I-81 VIADUCT PROJECT

CHAPTER 5

TRANSPORTATION AND ENGINEERING CONSIDERATIONS

This chapter describes existing and proposed highway and roadway characteristics, including vehicular traffic volumes, speeds, safety, and level of service, as well as non-motorized transportation (bicycle and pedestrian) accommodation. It summarizes the engineering features of the project alternatives.

5.1 INTRODUCTION

This chapter discusses the existing transportation conditions and deficiencies in the Project Area and how they are expected to change over time, both without and with implementation of the I-81 Viaduct Project alternatives. The chapter identifies the engineering standards used to identify deficiencies and develop the project alternatives, as well as the data, methods, and tools used to perform the planning and engineering analyses for the Project. Benefits and impacts to the transportation system also are discussed.

5.2 TRANSPORTATION PLANS AND LAND USE

Local Plans for the Project Area

Local and regional long-range plans have established goals for land use, economic development, and regional transportation networks and/or have identified I-81, particularly the I-81 viaduct, as an influential feature within Downtown Syracuse and adjacent neighborhoods. A number of planning studies and initiatives were considered in identifying deficiencies in the Project Area, as well as in the development of project alternatives. Details of local and regional long-range plans and planned developments in the Project Area are presented in **Section 6-2-1, Neighborhood Character**.

5.2.1 TRANSPORTATION CORRIDOR

Importance of the Project Route Segment

I-81 is a primary interstate freeway extending 850 miles from I-40 in Dandridge, Tennessee, to the Canadian border at Wellesley Island northwest of Alexandria Bay. This north-south corridor plays a key role in the regional, statewide, and national transportation system, serving various travel markets such as trade, intercity travelers, commuters, and tourists. As a vital link in Central New York, I-81 serves the cities of Binghamton, Syracuse, and Watertown.

In the Syracuse metropolitan area, I-81 is the primary north-south travel and commuter route, providing direct access from suburban communities to Downtown Syracuse and its hospitals, businesses, and universities. According to the Greater Syracuse Economic Growth Council, five of the region's 10 largest employers are located adjacent to I-81. In and near the City of Syracuse, I-81 connects with I-481, an auxiliary interstate route that bypasses the city to its east; I-690, an auxiliary interstate route that connects I-90 (The New York State Thruway) to I-481 through Downtown Syracuse; and I-90, a major east-west interstate route that traverses upstate New York. Due to the seamless connectivity with other interstate freeways, I-81 provides travelers with accessibility to a diverse array of destinations. Refer to **Figure 1-1** for an overview of the highway network within the area.

I-690 begins at Interchange 39 on I-90 in Van Buren and terminates at I-481 in DeWitt. It is a primary east-west travel and commuter route, providing direct access from suburban communities to Downtown Syracuse. Similar to the function of I-81, I-690 serves many employers, as well as retail and entertainment destinations in the Syracuse metropolitan area.

I-81 and I-690, in coordination with I-481 and the city's street network, provide an efficient system serving the vehicular transportation needs of the greater Syracuse area. Therefore, the efficient operation and adequate capacity of the interstate/arterial system is of critical importance in terms of providing an acceptable level of transportation service in the corridor. Furthermore, I-81 and I-690 have a considerable influence on the character and economic vitality of the city and region. Since the City of Syracuse is the region's largest economic center, the presence of I-81 and I-690 in Downtown Syracuse influences vehicular and pedestrian connectivity, land use development, goods movement, and regional travel patterns between neighborhoods and communities.

Alternative Routes

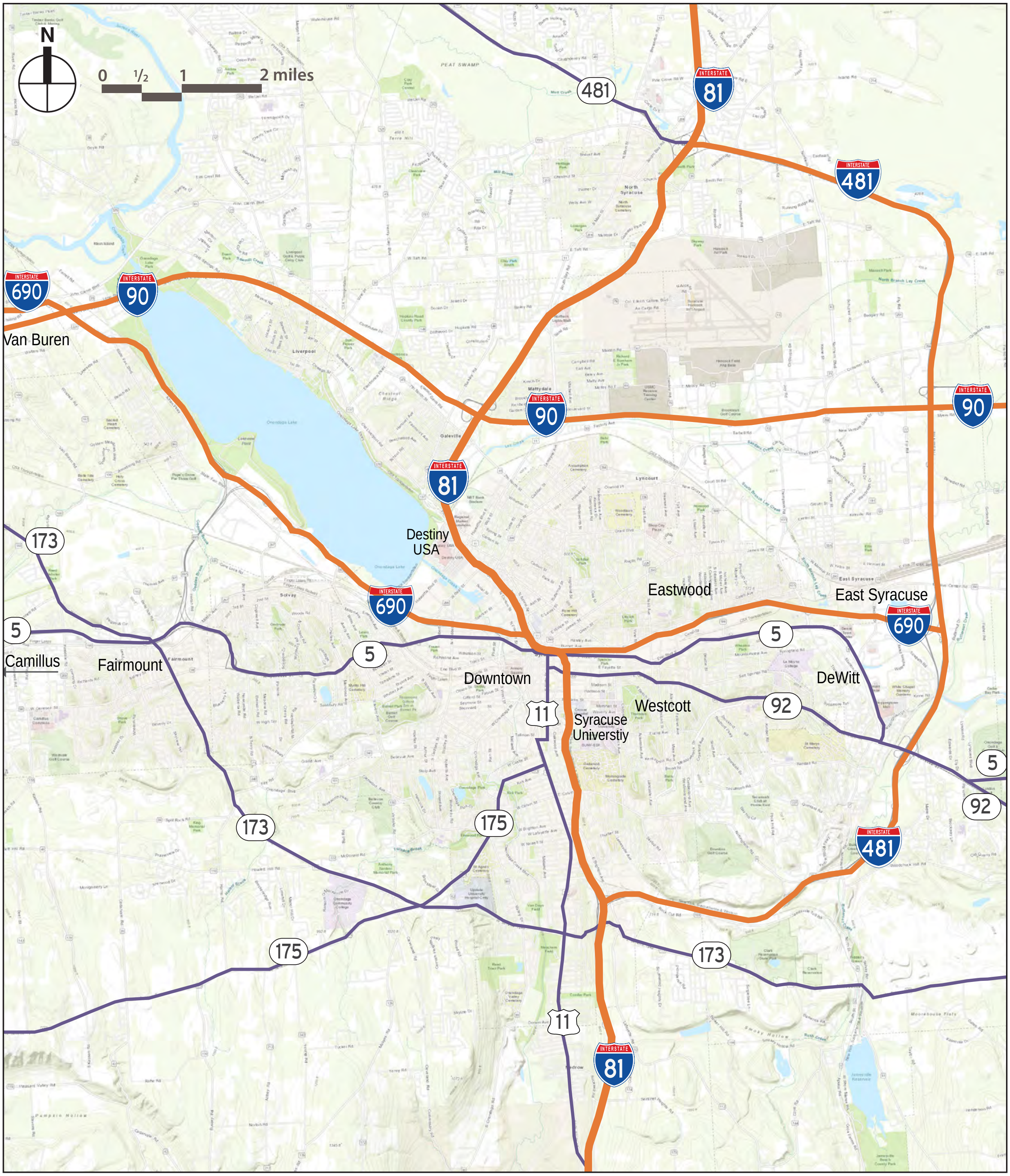
Two basic trip-types travel on I-81 in the Project Area:

- Through trips – traffic that passes through the Syracuse region. These are trips that begin and end beyond I-81's northern and southern interchanges with I-481.
- Non-through trips – traffic with origins and/or destinations in the Syracuse region (including Downtown Syracuse, University Hill, Destiny USA, and the communities that surround the City of Syracuse).

Figure 5-1 shows the existing interstate highway system and major alternate routes. For northbound and southbound through trips, I-481 provides a direct connection between the northern and southern I-81/I-481 interchanges, and currently functions as an alternative route. I-481 also is a potential route for trips currently using northbound I-81 to eastbound I-690, destined for Westcott, Eastwood, and East Syracuse. For pass-through trips currently using northbound I-81 to westbound I-690, there are less-suitable alternative routes on the existing roadway system due to lack of a bypass road around the west side of the city. State Route 173 (Onondaga Road) is a potential alternate route for northbound I-81 to westbound I-690 trips destined for Fairmount and Camillus. Route 173 can be accessed from I-81 at Interchange 16A.

For I-81 non-through trips, many southern parallel roadways into the downtown area are available for dispersing traffic, providing direct routes to key destinations. These local routes mostly are lower-speed facilities passing through residential areas, including Almond Street, Salina Street, State Street (US 11), and Cortland Avenue (State Route 175). In contrast, there are fewer northern parallel roadways to bring traffic directly to downtown.

I-690 is an east-west interstate highway extending approximately 14 miles from I-90 in Van Buren to I-481 in DeWitt. For eastbound and westbound I-690 through trips, I-90 (The New York State Thruway) is an alternative route. However, I-90 is a tolled facility and, as an alternative route, would



Alternative Routes
Figure 5-1

require an additional cost. In addition, State Route 5 (Erie Boulevard) and State Route 92 (Genesee Street) are potential alternative routes for westbound I-690 non-through trips, and State Route 5 (Genesee Street/Erie Boulevard) is a potential alternative route for eastbound I-690 non-through trips.

Corridor Deficiencies and Needs

The I-81 viaduct and I-81/I-690 interchange have been the subject of community and agency concern because of ongoing congestion and safety issues, as well as aging infrastructure. The *I-81 Corridor Study*[1] (NYSDOT, July 2013) that preceded this Project identified a section of I-81 and I-690 in and near Downtown Syracuse as a priority area for improvements due to a concentration of structural and geometric deficiencies, as well as frequent congestion and high vehicle crash rates. In many instances, highway design features (such as shoulder widths, median widths, horizontal alignment, and interchange spacing) pre-date current design standards and, coupled with high traffic volumes, have led to recurring congestion and crash rates that exceed the statewide average. In addition, the highway infrastructure is nearing the end of its intended design life, and the viaduct and other highway bridges have deteriorated due to age, wear, and harsh winter weather conditions. The I-81 viaduct study (or priority) area exhibits a high concentration of traffic incidents and non-standard and non-conforming features. Crash rates typically are two to three times higher than the statewide average rate for similar facilities. Although highway infrastructure is maintained in a state-of-good repair to ensure its structural integrity remains safe for the traveling public, continued deterioration could lead to increased maintenance costs, weight and speed restrictions on bridges, and potentially, eventual closure of bridges.

A survey of the Project Area identified over 200 non-standard and non-conforming features along the Project Area (see **Table 5-21** and **Appendix C-6**). While not all features contribute equally to safe operations, this number indicates the potential for design-related safety issues in the Project Area.

Corridor needs include replacement of structurally deficient bridges, improvement of non-standard/non-conforming conditions, operational improvements, and enhancement of pedestrian and bicycle access. The Syracuse Transit System Analysis[2] published in 2014 as part of the *I-81 Corridor Study* proposed many transit mobility and accessibility improvements along with other transportation Demand Management type improvements (e.g., guaranteed ride home, car sharing, and carpool matching). Potential improvements as a result of these independent studies are not part of the I-81 Viaduct project and would be progressed and funded separately.

Transportation Plans

The preliminary design and Right-of-Way (ROW) incidental phase of this project is on the approved Syracuse Metropolitan Transportation Council (SMTC) Transportation Improvement Program (TIP) as Project No. 350160. ROW acquisition and construction phases are not currently on the TIP or on the fiscally constrained Long Range Transportation Plan (LRTP).

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1 The I-81 Corridor Study report can be found at the following location: https://www.dot.ny.gov/i81opportunities/repository/I-81Corridor-Study.pdf

2 The Syracuse Transit System Analysis can be found at the following location: http://www.thei81challenge.org/cm/ResourceFiles/resources/Syracuse%20Transit%20System%20Analysis%202014%20Full.pdf

Abutting Highway Segments and Future Plans for Abutting Highway Segments

There are no plans to reconstruct or widen I-81 to the immediate north and south of the project study area. Additionally, there are no plans to reconstruct or widen I-690 to the immediate west and east of the project study area within the next 20 years. There are several other projects within the project study area that are independent of the I-81 Viaduct project and described below. These projects would be compatible with either build alternative, as well as the no-build alternative. Additionally, the scope and schedule of these other projects would not affect the construction of the I-81 Viaduct project.

- **Third lane of Frontage Road -** A private developer has proposed a project that begins at Exit 23B at the on-ramp from Carousel Center Drive to the I-81 Southbound Frontage Road (SR 936F). This project includes adding a third southbound travel lane to Bear Street. Traffic from the ramp will default into this lane upon reaching the service road (the ramp is currently controlled by a yield sign and has no acceleration lane). The intersection with Bear Street will be reconfigured by virtue of the elimination of the existing slip ramp from the Frontage Road southbound to Bear Street westbound. This project is anticipated to be completed by a private developer as part of required mitigation resulting from lakefront development projects. This mitigation work can be done with no impacts to the construction phasing and Work Zone Traffic Control plan of the I-81 Viaduct Project. Additionally, the proposed project is compatible with both Project alternatives.
- **S. Salina Street** - The City of Syracuse is re-paving a portion of North and South Salina Streets, between North State Street and Dr. Martin Luther King, Jr. East(MLK, Jr. East)/West. Work on State Street, which is part of this project, will start at James Street and continue south ending at MLK, Jr. East. This mill and pave project, funded under PIN 3756.06, started construction in 2020 and is on schedule to be completed by the spring of 2022. The work for this Salina/State Street project would be under the existing I-81 viaduct but will be completed prior to the interstate bridges starting construction. No construction phasing or Work Zone Traffic Control impacts are anticipated. Additionally, the proposed project is compatible with both Project alternatives.
- **Water Street** - The City of Syracuse has a proposed project that will close a portion of Water Street between University Avenue and Walnut Avenue. The project is not funded at this time, so there are no anticipated construction phasing or Work Zone Traffic Control conflicts with the I-81 Viaduct Project. Additionally, the proposed project is compatible with both Project alternatives.
- **James Street** - The City of Syracuse has a proposed project that will re-configure James Street to a three-lane section between State Street and Grant Street/Shotwell Street. The project is not funded at this time, so there are no anticipated construction phasing or Work Zone Traffic Control conflicts with the I-81 Viaduct Project. Additionally, the proposed project is compatible with both Project alternatives.
- **Two Way Conversion –** The City of Syracuse has a proposed project that will convert several one-way streets to two-way streets. The project has not been scheduled at this time, so there so there is no anticipated construction phasing or Work Zone Traffic Control conflicts with the I-81 Viaduct Project. This work is expected to be completed at some point between the I-81 Viaduct Project's Estimated Time of Completion (ETC, 2026) and design year (ETC+30, 2056). City streets proposed for conversion include:
  - Clinton Street – West Jefferson to Tallman Street;

  - Warren Street – Willow Street to Washington Street;
  - Montgomery Street – Erie Boulevard to Adams Street; and
  - Jefferson Street – Montgomery Street to State Street.

- **Milling and Resurfacing Project** – The City of Syracuse has a proposed project on four streets (Clinton Street – Herald Place to Jefferson Street, Warren Street – Erie Boulevard to South Salina Street, Montgomery Street – Erie Boulevard to Adams Street, and Jefferson Street – Clinton Street to Montgomery Street). This project is funded under PIN 3756.25 and construction began in June 2021 with a completion scheduled for Spring of 2022. The project is a simple paving project and will be completed in the 2021 construction season. Daily lane closures will be implemented and no construction phasing or Work Zone Traffic Control conflicts with the I-81 Viaduct Project is expected.
- **Colvin Street** - The City of Syracuse has two proposed paving projects on Colvin St from Salina St to Jamesville and from Comstock Ave to the City Line. These projects are funded under PIN 3756.82 and PIN 3756.81 and are expected to be constructed in 2023. There will be no conflicts with the I-81 Viaduct Project.

5.3 TRANSPORTATION CONDITIONS, DEFICIENCIES AND ENGINEERING CONSIDERATIONS

5.3.1 OPERATIONS (TRAFFIC AND SAFETY) & MAINTENANCE

Functional Classification

Functional classification is a designation by which streets and highways can be categorized according to the character of traffic service that they are intended to provide. Individual roads and streets serve travel as part of a network of roads through which the traffic moves. Functional classification defines the nature of this movement by defining the part that any particular road or street should play in serving the flow of trips through a highway network and the type of access it provides to adjacent properties. Functional classification describes the importance of a particular road or network of roads to the overall system and is used with the anticipated character of the area during the design life of the project to establish the design classification, which is used to identify appropriate highway design standards to meet the needs of the traffic served. Functional classification is also used to determine which roads are eligible for project funding under the Infrastructure, Investment and Jobs Act (IIJA) administered by the Federal Highway Administration. There are currently seven functional classifications, which are further distinguished as urban and rural yielding fourteen distinct designations. All streets and highways are grouped into one of the Functional Classifications depending on the character of the traffic and the degree of land access that they allow. For example, Arterials provide a high level of mobility and a greater degree of access control, while local facilities provide a high level of access to adjacent properties but a low level of mobility. Collector roadways provide a balance between mobility and land access. The Functional Classification for all highways and streets within the Project Area can be found in **Appendix C-6.5**. In addition, **Table C-6.5-1** in **Appendix C-6.5** describes additional highway classifications, including if the routes are part of the National Highway System (NHS), a Qualifying Highway, a Designated Truck Access Highways, and if they are part of the 16-foot Vertical Clearance Network. Definitions of these additional classifications includes:

- The National Highway System (NHS) is a network of strategic highways within the United States, including the Interstate Highway System and other roads serving major airports, ports, rail or truck terminals, railway stations, pipeline terminals and other strategic transport facilities. From the 2017 NYSDOT Bridge Manual, the NHS includes:
- All routes on the Interstate System.
  - The Strategic Highway Corridor Network (STRAHNET) and its highway connectors to major military installations. The STRAHNET includes highways important to the United States strategic defense policy and which provide defense access, continuity, and emergency capabilities for the movement of personnel, materials, and equipment in both peace time and war time.
  - Other major routes, as established by the 1995 NHS Act.
  - In addition, as part of MAP-21, the NHS now includes other principal rural and urban arterials. (See https://www.fhwa.dot.gov/planning/national_highway_system/)
- A Qualifying Highway is a highway designated as part of the Federal Surface Transportation Assistance Act (STAA) of 1982 and subsequent state legislation, including the 1990 Omnibus Truck Safety Bill, which allows STAA vehicles (tractor trailers combinations greater than 65 feet, tractor with 28-foot tandem trailers, maxi-cubes, triple saddle mounts, stinger-steered auto carriers and boat transporters) and 53-foot trailers to use that highway, and any other highway within one linear mile of the Qualifying highway.
- A Designated Truck Access Highway is a highway designated for use by STAA vehicles and 53-foot trailers. Unlike a Qualifying Highway, these vehicle combinations may not travel off the access highway for any distance.
- The 16-foot Vertical Clearance Network was established by the Federal government to facilitate the movement of large vehicles. The 16-foot vertical clearance network consists of the National Highway System (NHS), with a few exceptions. Minimum vertical clearance requirements over highways help accommodate the movement of large vehicles for maintenance operations, utility work, and the transport of people, products, construction equipment, and military equipment for national defense.

Control of Access

Access to the I-81, I-690, and I-481 mainlines and ramps proper are fully controlled. Access is controlled at the I-81, I-690 and I-481 on- and off-ramp terminal intersections with local streets, but within the city, there are a number of existing uncontrolled access points near ramp terminals that include residential and commercial driveways.

Access to other state, county and local roads is generally uncontrolled.

Traffic Control Devices

Traffic Signals

Most intersections within the project area are signalized with three-color signals. For a complete list of all intersection control types, refer to **Appendix C-1**.

Traffic signals within the project area are owned and maintained by either NYSDOT or the City of Syracuse. The existing traffic signals comprise a combination of different types of hardware and equipment, which has been installed or upgraded at various times in the past. Traffic signal equipment within the project limits is in fair to good condition based on field inspection.

Most of the traffic signals within the project area are actuated and use inductance loop detection for phase activation combined with pedestrian push buttons with man/hand indications. Fixed time signals and pedestrian countdown timers also are present in the project area. Signal are coordinated and interconnected by a centrally controlled traffic signal communication system.

Signs

Existing signs within the project area include, but are not limited to, parking, stop, street name, guide, regulatory and warning signs, and their condition varies from poor to good condition based on field inspection. There are several intersections within the project area where minor cross streets or driveways are controlled by stop signs.

Pavement Markings

Throughout the project limits, double yellow lines separate two-way traffic, white lines and edge lines delineate auxiliary turn lanes, through lanes, shoulders, and on street parking. Pavement markings are in fair to good condition.

Intelligent Transportation Systems (ITS)

Intelligent Transportation Systems are defined as the application of advanced sensor, computer, electronics and communication technologies, and management strategies – in an integrated manner – to improve the safety and efficiency of the surface transportation system.

The National ITS Architecture, which is maintained by the U.S. Department of Transportation (USDOT), Federal Transit Administration (FTA), USDOT describes the functions of an ITS system, the equipment required of a subsystem supporting those functions, and the data flow to tie the functions and physical equipment together. It provides a common organization to help transportation stakeholders plan and integrate their systems in a clear and efficient manner. The purpose of developing a regional ITS architecture is to illustrate and document regional integration so that planning and deployment can take place in an organized and coordinated fashion. Conformance with the National ITS Architecture is defined by development of a Regional Architecture and is required for agencies that use USDOT funding for ITS projects.

In conformance with FHWA Rule 940, a Regional Architecture was developed for the Syracuse Metropolitan Area (Onondaga County). Titled "Syracuse Metropolitan Area (Onondaga County), Intelligent Transportation Systems Strategic Plan, Draft Technical Memorandum #2, Regional Architecture" and published in August 2002. This regional architecture follows the National Architecture and was developed to include functionalities identified through stakeholder coordination.

The regional architecture is concerned with defining the interaction of system elements, as well as defining the types of information to be exchanged between transportation related agencies and their respective transportation management systems, center-to-center connections, and added functionality of this regional integration. The Syracuse Metropolitan Area Regional Architecture has defined the NYSDOT Operations Center and field equipment to be relevant for 16 specific service packages including Broadcast Traveler Information, Emergency Response, Emergency Routing, Freeway Control, Incident Management System, Interactive Traveler Information, Regional Traffic Control, Road Weather Information System, Surface Street Control, and several others. Service packages include the physical equipment forming sub-systems required to provide the specified transportation service. The service packages listed for NYSDOT Region 3 entities were determined as those required to provide services relevant to NYSDOT.

The Congestion Management Process (CMP) Plan for the region was updated in 2019 by SMTC. The CMP identifies regionally significant projects that could affect the CMP network, including I-81.

Existing Regional ITS Inventory

In support of the established service packages, NYSDOT Region 3 has installed permanent variable message signs (VMS), pan/tilt/zoom capable closed-circuit TV cameras (CCTV), and acoustic-based vehicle detection sensors. **Figures 5-2 through 5-5** identify fixed ITS field equipment in the Project Area.

NYSDOT lists 51 additional portable VMS in inventory supporting various needs throughout the region including four (4) signs in support of the two (2) Over-height Detection Systems to monitor and warn over-height vehicles approaching the low-clearance rail bridge on SR-370, Onondaga Lake Parkway.

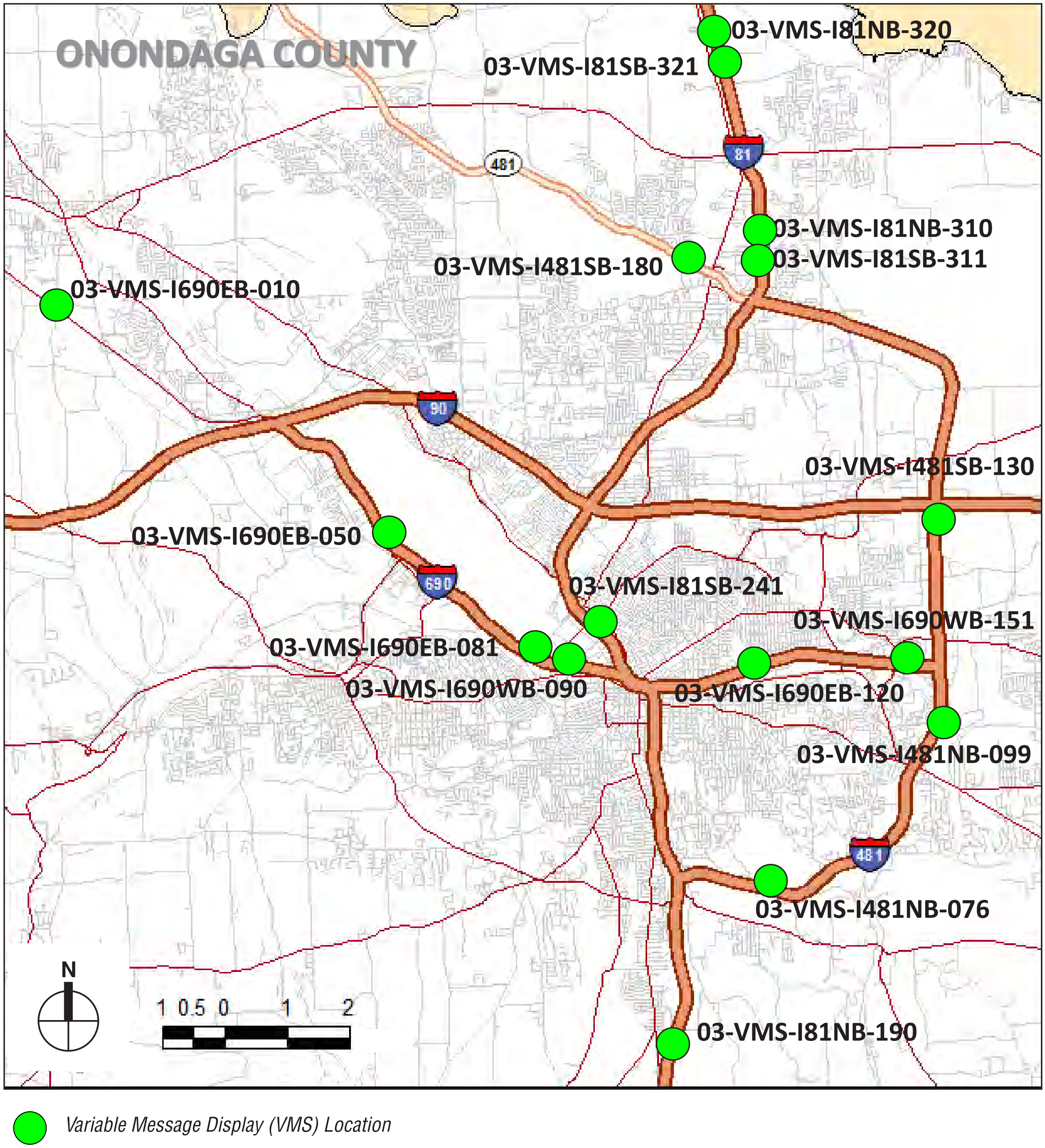
Each permanent field equipment site is powered by a local utility service drop. A state-owned and licensed radio system provides communications for the CCTV cameras and co-located acoustic sensors. The radio systems installed on I-81 and I-690 are Ethernet compatible. The radio systems installed on I-481 are not Ethernet compatible. The VMS signs use cellular modem service for low data usage serial communications.

