	-3.1%	-5.3%	3.4%	14.0%	-2.2%	-3.4%	4.5%	18.1%
I-90 WB West of Interchange 50	1.8%	3.7%	4.3%	17.7%	12.5%	8.0%	14.3%	57.1%	14.2%	11.2%	15.5%	62.4%
I-90 WB East of Interchange 50	-3.0%	0.0%	2.4%	6.8%	14.2%	-3.2%	4.8%	5.4%	15.2%	-1.3%	5.5%	9.3%
I-290 EB	6.2%	5.7%	8.2%	32.8%	14.1%	16.6%	16.3%	70.5%	12.2%	13.5%	14.8%	67.0%
I-290 WB	0.0%	10.1%	2.3%	5.6%	17.2%	9.3%	18.9%	28.4%	13.3%	6.6%	15.6%	26.2%

These increases may be vehicles that are being drawn to the roadways due to the additional available capacity from the improvements. This will be examined further in **Section 3.C.2.b. (2)**.

Segment peak hour volumes are included in **Appendix C**.

3.C.2.b. (2) Alternative MOEs

Modeling was conducted by the GBNRTC to assess the operations of the roadways within the study area for the Interim Build and Full Build alternatives traffic.

3.C.2.b. (2.1) Interim Build Alternative

For analysis purposes the Interim Improvements were combined and modeled as one alternative. This Interim Build Alternative incorporates the improvements documented in **Section 3.C.1.b. Interim Build Improvements**.

The Interim Build analysis was conducted to the same level of detail as the Existing and No-Build scenarios utilizing TransModeler Microsimulation software as described in **Section 2.C.1.i.** The models produced MOEs used to determine the benefits of the interim improvements on the study area.

Table 3-10 is a summary of the Peak Hour LOS from the traffic models.

Level of Service was designated using the following criteria:

Level of Service for expressways is defined in the 2010 HCM in terms of density. Density is a measure of the number of vehicles on a roadway segment averaged over space. Density is computed by dividing the volume of vehicles per lane on a roadway by the average speed of the vehicles. The LOS ranges for expressways segments are:

Basic Expressway Segments: Expressway segments that are outside the influence of merging, diverging, or weaving maneuvers.

Level of Service

A - ≤ 11 passenger cars/mile/lane (pc/mi/ln)
B - > 11-18 pc/mi/ln.
C - > 18-26 pc/mi/ln
D - > 26-35 pc/mi/ln
E - > 35-45 pc/mi/ln
F – Demand exceeds capacity, > 45 pc/mi/ln

Expressway Weaving Segments: Expressway segments that are formed when merge segments are closely followed by diverge segments forcing the crossing of two or more traffic streams traveling in the same direction.

Level of Service

A - ≤ 10 (pc/mi/ln)
B - > 10-20 pc/mi/ln.
C - > 20-28 pc/mi/ln
D - > 28-35 pc/mi/ln
E - > 35 pc/mi/ln
F – Demand exceeds capacity, > 35 pc/mi/ln

Expressway Merge & Diverge Segments: Expressway segments that occur primarily at on-ramp and off-ramp junctions with the expressway mainline.

Level of Service

A - ≤ 10 (pc/mi/ln)
B - > 10-20 pc/mi/ln.
C - > 20-28 pc/mi/ln
D - > 28-35 pc/mi/ln
E - > 35 pc/mi/ln
F – Demand exceeds capacity, > 35 pc/mi/ln

Table 3-10 depicts that the interim enhancements may improve some but not all study segments. Given the size and operational complexity of the study area, increasing traffic flows through particular segments adversely affects the operations of other adjacent segments. Hence, creating operating and traffic flow conditions that were markedly different then previously existed. This occurrence is depicted by the traffic volume increases noted in **Section 3.C.2.b. (1)** in **Tables 3-8** and **3-9** where increases in traffic volumes of up to approximately 70% are documented.

Table 3-10 – Peak Hour LOS

Location		AM Peak					PM Peak				
		Existing	No-Build		Interim Build		Existing	No-Build		Interim Build	
No.	Description		2020	2040	2020	2040		2020	2040	2020	2040
	MAINLINE & RAMPS - 90 & 290										
1	90EB - Henry - William	D	D	F	D	F	D	D	F	D	E
2	90WB - William - Henry	C	D	D	D	D	D	D	C	D	D
3	Ramp - 90E - William - Off	B	B	A	B	A	C	C	C	C	C
4	Ramp - William - 90W - On	C	D	D	C	C	B	B	B	B	B
5	Ramp - William - 90E - On	E	E	F	E	F	C	D	F	D	D
6	Ramp - 90W - William - Off	B	B	C	B	C	E	D	C	E	D
7	90EB - William - Walden	E	F	F	F	F	D	E	F	E	F
8	90WB - Walden - William	C	C	D	C	D	E	E	D	E	E
9	Ramp - 90E - Walden EB - Off	C	C	B	C	C	F	F	E	E	D
10	Ramp - Walden EB - 90W - On	A	A	A	A	A	A	A	A	A	A
11	Ramp - Walden EB - 90E - On	A	A	A	A	A	B	C	F	C	E
12	Ramp - 90W - Walden EB - Off	D	E	D	D	D	C	C	F	C	C
13	Ramp - 90E - Walden WB - Off	A	A	A	A	A	B	B	A	B	B
14	Ramp - Walden WB - 90W - On	B	C	C	B	C	D	D	D	D	C
15	Ramp - 90W - Galleria Drive - Off	A	A	B	B	A	B	B	A	B	A
16	Ramp - Walden WB - 90E - On	C	C	D	C	E	C	D	F	D	E
17	Ramp - 90W - Walden WB - Off	B	B	B	B	B	C	C	B	C	B
18	90EB - Walden - Route 33	F	F	F	F	F	E	E	F	E	F
19	90WB - Route 33 - Walden	C	D	D	D	D	E	E	C	E	D
20	Ramp - 90E - Route 33 EB - Off	E	E	E	D	D	D	D	C	D	D
21	Ramp - Route 33 EB - 90W - On	C	C	C	C	C	E	E	C	E	D
22	Ramp - Route 33 EB - 90E - On	D	F	F	E	F	E	F	F	E	F
23	Ramp - 90W - Route 33 EB - On	B	B	C	B	C	C	E	F	D	F
24	Ramp - 90E - Route 33 WB - On	E	E	E	E	E	E	D	F	D	F
25	Ramp - Route 33 WB - 90W - On	B	B	B	B	B	B	C	F	C	F
26	Ramp - Route 33 WB - 90E - On	C	B	B	B	B	E	F	F	E	C
27	Ramp - 90W - Route 33 WB - On	E	E	E	E	F	C	C	D	C	F
28	90E - Route 33 - Cleveland Drive	F	F	F	F	F	F	F	F	F	F
29	90W - Cleveland Drive - Route 33	D	D	D	C	D	D	E	F	D	F
30	Ramp - 90E - Cleveland - Off	B	B	B	C	C	B	F	B	B	B
31	Ramp - Cleveland - 90W - On	C	C	C	C	C	C	B	C	C	F
32	90E - Cleveland - Transit	C	F	F	D	F	D	E	E	E	F
33	90W - Transit - Cleveland	B	C	E	B	E	D	D	F	D	F
34	Ramp - 90E - 290W - On	E	E	E	E	E	F	E	F	F	F
35	Ramp - 290E - 90W - On	F	F	F	F	F	F	F	F	F	F
36	Ramp - 290 EB - 90E - On	C	C	F	E	F	C	C	F	E	F
37	Ramp - 90W - 290W - On	B	B	C	B	C	D	D	F	D	F
38	290W - 90W On Ramp - Sheridan Drive	D	D	D	C	D	E	D	F	E	F
39	290E - Sheridan Drive - 90W On Ramp	F	E	F	D	F	E	F	F	D	F
40	Ramp - 290W - Main St E - Off	E	F	F	n/a	n/a	D	D	F	n/a	n/a
41	Ramp - 290E - Main St E - Off	B	B	B	n/a	n/a	B	B	F	n/a	n/a
42	Ramp - Main St E - 290W - On	B	B	B	n/a	n/a	B	B	B	n/a	n/a
43	Ramp - Main St E/W - 290E - On	A	A	E	B	C	D	E	F	E	F
44	Ramp - 290E - Kensington - Off	C	C	B	C	E	B	B	B	C	F
45	Ramp - 290E - Main St W - Off	A	A	A	n/a	n/a	A	A	A	n/a	n/a
46	Ramp - 290W - Main St W - Off	B	A	A	C	F	C	C	B	D	D
47	Ramp - Main St W - 290W - On	B	B	B	C	C	C	C	C	E	F
48	Ramp - 90E - Transit Rd - Off	C	B	B	C	C	D	D	C	D	D
49	Ramp - Transit Rd - 90W - On	B	C	C	B	C	E	E	F	E	E
50	Ramp - Transit Rd - 90E - On	A	A	A	A	A	A	A	A	A	A
51	Ramp - 90W - Transit Rd - Off	A	A	A	A	A	B	B	A	B	A
52	Ramp - Harlem/Sheridan - 290E - On	A	A	A	B	B	A	A	D	B	B
53	Ramp - 290E - Harlem/Sheridan - Off	B	D	C	C	D	C	F	F	C	E
54	Ramp - 290W - Sheridan - Off	E	E	E	E	E	F	E	F	F	F
55	Ramp - Sheridan - 290W - On	B	B	B	B	C	C	C	C	C	C

As a result, due to these intricacies of the changes in operations for the individual study segments, it was necessary to examine the total study area to determine the collective benefits of the Interim Improvement Alternative. Improvements to the total study area are depicted in **Table 3-11** (Total Study Area Model Output) and **Table 3-12** (Percent Change in MOEs).

Table 3-11 – Total Study Area Model Output

Year	AM Peak			PM Peak		
	VMT	VHT	Total Delay (hrs)	VMT	VHT	Total Delay (hrs)
No-Build						
ETC 2020	234,436	8,212	3,365	274,619	13,320	5,880
ETC+20 2040	240,219	9,617	4,612	226,353	14,649	8,152
Interim Build Alternative						
ETC 2020	237,332	8,062	3,172	287,645	13,287	5,508
ETC+20 2040	248,925	9,683	4,524	247,039	14,619	7,867

Table 3-12 – Percent Changes in MOEs

Year	AM Peak			PM Peak		
	VMT	VHT	Total Delay (hrs)	VMT	VHT	Total Delay (hrs)
No-Build to Interim Build						
ETC 2020	1.2%	-1.8%	-5.7%	4.7%	-0.2%	-6.3%
ETC+20 2040	3.6%	0.7%	-1.9%	9.1%	-0.2%	-3.5%

This output depicts general decreases in VHT and delay. It also shows VMT increases after the implementation of the interim improvements, which is consistent with the increase in traffic volumes noted in **Section 3.C.2.b. (1)**. The decreases in VHT and delay combined with the increase in peak hour traffic volumes indicate potential reductions in congestion on the expressways.

Bigger improvements were noted for ETC conditions than for ETC+20 conditions which is consistent with the objective of the interim improvements being short term fixes to help mediate problem areas within the study area.

Detailed Interim Build Alternative MOEs for study area mainline segments, ramps, arterials, and intersections are included in **Appendix C**.

A comparison of queue length data between the No-Build and Interim Build Alternative scenarios indicates that there were queue reductions on both I-90 EB between Route 33 and Cleveland Drive and I-290 EB between Sheridan Drive and the I-90 WB On-Ramp in ETC (2020) during both peak periods. This also indicates potential reductions in congestion on the expressways and that the Interim Build Alternative will potentially provide some mitigation to the problem areas identified in **Section 2.C.1.i (3)** in 2020.

In ETC+20 (2040) there were queue reductions on both I-90 EB between Route 33 and Cleveland Drive and I-290 EB between Sheridan Drive and the I-90 WB On-Ramp during the PM peak. However, during the AM peak in ETC+20 there queue increases on both I-90 EB between Route 33 and Cleveland Drive and I-290 EB between Sheridan Drive and the I-90 WB On-Ramp. As with the MOE review, this is consistent with the objective of the interim improvements being short term fixes to help mediate problem areas within the study area.

Detailed queuing information is included in **Appendix C**.

3.C.2.b. (2.2) Full Build Alternatives

Analysis Methodology

The Full Build analysis was conducted using the GBNRTCs Macroscopic TransCad regional travel model. This model does not provide the same level of detail as the model used for the Existing, No-Build, and Interim Build scenarios that utilized TransModeler microsimulation software and, therefore, fewer MOEs were produced. The Full Build Alternative was analyzed using Daily LOS. The Daily LOS was compared to Daily LOS for the No-Build scenario that was generated from the GBNRTCs Macroscopic TransCad regional travel model for use in the Full Build analysis.

The Daily LOS was computed using the volume output from the Macroscopic TransCad regional travel model and incorporating the guidelines provided in the TRB Highway Capacity Manual and subsequent updates. The maximum traffic flow possible on a roadway facility is defined by the Highway Capacity Manual as the maximum service flow rate at Level of Service "E" defined as the "capacity" of the facility. The traffic volume that can be served under the stop-and-go conditions of LOS F is generally accepted as being lower than the maximum flow rate at LOS E. For most design and planning purposes, however, service flow rates better than E or F are generally used, usually C or D, to ensure a more acceptable quality of service for facility users.

Maximum LOS service volumes may change from time to time as a result of updated standard calculation procedures and new research findings reflected in the Highway Capacity Manual (HCM). The 1997 update to the 1994 HCM, established 2,400 passenger cars per hour per lane (pcphpl) as the basic capacity for freeway facilities under ideal conditions. As a result of consultation between the NYSTA, NYSDOT and the GBNRTC it was determined, for the purposes of this study to use a value of 2,200 pcphpl to account for the less than ideal conditions (weaving/merging) experienced within the study area.

Four Lane Full Build Alternative

For analysis purposes both Phase 1 and Phase 2 of the original Full Build Alternative were combined into and modeled as a single phase. This Four Lane Full Build Alternative incorporates the improvements documented in **Section 3.C.1.b.**

<u>Full Build Improvements – 4 Lanes</u>.

A comparison of Daily LOS between the No-Build and Four Lane Full Build alternatives depicted improvements in LOS for the I-90 and I-290 segments in the Four Lane Full Build scenario. The No-Build 2020 and 2040 scenarios were projected to experience Daily LOS E on all I-90 and I-290 segments. In 2020, the Four Lane Full Build alternative is projected to experience improvements on all I-90 and I-290 segments with Daily LOS D or better, except for the segment between Route 33 and Cleveland Drive which will operate at Daily LOS E. This indicates that the Four Lane Full Build Alternative will potentially mitigate the problem areas identified in **Section 2.C.1.i (3)** in 2020 with the exception of the segment between Route 33 and Cleveland Drive.

In 2040, the Four Lane Full Build alternative is projected to degrade to Daily LOS E on the following segments:

- I-90: I-190 to William Street
- I-90: William Street to Walden Avenue
- I-90: Walden Avenue to Route 33
- I-90: Route 33 to Cleveland Drive

Diagrams displaying No-Build and Four Lane Full Build conditions Daily LOS are included in **Appendix C**.

The traffic models are projecting that the increase in capacity on the expressways, from the addition of the fourth travel lane, is generally expected to draw additional traffic into the network as depicted in the volume increases in **Section 3.C.2.b. (1)**. The result of this is roadways servicing more traffic with operations below the desirable threshold of LOS D. Therefore, a Five Lane Full Build Alternative was modeled and analyzed.

Detailed Four Lane Full Build Alternative MOEs for study area mainline segments, ramps, and arterials are included in **Appendix C**.

<u>Five Lane Full Build Alternative</u>

The Five Lane Full Build Alternative incorporates the improvements documented in **Section 3.C.1.b.**

<u>Full Build Improvements – 5 Lanes</u>.

Similar to the Four Lane Full Build Alternative, the Five Lane Full Build analysis was conducted using Daily LOS generated from the GBNRTCs Macroscopic TransCad regional travel model.

A comparison of Daily LOS between the No-Build and Five Lane Full Build alternatives depicted improvements in LOS for the I-90 and I-290 segments in the Five Lane Full Build scenario. In 2020, the Five Lane Full Build alternative is projected to experience improvements on all I-90 and I-290 segments with Daily LOS D or better, except for the I-290 segment between Sheridan Drive and Main Street which will operate at Daily LOS E. In 2040, the Five Lane Full Build alternative is projected to experience Daily LOS D or better on all segments except for:

- I-90: Route 33 to Cleveland Drive
- I-290: Sheridan Drive to Main Street

This indicates that the Five Lane Full Build Alternative will potentially mitigate the problem areas identified in **Section 2.C.1.i (3)** in 2020 and 2040 with the exception of the segments identified above. Diagrams displaying Five Lane Full Build conditions Daily LOS and detailed Five Lane Full Build Alternative MOEs for study area mainline segments, ramps, and arterials are included in **Appendix C.**

3.C.2.b. (3) Safety and Traffic Control Considerations

No Build Alternative

This alternative would maintain the existing roadway without construction of significant accident counter measures or safety improvements. Current accident rates would remain the same or gradually increase.

Build Alternatives

The following accident counter measures have been identified as having the potential to reduce accidents and improve safety along the corridor. Inclusion of some or all of the following countermeasures will be considered in development of the improvement alternatives.

Desirable Countermeasures

1. *Eliminate Interchange 50A*

   Elimination of Interchange 50A at Cleveland Dr. will improve operations by removing a potential conflict point that is relatively close to Interchange 50. However, removal of this interchange may redistribute traffic onto the local network and change travel patterns which may by undesirable to the local community.

2. *Add a lane in the eastbound direction to the on-ramp of I-290 eastbound to I-90 westbound at* Interchange *50 to increase capacity and minimize weaving movements.*

3. *I-90 to I-290 ramp/interchange configuration*

   The primary travel pattern is I-90 eastbound to I-290 westbound and I-290 eastbound to I-90 westbound. Ramp configuration should favor these travel patterns to minimize weaving maneuvers.

   Reconfigure I-90 and I-290 interchange (Interchange 50) so that traffic eastbound on I-90 destined to I-290 westbound is kept left and I-90 eastbound traffic kept right so that the primary travel path of I-90 to I-290 is kept continuous minimizing weaving maneuvers. With this interchange configuration favoring the primary travel pattern, an increase in the network's capacity may also be realized.

4. *Improve roadway surface*

   Given the number of accidents that appeared to take place during inclement weather or under wet conditions for the majority of the segments exceeding the statewide average accident rates, driving conditions may be made safer by increasing the traction characteristics of the driving surface. However, this will only happen for prudent and conscientious drivers. Friction testing could assess if a pavement friction issue exists and determine necessary mitigation.

3.C.2.c. Pavement

Meeting the traffic capacity needs within the corridor will require construction of additional mainline travel lanes and reconfiguration of some interchanges, resulting in widened pavement 'footprint' through much of the study area. The need for additional travel lanes combined with the age and condition of the existing pavement, make full depth reconstruction the most likely recommendation for the Full Build Alternatives. The ***"Pavement Condition Assessment and Evaluation Report"*** included in **Appendix D** reviews the existing pavement condition, discusses life cycle costs, and gives preliminary cost estimates for the following alternative treatments: reconstruction with HMA pavement; reconstruction with PCC pavement; crack and seat or rubbilize with unbonded concrete overlay.

3.C.2.d. Structures

General

Specific details regarding bridge types, final span arrangements, etc. are normally studied during final design (Structure Design Justification Report, Structure Study Plans, and Preliminary Structure Plans). However some information regarding bridge type was necessary to describe visual impacts, especially for bridges visible from a cultural resource. Also refer to **Appendix E** for information related to Structures within the study area.

No Build

The No Build Alternative does not include the rehabilitation, widening, or construction of any bridges. Regularly scheduled bridge inspections would continue and repairs would be carried out on flagged components.

Build Alternatives

The widening of I-90 and the realignment of Interchange 50 will require significant structures related construction. Many existing mainline bridges must be reconstructed and widened or replaced. New bridges will also be necessary to complete the realignment of Interchange 50 and to provide new interchanges at new locations. The preliminary structures design efforts will be limited to identifying bridge locations, approximate spans, clearances and costs.

3.C.2.e. Hydraulics

General

During the design development stages the improvement alternatives will be evaluated to determine the practicability of any significant flood plain encroachments in accordance with provisions of ***Executive Order 11988***, as implemented in ***23CFR650A, Location and Hydraulic Design of Encroachments on Flood Plains*** and ***6NYCRR502, Flood Plain Management Criteria for State Projects***. The evaluation will also determine if they would support any other incompatible flood plain development.

No Build Alternative

This alternative would maintain the existing highway and would have no effect on existing hydraulic capacity.

Build Alternatives

The design of clear waterway openings for all structures over waterways will include a "Risk Analysis," as described in ***23CFR650A*** and be completed as part of the design development stages. As suggested in the design guidelines structures shall be designed to provide a minimum freeboard of 0.6 m for the 50-year storm, and some freeboard for the 100-year storm.

3.C.2.f. Drainage

General

Drainage systems will be designed to accommodate the following design storms:

- *Cross Drainage Structures* *50-year Storm*
- *Closed Drainage Systems* *10-year Storm*
- *Ditch Depths* *25-year Storm*
- *Ditch Velocities* *10-year Storm*

No Build Alternative

Other than ditch regrading and culvert cleaning the No Build Alternative does not include any drainage related improvements.

Build Alternatives

Surface water drainage would be collected by an open drainage system of ditches and culverts, similar to the existing system. The system would discharge into existing watercourses. The design of the system would ensure that discharges into watercourses would not appreciably change, either increase or decrease from existing levels. This will prevent any reduction in water flow downstream during dry weather, and avoid increasing high water levels during storm events.

Closed drainage systems consisting of drainage inlets and storm sewer pipes would likely be included in those areas where they exist today. Additional closed drainage systems would be included as necessary to facilitate pavement widening. If identified in the Storm Water Pollution Prevention Plan permanent storm water pollution controls would be constructed as part of the proposed drainage system.

3.C.2.g. Maintenance Responsibility

General

No changes in facility ownership as listed in **Section 2.C.1.b** are anticipated as part of this project. Maintenance responsibilities for the improved highways will be the same as they are today.