NYSDOT operates the Region 3 Traffic Management Center (TMC) located at the Syracuse State Office Building, 333 E. Washington Street. All CCTV cameras and VMS signs are monitored and controlled through the TMC. Vehicle sensors are generally configured to store historical data, while a limited map implementation uses the vehicle sensors along I-481 to allow the TMC to monitor congestion information along that corridor from I-81 to I-690.

Four ITS hubs aggregate the radio data communications from the field sites for further transmission to the TMC. These hub sites are located at:

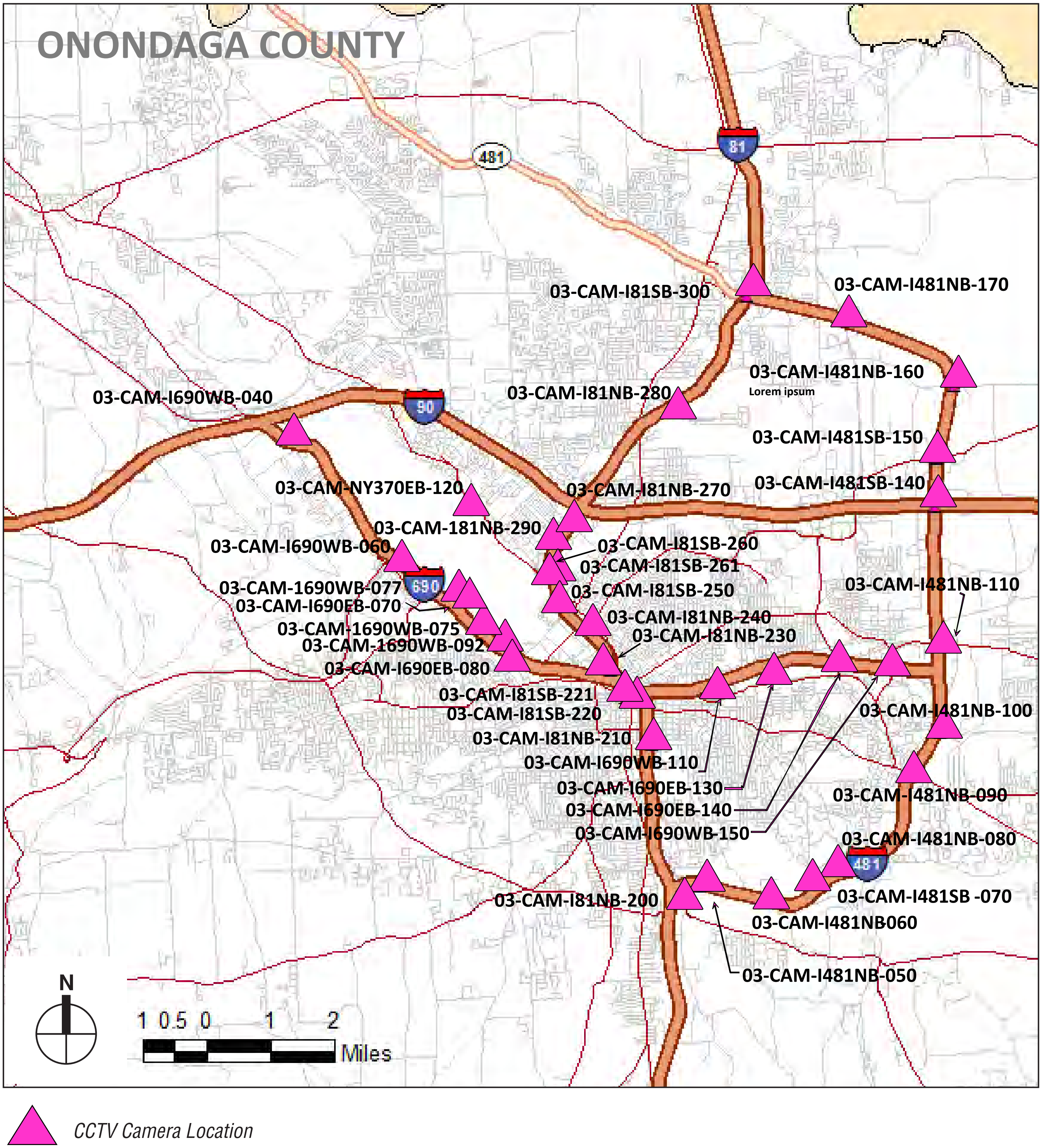
- Liverpool and I-81
- SR-695 and I-690
- Bridge Street and I-690
- South Bay Road (Back-up TMC)

The TMC communicates to other transportation stakeholders through various connections.



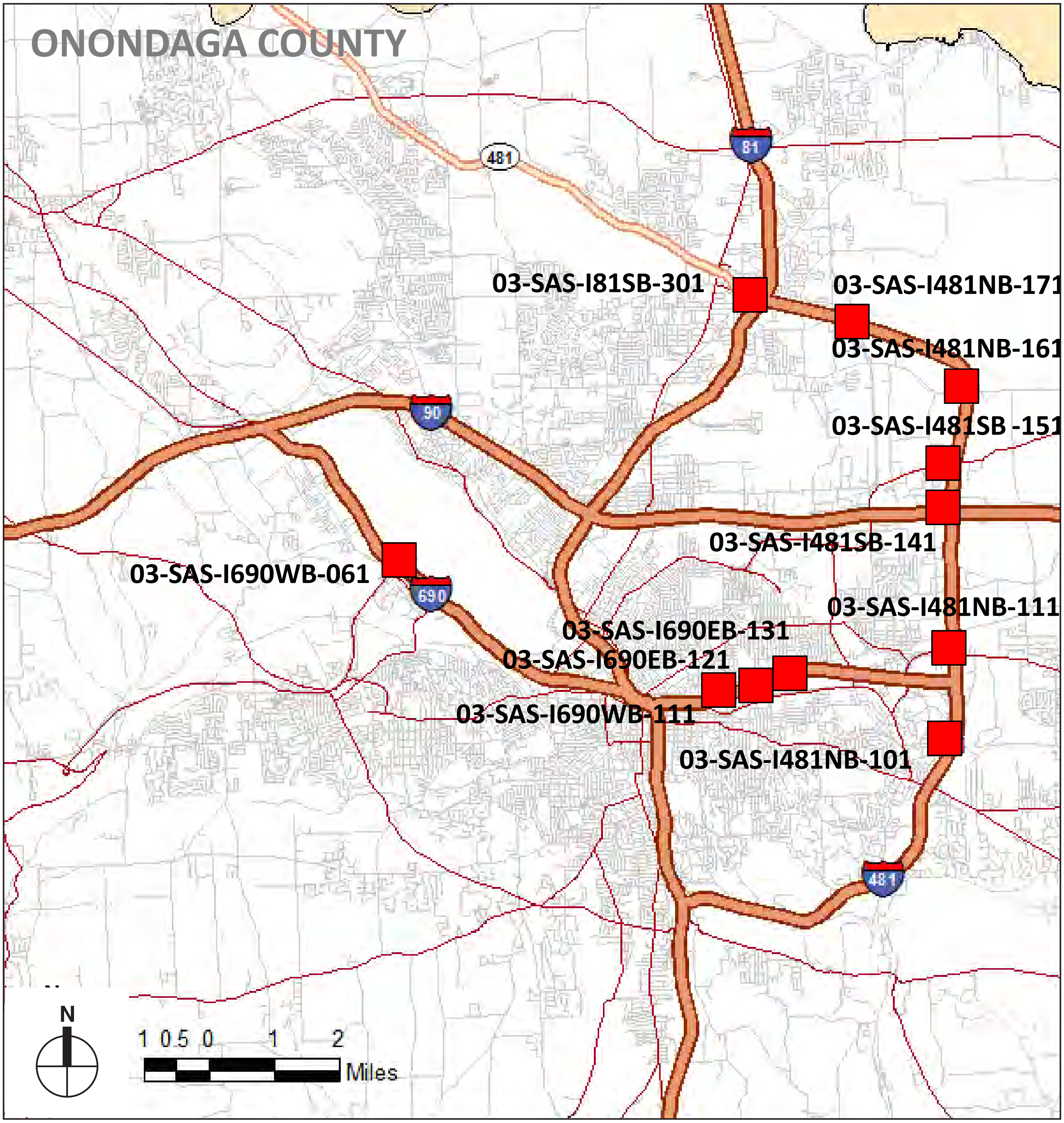
Variable Message Sign (VMS) Locations in Onondaga County

Figure 5-2



Closed Circuit Television (CCTV) Camera Locations in Onondaga County

Figure 5-3



Vehicle Detection Sensor Location

Vehicle Detection Sensor Locations in Onondaga County

Figure 5-4

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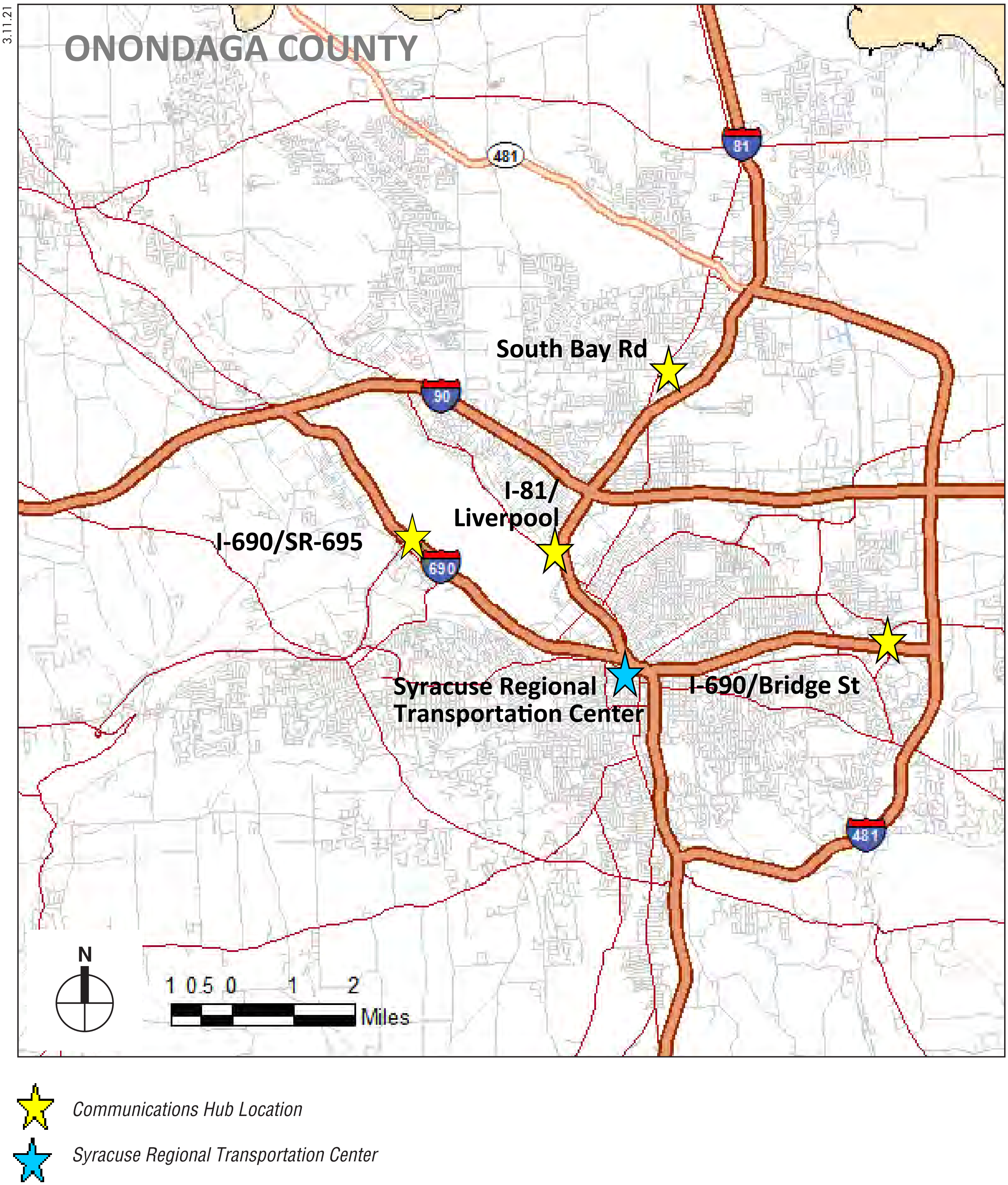


Communications Hub Locations in Onondaga County

- A static VPN is provided to share video with the Rochester center.
- A Cisco AnyConnect VPN connection is used to share sign access with the Watertown center.

An Onondaga County-owned fiber connects the 911 Center to City Hall in Syracuse, and then the link is completed through Region-owned fiber to the TMC. The New York State Police, 911 Center, and the County Sheriff are the main information exchange stakeholders for incidents and events related to the Region 3 TMC.

The inventoried equipment represents potential impacts to 15 CCTV cameras, six acoustic sensors, and six VMS signs installed along I-81 and I-690 or within interchanges connecting these two corridors to I-481.

The NYSDOT Region 3 Traffic Management Center (TMC) and two of the four existing hubs, at Liverpool/I-81 and at SR-695/I-690, are within the Project Area.

Existing ITS Deficiencies

Road Weather Information Systems (RWIS) were listed as a priority for the Region in development of the Regional Architecture. The geography of the Syracuse area promotes lake effect snowfall with annual totals exceeding 100 inches per year. Fog and ice are also hazards to the transportation in the Region. The current inventory notes that two RWIS sites remain in the area, but they have not been functional for several years.

TMC operators also report that wrong-way vehicles are an issue for the controlled access highways within the project area. An anecdotal estimate is approximately three vehicles per month enter the NYSDOT controlled access facilities via an exit ramp and travel in the wrong direction. In recognition of the crash and safety concern involving wrong-way movements on the freeway system, NYSDOT Region 3 initiated a project in December 2019 (PIN 3806.73, Regional Ground Mounted Sign Project), which is scheduled for a 2023 letting and 2024 construction completion. The project will implement wrong-way countermeasures at all freeway interchanges within the region, including full interchanges as well as partial interchanges, where wrong-way incidences have been observed or reported. Refer to Appendix A-6, Section 3.4 for additional information.

Microwave radios for hub to TMC backhaul communications are 5MB and 20MB. However, distances limit the actual available bandwidth and would need to be improved for increased video resolution or other bandwidth support functions. There is no wire line support for communications between the TMC and field equipment in the current system.

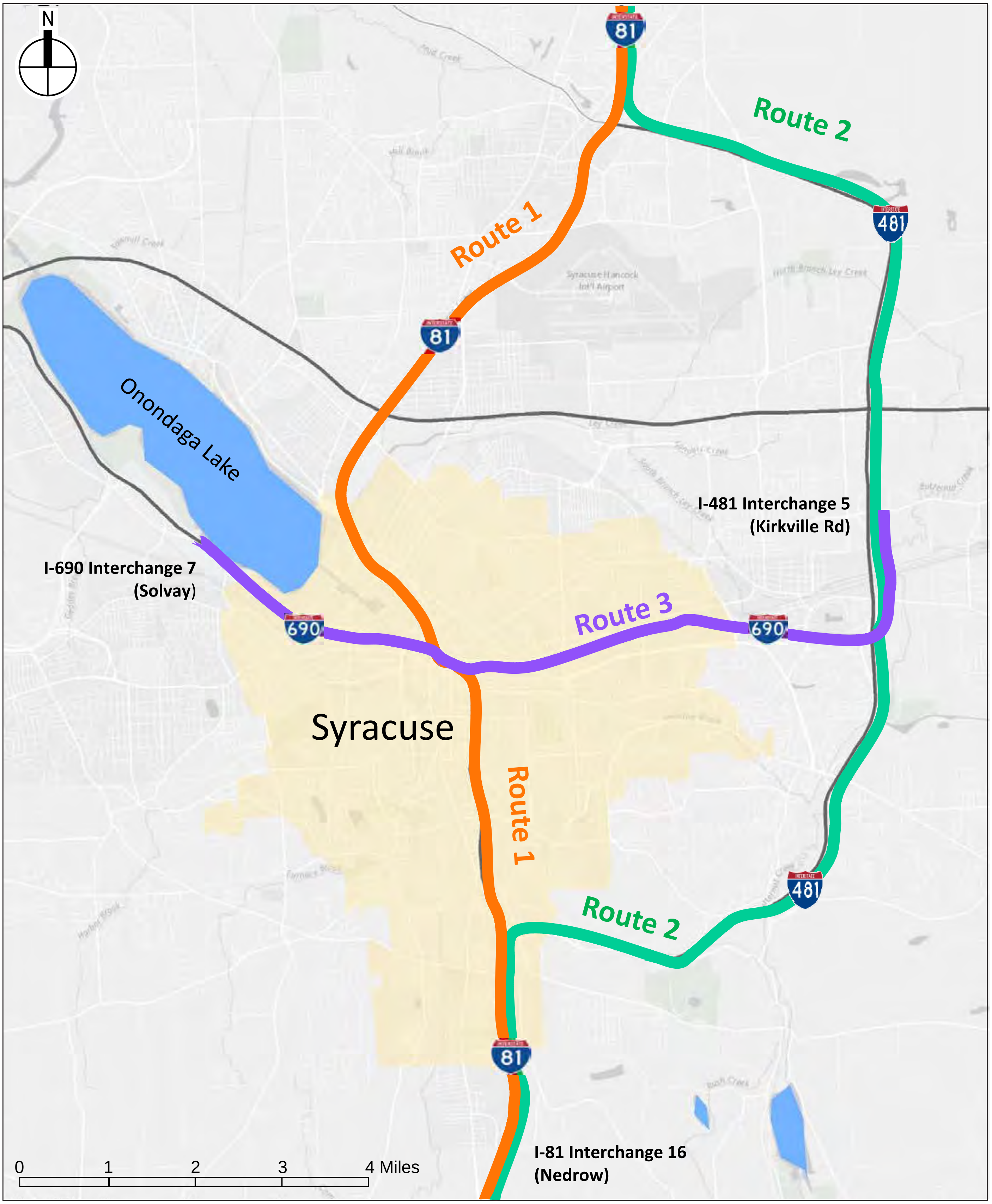
No Build Alternative

The No Build Alternative would include routine maintenance and repairs of the existing ITS system.

Speeds and Delay

Existing Travel Time and Speeds

Field travel times and vehicular speeds were collected in December 2013 along 11 routes within the Project Area. Three of the routes (Routes 1, 2, and 3) represent freeway segments and are shown in **Figure 5-6**. Eight routes (Routes 4 through 11) represent arterial segments and are shown in **Figure 5-7**. Data was collected using the average-car method, where a vehicle is driven along the route traveling with traffic at prevailing speeds while distance, travel time, and delay are recorded. Travel



Route 1
Route 2
Route 3

Travel Time Routes
(Routes 1 to 3) — Freeway
Figure 5-6

3.11.21

3.11.21

Travel Time Routes
(Routes 4 to 11) — Arterial
Figure 5-7

time and delay surveys were conducted during the AM (7:00 to 9:00 AM) and PM (4:00 to 6:00 PM) peak periods. Delay is the additional travel time experienced by a driver, passenger or pedestrian due to circumstances that impede the desirable movement of traffic. It is measured as the time difference between actual travel time and free-flow travel time. **Table 5-1** summarizes the average travel time, delay and speeds for each surveyed route by direction during the AM and PM peak periods.

Travel speeds on most routes were observed to be lower than the posted speed limits. Average travel speeds on the freeways throughout the project area range from approximately 55 to 66 miles-per-hour (mph) for the AM peak hour and from 55 to 63 mph in the PM peak hour. For most freeway routes, the AM peak hour travel speeds are similar to the PM peak hour speeds. The I-481 travel routes have higher travel speeds than the I-81 and I-690 travel routes during both the AM and PM peak hours.

Average travel speeds on the arterials in the project area range from 10 to 29 mph for the AM peak hour and from 7 to 38 mph for the PM peak hour. Except for Route 8 (West Street), all other arterial routes experience low speeds (i.e., less than 20 mph) during both the AM and PM peak hours. The arterial route with the highest travel speed is Route 8 (West Street), ranging from 20 to 38 mph during the AM and PM peak hours. Low-speed routes are typically caused by heavy traffic volumes and intersection (or traffic signal) delays.

Travel times for key origin-destination pairs in Onondaga County were estimated using output from VISSIM traffic simulations as well as the I-81 Project Travel Demand Model. VISSIM is a microscopic, time-step, and behavior-based model that analyzes multi-modal traffic flows with the flexibility of modeling all types of geometries and traffic control schemes. Details of the VISSIM model development are documented in the VISSIM Development and Calibration Report located in **Appendix C-2**. **Table 5-2** summarizes the average travel times for trips traveling between the key origin-destination pairs in the AM and PM peak periods.

Future No Build Travel Time and Speeds

Future year projections were developed for the Project's Estimated Time of Completion (ETC, 2026) and design year (ETC+30, 2056). Travel time and travel speed projections for the 2026 and 2056 No Build conditions were developed using the VISSIM simulation software. VISSIM was used to compute the average travel time for all vehicles that traveled within a defined segment for a defined period. **Table 5-3** presents the estimated travel time, delay and speeds for each of the 11 travel routes by direction during the AM and PM peak hours. On most routes, 2026 No Build travel speeds would be lower than the existing (2013) travel speeds and higher than 2056 No Build travel speeds.