3.C.2.h. Maintenance and Protection of Traffic

General

Where possible, traffic will be maintained using the existing travel lanes or constructing temporary pavement. For any of the improvement alternatives a reduction in the number of travel lanes and possible ramp closures will be necessary. In keeping with NYSTA and NYSDOT policies most lane and ramp closures would be done over night when traffic is lightest. If a ramp closure is necessary for an extended time period a detour route would be posted. Park & Ride lots, mass transit and public awareness campaigns will also be considered to reduce travel delays during construction.

Detailed maintenance and protection of traffic plans would be prepared during final design to show the location of all temporary detours, construction staging and temporary traffic maintenance details. Construction itself would likely be completed with a series of construction contracts and would cover a number of years. Maintenance of traffic during winter months will be a particular concern. Close coordination will be necessary with school buses, police, fire protection and ambulance services to help them plan their operations to account for unavoidable construction related delays.

3.C.2.i. Soils and Foundations

General

No comprehensive subsurface investigations have been made for this study at this time. Subsurface investigations will be needed in many locations during final design to determine foundation requirements for pavement and bridges.

Where necessary, retaining walls will be considered to avoid impacting a nearby constraint, such as buildings, railroads, or a steep embankment sideslope. Subsurface investigations would be made at select locations during final design to determine if a steeper slope could be used to reduce or eliminated the need for a retaining wall.

3.C.2.j. Utilities

General

Highway right-of-ways often include many utilities, electric lines, telephone lines, water lines, gas lines, etc. State Highway Laws give utility companies the right to use highway right-of-way as long as they do not interfere with the highway. If at some point the highway requires reconstruction or improvements and utilities are in the way, they must be relocated at the owners' expense. If the utility is outside of the right-of-way on private property or a private easement, and it needs to be relocated, then the State or the agency building the road improvement must pay for its relocation.

Several high tension electric transmission towers will need to be relocated under the Full Build Improvements – 5 Lane alternative as shown on the plans in **Appendix A**.

3.C.2.k. Railroads

There are two (2) railroad facilities currently operating within the study area, CSX Corporation and Norfolk Southern Railroad. Along the I-90 at milepost 423, CSX Corporation operates a multi-track facility bridging over the I-90, directly adjacent to the north side of Broadway. Norfolk Southern Railroad also operates a multi-track facility which runs under the I-90 at milepost 424. Development of the improvement alternatives has been progressed to minimize impacts to the railroad facilities. Relocation of railroad facilities is not anticipated.

Railroad force account agreements with CSX and Norfolk Southern would likely be needed for railroad flaggers during construction operations that cross railroad facilities and for miscellaneous work needed along these facilities.

No Build Alternative

This alternative would not impact the existing rail road facilities.

***Build* Alternatives**

As part of the I-90 widening the multi-span bridge spanning the Norfolk Southern Rail yard must be widened or reconstructed. Working above the rail yard could disrupt some rail operations and must be carefully planned. At the CSX crossing there is not adequate lateral clearance to construct the widened I-90 pavement under the existing railroad bridge. The design and construction of a new railroad bridge at this location must be closely coordinated with CSX.

3.C.2.l. Right-of-Way

General

Right-of-way is property that is either out rightly owned or over which an easement has been established for a roadway. State Highway Laws have established rights and responsibilities of the State, Counties, Villages and Towns to own and maintain roadways. All of these forms of government own roadways in the study area.

No Build Alternative

This alternative would not require the acquisition of right-of-way.

***Build* Alternatives**

For each improvement alternative it may be necessary to acquire narrow strips of additional right-of-way to complete widening or to maintain stable embankments. It may also be necessary to consider acquisition of some homes or commercial properties to complete geometric improvements at interchanges. Where possible all reconstruction would be designed to fit within the existing right-of-way.

The location and approximate size of the acquisition required to construct the Build Alternatives are included with the plans in **Appendix A**.

3.C.2.m. Landscape Development

General

The landscape development process is included to complement and enhance the existing roadside areas and to mitigate roadway improvements in a natural manner. The use of native plant species will be a primary objective for all landscape development in order to fully blend into the existing environment. From creek edges to roadside slopes and wetland areas to urban yards, the proposed landscape development will help the project fit “naturally” into the surrounding setting. Using "highly ornamental species" of vegetation is not appropriate for this setting and will not be promoted as part of the landscape development.

Landscape mitigation of roadway improvements will be designed to provide environmental enhancement and increase viewer awareness and appreciation. This will be particularly evident in interchange areas and adjacent to bridges. The use of native vegetation will enhance the surrounding landscape as well as soften some the harshness of the urban setting.

A detailed landscaping plan will be developed during the Final Design Phase of the project.

No Build Alternative

This alternative would not include any new landscaping.

Build Alternatives

In an effort to enhance the qualities of the existing I-90/I-290/NY33 corridor, proposed improvements would emphasize landscape development and enhancement. Naturalizing and native landscaping species would complement and blend in to the surrounding area. New vegetation would serve as scenic beautification, buffering and screening sensitive receptors, and mitigation for removals of existing vegetation. Enhancement of interchange areas and larger areas of existing native vegetation would be one of the main priorities considered

To help blend the project into the surrounding countryside, wooded edge areas would be planted with new similar vegetation species, and creek banks will be planted to look natural and a part of the surrounding landscape. Roadsides and adjacent open fields will be seeded with native grasses and wildflowers to enhance viewer interest and appeal. Identification and removal of invasive plant species will be considered as part of the landscape development process.

3.C.2.n. Provisions for Pedestrians, Including Persons with Disabilities

General

Pedestrians and non-vehicular traffic will be prohibited from using the travel lanes, shoulders, and ramps along limited access highways in the study area including the I-90, I-290 and NY 33. As authorized in ***Section 1156 of the New York State Vehicle and Traffic Law***, pedestrians are allowed to use other highways and streets. Pedestrians and persons with disabilities who wish to travel along a highway are required to use the sidewalks where they exist. In areas with no sidewalks, non-motorists are accommodated on the paved shoulders adjacent to the roadway. Any sidewalks impacted by construction would be designed to comply with the requirements of the Americans with Disabilities Act.

3.C.2.o. Provisions for Bicycling

General

Bicycles and pedestrians would be prohibited from using the interstate roadways. However, bicyclists are authorized to use unlimited access highways and streets by law. With certain exceptions, the rights and responsibilities of bicyclists are generally the same as for operators of motor vehicles under ***Sections 1230-1238 of the Vehicle and Traffic Law.*** Traffic laws require bicyclists to use paved shoulders along non-freeway/expressway highways where they exist. If no shoulder is available they may share the outside travel lane with motorists.

3.C.2.p. Lighting

General

Existing highway lighting disturbed by construction would be replaced in-kind. Providing additional lighting to enhance safety on illuminate complex ramp areas will be evaluated as an alternative is progress to final design.

3.C.2.q. Park-and-Ride Lots

General

Construction of temporary park-and-ride lots will be considered as a way to reduce construction related traffic delays. With the support of local governments and the public, these lots could be designed and built to be permanent.

The existing park and ride lot located at the Transit Road Interchange would remain in place or be reconstructed as part of the improvements at this location. Size and capacity of this lot will be evaluated during the detailed design phase.

3.D. PROJECT COSTS AND SCHEDULE

3.D.1. Costs

Construction cost estimates for each of the three Alternatives recommended for further consideration are included in the **Appendix F** and summarized in **Table 3-13**. Construction costs are given in 2014 dollars. Inflation between 2014 and the time of construction is not included. Engineering, contingencies and construction inspection costs are factored into these estimates.

Table 3-13 - Preliminary Project Cost Estimates

	Interim Improvements	Full Build Improvements 4-Lane	Full Build Improvements 5-Lane
Highway / Structures	$ 15,500,000	$ 512,536,000	$ 543,947,000
Tower Relocation	$ 0	$ 4,000,000	$ 14,000,000
TOTAL CONSTRUCTION	$ 15,500,000	$ 516,536,000	$ 557,947,000
Right-of-Way	$ 0	$ 110,000	$ 150,000
GRAND TOTAL	$ 15,500,000	$ 516,646,000	$ 558,097,000

3.D.2. Schedule

The following tentative schedule depends on timely allocation of funds for Final Design, Right-of-Way Acquisition, and Construction, and is dependent on which of the full build alternatives is ultimately progressed as the Preferred Alternative. Any delays or lack of funding would extend the schedule.

- *Scoping Report* *2004 - 2014*
- *Final Environmental Study* *2015 - 2018*
- *Design* *2017– 2019*
- *Construction* *2019 - 2024*

3.D.3. Construction Phasing

Due to funding constraints, and constructability issues it is likely that construction of the preferred alternative would be progress as several construction phases. If construction of an entire project was progressed in a continuous operation, it would likely take at least five years to complete. The project could be let as multiple concurrent contracts to shorten the duration. However, adjacent work zones complicate the maintenance and protection of traffic and increase travel delays. Based on the location of the interchanges and the needs of the project separating the project in to three phases appears to be most practical. The geographic limits of each phase might be: I-190 to south of NY33, NY33 to Main Street including Interchange 50, and Interchange 50 to Transit Road. Although Interchange 50 appears to have the highest priority, the actual number, sequence and work limit of each phase will be determined as funding sources are identified. A possible time frame for project phasing sequence is as follows:

- *Interim Improvements* *Duration: 2015 - 2019*
- *Phase 1* - NY33 to Main Street including Interchange 50 *Duration: 2019 - 2023*
- *Phase 2* – I-190 to south of NY33 *Duration: 2022 - 2025*
- *Phase 3* - Interchange 50 to Transit Road *Duration: 2024 - 2027*

CHAPTER 4 – SOCIAL, ECONOMIC AND ENVIRONMENTAL CONSIDERATIONS

4.A. INTRODUCTION

This section lists potential social, economic, and environmental impacts of transportation improvement alternatives developed to address deficiencies along the I-90 between the I-190 Interchange (Interchange 53) and the Transit Road Interchange (Interchange 49) including a section of the Youngmann Expressway (I-290) between I-90 and the Main Street Interchange (Interchange 7). The reviews of potential environmental impacts include three improvement alternatives and a No Build alternative as listed below:

- The ***No Build Alternative*** includes continuing normal maintenance activities on the existing highway.
- ***Interim Build Improvements***
- ***Full Build Improvements – 4 Lanes***
- ***Full Build Improvements – 5 Lanes***

Detailed descriptions of each alternative are included in **Chapter 3**.

This Project Scoping Report has been prepared as part of the project scoping phase to fulfill the requirements of the ***National Environmental Policy Act*** (NEPA) (1969 et seq.) and the ***State Environmental Quality Review Act*** (SEQR) (1988 et seq.) (Sections 6, NYCCR Part 617 & 17 NYCCR Part 15). The proposed project will be progressed as a NEPA Class I action and a SEQR Non Type II action, using the one hearing process and requiring an Environmental Impact Statement (EIS) to evaluate the anticipated environmental impacts.

The discussion of environmental impacts in each **Chapter 4** subsection begins with a description of existing social, economic, and environmental conditions. Impacts are then estimated by comparing the future conditions under the No Build Alternative to conditions under the improvement alternatives. A detailed analysis of social, economic, and environmental impacts will be conducted in a future Preliminary Design Phase of this project.