In the AM peak hour, travel speeds on the freeways throughout the project area would range from 44 to 63 mph in 2026 and from 40 to 63 mph 2056. During the PM peak hour, highway travel speeds would range from 51 to 63 mph and from 49 to 62 mph in 2026 and 2056, respectively. Similarly, in the AM peak hour, arterial travel speeds throughout the project area would range from 7 to 22 mph in 2026 and from 7 to 21 mph in 2056. During the PM peak hour, arterial travel speeds would range from 7 to 21 mph and from 7 to 28 mph in 2026 and 2056, respectively. Similar to the 2013 existing conditions, under the 2026 and 2056 No Build conditions a vast majority of arterial routes can be characterized as low-speed routes, because their travel speeds would be less than 20 mph during one or more peak hours. Some routes are expected to experience reductions in delay between 2026 and

Table 5-1
2013 Existing Travel Time, Delay and Speeds

ID	Route	Direction	Travel Time (min)		Travel Delay (min)		Travel Speed (mph)		Speed Limit
			AM	PM	AM	PM	AM	PM	(mph)
1	I-81 from Exit 17 to Exit 29N	NB	12	12	1	1	60	59	45-65
		SB	13	12	2	2	55	57	45-65
2	I-481 from Exit 2 to Exit 8	NB	13	13	0	0	66	63	65
		SB	13	13	0	0	66	63	65
3	I-690 from Exit 8 to Exit 17	EB	9	9	0	0	55	56	45-55
		WB	8	9	0	0	63	55	45-55
4	Irving Avenue from Raynor Avenue to Fayette Street	NB	4	4	2	1	19	20	30
		SB	4	6	2	3	19	13	30
5	Almond Street from Van Buren Street to Burnet Avenue	NB	5	6	2	3	18	16	30
		SB	5	6	2	3	19	15	30
6	State Street from Adams Street to Butternut Street	NB	7	9	4	7	10	7	30
7	Clinton Street from Websters Landing to Adams Street	SB	4	4	2	3	13	12	30
8	West Street from Adams Street to Genesee Street	NB	2	2	0	1	29	20	35
		SB	2	1	0	0	28	38	35
9	Fayette Street from Walnut Avenue to West Street	EB	5	6	2	3	18	14	30
		WB	6	8	4	5	12	10	30
10	Harrison Street from Comstock Avenue to West Street	WB	8	8	6	5	10	11	30
11	Adams Street from West Street to Comstock Avenue	EB	7	8	4	5	12	11	30

Table 5-2
Existing Origin-Destination Travel Times (Minutes)

Origin	Destination	AM	PM
Baldwinsville	Cicero	22	23
	Destiny USA	23	20
	Downtown	21	20
	Fairmount	18	18
	Fayetteville/Manlius	30	32
	LaFayette	32	31
	Liverpool	15	15
	St. Joseph's Hospital	22	20
	University Hill	24	23
Cicero	Baldwinsville	21	23
	Destiny USA	11	12
	Downtown	16	13
	Fairmount	22	23
	Fayetteville/Manlius	19	20
	LaFayette	28	25
	Liverpool	13	14
	St. Joseph's Hospital	15	12
	University Hill	21	17
Destiny USA	Baldwinsville	22	24
	Cicero	11	12
	Downtown	9	8
	Fairmount	12	15
	Fayetteville/Manlius	18	20
	LaFayette	20	19
	Liverpool	8	9
	St. Joseph's Hospital	8	7
	University Hill	12	11
Downtown	Baldwinsville	20	21
	Cicero	15	16
	Destiny USA	5	5
	Fairmount	13	14
	Fayetteville/Manlius	15	18
	LaFayette	17	18
	Liverpool	9	10
	St. Joseph's Hospital	3	3
	University Hill	7	7
Fairmount	Baldwinsville	17	18
	Cicero	22	23
	Destiny USA	13	13
	Downtown	13	12
	Fayetteville/Manlius	22	24
	LaFayette	24	23
	Liverpool	17	17
	St. Joseph's Hospital	14	12
	University Hill	16	15

Table 5-2 (cont'd)
Existing Origin-Destination Travel Times (Minutes)

Origin	Destination	AM	PM
Fayetteville/ Manlius	Baldwinsville	27	29
	Cicero	17	18
	Destiny USA	13	14
	Downtown	14	14
	Fairmount	20	22
	LaFayette	18	19
	Liverpool	16	18
	St. Joseph's Hospital	12	13
	University Hill	16	16
LaFayette	Baldwinsville	30	31
	Cicero	25	25
	Destiny USA	15	15
	Downtown	16	16
	Fairmount	23	24
	Fayetteville/Manlius	18	20
	Liverpool	19	20
	St. Joseph's Hospital	17	18
	University Hill	14	15
Liverpool	Baldwinsville	13	15
	Cicero	14	15
	Destiny USA	6	6
	Downtown	11	9
	Fairmount	16	18
	Fayetteville/Manlius	20	20
	LaFayette	23	20
	St. Joseph's Hospital	10	8
	University Hill	15	12
St. Joseph's Hospital	Baldwinsville	19	21
	Cicero	13	13
	Destiny USA	3	3
	Downtown	3	3
	Fairmount	12	14
	Fayetteville/Manlius	14	16
	LaFayette	17	18
	Liverpool	7	7
	University Hill	7	7
University Hill	Baldwinsville	21	22
	Cicero	16	17
	Destiny USA	6	7
	Downtown	6	6
	Fairmount	14	15
	Fayetteville/Manlius	16	17
	LaFayette	16	16
	Liverpool	10	11
	St. Joseph's Hospital	7	6

Table 5-3
2026 and 2056 No Build Alternative Travel Time, Delay and Speeds

ID	Route	Direction	Travel Time (min)				Travel Delay (min)				Travel Speed (mph)				Speed Limit
			2026		2056		2026		2056		2026		2056		
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	(mph)
1	I-81 from Exit 17 to Exit 29N	NB	14	14	14	13	2	2	3	2	54	54	53	54	45-65
		SB	16	13	17	13	5	2	6	2	44	53	42	53	45-65
2	I-481 from Exit 2 to Exit 8	NB	13	13	13	14	0	1	0	1	63	63	63	62	65
		SB	13	13	13	15	0	0	0	2	63	63	63	55	65
3	I-690 from Exit 8 to Exit 17	EB	9	9	10	10	1	0	1	1	51	53	50	49	45-55
		WB	9	10	12	10	0	1	3	1	56	51	40	51	45-55
4	Irving Avenue from Raynor Avenue to Fayette Street	NB	4	4	4	6	1	1	2	3	22	21	19	14	30
		SB	4	6	4	6	1	3	2	3	19	14	19	13	30
5	Almond Street from Van Buren Street to Burnet Avenue	NB	6	6	6	9	3	3	3	6	15	16	14	9	30
		SB	7	6	7	6	4	3	4	3	12	14	13	14	30
6	State Street from Adams Street to Butternut Street	NB	5	8	5	6	3	6	3	4	12	8	12	10	30
7	Clinton Street from Websters Landing to Adams Street	SB	3	5	3	4	2	3	2	2	15	10	15	13	30
8	West Street from Adams Street to Genesee Street	NB	2	2	2	2	1	1	1	0	22	21	21	27	35
		SB	3	2	2	2	2	1	1	0	14	19	19	28	35
9	Fayette Street from Walnut Avenue to West Street	EB	6	6	6	6	4	4	4	4	8	9	9	9	30
		WB	6	7	7	7	5	5	5	5	8	7	7	7	30
10	Harrison Street from Comstock Avenue to West Street	WB	8	7	7	8	6	5	5	6	8	8	9	7	30
11	Adams Street from West Street to Comstock Avenue	EB	8	9	7	8	6	7	5	6	7	7	8	8	30

2056 due to implementation of the City's two-way street conversion and signal optimization program. 2026 and 2056 No Build condition travel times for key origin-destination pairs in Onondaga County were estimated using output from VISSIM traffic simulations, as well as the I-81 Project Travel Demand Model. **Table 5-4** summarizes the average travel times for trips traveling between these origin-destination pairs during the AM and PM peak periods.

Table 5-4
No Build Origin-Destination Travel Times (Minutes)

	Year	2026		2056	
Origin	Destination	AM	PM	AM	PM
Baldwinsville	Cicero	22	23	23	23
	Destiny USA	22	20	23	21
	Downtown	21	20	22	21
	Fairmount	18	18	18	18
	Fayetteville/Manlius	31	31	32	38
	LaFayette	32	31	34	32
	Liverpool	15	15	15	16
	St. Joseph's Hospital	22	21	23	21
	University Hill	26	25	27	23
Cicero	Baldwinsville	21	23	21	23
	Destiny USA	12	11	11	11
	Downtown	16	14	15	13
	Fairmount	22	23	21	22
	Fayetteville/Manlius	19	20	18	24
	LaFayette	27	25	27	24
	Liverpool	13	14	13	13
	St. Joseph's Hospital	15	12	15	12
	University Hill	20	18	20	16
Destiny USA	Baldwinsville	22	25	22	26
	Cicero	11	13	10	11
	Downtown	8	9	7	8
	Fairmount	12	15	12	15
	Fayetteville/Manlius	17	20	17	25
	LaFayette	19	20	19	19
	Liverpool	8	10	8	9
	St. Joseph's Hospital	7	8	7	7
	University Hill	12	13	12	11
Downtown	Baldwinsville	19	21	19	21
	Cicero	15	15	13	14
	Destiny USA	5	5	5	5
	Fairmount	12	14	12	13
	Fayetteville/Manlius	15	18	15	23
	LaFayette	17	17	16	17
	Liverpool	9	9	8	9
	St. Joseph's Hospital	3	3	3	3
	University Hill	7	8	6	7

Table 5-4 (cont'd)
No Build Origin-Destination Travel Times (Minutes)

	Year	2026		2056	
Origin	**Destination**	**AM**	**PM**	**AM**	**PM**
Fairmount	Baldwinsville	17	18	18	19
	Cicero	23	23	22	22
	Destiny USA	13	13	13	13
	Downtown	13	12	14	13
	Fayetteville/Manlius	22	23	24	30
	LaFayette	24	23	26	24
	Liverpool	17	17	17	17
	St. Joseph's Hospital	14	13	15	13
	University Hill	17	16	19	15
Fayetteville/ Manlius	Baldwinsville	29	31	30	30
	Cicero	19	20	19	17
	Destiny USA	15	16	15	14
	Downtown	16	16	17	15
	Fairmount	22	24	23	22
	LaFayette	18	19	18	20
	Liverpool	19	20	19	18
	St. Joseph's Hospital	15	16	15	14
	University Hill	18	18	19	16
LaFayette	Baldwinsville	30	31	32	32
	Cicero	25	25	26	24
	Destiny USA	16	15	17	16
	Downtown	17	16	19	15
	Fairmount	23	24	25	24
	Fayetteville/Manlius	18	22	18	25
	Liverpool	20	19	21	20
	St. Joseph's Hospital	18	18	20	16
	University Hill	16	16	18	14
Liverpool	Baldwinsville	13	15	14	14
	Cicero	14	15	13	14
	Destiny USA	6	6	6	6
	Downtown	10	9	10	9
	Fairmount	16	18	16	18
	Fayetteville/Manlius	20	20	20	26
	LaFayette	22	20	22	20
	St. Joseph's Hospital	10	8	10	8
	University Hill	15	13	15	12

Table 5-4 (cont'd)
No Build Origin-Destination Travel Times (Minutes)

	Year	2026		2056	
Origin	**Destination**	**AM**	**PM**	**AM**	**PM**
St. Joseph's Hospital	Baldwinsville	21	21	20	22
	Cicero	13	13	12	12
	Destiny USA	3	3	3	4
	Downtown	4	3	3	3
	Fairmount	14	14	13	14
	Fayetteville/Manlius	14	17	14	22
	LaFayette	18	18	18	18
	Liverpool	7	7	7	8
	University Hill	7	8	7	7
University Hill	Baldwinsville	21	24	21	24
	Cicero	16	18	15	16
	Destiny USA	6	9	7	7
	Downtown	6	6	6	6
	Fairmount	14	17	14	16
	Fayetteville/Manlius	15	18	15	24
	LaFayette	16	18	16	16
	Liverpool	10	13	10	12
	St. Joseph's Hospital	6	7	6	6

Traffic Volumes

Existing Traffic Volumes

Traffic volume data was developed for numerous highway segments and more than 290 intersections in the Project Area. Existing traffic volumes were developed from traffic data collected during the November 2013 data collection program and included 24-hour automatic traffic recorder (ATR) and turning movement counts (TMC), Available data previously assembled by SMTC and NYSDOT for the *I-81 Corridor Study* also were used for the Project's traffic analyses. All counts collected prior to 2013 were factored using an annual growth rate of 0.3 percent (estimated from the I-81 Project Travel Demand Model) to represent a common base year of 2013. Counts were adjusted from the month the count was taken to a "seasonal peak period" representing average volume levels for the fall season, which historically is the busiest time of the year during the peak hours within the project area.

A 2013 base year was used as it coincides with the time period when the traffic data was collected, and initial development of the traffic models and analyses began. The 2013 base year has been retained since the study area has not experienced significant travel pattern changes in recent years. For example, annual data such as "Syracuse Urban Area - VMT since 1985" developed by NYSDOT shows a very stable vehicle-miles traveled (VMT) trend since 2013 for the functional classes of freeways, arterials, and collectors in Syracuse urban area. "Syracuse Urban Area – VMT Since 1985" data is located in **Appendix C-3**.

In March of 2020, a traffic data revalidation study was performed using StreetLight data. This analysis compared 2019 AADT data from StreetLight with AADT volume data derived from the base year traffic volumes used for the I-81 Viaduct Project. The conclusion of this analysis was that Project traffic volumes were above the lower 90-percent confidence ranges generated by StreetLight in 90 percent of cases. The revalidation study further concluded that in all locations in the project area where comparisons were performed on I-81, I-690, and I-481, Project volumes fell within the upper and lower 90-percent confidence intervals taken from StreetLight. The total of all locations is slightly higher (3 percent) in the Project volume set compared to StreetLight data. This indicates overall consistency between the two data sets, with the Project traffic volumes being slightly more conservative. The complete memo documenting the study, titled "Comparison of StreetLight and I-81 Project Traffic Volumes" is located in **Appendix C-3.**

Counts taken at 15-minute intervals were totaled to produce hourly volumes. The 60-minute windows with the greatest total vehicular volume were determined to be 7:30-8:30 AM and 4:30-5:30 PM for the morning and evening commuter peaks, respectively.

Peak hour directional splits and truck percentages for key roadway segments within the Project Area are shown below in **Table 5-5**. Directional split percentages indicate travel is directed predominantly inward towards the city center in AM peak hour and outward away from the city center in the PM peak hour. This trend is most pronounced on I-690 west of the West Street interchange and on the northern segment of I-81. Truck percentages during the AM and PM peak hours vary from one to nine percent and are highest on the interstate segments of I-81 and I-481.

Detailed existing AM and PM peak hour balanced traffic volumes on I-81, I-481, and I-690 highway segments and ramp connections, as well as turning movements at more than 290 intersections are located in **Appendix C-3**. **Table 5-6** shows the weekday AM and PM peak hour traffic volumes, as well as Average Annual Daily Traffic (AADT), for key segments on the interstate freeways and several local roadways in the Project Area.

The largest employment centers in Onondaga County, Downtown and University Hill, are located near the geographic center of the City of Syracuse and are situated south of the I-81/I-690 interchange. The main population centers are clustered north, southeast, and west of the city center, with less development directly south and southwest of the city.

During the AM peak hour, commuters from the outlying suburbs travel inward towards the city center using I-81, I-690, and I-481. The reverse pattern occurs in the PM peak hour, as travel is concentrated directionally away from the city center. This pattern is demonstrated in **Table 5-6**. The sections of I-81 and I-690 north and east of the I-81 interchange with I-690 are the heaviest traveled roadways in the project area.

The I-81 viaduct section south of I-690 is straddled by University Hill to the east and Downtown to the west. Both locations are adjacent to the I-81 interchange with Harrison and Adams Streets. I-81 ramps connect to Almond Street that distributes traffic to and from Harrison and Adams Streets, which extend into Downtown and University Hill. As a result, Harrison, Adams, and Almond Streets experience high traffic volumes in the AM and PM peak hours.

Overall, traffic volumes within the project area are higher during the PM peak hour than the AM peak hour because there are proportionally more trips for the purposes of shopping and entertainment that overlap with commuting trips during the evening hours.

Table 5-5
2013 Existing Condition Peak Hour Directional Split and Heavy Vehicle Percentages

Location	Direction	AM		PM	
		Split %	Truck %	Split %	Truck %
I-81 Just North of Colvin St. Interchange	NB	56%	5%	46%	6%
	SB	44%	6%	54%	5%
I-81 Just South of Court/Spencer St. interchange	NB	33%	5%	63%	4%
	SB	67%	9%	37%	9%
I-481 Just South of I-690 Interchange	NB	63%	8%	44%	7%
	SB	37%	5%	56%	6%
I-481 Just North of I-690 Interchange	NB	45%	8%	55%	6%
	SB	55%	6%	45%	6%
I-690 Just West of Just West St. Interchange	EB	70%	6%	38%	5%
	WB	30%	4%	62%	3%
I-690 Just East of Teall Ave. Interchange	EB	47%	5%	53%	5%
	WB	53%	5%	47%	4%
Just West St. Just South of Fayette St.	NB	33%	3%	52%	3%
	SB	67%	6%	48%	4%
Clinton St. Just North of W Onondaga St.	SB	100%	5%	100%	2%
Salina St. Just North of W Onondaga St.	NB	49%	3%	59%	2%
	SB	51%	6%	41%	4%
State St. Just North of Harrison St.	NB	29%	4%	43%	3%
	SB	71%	4%	57%	1%
Almond St. Just North of Harrison St.	NB	32%	4%	34%	3%
	SB	68%	6%	66%	5%
Irving Ave. Just North of Harrison St.	NB	17%	3%	43%	2%
	SB	83%	3%	57%	2%
Crouse Ave. Just North of Harrison St.	NB	100%	3%	100%	2%
Erie Blvd. Just East of Almond St.	EB	58%	4%	46%	3%
	WB	42%	3%	54%	2%
Fayette St. Just East of Almond St.	EB	63%	4%	37%	3%
	WB	37%	4%	63%	2%
Genesee St. Just East of Almond St	EB	48%	4%	53%	2%
	WB	52%	3%	47%	2%
Harrison St. Just East of Almond St.	EB	7%	5%	3%	5%
	WB	93%	3%	97%	1%
Adams St. Just East of Almond St.	EB	100%	5%	100%	3%

Table 5-6
2013 Existing Traffic Volumes at Key Locations

Location	Direction	Weekday Peak Hour		AADT
		AM	PM	
I-81 Just North of Colvin Street Interchange	NB	2,871	2,937	38,600
	SB	2,292	3,394	35,700
I-81 Just South of Court/Spencer Street Interchange	NB	2,464	5,787	46,500
	SB	5,413	3,425	45,200
I-481 Just South of I-690 Interchange	NB	3,310	2,657	29,500
	SB	1,904	3,430	27,700
I-481 Just North of I-690 Interchange	NB	2,135	2,902	25,200
	SB	2,602	2,329	24,600
I-690 Just West of West Street Interchange	EB	4,193	2,331	32,000
	WB	1,835	3,790	26,800
I-690 Just East of Teall Avenue Interchange	EB	3,480	4,649	43,600
	WB	3,949	4,057	43,000
West Street Just South of Fayette Street	NB	510	795	6,700
	SB	1,053	721	10,500
Clinton Street Just North of Onondaga Street	SB	531	424	4,900
Salina Street Just North of Onondaga Street	NB	377	498	4,700
	SB	396	339	4,000
State Street Just North of Harrison Street	NB	149	224	1,900
	SB	370	291	3,400
Almond Street Just North of Harrison Street	NB	700	504	6,200
	SB	1,477	959	12,500
Irving Avenue Just North of Harrison Street	NB	121	261	1,800
	SB	582	347	5,200
Crouse Avenue Just North of Harrison Street	NB	164	335	2,700
Erie Boulevard Just East of Almond Street	EB	360	341	3,600
	WB	262	396	3,400
Fayette Street Just East of Almond Street	EB	248	161	2,100
	WB	143	269	2,100
Genesee Street Just East of Almond Street	EB	337	449	4,100
	WB	360	399	3,800
Harrison Street Just East of Almond Street	EB	65	54	600
	WB	825	1,649	13,600
Adams Street Just East of Almond Street	EB	1,615	790	14,000

Note: AADT is the Average Annual Daily Traffic.

Future No Build Year Traffic Volumes

The No Build condition represents the future without the I-81 Viaduct Project. No Build traffic volumes represent a future-year growth scenario that includes all planned/committed highway and transit improvements, except the I-81 Viaduct Project alternatives. Two future No Build years were analyzed, including the Project's Estimated Time of Completion (ETC) year 2026 and design year

2056 (ETC+30). The primary tool used for estimating future Build year traffic volumes is the I-81 Project Travel Demand Model. This model is based on the SMTC regional travel demand model developed by the Syracuse Metropolitan Transportation Council (SMTC), with additional refinements to improve model accuracy within the Project area. The I-81 Project Travel Demand Model predicts traffic volumes as a result of the anticipated changes in land use, population, economic activity, and the transportation system. A discussion of planned developments in the Project Area is located in **Section 6-2-1.2.5, Planned Developments**. AM and PM peak hour traffic volumes were forecasted separately for the 2026 and 2056 No Build conditions.

Detailed AM and PM peak hour No Build traffic volumes for all interstate segments, ramp connections, and intersections for the 2026 and 2056 analysis years are located in **Appendix C-3**. **Table 5-7** shows the weekday AM and PM peak hour traffic volumes for key segments on the interstate freeways and several local roadways in the project area.

Table 5-7
2026 and 2056 No Build Traffic Volumes at Key Locations

Location	Direction	AM			PM		
		Existing	No Build		Existing	No Build	
		2013	2026	2056	2013	2026	2056
I-81 Just North of Colvin Street Interchange	NB	2,871	3,032	3,412	2,937	2,957	3,101
	SB	2,292	2,357	2,480	3,394	3,519	3,815
I-81 Just South of Court/ Spencer Street Interchange	NB	2,464	2,484	2,688	5,787	5,945	6,322
	SB	5,062	5,254	5,681	3,425	3,529	3,820
I-481 Just South of I-690 Interchange	NB	3,310	3,492	3,722	2,657	2,784	2,958
	SB	1,904	2,030	2,203	3,430	3,565	3,814
I-481 Just North of I-690 Interchange	NB	2,135	2,304	2,551	2,902	3,025	3,267
	SB	2,602	2,740	3,083	2,329	2,459	2,797
I-690 Just West of West Street Interchange	EB	4,193	4,512	4,893	2,331	2,545	2,801
	WB	1,835	1,974	2,178	3,790	4,024	4,386
I-690 Just East of Teall Avenue Interchange	EB	3,480	3,560	3,711	4,649	4,795	4,965
	WB	3,949	3,977	4,271	4,057	3,937	4,061
West Street Just South of Fayette Street	NB	510	495	438	795	833	782
	SB	1,053	1,022	1,082	721	655	698
Clinton Street Just North of Onondaga Street	NB			196			265
	SB	531	546	424	424	483	327
Salina Street Just North of Onondaga Street	NB	377	318	282	498	419	437
	SB	396	362	440	339	283	370

Table 5-7 (cont'd)
2026 and 2056 No Build Traffic Volumes at Key Locations

Location	Direction	AM			PM		
		Existing	No Build		Existing	No Build	
		2013	2026	2056	2013	2026	2056
State Street Just North of Harrison Street	NB	149	167	153	224	235	278
	SB	370	375	429	291	323	329
Almond Street Just North of Harrison Street	NB	700	713	747	504	519	517
	SB	1,477	1,528	1,584	959	1,004	1,159
Irving Avenue Just North of Harrison Street	NB	121	120	140	261	275	318
	SB	582	554	633	347	358	391
Crouse Avenue Just North of Harrison Street	NB	164	178	174	335	383	371
Erie Boulevard Just East of Almond Street	EB	360	363	417	341	357	399
	WB	262	273	313	396	395	447
Fayette Street Just East of Almond Street	EB	249	276	285	161	157	185
	WB	143	152	157	269	294	297
Genesee Street Just East of Almond Street	EB	337	357	370	449	461	478
	WB	360	369	386	399	372	436
Harrison Street Just East of Almond Street	EB	65	49	113	54	54	79
	WB	825	838	913	1,648	1,651	1,867
Adams Street Just East of Almond Street	EB	1,615	1,742	1,876	790	817	963

Overall, traffic volumes are expected to increase moderately by the year 2026. Traffic volume increases from 2026 to 2056 are greater due to the longer time interval but are still modest on an annual basis. Traffic volume increases in the area can be attributed to economic development and population growth. As shown in **Table 5-7**, the largest traffic increases occur on the section of I-81 south of Court Street, I-690 west of West Street, and I-481 south of the I-690 interchange. These are heavily traveled commuter routes today and under No Build conditions, a continuation of traditional growth patterns would produce regional traffic patterns similar to existing conditions.

It is important to note that circulation patterns in the downtown area are expected to change to some extent by 2056, as plans to convert portions of Clinton Street and other arterials from one-way to two-way operation are implemented in approximately 2030 based on current plans. This two-way street conversion project planned by the City is discussed in **Section 5-2, Transportation Plans and Land Use**. In 2056, northbound travel would be permitted on Clinton Street between Tallman Street and Jefferson Street. Southbound travel on Clinton Street would decrease as parallel north-south roads would compensate under the modified configuration.

Level of Service and Mobility

In the I-81 viaduct Project study area, motorists experience congestion on portions of southbound I-81, which typically is contained within a single peak hour (7:30-8:30 AM) on weekdays during the morning commuting period. Low travel speeds and poor levels of service prevail on southbound I-81 from the Interchange 18 (Harrison/Adams Streets) exit-ramp and often extend as far north as the southbound I-81 entrance-ramp from Route 370 and Onondaga Lake Parkway. In addition, the entrance-ramp to southbound I-81 from eastbound I-690 typically is congested during the same period and queues on this ramp can extend back to the eastbound I-690 mainline roadway.

Congestion in this area is caused by a bottleneck where the connector ramp from eastbound I-690 merges with southbound I-81. The two lanes provided in this segment are insufficient to accommodate the confluence of traffic from major population centers. These include the population centers from the north and west of the City of Syracuse that travel to the Harrison Street exit-ramp, which connects to Almond Street and Harrison Street, and provides the most direct access to major activity centers on University Hill and in the eastern portion of Downtown.

The system is further constrained by capacity limitations on the Harrison Avenue exit ramp itself, a portion of which is only a single lane. Additionally, the downstream intersections and traffic signals on Almond Street cannot accommodate the traffic demand efficiently, particularly at Harrison Street, where a high-volume of left-turns occur.

These conditions are expected to deteriorate further under No Build conditions without the proposed I-81 Viaduct project.

The operating performance of a roadway segment or intersection is commonly measured by level of service (LOS) based on such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience. The 2010 Highway Capacity Manual (HCM) defines six LOS ratings (letters A through F), with LOS A representing free-flow conditions and LOS F signifying unstable or breakdown conditions. The remaining LOS letters represent gradually declining traffic conditions as traffic performance drops from LOS B through LOS E, with E being the capacity of the roadway.

Freeway Level of Service

Specific criteria/measures are used to define LOS for different types of roadway facilities. In the case of basic freeway segments (BFS), LOS is based on the density of vehicles in the traffic stream, defined in terms of passenger car equivalents per-mile per-lane (pc/mi/ln). LOS for ramp operations is determined based on the density of the vehicles within the influence areas (typically including the outer two lanes of the freeway) created by the merging or diverging vehicles. The influence area for these movements typically extends 1,500 feet downstream of an entrance ramp or 1,500 feet upstream of an exit ramp. LOS for weaving areas also is determined by density. Traffic within a weaving area is subject to turbulence, normally in the form of forced lane changes within a restricted distance. Although there are both weaving and non-weaving vehicles within a weaving area, a single LOS is used to describe operations within the weaving area. The LOS of basic freeway segments, freeway ramps (ramp merge and diverge areas), and weaving areas would be determined by relating their respective VISSIM density calculations to the LOS criteria (as defined in the HCM, 6th Edition) in **Table 5-8**.

Table 5-8
Freeway Level of Service Criteria

Level of Service (LOS)	Density (pc/mi/ln)		
	Basic Segments	Ramp Merge and Diverge Areas	Weaving Segments
A	≤ 11	≤ 10	≤ 10
B	> 11 - 18	> 10 – 20	> 10 – 20
C	> 18 - 26	> 20 – 28	> 20 – 28
D	> 26 - 35	> 28 – 35	> 28 – 35
E	> 35 - 45	> 35	> 35 – 43
F	> 45	Demand exceeds capacity	> 43

Intersection Level of Service

LOS for intersections is defined in terms of average control delay (in seconds) per vehicle during peak traffic demand periods. Control delay is defined as the portion of the total delay attributed to traffic control devices, either traffic signals or stop signs. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections, LOS is related to the control delay for all movements, while for unsignalized intersections, LOS is for each stop-controlled movement. For two-way stop-controlled intersections, LOS depends on the amount of delay experienced by drivers on the minor (stop-controlled) approaches. All-way stop-controlled intersections require drivers on all approaches to stop before proceeding into the intersection, so LOS is determined by the average computed delay for all movements.

The LOS of signalized and unsignalized intersections would be determined by relating their respective VISSIM delay calculations to the LOS criteria (as defined in the HCM, 6th Edition) in **Table 5-9**. While HCM defines LOS of an intersection based on control delay, VISSIM only reports total delay at intersections which is always greater than control delay, although the differences between the two quantities is usually minor. As a result, all intersection LOS results were calculated using total delay with the same thresholds defined in **Table 5-9**.

Table 5-9
Intersection Level of Service Criteria

Level of Service (LOS)	Average Control Delay (sec/veh)	
	Signalized Intersection	Unsignalized Intersection
A	≤ 10	≤ 10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80	> 50

Existing Level of Service and Mobility

To evaluate the performance of the transportation system in the project area, the VISSIM traffic simulation models were run for several hours representing the AM and PM peak periods (see the *VISSIM Development and Calibration Report* located in **Appendix C-2**). However, because the true peak periods in the study area occur for one hour or less during the AM and PM peak periods and congestion does not typically extend beyond those hours, the following results represent the average of one peak hour during both the AM and PM peak periods.

Freeway Level of Service

Based on VISSIM density measures, existing AM and PM peak hour LOS analyses were conducted for all segments of I-81, I-481, and I-690 within the Project Area (see **Appendix C-3**).

Levels of service were calculated for basic freeway segments (BFS), freeway ramps, and weaving segments using the VISSIM models developed for the Project. VISSIM accounts for operational characteristics of all individual vehicles traveling over a freeway segment or ramp and determines the segment or ramp LOS based on the density of vehicles in the traffic stream. The results of the freeway segment, ramp merging and diverging, and weaving analyses are presented in **Table 5-10**.

The results indicate that all segments of I-481 and most segments of I-81 and I-690 currently operate at LOS D (which is considered acceptable) or better during the AM and PM peak hours. The segments that operate at LOS E or LOS F include:

- Southbound I-81 merge at the Old Liverpool Road on-ramp (2013 AM);
- Southbound I-81 merge at the Onondaga Lake Parkway (NY370) on-ramp (2013 AM);
- Southbound I-81 BFS between the Onondaga Lake Parkway on-ramp and the Interchange 22 (Bear St) on-ramp (2013 AM);
- Southbound I-81 diverge at Exit 21 (Spencer/Catawba Street) (2013 AM);
- Southbound I-81 BFS between the Interchange 21 (Spencer/Catawba Street) off and on-ramps (2013 AM);
- Southbound I-81 weave between the Interchange 21 (Spencer/Catawba Street) on-ramp and Exit 20 (Franklin Street) (2013 AM);
- Southbound I-81 diverge at Exit 19 (Clinton Street, Salina Street) (2013 AM);
- Southbound I-81 diverge at eastbound I-690 (2013 AM);
- Southbound I-81 BFS between the eastbound I-690 off and on-ramps (2013 AM);
- Southbound I-81 merge at the eastbound I-690 on-ramp (2013 AM);
- Southbound I-81 diverge at Exit 18 (Harrison Street, Adams Street) (2013 AM); and
- Eastbound I-690 diverge at the southbound I-81 off-ramp (2013 AM).

It should be noted that the majority of unacceptable LOS conditions occur in the AM peak hour on southbound I-81 north of I-690. This is to be expected since the larger suburban population centers are located to the north and motorists use southbound I-81 in the morning to reach the large Downtown and University Hill employment centers.

Table 5-10
2013 Existing Freeway LOS Analysis

Segment	Type	AM Density (pc/mi/ln)	AM LOS	PM Density (pc/mi/ln)	PM LOS
Northbound I-81					
between Interchange 16 (US 11) on-ramp and Exit 16A (I-481 Northbound)	BFS	9.6	A	12.4	B
at Exit 16A (I-481 Northbound)	Diverge	8.9	A	10.1	B
between Interchange 16A (I-481 Northbound) off and on-ramps	BFS	4.4	A	8.4	A
between Interchange 16A (I-481 Northbound) on-ramp and Exit 17 (S. Salina St, Brighton Av)	Weave	6.6	A	8.0	A
at Interchange 17 (S. Salina St) on-ramp	Merge	13.1	B	14.1	B
between Interchange 17 (S. Salina St, Brighton Av) off and on-ramps	BFS	13.3	B	14.5	B
between Interchange 17 (S. Salina St) and Interchange 17 (E. Colvin St) on-ramps	BFS	13.2	B	14.3	B
at Interchange 17 (E. Colvin St) on-ramp	Merge	13.9	B	15.8	B
between Interchange 17 (E. Colvin St) on-ramp and Exit 18 (Adams St)	BFS	16.9	B	19.4	C
at Exit 18 (Adams St, Harrison St)	Diverge	16.9	B	22.6	C
between Interchange 18 (Adams St, Harrison St) off and on-ramps	BFS	19.2	C	23.6	C
between Interchange 18 (Harrison St) on-ramp and Eastbound I-690 off-ramp	Weave	15.0	B	34.7	D
between Westbound I-690 off and on-ramps	BFS	12.4	B	33.2	D
at Westbound I-690 off-ramp	Diverge	9.2	A	21.7	C
at Westbound I-690 on-ramp	Merge	9.8	A	26.7	C
at Interchange 19 (N. Salina St, Pearl St) on-ramp	Merge	12.4	B	32.8	D
between Interchange 19 (Pearl St) and Interchange 20 (Butternut St) on-ramps	BFS	12.4	B	33.0	D
at Interchange 20 (Butternut St) on-ramp	Merge	13.0	B	31.0	D
at Exit 22 (Court St)	Diverge	12.9	B	31.4	D
between Interchange 22 (Court St) off and on-ramps	BFS	13.0	B	34.0	D
between Interchange 22 (Court St) on-ramp and Exit 23 (Hiawatha Blvd)	Weave	8.4	A	22.4	C
between Interchange 23 (Park St, Hiawatha Blvd) off and on-ramps	BFS	9.0	A	23.0	C
at Interchange 23 (Hiawatha Blvd) on-ramp	Merge	13.3	B	27.8	C
between Interchange 23 (Hiawatha Blvd) on-ramp and Exit 25 (7th North St)	BFS	9.3	A	20.9	C
at Exit 25 (7th North St)	Diverge	9.9	A	19.7	B
between Interchange 25 (7th North St) off and on-ramps	BFS	8.9	A	22.8	C
between Interchange 25 (7th North St) on-ramp and Exit 25A (I-90)	Weave	7.7	A	21.2	C
between Interchange 25A (I-90) off and on-ramps	BFS	8.6	A	24.0	C
between Interchange 25A (I-90) on-ramp and Exit 26 (US 11)	BFS	9.8	A	21.8	C
at Interchange 25A (I-90) on-ramp	Merge	9.8	A	21.8	C
at Exit 26 (US 11)	Diverge	8.3	A	17.2	B

Table 5-10 (cont'd)
2013 Existing Freeway LOS Analysis

Segment	Type	AM		PM	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
between Exit 26 (US 11) and Exits 27-28 (Airport Blvd)	BFS	8.1	A	20.0	C
at Exits 27-28 (Airport Blvd)	Diverge	8.1	A	20.0	B
between Interchange 27 (Airport Blvd) off and on-ramps	BFS	5.3	A	15.2	B
at Interchange 27 (Airport Blvd) on-ramp	Merge	7.7	A	18.4	B
between Interchange 27 (Airport Blvd) on-ramp and Taft Rd on-ramp	BFS	7.7	A	19.2	C
at Interchange 28 (Taft Rd) on-ramp	Merge	10.1	B	20.2	C
between Interchange 28 (Taft Rd) on-ramp and Exit 29S (I-481 South)	BFS	9.8	A	22.4	C
at Exit 29S (I-481 South)	Diverge	9.0	A	18.2	B
between Exit 29S (I-481 SB) and Southbound NY-481 on-ramp	BFS	9.0	A	21.0	C
between Interchange 29N (NY-481) on and off-ramps	Weave	7.3	A	17.0	B
between Exit 29N (NY-481 Northbound) and Northbound I-481 on-ramp	BFS	6.6	A	12.8	B
at Interchange 29S (I-481) on-ramp	Merge	8.1	A	15.3	B
between Interchange 29N (I-481) on-ramp and Exit 30 (NY-31)	BFS	8.2	A	16.6	B
Southbound I-81					
between Interchange 30 (NY-31) on-ramp and Exit 29N (NY-481)	BFS	19.2	C	10.8	A
at Exit 29N (NY-481)	Diverge	18.9	B	7.6	A
between Exit 29N (NY-481 Northbound) and Northbound I-481 on-ramp	BFS	18.5	C	10.0	A
between Interchange 29S (I-481) on and off-ramps	Weave	15.5	B	8.4	A
between Exit 29S (I-481 SB) and Southbound NY-481 on-ramp	BFS	15.8	B	9.1	A
at Interchange 29N (NY-481) on-ramp	Merge	23.8	C	14.3	B
between Interchange 29S (I-481) on-ramp and Exit 28 (Taft Rd)	BFS	25.3	C	14.7	B
at Exit 28 (Taft Rd)	Diverge	19.4	B	14.4	B
between Exit 28 (Taft Rd) and Exits 27-26 (Airport Blvd)	BFS	22.6	C	12.7	B
at Exits 27-26 (US 11)	Diverge	19.5	B	11.4	B
between Interchange 27 (Airport Blvd) off and on-ramps	BFS	19.2	C	10.3	A
at Interchange 27 (Airport Rd) on-ramp	Merge	19.5	B	14.1	B
between Interchange 27 (Airport Rd) and Interchange 26 (US 11) on-ramps	BFS	22.3	C	14.4	B
at Interchange 26 (US 11) on-ramp	Merge	16.8	B	15.3	B
between Interchange 26 (US 11) on-ramp and Exit 25A (I-90)	BFS	19.7	C	15.8	B
at Exit 25A (I-90)	Diverge	19.7	B	15.8	B
between Interchange 25A (I-90) off and on-ramps	BFS	23.8	C	17.8	B
between Interchange 25A (I-90) on-ramp and Exit 25 (7th North St)	Weave	19.6	B	14.7	B
between Interchange 25 (7th North St) off and on-ramps	BFS	21.6	C	16.1	B
between Interchange 25 (7th North St) on-ramp and Exits 23A and 23B (Hiawatha Blvd) and Exit 22 (Bear St)	Weave	19.5	B	14.9	B

Table 5-10 (cont'd)
2013 Existing Freeway LOS Analysis

Segment	Type	AM Density (pc/mi/ln)	AM LOS	PM Density (pc/mi/ln)	PM LOS
between Exit 23A and Old Liverpool Rd on-ramp	BFS	34.4	D	15.5	B
at Old Liverpool Rd on-ramp	Merge	36.9	E	16.1	B
at Onondaga Lake Pkwy (NY370) on-ramp	Merge	36.3	E	18.5	B
between Onondaga Lake Pkwy on-ramp and Interchange 22 (Bear St) on-ramp	BFS	48.7	F	21.7	C
at Interchange 22 (Bear St) on-ramp	Merge	33.9	D	21.7	C
at Exit 21 (Spencer/Catawba St)	Diverge	53.7	F	26.3	C
between Interchange 21 (Spencer/Catawba St) off and on-ramps	BFS	50.3	F	23.5	C
between Interchange 21 (Spencer/Catawba St) on-ramp and Exit 20 (Franklin St)	Weave	46.7	F	19.0	B
at Exit 19 (Clinton St, Salina St)	Diverge	67.1	F	22.3	C
at Eastbound I-690	Diverge	78.3	F	29.1	D
between Eastbound I-690 off and on-ramps	BFS	73.3	F	19.9	C
at Eastbound I-690 on-ramp	Merge	73.3	F	19.9	B
at Exit 18 (Harrison St, Adams St)	Diverge	42.5	E	30.7	D
at Westbound I-690 on-ramp	Merge	15.2	B	19.7	B
between Westbound I-690 and Interchange 18 (Adams St) on-ramps	BFS	17.2	B	22.6	C
between Exit 18 (Harrison St, Adams St) and Westbound I-690 on-ramp	BFS	22.7	C	28.8	D
at Interchange 18 (Harrison St, Adams St) on-ramp	Merge	13.6	B	22.0	C
between Interchange 18 (Adams St) and Exit 17 (S. State St)	BFS	13.8	B	21.9	C
at Exit 17 (S. State St, S. Salina St, Brighton Av)	Diverge	13.6	B	19.7	B
between Exit 17 (S. State St, S. Salina St, Brighton Av) off and on-ramps	BFS	6.1	A	12.5	B
at Brighton Av on-ramp	Merge	9.0	A	14.1	B
at Exit 16 (I-481) off-ramp	Diverge	6.3	A	11.5	B
between Interchange 16A (I-481) off and on-ramps	BFS	9.8	A	13.9	B
at Interchange 16A (I-481) on-ramp	Merge	10.9	B	13.4	B
between Interchange 16A (I-481) on-ramp and Interchange 16 (US 11) off-ramps	BFS	16.5	B	20.3	C
Northbound I-481					
between I-81 on-ramp and Exit 1 (Brighton Av, Rock Cut Rd)	Weave	7.6	A	10.9	B
between Interchange 1 (Brighton Av, Rock Cut Rd) off and on-ramps	BFS	6.6	A	8.2	A
at Interchange 1 (Brighton Av, Rock Cut Rd) on-ramp	Merge	8.1	A	8.2	A
between Interchange 1 (Brighton Av, Rock Cut Rd) and Exit 2 (Jamesville Rd)	BFS	10.6	A	11.1	B
at Exit 2 (Jamesville Rd)	Diverge	6.9	A	7.3	A
between Interchange 2 (Jamesville Rd) off and on-ramps	BFS	8.7	A	7.4	A
at Interchange 2 (Jamesville Rd) on-ramp	Merge	10.0	A	8.7	A

Table 5-10 (cont'd)
2013 Existing Freeway LOS Analysis

Segment	Type	AM Density (pc/mi/ln)	AM LOS	PM Density (pc/mi/ln)	PM LOS
between Interchange 2 (Jamesville Rd) on-ramp and Exit 3E (Eastbound NY-5)	BFS	13.6	B	11.8	B
at Exit 3E (Eastbound NY-5)	Diverge	9.2	A	8.5	A
between Interchange 3E (Eastbound NY-5) off and on-ramps	BFS	11.9	B	9.6	A
between Interchange 3E (Eastbound NY-5) on-ramp and Exit 3W (Westbound NY-5)	Weave	9.9	A	8.8	A
between Interchange 3W (Westbound NY-5) off and on-ramps	BFS	11.5	B	10.5	A
at Interchange 3W (Westbound NY-5) on-ramp	Merge	14.5	B	11.9	B
between Interchange 3W (Westbound NY-5) on-ramp and Exit 4 (Westbound I-690)	BFS	16.7	B	13.7	B
at Exit 4 (Westbound I-690)	Diverge	12.0	B	10.2	B
between Interchange 4 (I-690) off and on-ramps	BFS	10.3	A	10.6	A
at Interchange 4 (Eastbound I-690) on-ramp	Merge	11.0	B	15.9	B
between Interchange 4 (Eastbound I-690) on-ramp and Exit 5E (Kirkville Rd)	BFS	16.1	B	22.9	C
at Exit 5E (Kirkville Rd)	Diverge	11.2	B	18.1	B
between Interchange 5E (Kirkville Rd) off and on-ramps	BFS	15.1	B	19.2	C
between Interchange 5E (Kirkville Rd) on-ramp and Exit 5W (Kirkville Rd)	Weave	10.7	B	14.4	B
between Interchange 5W (Kirkville Rd) off and on-ramps	BFS	11.2	B	18.5	C
at Interchange 5W (Kirkville Rd) on-ramp	Merge	8.7	A	13.5	B
between Interchange 5W (Kirkville Rd) on-ramp and Exit 6 (I-90)	BFS	12.9	B	20.5	C
at Exit 6 (I-90)	Diverge	11.9	B	23.0	C
between Interchange 6 (I-90) off and on-ramps	BFS	8.8	A	11.1	B
at Interchange 6 (I-90) on-ramp	Merge	7.9	A	9.8	A
at Exit 7 (NY-298 Bridgeport Rd)	Diverge	9.5	A	11.5	B
between Interchange 7 (NY-298 Bridgeport Rd) off and on-ramps	BFS	8.0	A	10.6	A
at Interchange 7 (NY-298 Bridgeport Rd) on-ramp	Merge	5.9	A	10.1	B
between Interchange 7 (NY-298 Bridgeport Rd) on-ramp and Exit 8 (Northern Blvd)	BFS	8.8	A	14.7	B
at Exit 8 (Northern Blvd)	Diverge	6.3	A	10.4	B
between Interchange 8 (Northern Blvd) off and on-ramps	BFS	6.4	A	11.5	B
at Interchange 8 (Northern Blvd) on-ramp	Merge	6.3	A	14.6	B
between Interchange 8 (Northern Blvd) on-ramp and Exit 9N (I-81)	BFS	9.3	A	21.3	C
at Exit 9N (I-81)	Diverge	7.1	A	16.6	B
Southbound I-481					
at Interchange 9N (I-81) on-ramp	Merge	17.5	B	9.3	A
between Interchange 9N (I-81) on-ramp and Exit 8 (Northern Blvd)	BFS	20.1	C	12.0	B
at Exit 8 (Northern Blvd)	Diverge	14.7	B	8.5	A
between Interchange 8 (Northern Blvd) off and on-ramps	BFS	13.7	B	9.3	A

Table 5-10 (cont'd)
2013 Existing Freeway LOS Analysis

Segment	Type	AM		PM	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
at Interchange 8 (Northern Blvd) on-ramp	Merge	11.6	B	7.5	A
between Interchange 8 (Northern Blvd) on-ramp and Exit 7 (NY-298 Bridgeport Rd)	BFS	17.2	B	11.2	B
at Exit 7 (NY-298 Bridgeport Rd)	Diverge	14.4	B	7.9	A
between Interchange 7 (NY-298 Bridgeport Rd) off and on-ramps	BFS	13.1	B	10.1	A
at Interchange 7 (NY-298 Bridgeport Rd) on-ramp	Merge	11.3	B	10.4	B
between Interchange 7 (NY-298 Bridgeport Rd) and Exit 6 (I-90)	BFS	16.5	B	15.0	B
at Exit 6 (I-90)	Diverge	12.4	B	11.7	B
between Interchange 6 (I-90) off and on-ramps	BFS	14.3	B	11.9	B
at Interchange 6 (I-90) on-ramp	Merge	14.7	B	12.4	B
between Interchange 6 (I-90) on-ramp and Exit 5W (Kirkville Rd)	BFS	20.3	C	17.0	B
at Exit 5W (Kirkville Rd)	Diverge	14.7	B	11.2	B
between Interchange 5W (Kirkville Rd) off and on-ramps	BFS	17.5	B	15.8	B
between Interchange 5W (Kirkville Rd) on-ramp and Exit 5E (Kirkville Rd)	Weave	13.9	B	11.4	B
between Interchange 5E (Kirkville Rd) off and on-ramps	BFS	18.6	C	14.8	B
at Interchange 5E (Kirkville Rd) on-ramp	Merge	15.0	B	13.9	B
between Interchange 5E (Kirkville Rd) on-ramp and Exit 4 (Westbound I-690)	BFS	22.1	C	19.8	C
at Exit 4 (Westbound I-690)	Diverge	23.4	C	18.5	B
between Interchange 4 (I-690) off and on-ramps	BFS	9.8	A	11.9	B
at Interchange 4 (Eastbound I-690) on-ramp	Merge	8.4	A	15.3	B
between Interchange 4 (Eastbound I-690) on-ramp and Exit 3W (Westbound NY-5)	BFS	10.5	A	20.0	C
at Exit 3W (Westbound NY-5)	Diverge	9.7	A	20.1	C
between Interchange 3W (Westbound NY-5) off and on-ramps	BFS	9.3	A	16.3	B
between Interchange 3W (Westbound NY-5) on-ramp and Exit 3E (Eastbound NY-5)	Weave	8.3	A	22.0	C
between Interchange 3E (Eastbound NY-5) off and on-ramps	BFS	5.9	A	8.2	A
at Interchange 3E (Eastbound NY-5) on-ramp	Merge	6.5	A	10.1	B
between Interchange 3E (Eastbound NY-5) on-ramp and Exit 2 (Jamesville Rd)	BFS	6.6	A	10.4	A
at Exit 2 (Jamesville Rd)	Diverge	9.8	A	15.8	B
between Interchange 2 (Jamesville Rd) off and on-ramps	BFS	6.9	A	10.1	A
at Interchange 2 (Jamesville Rd) on-ramp	Merge	7.7	A	8.2	A
between Interchange 2 (Jamesville Rd) on-ramp and Exit 1 (Brighton Av)	BFS	11.2	B	12.2	B
at Exit 1 (Brighton Av)	Diverge	9.5	A	11.1	B
at Northbound I-81 and Southbound I-81 ramps	Diverge	9.5	A	8.8	A
between Northbound I-81 off-ramp and E. Brighton Av on-ramp	BFS	9.5	A	8.8	A

Table 5-10 (cont'd)
2013 Existing Freeway LOS Analysis

Segment	Type	AM Density (pc/mi/ln)	AM LOS	PM Density (pc/mi/ln)	PM LOS
at E. Brighton Av on-ramp	Merge	9.9	A	7.6	A
Eastbound I-690					
between Interchange 7 (NY-297) and Interchange 8 (State Fair Blvd) on-ramps	BFS	26.4	D	13.0	B
at Interchange 8 (State Fair Blvd) on-ramp	Merge	19.4	B	12.7	B
at Exit 8 (Hiawatha Blvd)	Diverge	22.0	C	13.5	B
between Exit 8 (Hiawatha Blvd) and Exit 9 (Bear St)	BFS	24.1	C	11.0	B
at Exit 9 (Bear St)	Diverge	19.6	B	10.2	B
between Exit 9 (Bear St) and Interchange 10 (N. Geddes St) on-ramp	BFS	21.3	C	9.6	A
between Interchange 10 (N. Geddes St) on-ramp and Exit 11 (West St)	Weave	21.1	C	11.7	B
between Interchange 11 West St off and on-ramps	BFS	30.4	D	21.1	C
at Interchange 11 (West St) on-ramp	Merge	32.5	D	20.9	C
at South I-81 off-ramp	Diverge	38.3	E	31.8	D
between South I-81 off and on-ramps	BFS	22.3	C	21.5	C
at Southbound I-81 on-ramp	Merge	19.8	B	22.0	C
at N. McBride St on-ramp	Merge	16.4	B	22.4	C
at Northbound I-81 on-ramp	Merge	26.0	C	28.2	D
between Northbound I-81 on-ramp and Exit 14 (Teall Av)	BFS	28.9	D	32.0	D
at Exit 14 (Teall Av)	Diverge	31.5	D	25.7	C
between Interchange 14 (Teall Av) off and on-ramps	BFS	20.5	C	27.2	D
at Interchange 14 (Teall Av) on-ramp	Merge	20.2	C	25.1	C
at Exit 15 (Midler Av)	Diverge	22.1	C	27.4	C
between Interchange 15 (Midler Av) off and on-ramps	BFS	15.9	B	25.0	C
at Interchange 15 (Midler Av) on-ramp	Merge	15.0	B	22.1	C
between Interchange 15 (Midler Av) on-ramp and Exits 16S-N (Thompson Rd)	BFS	17.1	B	27.5	D
at Exits 16S-N (Thompson Rd) and Exit 17 (Bridge St)	Diverge	13.1	B	19.9	B
between Interchange 16S-N (Thompson Rd) off and on-ramps	BFS	7.3	A	16.0	B
at Interchange 16S-N (Thompson Rd) on-ramp	Merge	7.9	A	17.5	B
between Interchange 16S-N (Thompson Rd) and Interchange 17 (Bridge St) on-ramps	BFS	8.3	A	19.3	C
at Interchange 17 (Bridge St) on-ramp	Merge	9.3	A	17.3	B
at I-481 off-ramps	Diverge	9.6	A	23.0	C
Westbound I-690					
at I-481 on-ramps	Merge	18.0	B	14.0	B
at Exit 17 (Bridge St)	Diverge	13.5	B	11.6	B
at Exits 16N-S (Thompson Rd)	Diverge	13.9	B	11.3	B