The study area is defined as the area within which any physical changes would be directly made by the alternatives under consideration. Generally, this is the area within the planned highway right-of-way including easements. This is where direct impacts would occur, in terms of residential and commercial building relocations, wetlands, and other environmental impacts. However, for certain areas, notably for traffic analysis, larger study areas were established to include areas where impacts may be expected beyond the study limits.

4.B. AFFECTED ENVIRONMENTAL AND SOCIAL, ECONOMIC AND ENVIRONMENTAL CONSEQUENCES

4.B.1. Social Consequences

4.B.1.a. Affected Population

Population estimates for Erie County and the townships in the study area are shown in **Table 4-1**. According to the US Census Bureau, the total population for Erie County has experienced a minor decrease between 1990 and 2000 of 1.9%.

Table 4-1 – Population

Municipality	2000	2013	Percent Change 2000 - 2013
Erie County (Total)	950,265	919,064	-3.3%
Depew (V)	16,629	15,304	-8.0%
Williamsville (V)	5,573	5,302	-4.9%
Amherst (T)	116,510	122,366	5.0%
Buffalo (C)	292,648	261,375	-10.7%
Cheektowaga (T)	94,019	88,726	-5.6%
Clarence (T)	26,123	30,673	17.4%
Lancaster (T)	39,019	41,604	6.6%
West Seneca (T)	45,920	44,711	-2.6%
Total I-90/I-290/NY 33 Study Area	**636,441**	**610,061**	**-4.1%**

The I-90/I-290 Study Area traverses portions of numerous census tracts in the towns of Amherst, Cheektowaga, Lancaster and West Seneca along with the villages of Depew and Williamsville. The location of the build alternatives will follow the same footprint as the existing I-90 with minor shifts in alignment to accommodate improvements.

4.B.1.b. Local Planning

The area in which the I-90 corridor lies has developed over the last 50 years from a rural farming community into a complex suburban community complete with densely packed residential areas complete with a multitude of commercial sectors and scattered industrial parcels. The land use along the section of the I-90 from Interchange 53 to Interchange 49, which is approximately 10 miles in length, exhibits this typical suburban mosaic of mixed use of the land. Interchange 53 is predominately bordered by mixture of industrial, recreation and entertainment, vacant, residential, commercial and community service uses. Interchanges 51 and 50 are almost exclusively bordered by residential neighborhoods encompassing two entertainment/recreation uses and segregated from the I-90 by a corridor of several major overhead power lines to the west of the highway along with some scattered parcels of vacant land. Large parcels of vacant land, some of which are reclaimed hazardous waste disposal sites, dominate the land just to the south of Interchange 49 with some varied commercial establishments. Intermixed in along local roadways, the I-290 portion of the corridor, bisected by a public services use (overhead power lines) and recreation/entertainment uses (baseball fields) is bounded by residential uses to the northwest.

4.B.1.c. Community Cohesion

Community cohesion relates to how the study will affect interaction among persons and groups. Will it change social relationships and patterns? This becomes an issue when an action divides a community or neighborhood, changing access patterns, isolating or otherwise affecting social relationships between the divided sections of the community.

Community cohesion would not be affected under the No Build Alternative. Transportation patterns would remain unchanged.

<u>Build Alternatives</u>

Improvement alternatives presented in this Project Scoping Report (PSR) follow the same footprint as the existing I-90 with minor shifts in the alignment to accommodate improvements. At interchange locations, improvement alternatives can vary from simple ramp widening to configuration changes. Construction of interchange alternatives presented in this PSR may result in property acquisitions adjacent to the existing right-of-way and are unlikely to isolate sections of the community. Community cohesion will be further evaluated in the Preliminary Design Phase of this project.

4.B.1.d. Changes in Travel Patterns or Accessibility

Travelers using the existing I-90 corridor in the vicinity of Interchange 50 experience travel delays and slow or stopped traffic during both the morning and afternoon peak travel hours. The delays result in lost time and frustration for many drivers. To account for the increased travel times, many commuters must leave their homes earlier and return home later. Drivers spend more time in their vehicles and less time at home or work. Movement of goods is also impacted as local business must lengthen the delivery workers shifts or reduce the number of deliveries they can schedule in a standard work day. Also as delay times increase, drivers seek alternate routes to avoid the congested expressway. Many times the alternate routes are local streets and minor arterials. As more traffic seeks alternate routes, local streets become more congested.

Because the I-90 corridor is a limited access facility, the effects on pedestrian movement, mass transit, and available parking are not expected.

No Build Alternative

Without capacity improvements, congestion and delays will increase. Drivers will seek alternate routes in greater numbers and the movement of goods will become more difficult.

Build Alternatives

Any of the three improvement alternatives will help reduce travel delays and driver frustration. Commuters would spend less time in traffic and would reach their intended destination sooner. Drivers currently using local routes to avoid the difficult driving conditions on the I-90 will be more likely to use the I-90 when traffic congestion is reduced. If more commuters use I-90, traffic on parallel local routes may be reduced. Any pedestrian facilities currently in place will remain in place or be reconstructed. Substantial changes in access between pedestrian trip generators and destinations are not anticipated.

4.B.1.e. Impacts on School Districts, Recreational Areas, Churches or Businesses

4.B.1.e. (1) School Districts

The study area traverses eight (8) school districts, Clarence, Lancaster, Williamsville, Amherst, Cleveland Hill, Cheektowaga-Maryvale, Cheektowaga, and Cheektowaga-Sloan School Districts.

No Build Alternative

There would be no impacts to school districts.

Build Alternatives

None of the improvement alternatives would require property from any of the area school districts. Improvements to the I-90/I-290/NY33 highways to reduce traffic congestion and improve the level of service would likely divert some traffic from the local streets and lead to a reduction in peak hour traffic on the local routes traveled by school buses.

During construction, traffic delays along the corridor could be expected resulting in minor short-term negative impacts. Short-term affects due to construction could be reduced by close coordination between the contractor and local districts so they know in advance where the delays will occur and can plan accordingly.

4.B.1.e. (2) Recreation Areas

There is a recreational facility called the Royal Playground located in the northeast quadrant of the I-90/I-290 interchange. The facility includes baseball diamonds, tennis courts and a basketball court. None of the Build Alternatives currently under consideration would impact this area. In addition, it is not anticipated that any other recreation areas would be directly impacted by the alternatives.

4.B.1.e. (3) Churches

There are several churches of various denominations near the I-90/I-290/NY33 corridor. I-90, I-290, and NY33 are controlled access highways limiting access to interchange locations along their mainlines therefore, not providing direct access to any church facilities.

No Build Alternative

There would be no impacts to churches.

Build Alternatives

An improvement alternative eliminating the Cleveland Drive Interchange could have an effect on the route church members use to go to the church located adjacent to the Cleveland Drive Interchange. The affect would be minor because several other routes are available to access this church. None of the alternatives being considered eliminate the Cleveland Drive ramps.

4.B.1.e. (4) Businesses

I-90 is the main east/west travel corridor in the Buffalo area, providing access to major cities such as Rochester, Syracuse, Albany, etc. Changes to this corridor would impact businesses on a local and regional level.

The corridor is also the primary commuter route between the Southtowns and the numerous business parks in Amherst and Williamsville area.

No Build Alternative

There would be no direct impacts to businesses. However, projected area-wide traffic growth will increase congestion and delays within the corridor, creating a less attractive environment for travel to local businesses.

Build Alternatives

Improvements to the I-90/I-290/NY33 corridor would have a positive impact on local and to a lesser extent regional businesses by reducing commute time for employees and improving access for customers. However, during construction, traffic delays along the corridor could be expected resulting in minor short-term negative impacts. The extent of both positive and negative impacts will be addressed in the Preliminary Design Phase of this project.

4.B.1.f. Impacts on Police, Fire Protection, and Ambulance Access

No Build Alternative

There would be no direct impact on emergency access. However, projected area-wide traffic growth will increase congestion and delays, negatively affecting response times for police, fire and ambulance services.

Build Alternatives

In many locations within the corridor, I-90 and ramp alignments would be shifted to accommodate improvements. There would be no need to change emergency access routes, with the exception of the Flyover Alternative at the NY33 Interchange. Access from the State Police Station located in the northwest quadrant of the NY33 Interchange to I-90 EB would require the State Police to seek access from Harlem Road increasing response time to incidences along the I-90 east of NY33. Emergency services requiring the use of I-90 would be improved by creating a less congested and more efficient highway facility.

Short-term effects on emergency access during construction would be reduced by close coordination between the contractor and emergency service providers so they know in advance where the delays will occur and can plan accordingly.

4.B.1.g. Impacts on Highway Safety, Traffic Safety, and Overall Public Safety

No Build Alternative

In the short-term, the No Build Alternative would have no immediate impacts on highway safety, traffic safety, and overall public safety. Over time as the projected area-wide traffic grows congestion and delays will increase. As the traffic and congestion grow, a corresponding increase in accident rates is also expected. The negative impacts on safety would be highest at the congested interchanges.

Build Alternatives

Improvements to the I-90/I-290/NY33 corridor to reduce traffic congestion and delays within the corridor and improve the operating level of service would have a positive impact on highway safety, traffic safety, and overall public safety. Accident rates would be reduced and accident clusters may be eliminated. As part of alternative development, geometric conditions would be evaluated and consideration given to elimination of substandard features that may be contributing to the accident clusters.

During construction, traffic delays along the corridor could be expected resulting in minor short-term negative impacts. The extent of both positive and negative impacts will be addressed in the Preliminary Design Phase of this project.

4.B.1.h. General Social Groups Benefited or Harmed

The project corridor traverses several communities with varying population ages and ethnic distributions. Approximately half of the block groups traversed by the corridor have non-white populations that are slightly greater than their respective census tracts. However, in some cases, only a small portion of the study boundary extends into these block groups. None of the census tracts or block groups have a non-white population exceeding 50%, and the difference in percentage points between block group and respective census tract is nominal.

Because right-of-way acquisitions are expected to be minor, no major separations or disruptions of existing neighborhoods is expected. Aside from attracting traffic from local streets to the mainline, no major changes in existing travel patterns is expected. The alternatives presented were designed to avoid existing development where possible. Impacts would be felt similarly by all social groups. Decisions to acquire buildings or property will be made solely on engineering and/or environmental considerations, not on the basis of an owner's or resident's age, ethnic background or economic status.

Preliminary review of available census data revealed that the median income, of block groups traversed by the corridor, are similar to that of their respective larger census tracts.

At this time, no minority or low income populations have been identified that would be impacted by disproportionately high and adverse impacts on human health or the environment. The effects of this project will be evaluated in accordance with Executive Order 12898 as part of the next design development phases.

4.B.2. Economic Consequences

4.B.2.a. Impacts on Regional and Local Economics

I-90 is the main east/west travel corridor in the Buffalo area, providing access to major cities such as Rochester, Syracuse, Albany, etc. Changes to this corridor would impact the economy on a local and regional level.

No Build Alternative

There would be no immediate impacts to the local economy. However, projected area-wide traffic growth will increase congestion and delays, creating a less attractive environment for local business growth.

Build Alternatives

Improvement alternatives reducing traffic congestion and delays in the corridor will provide a more efficient highway system for the transport of goods and services, making the economic environment more attractive to potential business development.

4.B.2.b. Impacts on Highway Related Businesses

Because the I-90 is a limited access facility, there are no businesses with direct access to the highway. In general, existing interchanges would maintain their current configurations. Businesses close to interchanges that rely on the existing traffic for a portion of their sales should not be affected. If new interchanges are constructed in areas such as Youngs Road and/or Broadway, access to businesses in those areas would be improved.

4.B.2.c. Impacts on Established Business Districts

There are several established business districts adjacent to the study limits including the Walden Galleria Mall area in Cheektowaga, the Main Street area in Williamsville, and the William Street/Union Road area. Each can be accessed from the I-90 or local streets.

No Build Alternative

There would be no immediate impacts to established business districts. However, projected area-wide traffic growth will increase congestion and delays creating a less attractive environment for travel to local businesses.

Build Alternatives

Improvements to the existing I-90 highway system and access ramps would improve access to established business districts adjacent to the study area.

Providing additional interchanges in areas such as Broadway and Youngs Road would improve access to businesses located near the interchanges and may increase patronage.

4.B.2.d. Relocation Impacts

Improvement alternatives developed in this study closely follow the same footprint as the existing alignment with minor shifts in the mainline and ramps, or interchange reconfigurations that fall in or closely within the existing right-of-way. Relocation impacts are not anticipated.

4.B.3. Environmental Consequences

4.B.3.a. Surface Water / Wetlands

4.B.3.a. (1) Wetlands

Wetlands comprise a transition zone between dryer uplands, terrestrial habitats and aquatic habitats. Although the wetlands found in western New York vary widely in their composition, they are all distinguished by the extended presence of water, either inundating or saturating the soil, the presence of unique wetland soils resulting from extended saturation, and the presence of vegetation that is adapted to, or tolerant of, extended periods of ground inundation or saturation.

Because of their location within the landscape, wetlands are unique in the functions and values that are associated with them. Functions include the physical (water storage), chemical (transformation/retention of nutrients), and the biological (food, nesting, and cover for wildlife) characteristics of the wetland. Recognition of the importance of wetlands to maintaining a diversity of ecological communities is directly related to the variety and importance of the functions provided by wetlands. Values are wetland characteristics considered beneficial to humans and are typically associated with specific functions of the wetlands. For example, water storage reduces damage from floodwater; transformation/retention of nutrients improves water quality for recreation and consumptive uses; and food, nesting, and cover for wildlife supports waterfowl production and maintains biodiversity.

NYSDEC regulates activities in wetlands that are larger than 12 acres in size (or smaller if deemed to be of unusual local importance). The regulatory authority extends to include a 98.0 ft buffer zone around the wetland. The New York Freshwater Wetland Act defines wetlands as any or all of the following:

a) lands and submerged lands commonly called marshes, swamps, sloughs, bogs, and flats supporting aquatic and semi-aquatic vegetation.....;

b) *lands and submerged lands containing remnants of any vegetation that is not aquatic or semi-aquatic that has died because of wet conditions over a sufficiently long period, provided wet conditions do not exceed a maximum seasonal water depth of six feet ... and can be expected to persist indefinitely, barring human intervention;*

c) *lands and waters substantially enclosed by aquatic and semi-aquatic vegetation as set forth in paragraph (a) and (b) [,] the regulation of which is necessary to protect and preserve ...[them]; and*

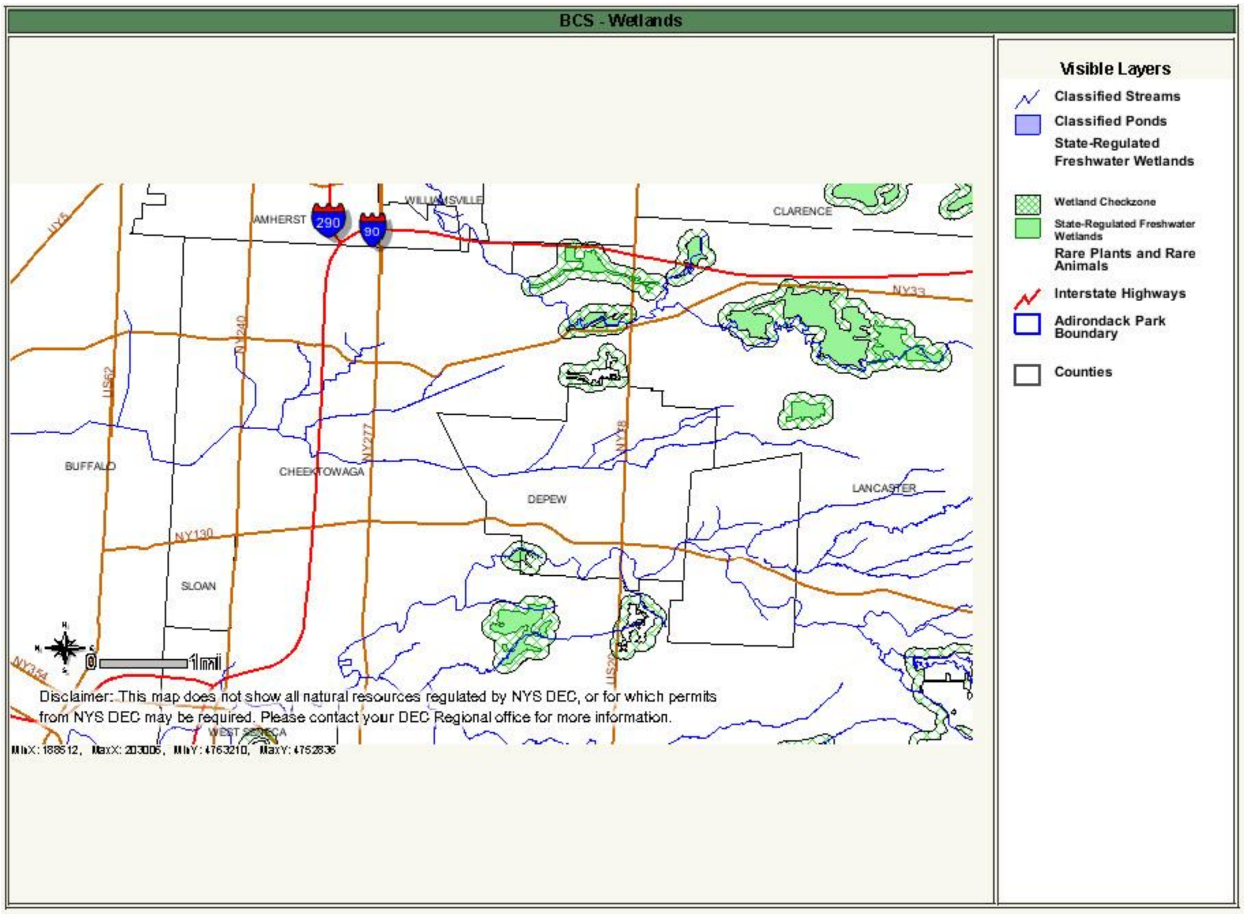
d) *the waters overlying the areas set forth in (a) and (b) and the lands underlying (c).*

The United States Army Corps of Engineers (COE) regulates activities in wetlands of any size. Unlike NYSDEC, COE authority does not extend beyond the edges of the wetland. The COE defines wetlands as:

- *Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands typically include swamps, marshes, bogs, and similar areas.*

There are several known and classified wetlands within the corridor and several areas that are likely to contain wetlands. These are primarily undeveloped lands underlain by hydric soils, but also include areas where the drainage has been altered by development. Two NYSDEC Freshwater Wetlands (One class 1 and one class 2 wetland) have been mapped and are located within 50.0 ft of the I-90 ROW. Current regulations allow for the issuance of a permit only if the project applicant can demonstrate that the proposed project activity satisfies a compelling economic or social need that clearly and substantially outweighs the loss of or detriment to the benefit(s) of both the Class I and Class II wetland. Ten NWI wetlands occur within the study area. Of these ten wetlands, two have subsequently been filled for development or are in the course of remediation activities; three wetlands are man-made excavations with no apparent hydrologic connection to waters of the U.S.; and two are man-made excavations with a potential for hydrologic connection to waters of the U.S. The remaining three wetlands appear to be natural in origin; one with a hydrologic connection to Ellicott Creek, one with a potential for hydrologic connection to the Buffalo River and one with no apparent hydrologic connection. **Figure 4-1** is a map showing locations of the wetlands in the study area. Further field investigation and delineation efforts will be required during the Preliminary Design Phase.

Figure 4-1 – Wetlands within the Project Area



4.B.3.a. (2) Coastal Zone Management

The study area does not include any portion of the Coastal Areas of New York State. Therefore, compliance with ***19 NYCRR Parts 600-601***, administered by the NYS Department of State, is not required.

4.B.3.a. (3) Navigable Waters

Three main watercourses traverse the study area. Ellicott Creek and Scajaquada Creek in the northern and central portion of the study area flow to the Niagara River. Cayuga Creek in the southeastern corner of the study area flows into the Buffalo River just south of Interchange 52. No portions of these watercourses have been designated as navigable waterways by the United States Army Corps of Engineers (USACE). Several other much smaller and intermittent drainage channels are located within the study area.

4.B.3.a. (4) Wild, Scenic, and Recreational Rivers

A wild, scenic or recreational river area that is eligible to be designated as such is a free-flowing stream and the related adjacent land area possesses one or more of the following values: outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar value. Every wild, scenic or recreational river in its free-flowing condition, or upon restoration to this condition, shall be considered eligible for inclusion in the national wild and scenic rivers system and, if included, shall be classified, designated, and administered as one of the following:

(1) Wild river areas – Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

(2) Scenic river areas – Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

(3) Recreational river areas – Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

The ***Nationwide Rivers Inventory*** (NRI) is a listing of more than 3,400 free-flowing river segments in the United States that are believed to possess one or more "outstandingly remarkable" natural or cultural values judged to be of more than local or regional significance.

None of the waterways flowing through the study area are either designated components of the National Wild or Scenic Rivers System or listed on the NRI.

4.B.3.a. (5) Stormwater Management

General

During construction and post-construction periods, erosion, runoff, and sedimentation must be controlled to prevent adverse effects on topography, water quality and quantity, storm drainage systems/pathways, and existing or potential vegetation. Erosion and sedimentation effects associated with transportation infrastructure are caused primarily during construction, when soil is stripped of protective vegetation. Soil erosion can come about when open excavations, disturbed areas, and soil stockpiles are exposed to wind, the vertical force of rain, and stormwater runoff. Sedimentation occurs when water velocities decrease and suspended particles settle out, collecting in storm sewers and drainage ways.

Highways and other paved areas that vehicles use on a regular basis are a source of metal pollution. This pollution can have substantial effects on the local watershed and water resources. To estimate the effects construction may have on surface water quality, both existing and future conditions will be analyzed using the Toler Method Analysis as described in the FHWA's *Pollutant Loadings and Impacts from Highway Stormwater Runoff* (FHWA 1990) during the preliminary engineering and detailed environmental studies phase of the project.

Pollutants from vehicles, maintenance, and deposition of air emissions accumulate on the road surfaces. These pollutants are primarily moved from the road surfaces to surface waters by rainfall runoff and the melting of snow and ice. Although these contaminants have the potential to adversely affect the quality of surface water in the vicinity of the construction, these effects will be minimized by the future design of the open and closed stormwater collection and conveyance systems. These collection systems would incorporate a combination of grit, sediment, and oil separator devices to control the initial runoff, or water quality treatment volume, thus preventing the potentially most polluted runoff from discharging directly into nearby surface waters.