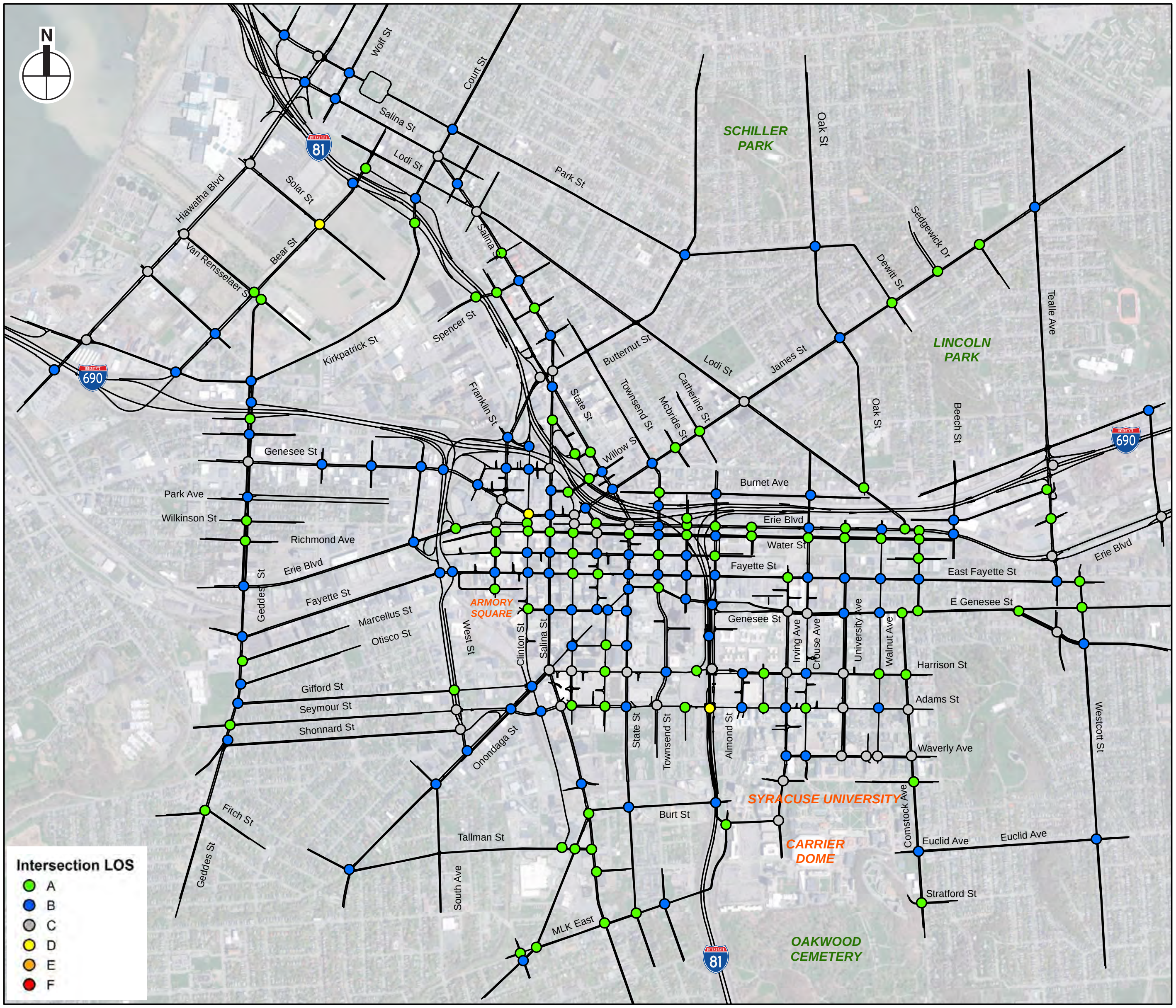
Table 5-10 (cont'd)
2013 Existing Freeway LOS Analysis

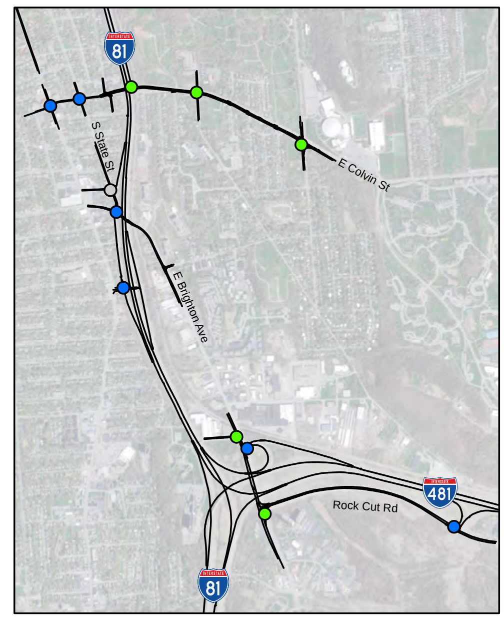
Segment	Type	AM Density (pc/mi/ln)	AM LOS	PM Density (pc/mi/ln)	PM LOS
between Interchange 16N-S (Thompson Rd) off and on-ramps	BFS	16.5	B	13.4	B
at Interchange 16N-S (Thompson Rd) on-ramp	Merge	15.7	B	18.3	B
at Exit 15 (Midler Av)	Diverge	15.4	B	20.5	C
between Interchange 15 (Midler Av) off and on-ramps	BFS	18.9	C	21.5	C
at Interchange 15 (Midler Av) on-ramp	Merge	18.6	B	23.1	C
at Exit 14 (Teall Av) off-ramp	Diverge	17.8	B	21.5	C
between Interchange 14 (Teall Av) off and on-ramps	BFS	17.6	B	22.9	C
at Interchange 14 (Teall Av) on-ramp	Merge	18.9	B	25.9	C
between Interchange 14 (Teall Av) on-ramp and South I-81 off-ramp	BFS	22.3	C	29.9	D
at South I-81 off-ramp	Diverge	20.9	C	27.8	C
at Exit 13 (Townsend St)	Diverge	19.1	B	22.0	C
between Exit 13 (Townsend St) and Northbound I-81 off and on-ramp	BFS	11.7	B	21.9	C
at Northbound I-81 off-ramp	Diverge	11.6	B	22.3	C
between Northbound I-81 off and on-ramps	BFS	10.9	A	21.1	C
at Northbound I-81 on-ramp	Merge	28.3	D	23.8	C
at Exit 11 (West St) off-ramp	Diverge	18.8	B	30.9	D
between Interchange 11 (West St) off and on-ramps	BFS	13.7	B	24.6	C
between Exit 10 (N. Geddes St) and Interchange 9 (Bear St) on-ramp	BFS	7.7	A	18.9	C
between Interchange 11 (West) on-ramp and Exit 10 (N. Geddes St)	Weave	9.4	A	17.4	B
at Interchange 9 (Bear St) on-ramp	Merge	11.6	B	24.1	C
between Interchange 9 (Bear St) and Interchange 8 (State Fair Blvd) on-ramps	BFS	11.0	A	25.0	C
at Interchange 8 (Hiawatha Blvd) on-ramp	Merge	14.8	B	23.4	C
between Interchange 8 (State Fair Blvd) on-ramp and Exit 7 (NY-297, Fairgrounds)	BFS	15.3	B	28.3	D

Intersection Level of Service

VISSIM was used to conduct signalized and unsignalized intersection analyses for the weekday AM and PM peak hours under existing (2013) conditions. VISSIM tracks the operating characteristics of each individual vehicle passing through an intersection and determines the LOS through the intersection using parameters such as average vehicle delay for the intersections and approaches. A total of 290 intersections in the Project Area were analyzed to evaluate existing traffic operations.

More detailed LOS analysis information (including overall intersection and approach LOS) for 290 intersections are included in **Appendix C-3**. **Figures 5-8 and 5-9** show the overall intersection LOS for the AM and PM peak hours respectively.

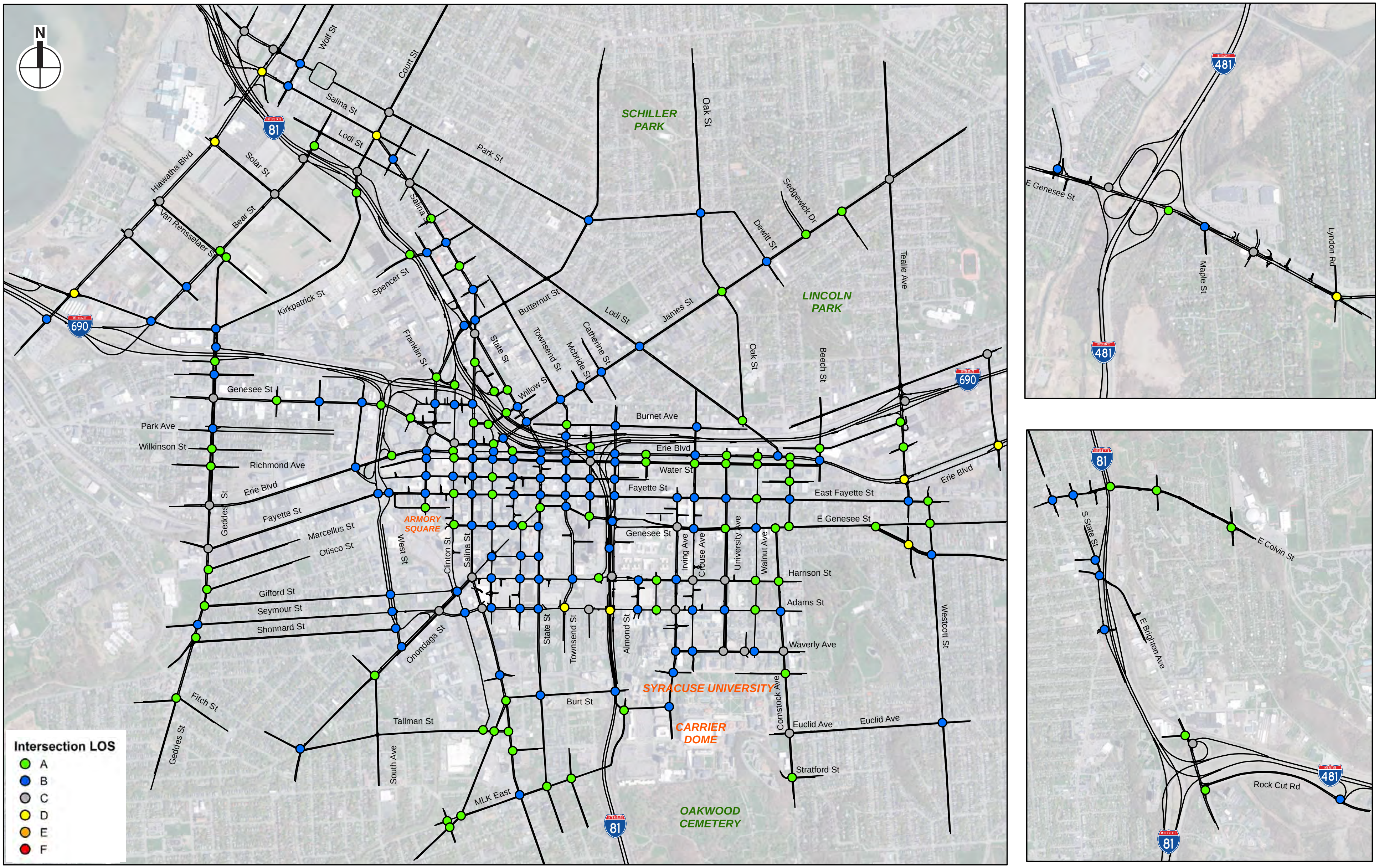




Intersection Levels of Service
Existing 2013 AM

I-81 Viaduct Project

Figure 5-8



Intersection Levels of Service
Existing 2013 PM

I-81 Viaduct Project

Figure 5-9

Under existing conditions, all intersections operate acceptably at LOS D or better during the AM and PM peak hours. This implies that these intersections typically operate without substantial congestion and that reserve capacity exists on the local street network.

Future No Build Alternative Level of Service and Mobility

Freeway Level of Service

The future No Build freeway LOS was determined by relating the VISSIM density calculations to the LOS criteria in **Table 5-8**. Levels of service were calculated for all the basic freeway segments, freeway ramps (ramp merge and diverge areas), and weaving areas within the Project Area (see **Appendix C-3**). **Table 5-11** shows the LOS analysis results for 2026 and 2056 No Build traffic conditions on selected critical sections of I-81, I-481, and I-690. Since traffic volumes on the project area roadways were assumed to increase moderately based on information generated by the I-81 Project Travel Demand Model, 2026 and 2056 traffic conditions on I-81, I-481 and I-690 are expected to deteriorate slightly, in comparison to 2013 existing conditions. The analysis results indicate that vehicle densities on nearly all freeway segments would increase by 2026 and 2056 under No Build Conditions.

The freeway segments that would operate at LOS E or worse under 2026 and/or 2056 No Build conditions include:

- Northbound I-81 BFS between the Interchange 17 (S. Salina Street) and Interchange 17 (E. Colvin Street) on-ramps (2056 AM);
- Northbound I-81 merge at the Interchange 17 (E. Colvin Street) on-ramp (2056 AM);
- Northbound I-81 BFS between the Interchange 17 (E. Colvin Street) on-ramp and Exit 18 (Adams Street) (2056 AM);
- Northbound I-81 diverge at Exit 18 (Adams Street, Harrison Street) (2026 AM, 2056 AM);
- Northbound I-81 weave between the Interchange 18 (Harrison Street) on-ramp and eastbound I-690 off-ramp (2056 PM);
- Southbound I-81 BFS between the Interchange 25 (7th North Street) off and on-ramps (2056 AM);
- Southbound I-81 weave between the Interchange 25 (7th North Street) on-ramp and Exits 23A and 23B (Hiawatha Boulevard) and Exit 22 (Bear Street) (2056 AM);
- Southbound I-81 BFS between Exit 23A and the Old Liverpool Road on-ramp (2026 AM, 2056 AM);
- Southbound I-81 merge at the Old Liverpool Road on-ramp (2026 AM, 2056 AM);
- Southbound I-81 merge at the Onondaga Lake Pkwy (NY370) on-ramp (2026 AM, 2056 AM);
- Southbound I-81 BFS between the Onondaga Lake Pkwy on-ramp and Interchange 22 (Bear Street) on-ramp (2026 AM, 2056 AM);
- Southbound I-81 merge at the Interchange 22 (Bear Street) on-ramp (2026 AM, 2056 AM);
- Southbound I-81 diverge at Exit 21 (Spencer/Catawba Street) (2026 AM, 2056 AM);

- Southbound I-81 BFS between the Interchange 21 (Spencer/Catawba Street) off and on-ramps (2026 AM, 2056 AM);
- Southbound I-81 weave between the Interchange 21 (Spencer/Catawba Street) on-ramp and Exit 20 (Franklin Street) (2026 AM, 2056 AM);
- Southbound I-81 diverge at Exit 19 (Clinton Street, Salina Street) (2026 AM, 2056 AM);
- Southbound I-81 diverge at eastbound I-690 (2056 AM);
- Southbound I-81 BFS between the eastbound I-690 off and on-ramps (2026 AM, 2056 AM);
- Southbound I-81 merge at the eastbound I-690 on-ramp (2026 AM, 2056 AM);
- Southbound I-81 diverge at Exit 18 (Harrison Street, Adams Street) (2026 AM, 2056 AM, 2056 PM);
- Northbound I-481 diverge at Exit 3E (eastbound NY-5) (2056 PM);
- Northbound I-481 diverge at Exit 6 (I-90) (2056 PM);
- Southbound I-481 merge at the Interchange 4 (eastbound I-690) on-ramp (2056 PM);
- Southbound I-481 BFS between the Interchange 4 (eastbound I-690) on-ramp and Exit 3W (westbound NY-5) (2056 PM);
- Southbound I-481 diverge at Exit 3W (westbound NY-5) (2056 PM);
- Southbound I-481 BFS between the Interchange 3W (westbound NY-5) off and on-ramps (2056 PM);
- Southbound I-481 weave between the Interchange 3W (westbound NY-5) on-ramp and Exit 3E (eastbound NY-5) (2026 PM, 2056 PM);
- Eastbound I-690 BFS between Exit 9 (Bear Street) and the Interchange 10 (N. Geddes Street) on-ramp (2056 AM);
- Eastbound I-690 weave between the Interchange 10 (N. Geddes Street) on-ramp and Exit 11 (West Street) (2056 AM);
- Eastbound I-690 BFS between the Interchange 11 West Street off and on-ramps (2026 AM, 2056 AM);
- Eastbound I-690 merge at the Interchange 11 (West Street) on-ramp (2026 AM, 2056 AM);
- Eastbound I-690 diverge at the southbound I-81 off-ramp (2026 AM, 2056 AM, 2056 PM);
- Eastbound I-690 BFS between the northbound I-81 on-ramp and Exit 14 (Teall Avenue) (2056 PM);
- Eastbound I-690 diverge at Exit 14 (Teall Avenue) (2056 PM); and
- Westbound I-690 diverge at Exit 13 (Townsend Street) (2056 AM).

Table 5-11
2026 and 2056 No Build Alternative Freeway LOS Analysis

Segment	Type	2026				2056			
		AM		PM		AM		PM	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
Northbound I-81									
between Interchange 16 (US 11) on-ramp and Exit 16A (I-481 Northbound)	BFS	15.5	B	12.6	B	18.0	B	14.1	B
at Exit 16A (I-481 Northbound)	Diverge	13.4	B	10.4	B	16.3	B	11.8	B
between Interchange 16A (I-481 Northbound) off and on-ramps	BFS	10.6	A	8.6	A	12.3	B	9.6	A
between Interchange 16A (I-481 Northbound) on-ramp and Exit 17 (S. Salina St, Brighton Av)	Weave	9.9	A	8.3	A	11.3	B	9.0	A
at Interchange 17 (S. Salina St) on-ramp	Merge	16.9	B	14.6	B	18.1	B	15.0	B
between Interchange 17 (S. Salina St, Brighton Av) off and on-ramps	BFS	17.7	B	14.9	B	21.2	C	15.5	B
between Interchange 17 (S. Salina St) and Interchange 17 (E. Colvin St) on-ramps	BFS	17.7	B	14.9	B	38.1	E	15.5	B
at Interchange 17 (E. Colvin St) on-ramp	Merge	22.5	C	15.7	B	67.1	F	16.3	B
between Interchange 17 (E. Colvin St) on-ramp and Exit 18 (Adams St)	BFS	32.0	D	19.4	C	60.0	F	20.0	C
at Exit 18 (Adams St, Harrison St)	Diverge	41.7	E	19.2	B	56.8	F	19.8	B
between Interchange 18 (Adams St, Harrison St) off and on-ramps	BFS	23.6	C	23.4	C	22.9	C	24.5	C
between Interchange 18 (Harrison St) on-ramp and Eastbound I-690 off-ramp	Weave	17.3	B	31.3	D	18.4	B	53.4	F
between Westbound I-690 off and on-ramps	BFS	14.2	B	27.0	D	14.9	B	29.3	D
at Westbound I-690 off-ramp	Diverge	11.4	B	21.2	C	11.9	B	22.4	C
at Westbound I-690 on-ramp	Merge	11.5	B	25.9	C	12.5	B	27.0	C
at Interchange 19 (N. Salina St, Pearl St) on-ramp	Merge	14.5	B	32.5	D	15.6	B	33.6	D
between Interchange 19 (Pearl St) and Interchange 20 (Butternut St) on-ramps	BFS	14.1	B	32.4	D	15.3	B	33.8	D
at Interchange 20 (Butternut St) on-ramp	Merge	14.7	B	30.5	D	15.1	B	33.2	D
at Exit 22 (Court St)	Diverge	14.5	B	30.3	D	15.1	B	32.1	D
between Interchange 22 (Court St) off and on-ramps	BFS	14.6	B	33.5	D	15.4	B	35.0	D
between Interchange 22 (Court St) on-ramp and Exit 23 (Hiawatha Blvd)	Weave	9.5	A	22.2	C	9.9	A	23.5	C
between Interchange 23 (Park St, Hiawatha Blvd) off and on-ramps	BFS	10.4	A	23.3	C	10.8	A	25.3	C
at Interchange 23 (Hiawatha Blvd) on-ramp	Merge	13.8	B	27.3	C	15.8	B	30.0	D
between Interchange 23 (Hiawatha Blvd) on-ramp and Exit 25 (7th North St)	BFS	9.6	A	20.4	C	11.1	B	22.7	C
at Exit 25 (7th North St)	Diverge	10.3	B	19.5	B	11.7	B	21.5	C
between Interchange 25 (7th North St) off and on-ramps	BFS	9.2	A	22.1	C	10.8	A	25.0	C

Table 5-11 (cont'd)
2026 and 2056 No Build Alternative Freeway LOS Analysis

Segment	Type	2026 AM Density (pc/mi/ln)	2026 AM LOS	2026 PM Density (pc/mi/ln)	2026 PM LOS	2056 AM Density (pc/mi/ln)	2056 AM LOS	2056 PM Density (pc/mi/ln)	2056 PM LOS
between Interchange 25 (7th North St) on-ramp and Exit 25A (I-90)	Weave	8.0	A	20.9	C	9.1	A	25.2	C
between Interchange 25A (I-90) off and on-ramps	BFS	8.9	A	23.0	C	10.4	A	26.0	D
between Interchange 25A (I-90) on-ramp and Exit 26 (US 11)	BFS	10.1	A	21.3	C	11.7	B	23.4	C
at Interchange 25A (I-90) on-ramp	Merge	10.1	B	21.3	C	11.7	B	23.4	C
at Exit 26 (US 11)	Diverge	8.6	A	16.9	B	9.8	A	18.1	B
between Exit 26 (US 11) and Exits 27-28 (Airport Blvd)	BFS	8.4	A	19.6	C	10.4	A	22.4	C
at Exits 27-28 (Airport Blvd)	Diverge	8.4	A	19.6	B	10.4	B	22.4	C
between Interchange 27 (Airport Blvd) off and on-ramps	BFS	5.5	A	15.1	B	6.7	A	17.7	B
at Interchange 27 (Airport Blvd) on-ramp	Merge	8.0	A	18.6	B	9.3	A	21.0	C
between Interchange 27 (Airport Blvd) on-ramp and Taft Rd on-ramp	BFS	8.0	A	19.1	C	9.3	A	21.9	C
at Interchange 28 (Taft Rd) on-ramp	Merge	10.5	B	20.2	C	11.6	B	21.8	C
between Interchange 28 (Taft Rd) on-ramp and Exit 29S (I-481 South)	BFS	10.0	A	22.2	C	11.3	B	24.9	C
at Exit 29S (I-481 South)	Diverge	9.1	A	17.8	B	10.1	B	19.3	B
between Exit 29S (I-481 SB) and Southbound NY-481 on-ramp	BFS	9.2	A	20.7	C	10.4	A	23.6	C
between Interchange 29N (NY-481) on and off-ramps	Weave	7.6	A	17.0	B	8.0	A	18.4	B
between Exit 29N (NY-481 Northbound) and Northbound I-481 on-ramp	BFS	6.8	A	12.9	B	7.6	A	15.2	B
at Interchange 29S (I-481) on-ramp	Merge	8.5	A	15.8	B	9.3	A	18.1	B
between Interchange 29N (I-481) on-ramp and Exit 30 (NY-31)	BFS	8.6	A	17.1	B	9.5	A	19.9	C
Southbound I-81									
between Interchange 30 (NY-31) on-ramp and Exit 29N (NY-481)	BFS	20.1	C	11.4	B	24.0	C	13.7	B
at Exit 29N (NY-481)	Diverge	20.0	C	11.3	B	24.1	C	13.7	B
between Exit 29N (NY-481 Northbound) and Northbound I-481 on-ramp	BFS	19.5	C	10.6	A	23.4	C	12.8	B
between Interchange 29S (I-481) on and off-ramps	Weave	16.6	B	9.0	A	20.4	C	10.7	B
between Exit 29S (I-481 SB) and Southbound NY-481 on-ramp	BFS	16.8	B	9.7	A	19.9	C	11.3	B
at Interchange 29N (NY-481) on-ramp	Merge	24.4	C	15.6	B	26.7	C	17.1	B
between Interchange 29S (I-481) on-ramp and Exit 28 (Taft Rd)	BFS	26.3	D	15.8	B	29.5	D	17.6	B
at Exit 28 (Taft Rd)	Diverge	19.6	B	13.5	B	21.1	C	14.7	B
between Exit 28 (Taft Rd) and Exits 27-26 (Airport Blvd)	BFS	23.5	C	13.8	B	26.7	D	15.5	B
at Exits 27-26 (US 11)	Diverge	20.0	C	13.0	B	20.0	B	12.9	B
between Interchange 27 (Airport Blvd) off and on-ramps	BFS	20.1	C	11.3	B	22.8	C	12.7	B