No Build Alternative

The No Build Alternative does not involve construction activities or changes in the existing traffic patterns; thus, there would be no erosion or sedimentation effects on water resources in the study area.

Build Alternative

As noted above, the future conditions under the Build Alternative will be analyzed using the Toler Method Analysis as described in the FHWA's *Pollutant Loadings and Impacts from Highway Stormwater Runoff* (FHWA 1990) during the preliminary engineering and detailed environmental studies phase of the project.

Standard construction methods, including reasonable measures and best management practices would be used to minimize the two critical elements of erosion and sediment control: stormwater runoff and wind exposure. State Pollutant Discharge Elimination System (SPDES) general permits (GP-0-10-001, etc.) require the completion and implementation of a Stormwater Pollution Prevention Plan (SWPPP). As part of the SWPPP, the project design would develop and implement storm water management practices, including water quality treatment volume. The SWPPP would detail the site-specific methods that would be implemented to control or reduce the rate of stormwater runoff, reduce potential erosion of exposed soil, and minimize potential flooding. The SWPPP would identify and define controls to prevent or reduce wind erosion and dust during and after construction activities. Construction activities would be scheduled to minimize the extent of disturbed areas at any one time, thus avoiding exposure of large areas of open soil to the adverse effects of wind. Vegetative covers, mulch, spray adhesives, wetting of exposed soil, and wind barriers may be employed, as appropriate.

A project-specific SWPPP would be completed during final design in accordance with the requirements of NYSDOT's Standard Specifications for Soil Erosion and Sediment Control (NYSDEC 2005). The SWPPP would be prepared prior to the start of any construction activities and would be closely adhered to. The use of best management practices and adherence to the SWPPP would prevent effects to surface waterbodies and mitigate any potential stormwater effects.

The use of best management practices detailed in the SWPPP and adherence to NYSDOT's standard specifications included within the construction contracts would ensure that construction activities would not affect water quality and would not lead to any subsequent indirect effect on aquatic habitats downstream of the study area. Any potential effects to water quality would be short-term, minor, and limited to the area immediately adjacent to the construction zone.

4.B.3.b. Floodplain Management

A review of Federal Emergency Management Agency maps shows that the majority of the study area is outside of areas designated as floodplains. However, limited floodplain areas in association with Ellicott Creek (in the eastern portion of the study area), Scajaquada Creek (between Interchange 51 and Interchange 52), Cayuga Creek and the Buffalo River (south of Interchange 53) do exist. The majority of the study area is mapped as Zone X, which is defined as an area outside of the 100-year and 500-year floodplains.

4.B.3.c. Water Source Quality

According to the Final 2014, 303(d) Impaired Waters List, Scajaquada Creek is designated as impaired for its designated use. Scajaquada Creek and its tributaries are characterized as impaired by floatables, oxygen demand and pathogens. The source of the degradation is identified as combined sewer overflows and urban runoff. Even though this waterway is degraded, the proposed project alternatives will have to be developed in such a way as to prohibit further degradation both from construction activities, as well as, the control of stormwater runoff from paved highways.

4.B.3.d. General Ecology and Wildlife

The study area lies within a highly developed, dense suburban setting. Maintained lawns and ornamental tree and bush species dominate the vegetative cover with little natural cover left. Areas that are not currently developed are isolated and have been subjected to significant past disturbance. Scrub vegetation and secondary growth, typical of disturbed suburban sites, dominate these areas. Red maple, eastern cottonwood, and honeysuckle, are among the common species. A variety of wildlife, typical of those species that have been able to adapt to a suburban setting, occur throughout project corridor. Common species include the eastern gray squirrel, raccoon, and a wide variety of songbirds. A population of white tail deer and wild turkey inhabit the easternmost portion of the study area near Interchange 49. These animals also are well adapted to developed suburban settings and any proposed project is expected to have little, if any, impact on them.

Preliminary consultation with the U.S. Fish and Wildlife Service reveals that with the exception of occasional transient individuals, no federally listed or proposed threatened or endangered species are known to occur within the corridor. In addition, no currently designated or proposed critical habitat exists within the corridor. The New York State Department of Environmental Conservation indicated that three plant species listed as endangered in New York State have the potential to exist within the study area. The last reported occurrence of any of these three plant species was pre-1900. Given the significant suburban development that has occurred throughout the project area the likelihood that these species remain is negligible. In addition to the three plant species, two mollusk species were identified as potentially living in the waterways within the study area. While these species are not specifically protected, the endangered and threatened species regulations states a license would be required to take either of these mollusks. In the event that the proposed project involves impacts to either the Buffalo River or Cayuga Creek east of the I-90 corridor and south of Interchange 53, further investigation as to the existence of the mollusks may be necessary and a mollusk take license may be required.

Long-Eared Bat (*Myotis septentrionalis*)

In addition to the species identified above, the northern long-eared bat, which occurs throughout New York State, has been proposed for protection by USFWS. Habitat for northern long-eared bat includes caves and abandoned mines (winter) and forested/wooded areas (summer). Trees are considered suitable summer roosting habitat if they are at least three inches in diameter at breast height and have exfoliating bark, cracks, crevices or cavities. Isolated trees are considered suitable habitat when they exhibit the characteristics of a suitable roost tree and are less than 1,000.0 ft from a woodlot or wooded fencerow.

Indiana Bat (*Myotis sodalis*)

The Indiana bat, which was listed as endangered in 1967, hibernates during winter in caves and occasionally, in abandoned mines. For hibernation, they require cool, humid caves with stable temperatures, under 50° F but above freezing. Very few caves within the range of the species have these conditions.

Hibernation is an adaptation for survival during the cold winter months when no insects are available for bats to eat. Bats must store energy in the form of fat before hibernating. During the six months of hibernation the stored fat is their only source of energy. If bats are disturbed or cave temperatures increase, more energy is needed and hibernating bats may starve.

After hibernation, Indiana bats migrate to their summer habitat in wooded areas where they usually roost under loose tree bark on dead or dying trees. During summer, males roost alone or in small groups, while females roost in larger groups of up to 100 bats or more. Indiana bats also forage in or along the edges of forested areas.

Indiana bats are found over most of the eastern half of the United States. Almost half of all Indiana bats (207,000 in 2005) hibernate in caves in southern Indiana. In 2005, other states which supported populations of over 40,000 included Missouri (65,000), Kentucky (62,000), Illinois (43,000) and New York (42,000). Other states within the current range of the Indiana bat include Alabama, Arkansas, Connecticut, Iowa, Maryland, Michigan, New Jersey, North Carolina, Ohio, Oklahoma, Pennsylvania, Tennessee, Vermont, Virginia, West Virginia. The 2005 population estimate is about 457,000 Indiana bats, half as many as when the species.

4.B.3.e. Historic and Cultural Resources

The proposed study area contains a total of 210 structures that are addressed on the National Register of Historic Places (NRHP). Six structures are classified as Individually Eligible but Not Listed. One hundred sixty-three structures have been determined not to be eligible for listing and determination information was unavailable for 41 of the structures. A listing of the six structures along with a description of the structure and their location is shown in **Table 4-2**. There are three NRHP listed sites in the vicinity of the proposed project area. Of these, one is a cemetery, and the other two are churches. It is anticipated that none of the three sites may be impacted by the proposed project.

Table 4-2 – Six Structures Determined to be Individually Eligible but Not Listed

USN	Description	Location
02902.000091	Harlem Road Community Center	4355 Harlem Road
02902.000491	Building	265 Reist Street
02906.000541	Building	2536 Union Road
02906.000545	Building	2536 Union Road
02906.000028	Immaculate Heart of Mary Children's Home	William Street & Kennedy Road
02955.000003	Lehigh Valley Railroad Station	86 South Long Street

The project will need to comply with Section 14.09 of the State Historic Preservation Act and coordinate with the NYS Historic Preservation Office, as appropriate.

4.B.3.f. Visual Resources

A Visual Impact Analysis (VIA) will be prepared during the Preliminary Design and detailed Environmental Review phases of the project in accordance with FHWA's guidance in Visual Impact Assessment for Highway Projects (1981) and in accordance with SEQRA. The intent of the VIA is to identify and evaluate the design alternatives impacts and/or benefits on the existing views to and from the corridor and the viewers; and to develop mitigation

Each of these visual character's response to change introduced by the design alternatives will affect the viewer's response and the overall visual impact. Impacts to the visual environment may include the widening of the mainline pavement, reconfiguration of the interchange at Interchange 50 and elimination of several ramps at the Main Street interchange with I-290 resulting in signalized intersections along Main Street at the reconfigured ramps. These enhancements may result in impacts or provide benefits to the visual environment and will be analyzed in the VIA. Mitigation measures will also be analyzed to minimize the negative visual impacts. Measures may include buffering; alteration of vertical and horizontal alignments; landscape treatments along the mainline and/or along Main Street; and design elements including material choices, color, and finish.

4.B.3.g. Parks and Recreational Facilities

Publicly owned parks, recreation areas or wildlife and waterfowl refuges, or properties of a historic site of national, state or local significance are classified as Section 4(f) properties. There are 58 Section 4(f) properties lying in the study area, 13 of which are located adjacent to the I-90 Corridor. These parcels consist of several school parks; two Town of Cheektowaga public parks/recreation areas; vacant land owned by the Town; and a privately held picnic area. Publicly owned properties that have been purchased and/or improved with specific federal funds also fall under Section 6(f) regulations and must be evaluated. Although at this time there is no readily available information as to which Section 4(f) properties or Section 6(f) properties might be affected, it can be assumed that there could be impacts to at least some of the identified 4(f) and/or 6(f) properties. A full Section 4(f)/6(f) evaluation will be completed during preparation of environmental studies, when it is determined which parcels could be impacted by the various alternatives under consideration.

4.B.3.g. (1) Adirondack Park

This item does not apply.

4.B.3.h. Farmlands Assessment

There are no active farmlands, agriculture districts or unique and prime farmlands located within the project limits.

4.B.3.i. Air Quality

Transportation Conformity

The intent of the General Conformity requirement is to prevent the air quality impacts of federal actions from causing or contributing to a violation of the NAAQS or interfering with the purpose of a SIP, TIP, or FIP.

The conformity requirements for local transportation plans and the proposed project are found in Section 176 of the Clean Air Act Amendments of 1990 (CAAA90) and 40 CFR Parts 51 and 93-Criteria and Procedures for Determining Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Funded or Approved Under Title 23 U.S.C. or the Federal Transit Act.

The SEQRA and NEPA review process requires that this project meet the conformity requirements of the State Implementation Plan (SIP) for New York State. The SIP was prepared in order to achieve the mandated goals of meeting and maintaining the National Ambient Air Quality Standards (NAAQS).

The proposed project is located in Erie County, which is part of the Greater Buffalo-Niagara Region. The USEPA has designated the Greater Buffalo-Niagara Region as in attainment for carbon monoxide and particulate standards. However, with respect to ozone, the USEPA has designated the Greater Buffalo-Niagara Region as an ozone non-attainment area. As an ozone non-attainment area, the region is subject to conformity procedures and the Greater Buffalo/Niagara Regional Transportation Council (GBNRTC) is required to continue to perform air quality analysis for Erie and Niagara County on all projects listed under the Transportation Improvement Plan (TIP).