Table 5-11 (cont'd)
2026 and 2056 No Build Alternative Freeway LOS Analysis

Segment	Type	2026				2056			
		AM		PM		AM		PM	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
at Interchange 27 (Airport Rd) on-ramp	Merge	20.5	C	15.4	B	22.7	C	17.2	B
between Interchange 27 (Airport Rd) and Interchange 26 (US 11) on-ramps	BFS	23.2	C	15.5	B	26.0	D	17.3	B
at Interchange 26 (US 11) on-ramp	Merge	18.5	B	16.2	B	19.9	B	17.0	B
between Interchange 26 (US 11) on-ramp and Exit 25A (I-90)	BFS	20.4	C	16.6	B	23.0	C	17.9	B
at Exit 25A (I-90)	Diverge	20.4	C	16.6	B	23.0	C	17.9	B
between Interchange 25A (I-90) off and on-ramps	BFS	25.5	C	18.9	C	31.5	D	20.2	C
between Interchange 25A (I-90) on-ramp and Exit 25 (7th North St)	Weave	23.1	C	15.5	B	28.6	D	16.5	B
between Interchange 25 (7th North St) off and on-ramps	BFS	27.1	D	16.8	B	36.0	E	17.9	B
between Interchange 25 (7th North St) on-ramp and Exit 23A and 23B (Hiawatha Blvd) and Exit 22 (Bear St)	Weave	33.3	D	15.8	B	39.9	E	17.1	B
between Exit 23A and Old Liverpool Rd on-ramp	BFS	83.8	F	16.2	B	92.3	F	17.5	B
at Old Liverpool Rd on-ramp	Merge	67.3	F	16.8	B	70.6	F	17.7	B
at Onondaga Lake Pkwy (NY370) on-ramp	Merge	59.6	F	19.0	B	69.2	F	20.0	B
between Onondaga Lake Pkwy on-ramp and Interchange 22 (Bear St) on-ramp	BFS	71.1	F	22.2	C	73.9	F	23.6	C
at Interchange 22 (Bear St) on-ramp	Merge	64.3	F	22.7	C	59.2	F	24.2	C
at Exit 21 (Spencer/Catawba St)	Diverge	61.0	F	27.4	C	68.8	F	29.1	D
between Interchange 21 (Spencer/Catawba St) off and on-ramps	BFS	58.5	F	24.9	C	68.3	F	26.6	D
between Interchange 21 (Spencer/Catawba St) on-ramp and Exit 20 (Franklin St)	Weave	46.8	F	19.7	B	48.1	F	21.2	C
at Exit 19 (Clinton St, Salina St)	Diverge	59.7	F	23.4	C	48.9	F	25.2	C
at Eastbound I-690	Diverge	28.7	D	31.2	D	35.4	E	33.9	D
between Eastbound I-690 off and on-ramps	BFS	62.5	F	20.6	C	74.7	F	26.4	D
at Eastbound I-690 on-ramp	Merge	62.5	F	20.6	C	74.7	F	26.4	C
at Exit 18 (Harrison St, Adams St)	Diverge	47.5	F	33.7	D	51.4	F	42.0	E
at Westbound I-690 on-ramp	Merge	15.8	B	20.4	C	12.0	B	21.2	C
between Westbound I-690 and Interchange 18 (Adams St) on-ramps	BFS	17.6	B	23.1	C	17.9	B	24.4	C
between Exit 18 (Harrison St, Adams St) and Westbound I-690 on-ramp	BFS	23.6	C	29.4	D	18.0	B	30.7	D
at Interchange 18 (Harrison St, Adams St) on-ramp	Merge	14.1	B	22.6	C	11.1	B	24.1	C
between Interchange 18 (Adams St) and Exit 17 (S. State St)	BFS	14.3	B	22.4	C	11.3	B	23.8	C
at Exit 17 (S. State St, S. Salina St, Brighton Av)	Diverge	14.0	B	19.8	B	11.0	B	20.6	C
between Exit 17 (S. State St, S. Salina St, Brighton Av) off and on-ramps	BFS	6.2	A	13.0	B	5.1	A	14.6	B
at Brighton Av on-ramp	Merge	9.2	A	14.9	B	7.9	A	16.6	B

Table 5-11 (cont'd)
2026 and 2056 No Build Alternative Freeway LOS Analysis

		2026				2056			
		AM		PM		AM		PM	
Segment	Type	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
at Exit 16 (I-481) off-ramp	Diverge	6.3	A	11.7	B	5.4	A	15.4	B
between Interchange 16A (I-481) off and on-ramps	BFS	9.9	A	14.7	B	6.8	A	16.3	B
at Interchange 16A (I-481) on-ramp	Merge	10.7	B	14.1	B	9.3	A	15.5	B
Northbound I-481									
between Interchange 16A (I-481) on-ramp and Interchange 16 (US 11) off-ramps	BFS	16.1	B	21.3	C	13.9	B	23.5	C
between I-81 on-ramp and Exit 1 (Brighton Av, Rock Cut Rd)	Weave	7.3	A	11.2	B	9.0	A	12.7	B
between Interchange 1 (Brighton Av, Rock Cut Rd) off and on-ramps	BFS	5.3	A	8.5	A	6.7	A	23.7	C
at Interchange 1 (Brighton Av, Rock Cut Rd) on-ramp	Merge	7.1	A	8.5	A	8.3	A	13.1	B
between Interchange 1 (Brighton Av, Rock Cut Rd) and Exit 2 (Jamesville Rd)	BFS	9.1	A	11.5	B	10.7	A	12.7	B
at Exit 2 (Jamesville Rd)	Diverge	6.0	A	7.6	A	7.0	A	8.3	A
between Interchange 2 (Jamesville Rd) off and on-ramps	BFS	7.5	A	7.6	A	2.9	A	8.7	A
at Interchange 2 (Jamesville Rd) on-ramp	Merge	9.4	A	9.2	A	6.7	A	10.2	B
between Interchange 2 (Jamesville Rd) on-ramp and Exit 3E (Eastbound NY-5)	BFS	12.6	B	12.3	B	8.3	A	20.9	C
at Exit 3E (Eastbound NY-5)	Diverge	9.0	A	11.3	B	5.8	A	72.1	F
between Interchange 3E (Eastbound NY-5) off and on-ramps	BFS	10.8	A	10.4	A	7.3	A	11.0	B
between Interchange 3E (Eastbound NY-5) on-ramp and Exit 3W (Westbound NY-5)	Weave	9.0	A	9.2	A	6.7	A	9.6	A
between Interchange 3W (Westbound NY-5) off and on-ramps	BFS	11.3	B	11.3	B	7.5	A	12.0	B
at Interchange 3W (Westbound NY-5) on-ramp	Merge	15.7	B	13.0	B	14.4	B	13.4	B
between Interchange 3W (Westbound NY-5) on-ramp and Exit 4 (Westbound I-690)	BFS	17.6	B	14.8	B	15.8	B	15.2	B
at Exit 4 (Westbound I-690)	Diverge	12.6	B	11.0	B	11.5	B	11.5	B
between Interchange 4 (I-690) off and on-ramps	BFS	11.0	A	17.7	B	10.3	A	18.3	C
at Interchange 4 (Eastbound I-690) on-ramp	Merge	12.0	B	21.6	C	12.1	B	24.2	C
between Interchange 4 (Eastbound I-690) on-ramp and Exit 5E (Kirkville Rd)	BFS	17.3	B	30.0	D	17.5	B	32.1	D
at Exit 5E (Kirkville Rd)	Diverge	12.3	B	26.0	C	12.8	B	28.7	D
between Interchange 5E (Kirkville Rd) off and on-ramps	BFS	16.1	B	25.9	C	15.8	B	27.0	D
between Interchange 5E (Kirkville Rd) on-ramp and Exit 5W (Kirkville Rd)	Weave	11.4	B	18.8	B	11.2	B	19.7	B
between Interchange 5W (Kirkville Rd) off and on-ramps	BFS	12.1	B	23.8	C	12.0	B	25.0	C
at Interchange 5W (Kirkville Rd) on-ramp	Merge	9.4	A	17.5	B	9.6	A	18.9	B
between Interchange 5W (Kirkville Rd) on-ramp and Exit 6 (I-90)	BFS	14.0	B	27.2	D	14.3	B	29.5	D
at Exit 6 (I-90)	Diverge	13.0	B	33.5	D	13.2	B	35.9	E

Table 5-11 (cont'd)
2026 and 2056 No Build Alternative Freeway LOS Analysis

Segment	Type	2026				2056			
		AM		PM		AM		PM	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
between Interchange 6 (I-90) off and on-ramps	BFS	9.4	A	14.3	B	9.8	A	15.8	B
at Interchange 6 (I-90) on-ramp	Merge	8.4	A	12.0	B	8.9	A	13.4	B
at Exit 7 (NY-298 Bridgeport Rd)	Diverge	10.2	B	14.9	B	11.0	B	16.2	B
between Interchange 7 (NY-298 Bridgeport Rd) off and on-ramps	BFS	8.3	A	12.8	B	8.4	A	14.6	B
at Interchange 7 (NY-298 Bridgeport Rd) on-ramp	Merge	6.3	A	11.9	B	6.5	A	13.5	B
between Interchange 7 (NY-298 Bridgeport Rd) on-ramp and Exit 8 (Northern Blvd)	BFS	9.3	A	17.3	B	9.7	A	19.6	C
at Exit 8 (Northern Blvd)	Diverge	6.7	A	12.4	B	6.9	A	14.0	B
between Interchange 8 (Northern Blvd) off and on-ramps	BFS	6.8	A	13.6	B	7.1	A	15.4	B
at Interchange 8 (Northern Blvd) on-ramp	Merge	6.8	A	16.5	B	6.7	A	17.9	B
between Interchange 8 (Northern Blvd) on-ramp and Exit 9N (I-81)	BFS	10.0	A	23.5	C	9.9	A	25.5	C
at Exit 9N (I-81)	Diverge	7.6	A	18.6	B	7.6	A	20.5	C
Southbound I-481									
at Interchange 9N (I-81) on-ramp	Merge	19.3	B	8.9	A	22.5	C	9.7	A
between Interchange 9N (I-81) on-ramp and Exit 8 (Northern Blvd)	BFS	21.1	C	12.9	B	24.0	C	14.2	B
at Exit 8 (Northern Blvd)	Diverge	15.5	B	9.3	A	17.7	B	10.2	B
between Interchange 8 (Northern Blvd) off and on-ramps	BFS	14.5	B	9.9	A	16.6	B	11.1	B
at Interchange 8 (Northern Blvd) on-ramp	Merge	12.3	B	8.0	A	14.0	B	9.0	A
between Interchange 8 (Northern Blvd) on-ramp and Exit 7 (NY-298 Bridgeport Rd)	BFS	18.2	C	11.9	B	20.7	C	13.4	B
at Exit 7 (NY-298 Bridgeport Rd)	Diverge	15.7	B	8.6	A	18.3	B	9.8	A
between Interchange 7 (NY-298 Bridgeport Rd) off and on-ramps	BFS	13.8	B	10.7	A	15.7	B	11.8	B
at Interchange 7 (NY-298 Bridgeport Rd) on-ramp	Merge	12.0	B	11.3	B	13.7	B	12.9	B
between Interchange 7 (NY-298 Bridgeport Rd) and Exit 6 (I-90)	BFS	17.3	B	16.0	B	19.7	C	18.1	C
at Exit 6 (I-90)	Diverge	13.1	B	12.8	B	15.2	B	14.7	B
between Interchange 6 (I-90) off and on-ramps	BFS	15.1	B	12.8	B	17.2	B	14.4	B
at Interchange 6 (I-90) on-ramp	Merge	15.5	B	13.3	B	17.5	B	14.5	B
between Interchange 6 (I-90) on-ramp and Exit 5W (Kirkville Rd)	BFS	21.4	C	18.3	C	24.1	C	20.0	C
at Exit 5W (Kirkville Rd)	Diverge	15.4	B	12.6	B	17.4	B	13.8	B
between Interchange 5W (Kirkville Rd) off and on-ramps	BFS	18.3	C	16.8	B	20.7	C	18.4	C
between Interchange 5W (Kirkville Rd) on-ramp and Exit 5E (Kirkville Rd)	Weave	14.8	B	12.3	B	17.1	B	14.1	B
between Interchange 5E (Kirkville Rd) off and on-ramps	BFS	19.5	C	15.8	B	22.2	C	18.1	C
at Interchange 5E (Kirkville Rd) on-ramp	Merge	15.8	B	14.7	B	17.8	B	16.6	B

Table 5-11 (cont'd)
2026 and 2056 No Build Alternative Freeway LOS Analysis

Segment	Type	2026				2056			
		AM		PM		AM		PM	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
between Interchange 5E (Kirkville Rd) on-ramp and Exit 4 (Westbound I-690)	BFS	22.9	C	20.8	C	25.9	C	23.5	C
at Exit 4 (Westbound I-690)	Diverge	24.6	C	20.0	B	28.4	D	22.7	C
between Interchange 4 (I-690) off and on-ramps	BFS	10.9	A	12.7	B	12.3	B	14.4	B
at Interchange 4 (Eastbound I-690) on-ramp	Merge	8.6	A	15.7	B	9.7	A	56.7	F
between Interchange 4 (Eastbound I-690) on-ramp and Exit 3W (Westbound NY-5)	BFS	11.3	B	22.5	C	12.3	B	81.1	F
at Exit 3W (Westbound NY-5)	Diverge	10.9	B	24.5	C	11.6	B	66.2	F
between Interchange 3W (Westbound NY-5) off and on-ramps	BFS	9.7	A	26.9	D	10.9	A	66.3	F
between Interchange 3W (Westbound NY-5) on-ramp and Exit 3E (Eastbound NY-5)	Weave	9.2	A	41.2	E	10.7	B	71.4	F
between Interchange 3E (Eastbound NY-5) off and on-ramps	BFS	6.5	A	8.9	A	7.6	A	8.9	A
at Interchange 3E (Eastbound NY-5) on-ramp	Merge	7.0	A	10.2	B	8.0	A	9.9	A
between Interchange 3E (Eastbound NY-5) on-ramp and Exit 2 (Jamesville Rd)	BFS	7.1	A	10.8	A	8.2	A	10.7	A
at Exit 2 (Jamesville Rd)	Diverge	10.6	B	16.1	B	12.2	B	16.2	B
between Interchange 2 (Jamesville Rd) off and on-ramps	BFS	7.6	A	10.3	A	9.2	A	10.3	A
at Interchange 2 (Jamesville Rd) on-ramp	Merge	8.4	A	8.5	A	9.7	A	8.6	A
between Interchange 2 (Jamesville Rd) on-ramp and Exit 1 (Brighton Av)	BFS	12.1	B	12.6	B	14.0	B	12.7	B
at Exit 1 (Brighton Av)	Diverge	10.9	B	11.4	B	12.8	B	11.3	B
at Northbound I-81 and Southbound I-81 ramps	Diverge	8.6	A	9.0	A	10.0	B	9.8	A
between Northbound I-81 off-ramp and E. Brighton Av on-ramp	BFS	8.6	A	9.0	A	10.0	A	9.8	A
at E. Brighton Av on-ramp	Merge	9.4	A	8.1	A	10.3	B	8.6	A
Eastbound I-690									
between Interchange 7 (NY-297) and Interchange 8 (State Fair Blvd) on-ramps	BFS	27.8	D	13.9	B	31.5	D	15.8	B
at Interchange 8 (State Fair Blvd) on-ramp	Merge	20.1	C	13.1	B	22.5	C	14.5	B
at Exit 8 (Hiawatha Blvd)	Diverge	23.1	C	14.1	B	27.4	C	16.9	B
between Exit 8 (Hiawatha Blvd) and Exit 9 (Bear St)	BFS	25.8	C	11.6	B	34.5	D	13.5	B
at Exit 9 (Bear St)	Diverge	22.6	C	10.8	B	31.1	D	12.3	B
between Exit 9 (Bear St) and Interchange 10 (N. Geddes St) on-ramp	BFS	24.9	C	10.1	A	37.2	E	11.6	B
between Interchange 10 (N. Geddes St) on-ramp and Exit 11 (West St)	Weave	27.7	C	12.7	B	43.1	E	14.0	B
between Interchange 11 West St off and on-ramps	BFS	46.8	F	22.8	C	67.2	F	25.2	C
at Interchange 11 (West St) on-ramp	Merge	44.0	E	21.8	C	57.0	F	24.1	C
at South I-81 off-ramp	Diverge	48.5	F	33.1	D	57.5	F	36.3	E
between South I-81 off and on-ramps	BFS	22.5	C	22.5	C	22.5	C	23.8	C

Table 5-11 (cont'd)
2026 and 2056 No Build Alternative Freeway LOS Analysis

Segment	Type	2026				2056			
		AM		PM		AM		PM	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
at Southbound I-81 on-ramp	Merge	20.4	C	23.1	C	21.0	C	24.3	C
at N. McBride St on-ramp	Merge	16.9	B	29.5	D	17.4	B	26.4	C
at Northbound I-81 on-ramp	Merge	26.3	C	32.2	D	27.1	C	33.9	D
between Northbound I-81 on-ramp and Exit 14 (Teall Av)	BFS	28.3	D	31.9	D	28.7	D	38.8	E
at Exit 14 (Teall Av)	Diverge	24.0	C	34.6	D	30.6	D	47.6	F
between Interchange 14 (Teall Av) off and on-ramps	BFS	18.0	C	23.5	C	18.6	C	25.8	C
at Interchange 14 (Teall Av) on-ramp	Merge	18.1	B	23.0	C	19.0	B	24.9	C
at Exit 15 (Midler Av)	Diverge	20.8	C	27.4	C	21.7	C	23.0	C
between Interchange 15 (Midler Av) off and on-ramps	BFS	14.9	B	22.7	C	15.6	B	25.3	C
at Interchange 15 (Midler Av) on-ramp	Merge	13.0	B	20.5	C	13.9	B	20.6	C
between Interchange 15 (Midler Av) on-ramp and Exits 16S-N (Thompson Rd)	BFS	16.1	B	25.4	C	16.9	B	28.3	D
at Exits 16S-N (Thompson Rd) and Exit 17 (Bridge St)	Diverge	12.7	B	18.3	B	13.3	B	20.3	C
between Interchange 16S-N (Thompson Rd) off and on-ramps	BFS	7.0	A	14.6	B	7.7	A	16.3	B
at Interchange 16S-N (Thompson Rd) on-ramp	Merge	8.0	A	16.8	B	8.6	A	18.0	B
between Interchange 16S-N (Thompson Rd) and Interchange 17 (Bridge St) on-ramps	BFS	8.8	A	19.5	C	9.6	A	21.7	C
at Interchange 17 (Bridge St) on-ramp	Merge	9.7	A	17.2	B	10.5	B	21.8	C
at I-481 off-ramps	Diverge	10.2	B	23.0	C	11.1	B	31.4	D
Westbound I-690									
at I-481 on-ramps	Merge	18.8	B	10.1	B	18.7	B	11.3	B
at Exit 17 (Bridge St)	Diverge	13.9	B	9.1	A	13.5	B	10.1	B
at Exits 16N-S (Thompson Rd)	Diverge	14.6	B	8.1	A	14.5	B	9.0	A
between Interchange 16N-S (Thompson Rd) off and on-ramps	BFS	17.1	B	9.7	A	17.2	B	10.8	A
at Interchange 16N-S (Thompson Rd) on-ramp	Merge	16.0	B	16.4	B	16.5	B	17.1	B
at Exit 15 (Midler Av)	Diverge	15.5	B	19.0	B	15.9	B	19.6	B
between Interchange 15 (Midler Av) off and on-ramps	BFS	19.1	C	19.2	C	19.8	C	20.0	C
at Interchange 15 (Midler Av) on-ramp	Merge	18.9	B	20.7	C	19.3	B	21.2	C
at Exit 14 (Teall Av) off-ramp	Diverge	17.8	B	19.3	B	18.3	B	19.8	B
between Interchange 14 (Teall Av) off and on-ramps	BFS	18.2	C	20.0	C	18.3	C	20.1	C
at Interchange 14 (Teall Av) on-ramp	Merge	22.5	C	24.1	C	22.0	C	24.8	C
between Interchange 14 (Teall Av) on-ramp and South I-81 off-ramp	BFS	24.1	C	27.8	D	24.9	C	27.9	D
at South I-81 off-ramp	Diverge	21.7	C	23.4	C	27.8	C	21.4	C

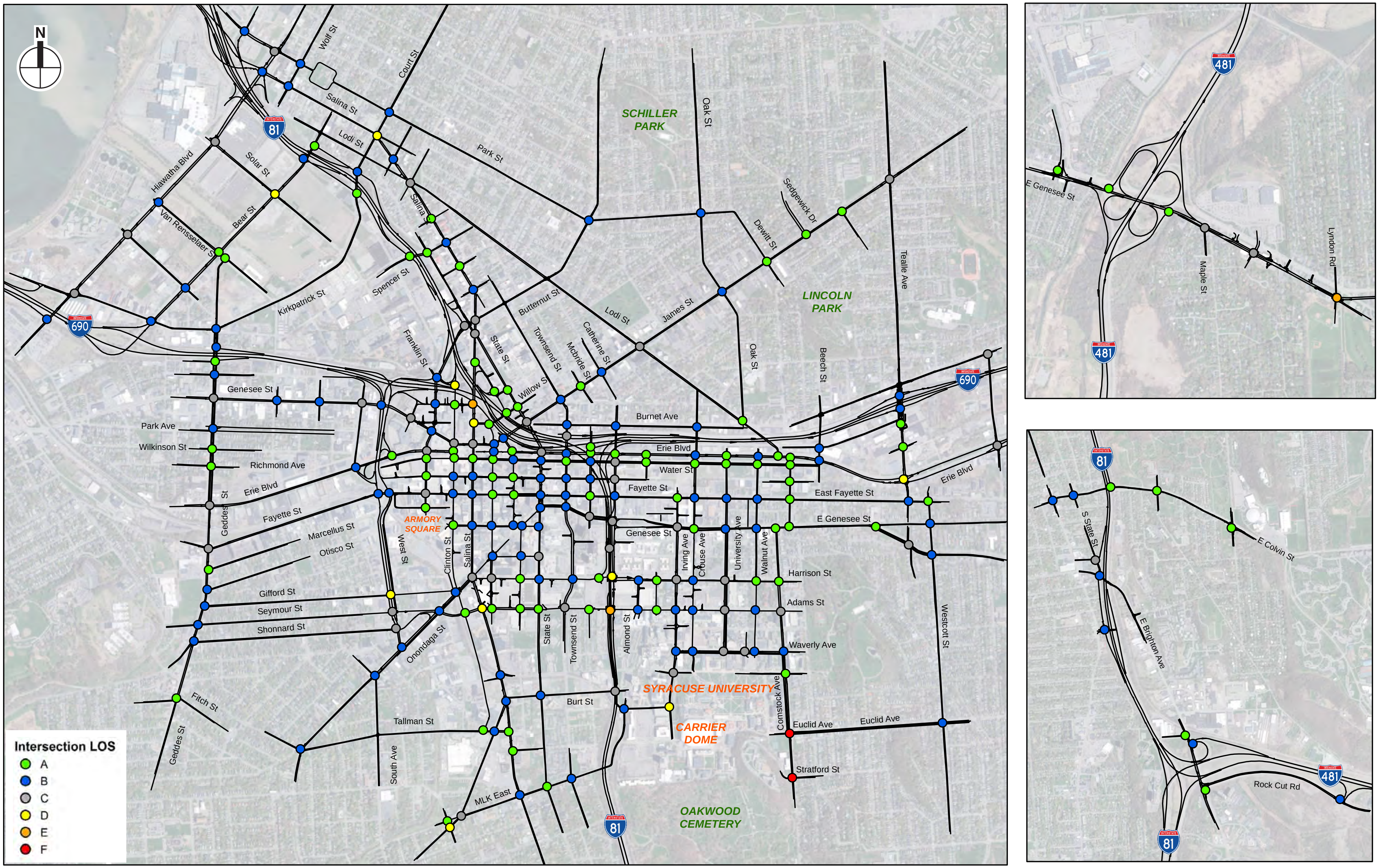
Table 5-11 (cont'd)
2026 and 2056 No Build Alternative Freeway LOS Analysis

Segment	Type	2026				2056			
		AM		PM		AM		PM	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
at Exit 13 (Townsend St)	Diverge	28.1	D	21.0	C	39.0	E	20.9	C
between Exit 13 (Townsend St) and Northbound I-81 off and on-ramp	BFS	12.7	B	21.7	C	14.9	B	21.7	C
at Northbound I-81 off-ramp	Diverge	12.6	B	22.0	C	14.8	B	22.0	C
between Northbound I-81 off and on-ramps	BFS	11.7	B	20.8	C	13.8	B	20.9	C
at Northbound I-81 on-ramp	Merge	14.7	B	23.3	C	16.7	B	24.5	C
at Exit 11 (West St) off-ramp	Diverge	21.1	C	30.3	D	23.9	C	31.0	D
between Interchange 11 (West St) off and on-ramps	BFS	15.4	B	24.3	C	17.8	B	25.2	C
between Exit 10 (N. Geddes St) and Interchange 9 (Bear St) on-ramp	BFS	8.5	A	19.1	C	10.1	A	21.0	C
between Interchange 11 (West) on-ramp and Exit 10 (N. Geddes St)	Weave	9.8	A	17.4	B	10.9	B	19.0	B
at Interchange 9 (Bear St) on-ramp	Merge	12.1	B	25.9	C	16.0	B	28.1	D
between Interchange 9 (Bear St) and Interchange 8 (State Fair Blvd) on-ramps	BFS	11.5	B	25.2	C	15.0	B	27.8	D
at Interchange 8 (Hiawatha Blvd) on-ramp	Merge	14.4	B	23.4	C	12.9	B	25.5	C
between Interchange 8 (State Fair Blvd) on-ramp and Exit 7 (NY-297, Fairgrounds)	BFS	15.0	B	28.6	D	15.2	B	30.8	D

Intersection Level of Service

Based on VISSIM delay calculations, **Figures 5-10 through 5-13** show the projected peak hour intersection LOS under No Build conditions. More detailed LOS analyses for 290 intersections are included in **Appendix C-3**. As expected, the delay at most intersections would increase because of the projected increase in traffic volumes for the future years. However, signal timing adjustments were made for the year 2056 analysis to account for the City's planned project to convert streets from one-way to two-way operation and optimize signal timing at many intersections. During the AM peak hour, five intersections would operate at LOS E or F during in 2026 and two would operate at LOS E or F in 2056. During the PM peak hour, seven intersections would operate at LOS E or F during in 2026 and ten would operate at LOS E or F in 2056. The following is a summary of locations that would operate at LOS E or F:

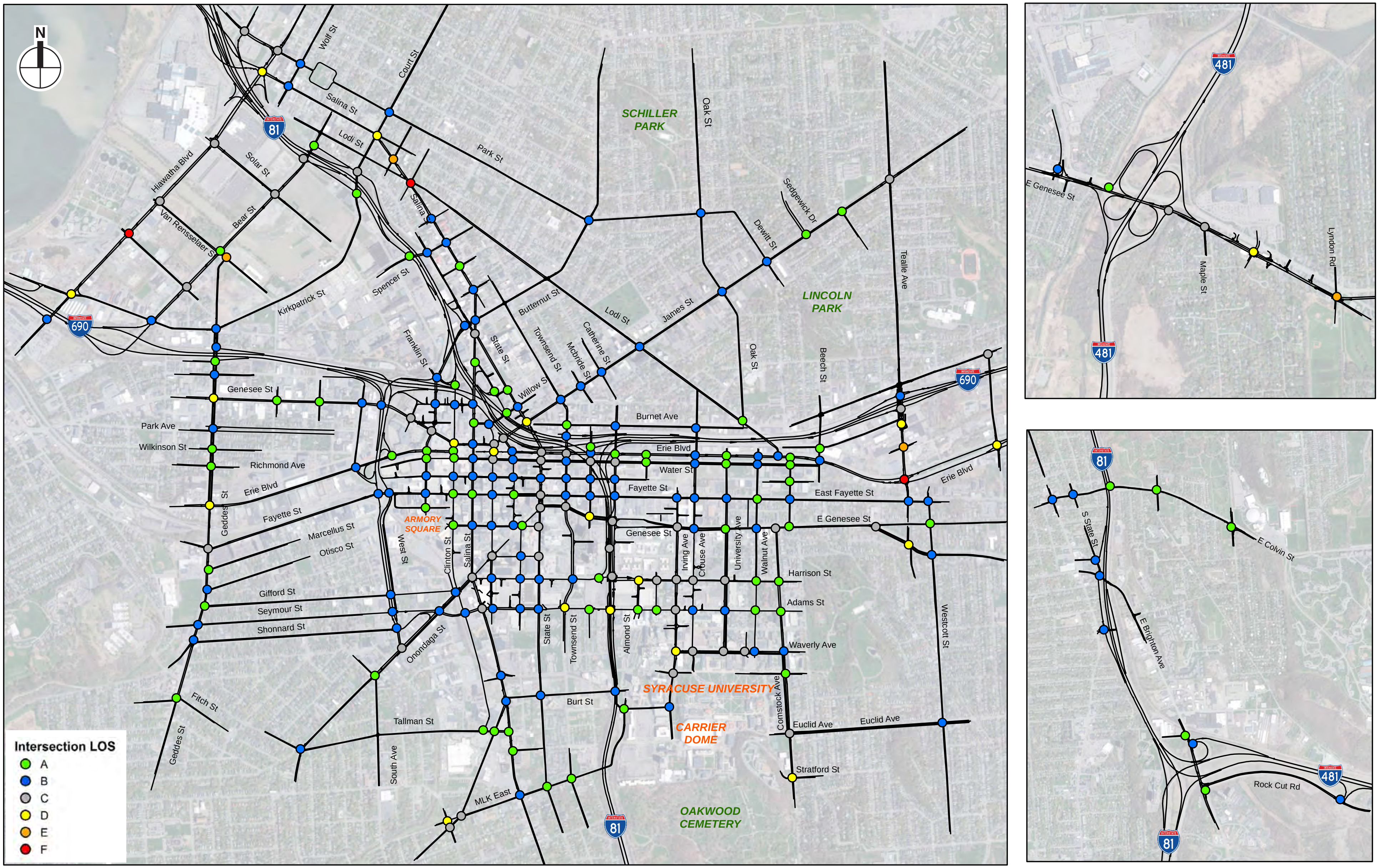
- Almond Street at Adams Street (2026 AM, 2056 AM, 2056 PM);
- Comstock Avenue at Euclid Avenue (2026 AM);
- Comstock Avenue at Stratford Street (2026 AM, 2056 PM);
- Hiawatha Boulevard at Pulaski Street (2026 PM, 2056 PM);
- N. Geddes Street at Van Rensselaer Street (2026 PM);
- N. Salina Street at Herald Place (2026 AM);



Intersection Levels of Service
No Build 2026 AM

I-81 Viaduct Project

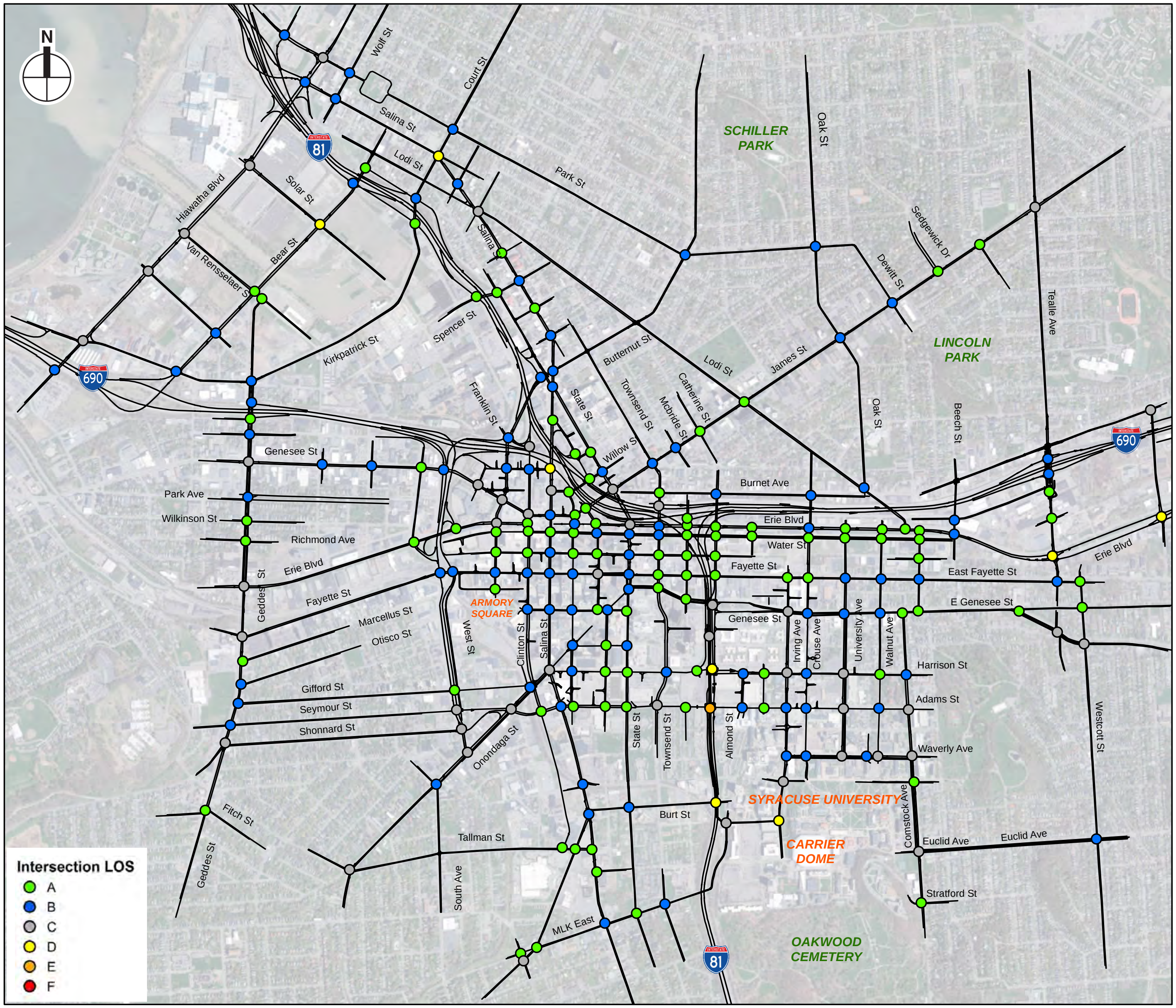
Figure 5-10

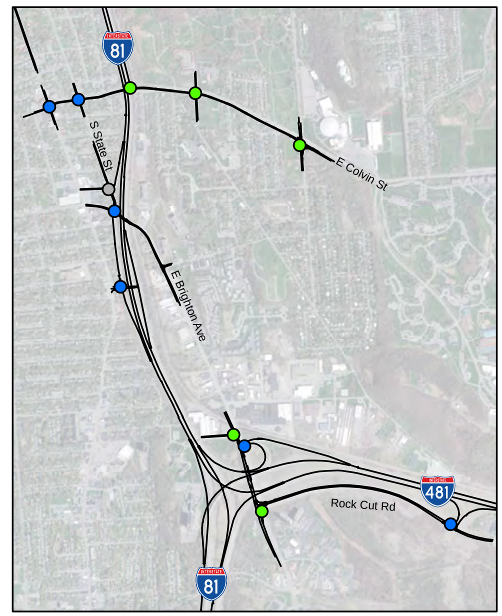


Intersection Levels of Service
No Build 2026 PM

I-81 Viaduct Project

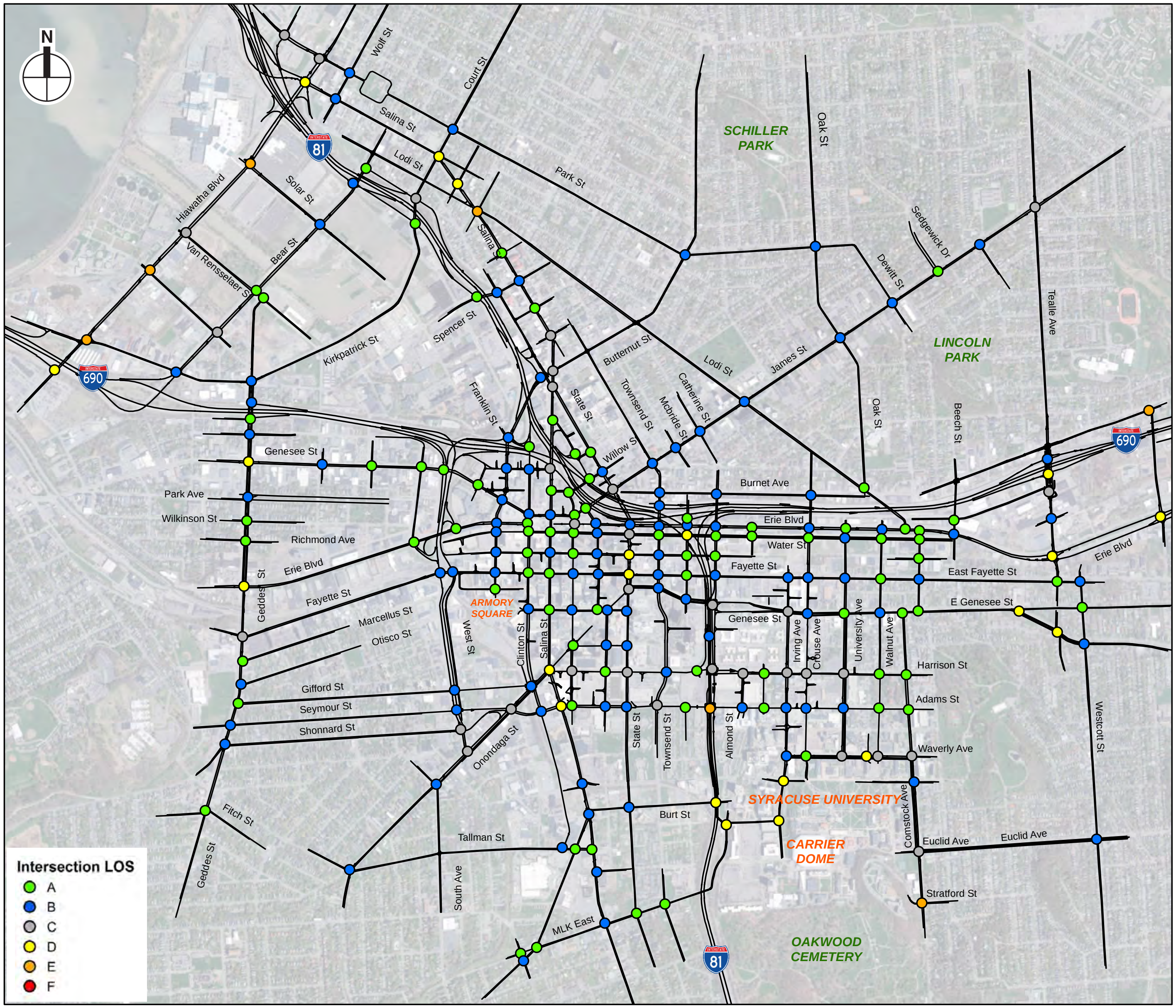
Figure 5-11

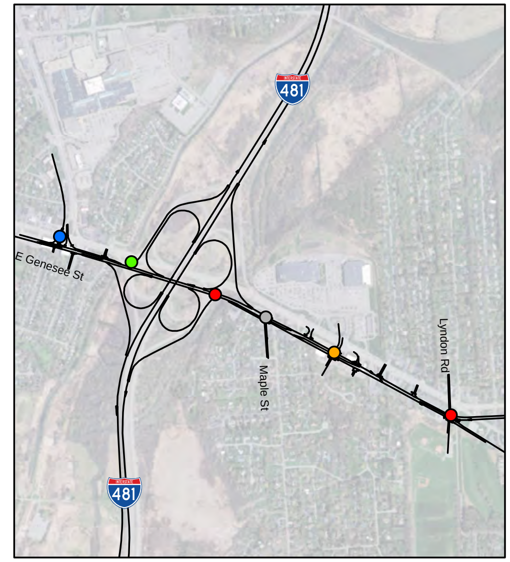


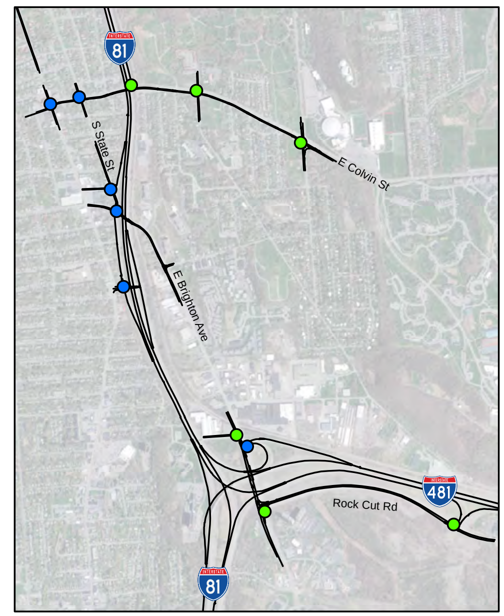


Intersection Levels of Service
No Build 2056 AM

Figure 5-12







Intersection Levels of Service
No Build 2056 PM

Figure 5-13

I-81 Viaduct Project

- NY 5/E. Genesee Street at ALDI/BOA driveway (2056 PM);
- NY 5/E. Genesee Street at Northbound I-481 Off-Ramp (2056 PM);
- NY 5/E. Genesee Street/Highbridge Road at Bridlepath Road/Lyndon Road (2026 AM, 2026 PM, 2056 AM, 2056 PM);
- Solar Street at Hiawatha Boulevard W. (2056 PM);
- Spencer Street at Hiawatha Boulevard W. (2056 PM);
- Teall Avenue at Erie Boulevard E. (2026 PM);
- Teall Avenue at Lynch Street (2026 PM);
- US 11/N. Salina Street at Danforth Street (2026 PM);
- US 11/N. Salina Street at Lodi and Kirkpatrick Streets (2026 PM, 2056 PM);
- Westmoreland Avenue at Burnet Avenue (2056 PM)

Most of the deficient operations at these intersections would be caused by the failure in one or more of the approach movements. Generally, the high traffic demand, in particular the left turn movement, would lead to the failure of the entire intersection by blocking the through movement on the same intersection approach.

Safety Considerations, Crash History, and Analysis

Existing Safety Considerations, Crash History, and Analysis

A crash analysis was performed in accordance with the Highway Design Manual Chapter 5 using police crash reports compiled from NYSDOT for the three-year period, from July 1, 2010 through June 30, 2013. The crash history was analyzed for I-81 from Interchange 16A to Interchange 29, I-690 from Interchange 9 to the I-481 interchange, and I-481 between the southern and northern interchanges with I-81. Since the original crash data is several years old, crash data from September 1, 2014 through August 30, 2017 was reviewed to determine if crash frequencies and patterns identified from the original data set are still valid and appropriate for use in this report. Similarly, a more recent review of crash data (September 1, 2017 to August 30, 2020) was reviewed to determine if crash frequencies and patterns identified from the previous evaluations are still valid and appropriate for use in this report. For most locations, the frequency and types of crashes were found to be consistent between the original and newer data sets. Therefore, the discussion that follows is based on the original data, unless otherwise noted.

Crash summaries and individual crash details can be reviewed in **Appendix C-4.**

I-81

Crash records are assigned to Reference Markers, which are signs installed roughly every one-tenth of a mile on highways and used by NYSDOT and police to monitor traffic and identify high-crash locations. A total of 1,306 crashes occurred on I-81 within the project limits from Reference Marker (RM) 81I 3303 2006 to RM 81I 3303 3066 (from approximately one-half mile south of the I-81/I-481 south interchange to approximately one-half mile north of the I-81/I-481 north interchange).

Of the 1,306 documented crashes in the project area, approximately 267 (20 percent) crashes were personal-injury crashes and 1,032 (79 percent) crashes were property damage only crashes. There were five non-reportable crashes and two fatalities. An accident is considered non-reportable, rather than reportable, if there was no personal injury and either no motorist report was filed, no dollar value of vehicular damage was entered on the report, or the amount of vehicular damage did not exceed a specified amount. The predominant crash types within the project limits are rear-end (31 percent), fixed-object (30 percent), and overtaking (24 percent) crashes, which account for 85 percent of the total crashes. Fixed objects are defined as permanent installations, limited in length (e.g. trees, utility poles, and signs), which can be struck by vehicles running off the road.

The 1,306 documented crashes involved a total of 2,383 vehicles, 163 (7 percent) were commercial vehicles, and the remaining 2,220 vehicles (93 percent) involved passenger vehicles only.

Major factors contributing to the crashes on I-81 are poor driver judgment/behavior and aggressive driving. Unsafe speed (342 crashes), following too closely (358 crashes), unsafe lane changing (200 crashes), and driver inattention (187 crashes) were identified in a large number of the crashes as the primary contributing factors. In addition, slippery pavement (276 crashes) was also an important contributing factor for the crashes and many ramps in the Project Area have non-standard acceleration, deceleration, and auxiliary lane lengths, and/or spacing.

I-690

Crash records documented 843 crashes occurring within the I-690 limits from RM 690I 3301 2002 to RM 690I 3301 3016 (from approximately one-half mile west of the I-690/Hiawatha Boulevard interchange to just west of the I-690/I-481 interchange). Of the 843 documented crashes along this segment of I-690, approximately 175 (21 percent) crashes were personal-injury crashes and 665 (79 percent) crashes were property damage only crashes. There were three non-reportable crashes and no fatalities. The predominant crash types within the project limits are fixed object (36 percent), rear-end (30 percent), and overtaking (22 percent) crashes, which account for 88 percent of the total crashes.

The 843 documented crashes involved a total of 1,474 vehicles, 64 vehicles (4 percent) were commercial vehicles and the remaining 1,410 vehicles (96 percent) involved passenger vehicles only.

Major factors contributing to the crashes on I-690 are poor driving behavior and aggressive driving, such as unsafe speed (253 crashes) and driver inattention (168 crashes). Factors such as following too closely (214 crashes), unsafe lane changing (115 crashes), passing or lane usage improper (79 crashes), and reaction to other uninvolved vehicle (73 crashes) typically are associated with traffic congestion, either generally along the roadway or localized on- and off-ramps. Many ramps in the Project Area have non-standard acceleration, deceleration, and auxiliary lane lengths, and/or spacing.

Interstate I-481

Crash records documented 481 crashes occurring within I-481 limits from RM 481I 3301 1000 to RM 481I 3301 2145 (from just north of the I-81/I-481 south interchange to just south of the I-81/I-481 north interchange). Of the 481 documented crashes in the project area, approximately 91 (19 percent) crashes were personal-injury crashes and 386 (80 percent) crashes were property damage only crashes. There were two non-reportable crashes and two fatalities. The predominant crash types within the project limits are fixed-object (49 percent), rear-end (20 percent), animal-related (14 percent), and overtaking (13 percent) crashes, which account for 96 percent of the total crashes.

The 481 documented crashes involved a total of 737 vehicles, 40 vehicles (5 percent) were commercial vehicles and the remaining 697 vehicles (95 percent) involved passenger vehicles only.

Major contributing factors to the crashes on I-481 are poor driver judgment/behavior and aggressive driving. Unsafe speed (157 crashes), following too closely (88 crashes), unsafe lane changing (41 crashes), and driver inattention (50 crashes) were identified in a large number of the crashes as the primary contributing factors. In addition, slippery pavement (112 crashes) and animal-action (70 crashes) also were important contributing factors for the crashes.

Safety Analysis Related to Non-standard and Non-conforming Features

A survey of the I-81, I-690, and I-481 corridors identified more than 200 non-standard and non-conforming features in the Project Area. While not all features contribute equally to traffic performance, this number indicates the potential for substantial design improvements in the Project Area. To understand the impacts of the non-standard and non-conforming features to safety, the following areas with the greatest concentration of design limitations were studied:

- I-81/I-690 S-Curve and Slalom Area
- I-81/I-481 "Southern Interchange"
- I-81/I-481 "Northern Interchange"
- I-81 Southbound at Court Street Weaving Area
- I-481 Southbound at Interchange 3 (NY 5/NY 92)

I-81 and I-690 S-Curve and Slalom Area

The I-81 and I-690 S-Curve and Slalom Area is the area approaching/through the I-81/I-690 interchange. It includes I-81 from Interchange 17 near Colvin Street (south of downtown) to Interchange 25 at 7th N. Street (north of downtown) and I-690 from Interchange 9 in the vicinity of Hiawatha Boulevard (near the fairgrounds) to west of Interchange 15 near Peat Street (northeast of Syracuse University). The area includes I-81 RM 81I 3303 2029 to RM 81I 3303 3008 in the northbound and southbound directions and I-690 RM 690I 3301 2009 to RM 690I 3301 2046 in the eastbound and westbound directions.

Over the three-year analysis period, 1,354 crashes were found to have actually occurred in the S-curve and slalom area—817 on I-81 between RM 2029 and RM 3008 and 537 on I-690 between RM 2009 and RM 2046. Of these, 1,299 crashes (776 along I-81 and 523 along I-690) could be located, and 55 crashes (41 along I-81 and 14 along I-690) had reference markers unknown. It should be noted that a review of more recent crash data from September 1, 2014 through August 30, 2017 indicated an increase in the number of crashes along I-690 through the western portion of the I-81 interchange. However, some of the increase may be attributable to construction activity at this location.

There are many locations in the S-curve and slalom area with existing non-standard and non-conforming features. Based on a detailed examination of crash reports in the greater I-81 at I-690 interchange area, there were 312 crashes (47 percent) along I-81 between RM 2032 and RM 2166 (from approximately MLK, Jr. East to Hiawatha Boulevard) that were identified to be potentially related to non-standard/non-conforming geometric features. There were also 116 crashes (27 percent) along I-690 between RM 2014 and RM 2042 (from approximately Geddes Street interchange to Teall Avenue interchange) that were identified to be potentially related.

Crash rates in this area are 1½ to three times the statewide average. A crash rate comparison for key segments in the I-81/I-690 interchange area is presented in **Table 5-12**.