The proposed project, located in an ozone "non-attainment" area and considered "non-exempt", is subject to the conformity requirements of the CAAA90 and 40 CFR Parts 51 and 93. Generally, the conformity determination must demonstrate that the plan or program conforms to an applicable SIP for air quality and that those plans or programs, based on detailed analysis of potential air quality impacts, will improve the region's air quality.

Consequently, Greater Buffalo-Niagara Region Transportation Improvement Plan (TIP) conformity guidelines require that a quantitative air quality analysis be undertaken for each pollutant that exceeds the standards. The 2011-2015 TIP was endorsed by the GBNRTC and received a positive conformity determination from the Federal Transit Administration (FTA) and the Federal Highway Administration

(FHWA). This current five-year program demonstrated reduced mobile source emissions, contributed to the improvement of the area's overall air quality, and is consistent with the current SIP for air quality. The proposed project was included in the original 2011-2015 TIP and neither the design, scope or concept of the project have changed significantly since the conformity determination was made. Therefore, pursuant to 23 CFR 770, this project conforms to the SIP.

Carbon Monoxide (CO) Microscale Analysis

To determine whether the project is subject to a microscale air quality analysis, the feasible build alternatives will be reviewed and a screening will be performed in accordance with the NYSDOT EPM. The screening will consist of reviewing the Level of Service changes, capture criteria, and traffic volume thresholds. This screening process is performed to identify projects that have a potential for local air quality impacts and warrant the performance of a microscale air quality analysis.

Mesoscale Analysis

If the project significantly affects traffic conditions over a large area (i.e. regionally significant), it is also appropriate to consider regional air quality effects of the project by way of a mesoscale analysis. Mesoscale analysis (regional air quality) covers a geographic area that is larger than the immediate project area, but smaller than the entire network system. The size of the analysis area would depend upon the scale and scope of the project, but it should include at a minimum, all the roadways that are affected by the project. A mesoscale analysis would consider the regional effects for all five air pollutants (PM2.5, PM10, CO, VOC, and NOx). Therefore, the feasible build alternatives will also be screened to determine if a quantitative mesoscale analysis should be performed.

Other Air Quality Analyses

Due to the scope of the project, screening may also be performed to determine if the following analyses are required: Mobile Source Air Toxics (MSATs) Analysis, Particulate Matter (PM) Analysis, and Greenhouse Gas Analysis.

4.B.3.j. Noise

The methods to be used in this analysis will be in accordance with the provisions and procedures of the policies stated in the federal noise regulations (23 CFR 772), and the NYSDOT Transportation and Environmental Manual.

As part of the Preliminary Design and Detail Environmental Review Phases, the project will be screened to identify whether it is a Noise Regulation Type I project or a Noise Regulation Type II project.

- Type I projects - A proposed Federal or Federal-aid highway project for the construction of a highway on new location or the physical alteration of an existing highway which significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes, as well as, other modifications per regulations.
- Type II projects - A proposed Federal or Federal-aid highway project for noise abatement on an existing highway.

This project appears to possibly meet the criteria for a Type I project, as defined by 23 CFR 772 and therefore may require a formal noise study. Particularly sensitive noise receptors such as residences, schools, and churches would need to be identified. In determining noise impacts, primary consideration is given to exterior areas of these sensitive receptors.

A quantitative noise study may need to be performed to determine and analyze expected traffic noise impacts and alternative noise abatement measures to mitigate these impacts, giving weight to the benefits and cost of abatement, and to the overall social, economic and environmental effects. If it is determined that computer modeling will be required, computer models reflecting the field conditions will be created for each site. The FHWA Traffic Noise Model (TNM) computer program will be used for this modeling.

The traffic noise analysis would include the following for each alternative under detailed study:

1. Identification of existing activities, developed lands, and undeveloped lands for which development is planned, designed and programmed, which may be affected by noise from the highway;
2. Prediction of traffic noise levels;
3. Determination of existing noise levels;
4. Determination of traffic noise impacts; and
5. Examination and evaluation of alternative noise abatement measures for reducing or eliminating the noise impacts.

It is anticipated that the expected increased traffic volumes would increase local noise levels to some extent yet to be indicated through noise modeling. For each alternative, exterior areas of frequent human use will be investigated to identify appropriate locations for noise measurement and modeling.

4.B.3.k. Energy

Federal Highway Administration 1987 guidelines require quantifying direct and indirect energy consumption due to a highway project. The State Energy Plan, adopted in 2002, calls for the State's transportation sector to be more energy efficient and sets goals for reducing consumption. Accordingly, the potential energy effects from the modifications to the I-90/I-290 Corridor should be compared to taking no action (the No-Build alternative).

Because the Build Alternatives will increase Vehicle Miles Traveled (VMT), increase vehicle operating speeds and change travel patterns along the corridor, the proposed project has the potential to affect energy consumption. Both the potential direct and indirect energy impacts of the proposed project should be analyzed based on guidance and procedures developed by NYSDOT for estimating the energy impacts from construction and operation of transportation projects.

Guidance for preparing an Energy and Greenhouse Gas (GHG) Analysis is included in Executive Order 12185, NYSDOT 2012 – The Environmental Manual (TEM), updated in December 2012, NYSDOT 2003a – Draft Energy Analysis Guideline for Project-Level Analysis and NYSDOT 2003b – Draft Greenhouse Gases (CO_2) Emissions Estimate Guidelines.

An energy assessment is typically required for proposed projects that are expected to:

a. Increase or decrease VMT;

b. Generate additional vehicle trips;

c. Significantly affect land use development patterns;

d. Result in a shift in travel patterns; or

e. Significantly increase or decrease vehicle operating speeds.

Direct energy impact is the energy consumed by vehicles using a facility based on vehicular volumes, weight and average travel speeds. The direct energy analysis uses the Urban Fuel Consumption Method (UFCM) for light duty vehicles and medium and heavy trucks described in NYSDOT's energy analysis guidelines. For this analysis, average speeds and traffic volumes (and thus VMT) are estimated by link for the worst-case morning and evening peak hours, summed and factored to produce an average daily and annual fuel consumption for each alternative.

Indirect energy is associated with constructing, operating and maintaining a facility. An indirect energy analysis will be conducted using the Input-Output Approach in NYSDOT's *Draft Energy Analysis Guidelines for Project-Level Analysis*. Maintenance Energy is based on the lane-miles of pavement type for a facility. The indirect energy analysis is focused on the differences in the energy consumed due to construction between the No-Build and the Build Alternatives. Construction energy covers production and transport of materials, powering on-site equipment, worker transportation and other factors plus the materials used in construction itself.

The assessment will give an indication of whether the combined total energy usage/fuel consumption would be generally reduced or increased. This will indicate whether or not the build alternatives will have a negative or significant impact on the total energy consumption within the proposed project study area.

Based on the traffic assessment completed to date which estimated increases in VMT, higher vehicle operating speeds and reduced congestion (improved LOS); the total energy consumption within the proposed study area would be significantly increased for the Build Alternatives.

4.B.3.l. Contaminated Materials Assessment

Additional areas of concern include the two (2) railroad facilities currently operating within the study area, CSX Corporation and Norfolk Southern Railroad. Along the I-90 at MP 423, CSX Corporation operates a multitrack facility bridging over the I-90, directly adjacent to the north side of Broadway. Norfolk Southern Railroad also operates a multitrack facility which runs under the I-90 at MP 424.

Any operating or abandoned industrial facility within or near the study limits would have the potential to contain contaminated areas on site. Further investigation will be required in a later phase of the design process.

4.B.3.l. (1) Asbestos

An Asbestos Assessment to identify suspect asbestos containing materials within the study limits will be conducted in a later phase of the design process.

4.B.3.l. (2) Hazardous Waste

Located a half-mile east of the Buffalo International Airport and south of Interchange 49, adjacent to Aero Drive, is the 121 acre site known as the Pfohl Brothers Landfill. When this landfill was active, it received solid and liquid chemical waste and sludges, including heavy metals, such as mercury and barium, and volatile organic compounds (VOC's), such as benzene and dioxin, from local businesses. This landfill is a known hazardous waste site and has been remediated and capped.

4.B.3.m. Construction Impacts

Construction activities can cause a number of short-term environmental impacts, which will be controlled to the greatest extent possible. There are no long-term construction impacts with any of the Build Alternatives. Construction equipment can generate substantial amounts of dust and noise, and runoff from construction sites can temporarily increase silt loads and affect surface water quality. The contract specifications would include requirements for the mitigation of the short term impacts. The specifications would include requirements for effective dust control, adequate mufflers on all equipment, and the use of erosion and pollution prevention systems. A Storm Water Pollution Prevention Plan would be prepared for construction activities during the detailed design phase. Other construction impacts include traffic delays through construction workzones and along highway detours. Maintenance and Protection of Traffic Plans, contract pay items and other contract requirements would be used to keep delays as short as possible.

4.B.3.n. Anticipated Permits and Approvals

Construction of any of the improvement alternatives would require permits and coordination with State and Federal Agencies. It is anticipated that the following permits will be required: Freshwater Wetlands Act (NYSDEC), Water Quality Certification (NYSDEC), Stream Protection (NYSDEC), Dredge/Fill Permit (ACOE 404), Section 10 Permit (ACOE 10), Stormwater Management (NYSDEC) and State Historic Preservation (NYSOPRHP).

4.B.4. Indirect/Secondary and Cumulative Impacts

4.B.4.a. Indirect/Secondary Impacts

The purpose of the indirect/secondary impact evaluation is to identify potential development areas that may develop as a result of new highway or improved highway construction. The areas identified may or may not be developed since many factors could influence the development potential of any site including land availability, land use controls, natural land characteristics, available utilities, regulatory constraints and economics. Based on the suggested alternatives and the fact that the much of the corridor is already developed, the project is not expected to significantly change the land development trends in the area. As project alternatives are finalized, a more detailed evaluation of indirect and secondary impacts would be completed.

Definitions:

For the purpose of this evaluation, the following definitions apply:

- **Normal growth** refers to growth that would be anticipated regardless of whether the proposed action is implemented.
- **Induced growth** specifically refers to that amount of additional growth that would be anticipated as a result of the construction of the proposed alternative, i.e. growth that would not be expected to occur without the construction.
- **Indirect/secondary impacts** are defined as those impacts that would occur as a result of induced growth, i.e. providing new highway access to previously undeveloped land may encourage development of that land.
- **Cumulative impacts** differ from indirect/secondary impacts in that they consist of the social, economic and environmental impacts which result from the incremental impact of the project when added to other past, present, and reasonably foreseeable future actions regardless of what agency or private entity undertakes such other actions.
- **As-of-right development** is that amount and type of development that is allowed by existing zoning.

4.B.4.b. Cumulative Impacts

Cumulative impacts differ from indirect/secondary impacts in that they consist of the social, economic and environmental impacts which result from the incremental impact of the project when added to other past, present, and reasonably foreseeable future actions regardless of what agency or private entity undertakes such other actions. The cumulative impact analysis identifies additional major infrastructure improvement projects that are planned in the I-90/I-290/NY33 project area. It is not possible to quantify actual impacts at this stage due to the lack of detail and general nature of these conceptual plans. As the design alternatives are progressed, an analysis of cumulative impacts will be conducted.

4.B.5. Relationship Between Short Term Use of Man's Environment and the Maintenance and Enhancement of Long Term Productivity

Evaluation of the project's impacts on long term productivity will be considered during Preliminary Design Phases.

4.B.6. Any Irreversible and Irretrievable Commitments of Resources Which Would be Involved in Proposed Action

Evaluation of the commitment of resources will be considered during Preliminary Design Phases.

4.B.7. Adverse Environmental Impacts that Cannot be Avoided or Adequately Mitigated

Evaluation of the adverse environmental impacts that cannot be mitigated will be considered during Preliminary Design Phases.

CHAPTER 5 – EVALUATION AND COMPARISON OF ALTERNATIVES

5.A. COST, BENEFIT AND IMPACT COMPARISON

The previous chapters have presented a wide variety of information about the study and the four alternatives, the No Build, and three Build Alternatives. The purpose of this Project Scoping Report is to be a decision making tool, focused on identifying the advantages and disadvantages of the alternatives. **Table 5-1** includes a summary of costs, benefits and impacts of the four alternatives, with references to additional information contained in the report. Comparisons of alternatives are made and impacts are measured from a consistent point of reference, the year 2040.

Table 5-1 – Alternative Comparison

Topic	No Build	Interim Build Improvements	Full Build Improvements 4 Lanes	Full Build Improvements 5 Lanes
Right of Way (acres)	0	0	1.1	1.5
Transmission Towers Relocated	0	0	1[1]	6[1]
Construction Cost - (2014 $ millions)	$0	$15.5	$516.6	$558.1
VMT				
AM Peak Hour (2020)	234,436	237,332	N/A[2]	N/A[2]
AM Peak Hour (2040)	240,219	248,925	N/A[2]	N/A[2]
PM Peak Hour (2020)	274,619	287,645	N/A[2]	N/A[2]
PM Peak Hour (2040)	226,353	247,039	N/A[2]	N/A[2]
Total Delay (hours)				
AM Peak Hour (2020)	3,365	3,172	N/A[2]	N/A[2]
AM Peak Hour (2040)	4,612	4,524	N/A[2]	N/A[2]
PM Peak Hour (2020)	5,880	5,508	N/A[2]	N/A[2]
PM Peak Hour (2040)	8,152	7,867	N/A[2]	N/A[2]
LOS	None	Slightly Improved[3]	Moderately Improved	Significantly Improved

Notes:
1. Additional costs for modifications to the towers adjacent to the relocated towers are included in the construction cost estimate.
2. Full Build Improvements were modeled using the TransCAD regional travel demand model whereby VMT, VHT and Total Delay are not available.
3. LOS improved in the vicinity of Interchange 50.

5.B. DISCUSSION

No Build Alternative

The No Build Alternative would not satisfy any of the project objectives. It has been included here to add context to the benefits and impacts of the build alternatives.

Interim Build Improvements

The Interim Build Improvements is a relatively low cost alternative and would satisfy the project objectives within the vicinity of Interchange 50 for the short term (2020 to 2040). However, at 2040, these improvements would not be sufficient to provide the desired LOS at Interchange 50 or anywhere along the study corridor.

Full Build Improvements – 4 Lanes

This alternative would provide satisfactory LOS for most of the I-90 corridor for the short term (2020-2040). However, at 2040, these improvements would not be sufficient to provide the desired LOS along the study corridor except for the segment between the WTB and Transit Road (Interchange 49).

Full Build Improvements – 5 Lanes

This alternative would provide satisfactory LOS for most of the I-90 corridor for the short term and long term (2040 and beyond). However, at year 2040, the segment of I-90 between NY33 and Cleveland Drive would still have an undesirable (but manageable) LOS E. Also due to not adding an additional lane along the segment of I-290 between Interchange 50 and Sheridan Drive, this portion of I-290 would have an undesirable (but manageable) LOS E.

CHAPTER 6 – RECOMMENDATION

6.A. RECOMMENDATION

Existing Conditions MOEs indicate congestion occurs throughout the study area with low speeds, high delays, and LOS E/F noted at several locations which is indicative of insufficient capacity and geometrical deficiencies. Mitigation strategies for these types of deficiencies include geometrical improvements and additional lanes which will be implemented in the Build Alternatives.

Recommendations made from this study are based on the stated objectives which were to:

- Identify structural, capacity, operational, and safety problems that may occur over the next 30 years.
- Improve the traffic conditions within the I-90/I-290 corridor using a cost effective method to provide an acceptable level of service at the design year of 2040.
- Develop properly designed improvement alternatives based on the design year 2040 traffic forecasts and current design standards, which provide adequate capacity to the design year 2040.
- Provide cost effective improvements to I-90, I-290, and adjacent access ramps within the study limits to meet the social demands of the community within the corridor by providing the maximum potential for future economic enhancement to the region of New York State.
- Provide cost effective improvements to I-90, I-290, and adjacent ramps within the study limits using cost effective measures that avoid or reduce highway related nuisance and environmental impacts to the greatest extent practicable.

<u>Interim Build Improvements</u>

To achieve these objectives, it is recommended to initiate the **Interim Build Improvements** as soon as funding is available. These improvements have shown to improve the conditions in and around Interchange 50 and beyond.

Based on the traffic modeling completed under this study for the Interim Build Improvements, the changes noted below are anticipated when compared to the No-Build Alternative for the year 2020. The results of these improvements will be effective and would be realized with a relative low construction cost ($15.5 M). In addition, the Interim Build Improvements would not result in any right-of–way takings and no adverse environmental, social or economic impacts are anticipated.

The following are the improved locations within the corridor as a result of the interim improvements.

Mainline Segments

Interstate 90 Westbound

- Transit Road to Cleveland Drive
    - Improves from a LOS C to LOS B in the AM Peak Hour
    - Remains at a LOS D in the PM Peak Hour
- Cleveland Drive to NY33
    - Improves from a LOS D to LOS C in the AM Peak Hour
    - Improves from a LOS E to LOS D in the PM Peak Hour

Interstate 90 Eastbound

- NY33 to Cleveland Drive
    - Although the Level of Service remains at LOS F, the average density (vehicles/mile/lane) by which the LOS is calculated, along with other measures of effectiveness is greatly improved:
        - AM Peak Hour
            - The average density is reduced from 88.6 to 63.2 (29% reduction).
            - Average throughput volume increased from 4900 to 5350 vehicles
            - Average Stopped Time reduced from 8.1 seconds/veh to 3.0 seconds/veh
        - PM Peak Hour
            - The average density is reduced from 103.5 to 63.6 (39% reduction).
            - Average throughput volume increased from 5300 to 6000 vehicles
            - Average Stopped Time reduced from 20.6 seconds/veh to 2.7 seconds/veh
            - Average Speed increased from 16.8 mph to 29.1 mph
- Cleveland Drive to Transit Road
    - Improves from a LOS F to LOS D in the AM Peak Hour
    - Remains at a LOS E in the PM Peak Hour

Interstate 290 Westbound

- I-90 Westbound On Ramp to Sheridan Drive
    - Improves from a LOS D to LOS C in the AM Peak Hour
    - Although the LOS is reduced from LOS D to LOS E in the PM Peak Hour, the throughput volume increased from 4,950 to 5,450 vehicles and the average speed is increased from 53.5 mph to 55.0 mph

Interstate 290 Eastbound

- Sheridan Drive to I-90 Westbound On Ramp
    - Improves from a LOS E to LOS D in the AM Peak Hour
    - Improves from a LOS F to LOS D in the PM Peak Hour

Ramps

Improvements are projected to occur on the following ramps:

- William Street on ramp to I-90 WB
  - Improves from a LOS D to LOS C in the AM Peak Hour
- I-90 EB off ramp to Walden Avenue EB
  - Improves from a LOS F to LOS E in the PM Peak Hour
- I-90 WB off ramp to Walden Avenue EB
  - Improves from a LOS E to LOS D in the AM Peak Hour
- Walden Avenue WB on ramp to I-90 WB
  - Improves from a LOS C to LOS B in the AM Peak Hour
- I-90 EB off ramp to NY 33 EB
  - Improves from a LOS E to LOS D in the AM Peak Hour
- NY 33 EB on ramp to I-90 EB
  - Improves from a LOS F to LOS E in the AM Peak Hour
  - Improves from a LOS F to LOS E in the PM Peak Hour
- I-90 WB on ramp to NY 33 EB
  - Improves from a LOS E to LOS D in the PM Peak Hour
- NY 33 WB on ramp to I-90 EB
  - Improves from a LOS F to LOS E in the PM Peak Hour
- I-90 EB off ramp to Cleveland Drive
  - Improves from a LOS F to LOS B in the PM Peak Hour
- I-290 EB off ramp to Harlem Road/Sheridan Drive
  - Improves from a LOS D to LOS C in the AM Peak Hour
  - Improves from a LOS F to LOS C in the PM Peak Hour

Full Build Improvements

It is further recommended that preliminary engineering and detailed environmental assessments be conducted to determine which Full Build Alternative (4-Lane or 5-Lane) should be advanced as the Preferred Alternative. This determination should be made after additional traffic modeling and analyses using the TransModeler on each of these alternatives have been completed. The use of TransModeler would provide the most comprehensive and accurate assessment of the full range of MOEs for comparison between the two alternatives.

Once the full range of MOEs has been compared between the two alternatives, an assessment of the construction costs along with the anticipated adverse environmental, social or economic impacts would have to be considered in order to determine which Full Build Alternative should be selected as the Preferred Alternative.

Conclusion

In conclusion, efforts should be made to initiate the **Interim Build Improvements** as soon as possible, as outline above, and to begin more detailed engineering and environmental assessments on the **Full Build Improvements** alternatives to determine which should be progressed as the Preferred Alternative for final design and construction.

CHAPTER 7 – PUBLIC INVOLVEMENT

7.A. INTRODUCTION

Public involvement is an integral part of the transportation planning process. Accordingly, the New York State Thruway Authority and the New York State Department of Transportation will provide opportunities for open and meaningful public and agency participation throughout the environmental review process.

The public will be engaged and encouraged to provide feedback throughout the duration of the project. Efforts to engage the public include:

7.B. PUBLIC MEETINGS

Public meetings: The public scoping meeting was an early opportunity for the public to become directly involved with the development of project alternatives and the environmental impact review process.

The meeting was held on October 25, 2004 to present an overview of the study and progress to date, including existing and projected needs of the corridor. The meeting consisted of a public informational open house held from 5:30 PM to 8:00 PM with a presentation given at 6:30 PM at the former Sheraton Four Points Hotel in the Town of Cheektowaga. A full Public Information Meeting Summary can be found in **Appendix H – Public Information Meeting Summary**.

In addition to the public scoping meeting, public input may be solicited during public meetings to be held during the Preliminary Engineering and Detailed Environmental Review Phases of the project.

Other public input, briefings, and day-to-day contacts may be held throughout the environmental review process; for example, meetings with elected officials, community groups, special interest groups, and agency representatives may be held on an as-requested, as-needed basis during the course of the project.

Informational materials, including presentations, display boards, and written materials, may be produced to support meetings and may be provided at major milestones, as appropriate.

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