Table 5-12
I-81/I-690 Interchange Area Crash Rate Comparison

Reference Marker	Segment Location	Number of Crashes	Computed Accident Rate ACC/MVM	Statewide Accident Rate ACC/MVM
RM 2043 – RM 2046	Northbound I-81 from Harrison Street on-ramp to westbound I-690 off-ramp	66	3.21	1.09
RM 2047 – RM 2049	Northbound I-81 at Salina Street	43	2.88	1.09
RM 2047 – RM 2049	Southbound I-81 at Salina Street	24	1.67	1.09
RM 2043 – RM 2046	Southbound I-81 from eastbound I-690 on-ramp to Harrison Street off-ramp	44	2.30	1.09
RM 2025 – RM 2028	Eastbound I-690 from Townsend Street to E. Willow Street	42	2.37	1.09

I-81 and I-481 "Southern Interchange"

The I-81/I-481 "Southern Interchange" is the area surrounding and including the I-81 interchange with I-481 south of Downtown Syracuse. It includes I-81 Interchange 16A and I-481 Interchange 1 in the vicinities of E. Seneca Turnpike and Brighton Avenue, respectively. The area comprises RM (RM) 81I 3303 2006 through RM 81I 3303 2018 in the northbound and southbound directions and RM 481I 3301 1000 through RM 481I 3301 2003 in the eastbound and westbound directions.

Over the three-year analysis period, 90 crashes occurred near the interchange; 68 crashes were located on I-81 between RM 2006 and RM 2018, 18 were located on I-481 between RM 1000 and RM 2003, and four crashes had RMs unknown.

The roadway segments within or immediately adjacent to the interchange meet the NYSDOT threshold of 27 crashes (i.e., 9 per year) needed for an urban full-access controlled facility to qualify as a Priority Investigation Location (PIL) in NYSDOT Region 3. The stretch of I-481 in the southern interchange area is below the PIL threshold. The crash rate (all crash types and both travel directions combined) for the two-lane segment of I-81 from RM 2006 to RM 2015, which includes the PIL segment, was estimated to be 1.48 crashes per million vehicle miles (ACC/MVM). This is 1.36 times the statewide average of 1.09 ACC/MVM for a similar urban controlled-access facility. The crash rates for the three-lane segment of I-81 from RM 2016 to RM 2018 and for the two-lane segment of I-481 in its entire stretch within the southern interchange area were estimated to be 0.75 and 0.67 ACC/MVM, respectively – both of which are lower than the applicable statewide average of 1.09 ACC/MVM.

It should be noted that fixed-object, wet-road, and nighttime crashes are high throughout the southern interchange area. Preliminary crash analysis for the I-81 segment suggests that speeding, slippery pavement, and inadequate lighting could be primary and/or contributing factors to crashes throughout the area, including along the non-standard horizontal curve.

Although both directions of I-81 were calculated to have higher crash rates than the overall, wet-road, and fixed-object statewide average, only a small portion of I-81 in the northbound direction between RM 2012 and RM 2014 was identified to have a non-standard feature (non-standard horizontal curve radius). Based on a detailed examination of police reports, most (60 percent) of the 20 crashes that occurred on northbound I-81 between RM 2012 and RM 2014 were found to be potentially related to the non-standard curve.

I-81 and I-481 "Northern Interchange"

The I-81/I-481 "Northern Interchange" area is the cloverleaf interchange of I-81 with NY 481/I-481 in North Syracuse (i.e., north of Downtown Syracuse and north of the I-81 viaduct S-curve/slalom area). It includes I-81 Interchange 29 and NY 481/I-481 Interchange 9 in the vicinities of Church Street and S. Bay and Thompson Roads. I-81 comprises the north and south legs of the north interchange area, extending from RM (RM) 81I 3303 3047 to RM 81I 3303 3066. The roadway is typically three lanes in each direction. NY 481 and I-481 comprise the west and east legs, respectively, of the north interchange area (i.e., the roadway's jurisdiction changes from Federal to State within the interchange). The NY 481 segment extends from RM 481 3301 1006 to RM 481 3301 1000 and then continues as the I-481 segment from RM 481I 3301 2145 to RM 481I 3301 2135. Both NY 481 and I-481 are typically two lanes in each direction. Although ramps at the interchange have their own reference markers, all ramp crashes were coded to the nearest mainline reference marker for the purposes of this preliminary analysis.

Over the three-year analysis period, 293 crashes were found to have occurred in the vicinity of the interchange – 151 on I-81, 84 on NY 481, 45 on I-481, and 13 with reference markers unknown.

The roadway segments within or immediately adjacent to the interchange meet the NYSDOT threshold of 27 crashes (i.e., 9 per year) needed for an urban full-access controlled facility to qualify as a PIL in NYSDOT Region 3. The crash rates along all roadway segments in the interchange area are higher than the statewide averages for similar facilities. The crash rate on the I-81 segment (for all crash types and both travel directions combined) was calculated to be 1.24 ACC/MVM, which is 1.14 times the statewide average of 1.09 ACC/MVM; the rate along NY 481 was calculated to be 2.11 ACC/MVM, which is 1.94 times the statewide average; and the rate along I-481 was calculated to be 1.11, which is 1.02 times the statewide average. It should be noted that crash frequency north and east of the interchange drops substantially.

Within the interchange area, 100 (34 percent) of these crashes occurred in areas with non-standard features, and approximately 11 (4 percent) of the crashes were found to be potentially related to the non-standard features. Most crashes along the area roadways occurred due to a variety of other factors, including speeding, unsafe lane changing, peak-hour congestion, animals in the roadway, debris in the roadway, and inclement weather conditions. Although the types of, severities of, and contributing factors to the 11 crashes that were potentially related to non-standard features varied by location, the primary contributing factors were non-standard sight distance, superelevation, and curve radius.

For this interchange, the discussion above is based on 2010 to 2013 data. A review of more recent crash data (September 1, 2017 to August 30, 2020) showed similar crash numbers and patterns when compared to the 2010 to 2013 data set except for northbound I-81, between the I-81 bridge over Church Street and the start of the northbound off-ramp to existing southbound I-481 (RM 3303 3052). NYSDOT has plans to conduct a separate independent safety evaluation at this location.

Southbound I-81 at Court Street Weaving Area

The southbound I-81 at Court Street weaving area is a section of I-81 from the Bear Street on-ramp to the Genant Drive off-ramp. Crash records documented 51 crashes occurring on southbound I-81 at Court Street weave from RM 81I 3303 2056 to RM 81I 3303 2060. Of the 51 documented crashes in this area, approximately eight (16 percent) crashes were personal injury crashes and 43 (84 percent) crashes were property damage only crashes. There were no fatalities.

The predominant crash types within the project limits are rear-end (65 percent), overtaking (16 percent), and fixed-object crashes (10 percent), which account for 26 percent of the total crashes. All crashes involved passenger vehicles only.

The contributing factors for the crashes were following too closely (31 crashes), driver inattention (12 crashes), unsafe Speed (11 crashes), pavement slippery (seven crashes), and unsafe lane changing (seven crashes).

Southbound I-481 at Interchange 3 (NY 5/NY 92)

Recent crash records documented 67 crashes occurring on I-481 through the NY 5 / NY 92 interchange from RM 481I 3301 2042 to RM 481I 3301 2049. Of the 67 documented crashes in this area, approximately eleven (16 percent) crashes were personal injury crashes and 56 (84 percent) crashes were property damage only crashes. There were no fatalities. The predominant crash types within the interchange limits are rear-end (67 percent), overtaking (12 percent), and fixed-object crashes (12 percent). Three crashes involved a commercial vehicle. The highest frequency of contributing factors for the crashes was following too closely (35 crashes), followed by driver inattention (16 crashes), unsafe speed (12 crashes), and unsafe lane changing (ten crashes). Both the overall and wet road crash rates (2.89 and 1.11 ACC/MVM) on southbound I-481 at this location are substantially higher than the statewide averages for similar facilities of 1.22 and 0.19 ACC/MVM, respectively.

Future No Build Safety Considerations

Based on the results of the detailed crash analysis performed for the project area, the majority of reported crashes on the interstate freeways (I-81, I-481, and I-690) were rear-end, overtaking and fixed-object crashes. Rear-end and overtaking crashes typically reflect congested traffic flow conditions and generally result from driver behavior problems such as following too closely, unsafe lane changing, and driver inattention. Traffic congestion during peak periods may encourage drivers to follow too closely, accelerate and decelerate frequently, and make excessive lane changing maneuvers to pass slower vehicles. Fixed-object crashes often relate to slippery pavement, which also is an important contributing factor. The lack of skid resistance is often caused by the aging and deterioration of pavement. In addition, non-standard features in the project area, such as insufficient horizontal and vertical stopping sight distance, non-standard lane and shoulder widths, and insufficient weaving distance can contribute to these types of crashes.

For the No Build Alternative, with traffic growth and unchanged capacity, congestion will be worse than the existing condition. Traffic volume is forecasted to increase approximately 14 percent from 2013 to 2056 and non-standard features would not be improved under the No Build conditions. In addition, pavement conditions would continue to deteriorate until bridge deck replacements/resurfacing occurs. Therefore, it can be expected that the crash condition would worsen with the No Build Alternative.

Safety performance measures are required to identify safety problems that may exist in the project area and to evaluate the effectiveness of the build alternatives in addressing these problems. Traditionally, evaluating the safety of a proposed improvement alternative begins with a review of the facility's crash history and applying crash reduction factors from NYSDOT's Post Implementation Evaluation System (PIES). PIES includes factors for capital improvements typically constructed as part of a major highway project and low-cost improvements (highway signs, pavement markings, signal timing, etc.) that are usually implemented through minor maintenance activities. However, the proposed build alternatives for the I-81 Viaduct Project would alter roadway geometrics substantially, such that proposed roadway segments would not align with existing roadway segments and associated empirical data.

To address this issue, the FHWA Surrogate Safety Assessment Model (SSAM) was used to develop surrogate safety measures of effectiveness (MOEs), based on vehicle trajectory information from the VISSIM microscopic traffic simulation model. One of the surrogate safety measures is the traffic "conflict", defined as an occurrence when two or more road users would collide if intervening action is not taken. The FHWA document "Surrogate Safety Assessment Model (SSAM) and Validation (FHWA-HRT-08-051, June 2008)" asserts that the traffic conflict is a reliable surrogate safety measure of comparative safety, due to its correlation with actual crashes. Therefore, higher rates of traffic conflicts can indicate lower levels of safety. This methodology is presented in this section to provide a comparison of existing and No Build condition vehicle conflicts, and is used later in this chapter to compare No Build vehicle conflicts with those for the I-81 Viaduct Project alternatives.

Vehicle trajectories produced by the VISSIM simulation model were input to SSAM to generate traffic conflicts and associated surrogate safety measures. Safety MOEs for 2013 Existing Conditions are compared to the No Build for 2056 peak hours in **Table 5-13**. Total vehicle conflicts would increase 23 percent in AM peak hour and 37 percent in the PM peak hour. The increase in rear end conflicts would be the most substantial, with a 57 percent increase during the PM peak hour. Since rear end conflicts relate closely to traffic congestion, this is indicative of the expected deterioration in traffic operations in the future without the Project. In addition, lane change conflicts for the No Build condition would increase by approximately 27 percent in the AM peak hour and 41 percent in the PM peak hour.

Table 5-13
Existing vs. No Build Condition Vehicle Conflicts

Scenario	2013 Existing Condition			2056 No Build Condition		
MOE/Peak	AM	PM	AM+PM	AM	PM	AM+PM
Rear End Conflicts	44,392	57,805	102,197	58,459	90,618	149,077
Lane Change Conflicts	43,542	71,334	114,876	55,435	100,854	156,289
Crossing Conflicts	96,937	166,461	263,398	113,459	211,899	325,359
Total Conflicts	184,871	295,599	480,470	227,353	403,371	630,724

Safety Cost and Benefits Analysis

In addition to the SSAM analysis, an analysis was conducted to identify the annual cost of crashes for the No Build alternative, to be used as a baseline for comparison to the build alternatives discussed later in this chapter. The analysis included the freeway system and more than 100 local street intersections in the project area. Specifically, the analysis limits are as follows:

- I-81 from just south of the southern I-481 interchange to just north of the northern I-481 interchange (Reference Marker (RM) 81I 3303 2008 to 81I 3303 3062)
- I-481 from the southern I-81 interchange through the northern I-81 interchange (RM 481I 3301 1000 to RM 481 3301 1004)
- I-690 from west of Hiawatha Boulevard to its eastern terminus at I-481 (690I 3301 2005 to 690I 3301 3019)
- 105 local street intersections which are expected to experience notable geometric or traffic volume changes as a result of the project

Detailed analysis data are provided in **Appendix C-4.**

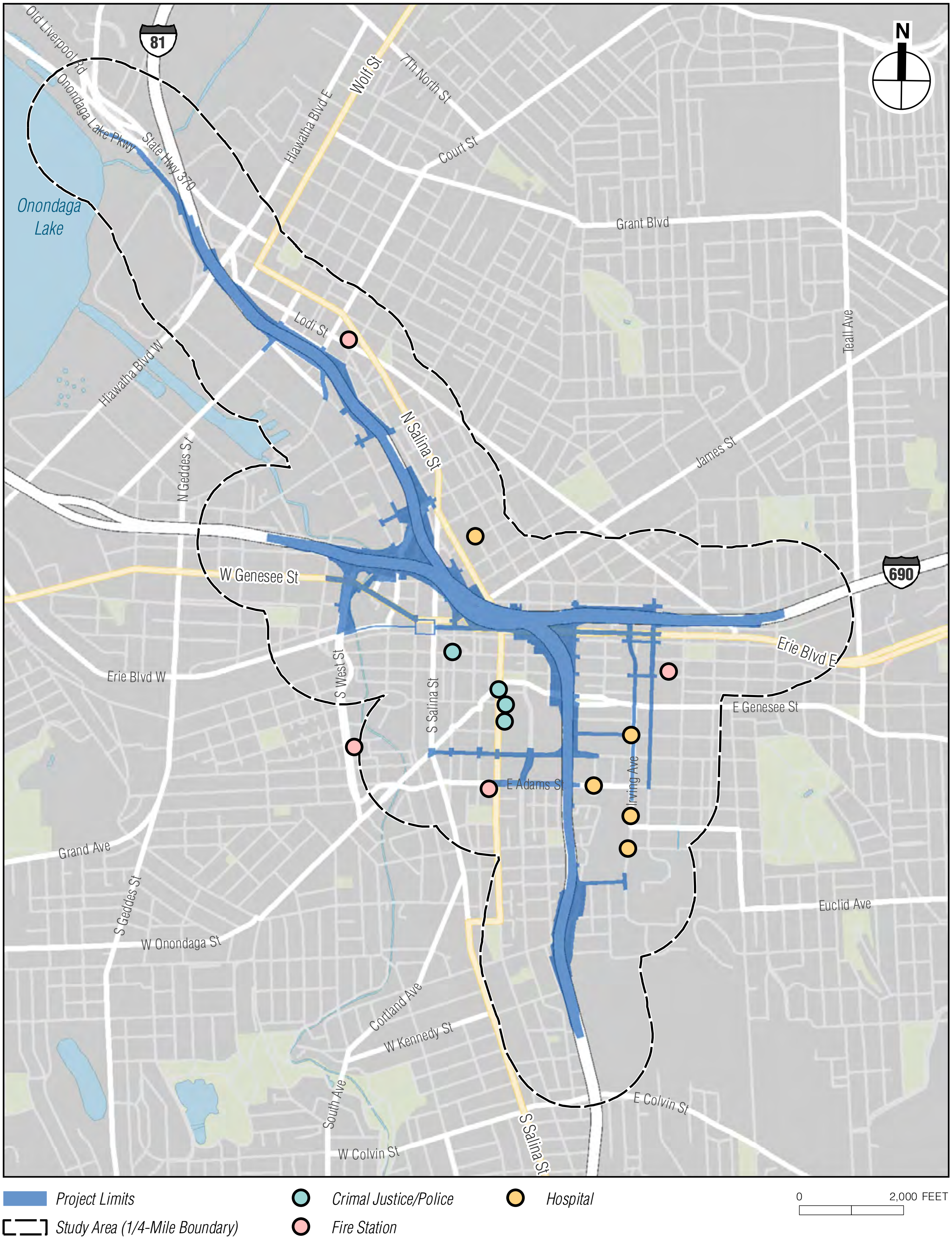
Crash data for a three-year period from January 1, 2015 through December 31, 2017 was evaluated to identify the location of crashes and for initial analysis using the Highway Safety Analysis (HSA) software. Crashes occurring on freeways were grouped into logical segments based on features such highway geometrics and design modifications proposed by the project. The crash data was then analyzed within HSA, and Accident Summary Sheets were prepared for each existing freeway segment and intersection.

Future year AADTs were developed for each intersection and freeway segment for the No Build alternative by adjusting previously developed existing 2013 AADTs based on traffic volume projections from the I-81 Project Travel Demand Model. Initial adjustments to the number of crashes were made based on the projected change in traffic volume. In addition, NYSDOT average accident severity distribution and costs from the January 1, 2015 to December 31, 2016 data for similar state highways, in conjunction with actual severity distributions at each analysis location, were used to adjust crash costs.

Based on crash history and projected changes in traffic volumes at each location, Safety Benefits Evaluation Forms (Form TE-164) were completed for the No Build condition. Crash costs at each location were totaled and the results of the analysis indicate a total annual crash cost of $41,363,370 for the No Build alternative.

Existing Police, Fire, and Ambulance Access

The Project Area is served by several police and fire departments, as well as ambulance services. Police and fire protection services in the City of Syracuse are provided by the Syracuse Police Department and the Syracuse Fire Department, respectively. Fire Station 1 located at 900 S. State Street and Fire Station 2 at 2300 Lodi Street are both located within the project area but are outside of the project limits. Syracuse Police Department headquarters at 511 South State Street is also inside of the project area but outside of the project limits (see **Figure 5-14**).



Emergency Services

Figure 5-14

Ambulance services within the project area are supplied by a group of providers including:

- Rural/Metro Medical Services
- Eastern Ambulance
- Syracuse University Ambulance
- TLC Medical Transportation Services
- Able Medical Transport

Emergency room services are provided at the following major hospitals:

- St. Joseph's Hospital
- Upstate Medical University Hospital
- Crouse Hospital

I-81, I-690, Townsend Street, Butternut Street, Irving Avenue, and Adams Street are major access routes for emergency room services.

Emergency services are geographically dispersed throughout the City of Syracuse both within and around the project area and various emergency responders frequently travel on routes through and within the project area.

Parking Regulations and Parking Related Conditions

A parking study was initiated for the I-81 Viaduct Project to identify the extent to which on- and off-street parking is available and utilized, and to evaluate potential impacts to parking under each project alternative. The parking within the I-81 Viaduct Study Area is shown in **Figure 5-15**. This section provides a summary of the parking analysis and the complete study is documented in **Appendix C-5**.

Existing Parking Conditions

Parking on interstate highways is restricted by law, therefore there is no parking allowed on the interstates or their ramps within the project limits. In addition, parking is not allowed on Almond Street or on most of Adams and Harrison Streets. Throughout the rest of the Project Area, most on-street parking is limited to two-hour, metered parking, and a variety of restrictions, reserved spaces, and loading zones regulate when and where on-street parking is available. Typically, on-street parking restrictions and fees are limited to weekdays. The off-street parking inventory consists of both public and private facilities. Most are surface parking lots, but nearly half of the off-street spaces in the area are within parking garages. The existing total parking supply in the I-81 Viaduct Study Area is 29,233.

For planning purposes, parking supply is adjusted to allow for a buffer of available spaces and to account for inefficiencies in parking associated with a number of factors. For example, depending on how familiar occupants are with a parking facility, a facility will be perceived as full at less than its capacity if a driver has to search through a number of floors or aisles to find an available space. There is also the potential for weather events to affect available parking, such as when snow covers pavement markings resulting in inefficient parking within a surface lot or when snow is plowed onto on-street parking spaces. This adjustment of overall supply is known as the effective supply. This approach of using effective supply is consistent with best practices noted in numerous industry references such as the *Transportation Planning Handbook 4th Edition* produced by the Institute of Transportation Engineers (2016) and *Planning and Urban Design Standards* by the American Planning Association (2006). For

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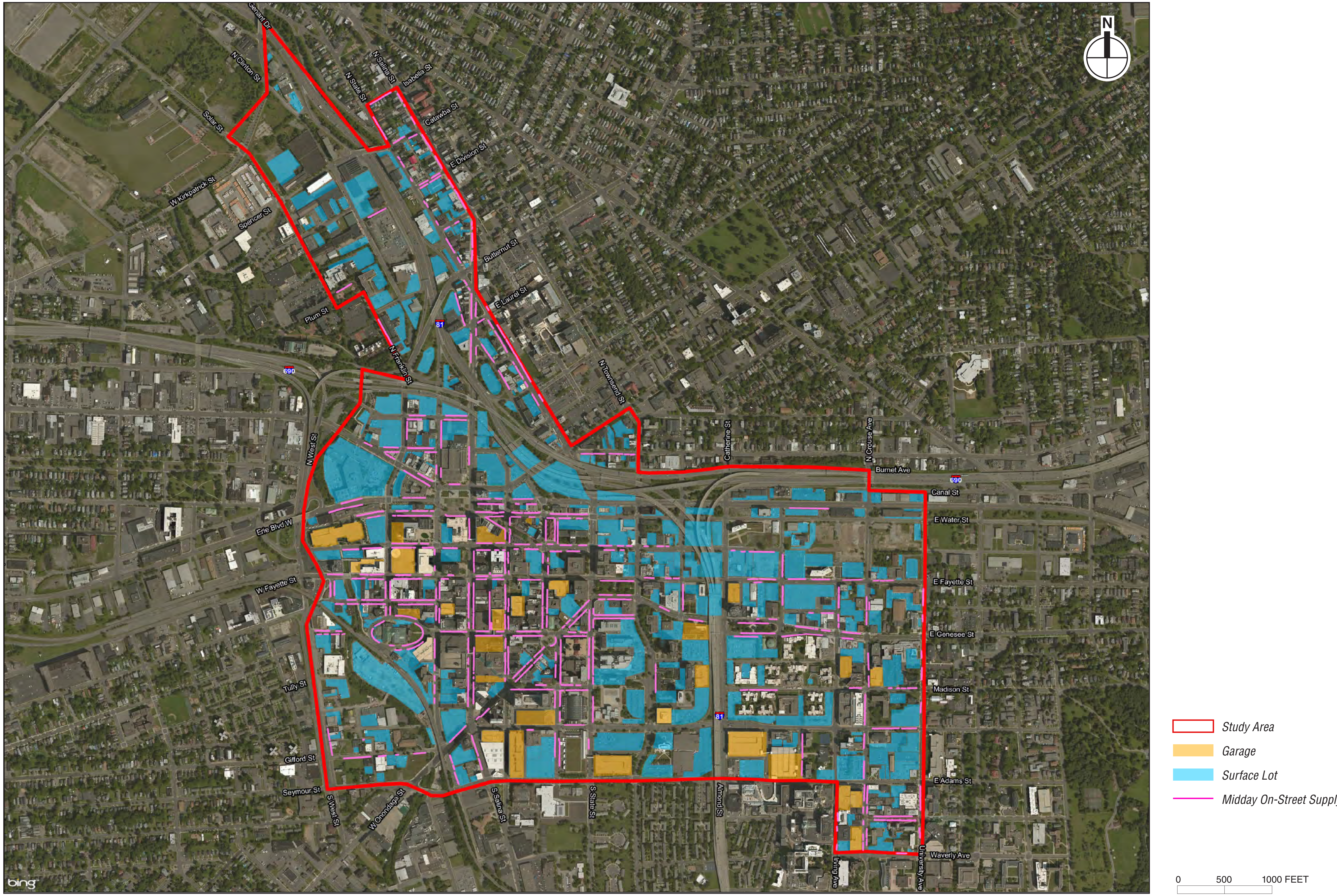


I-81 Viaduct Study Area — Existing Parking Areas
Figure 5-15

consistency with the *2008 Downtown Syracuse Parking Study*, an 85 percent effective supply was assumed for on-street facilities (accounting for higher visitor occupancy and higher chance of being affected by weather)) and 93 percent for off-street facilities (accounting for a higher share of monthly/frequent parkers and lower chance of weather impacts). Parking demand was developed from previous studies and inventories performed for the I-81 Viaduct Project in 2014. Peak parking demand within the I-81 Viaduct Study Area occurs midday when parking is approximately 79 percent utilized. While some roadway segments and off-street facilities are over-utilized, some are substantially under-utilized depending on the location of the facility compared to the parking generators (see **Appendix C-5** for Parking Impact Analysis).

No Build Parking Conditions

Information was gathered to estimate parking supply and demand changes by 2020 due to known development projects through internet research and coordination with a number of local agencies and other stakeholders. Parking demand was not developed for conditions beyond 2020 as growth is generally small and it is assumed that any future parking demand generated past 2020 will be accommodated as part of any future development processes through zoning requirements and/or market demand. It is estimated that the known development projects through 2020 would result in a net increase in parking supply of 2,149 spaces within the I-81 Viaduct Study Area. Therefore, the 2020 No Build supply is expected to be 31,382 spaces.

The No Build Alternative demand is based on the estimated parking demand generated by the change in households and employees by 2020 within the I-81 Viaduct Study Area, which account for the future projects discussed above. When assumed parking demand ratios are applied to the anticipated change in demographics, the total increase in parking demand is estimated to be approximately 1,800 by 2020. In 2020, parking supply effectively would be 79 percent utilized and would be similar to existing conditions, as shown in **Table 5-14**.

Table 5-14
2020 No Build Parking Supply & Demand Summary

Analysis Year	Change in Supply	Supply	Effective Supply	Change in Demand	Demand	Utilization
Existing Conditions		29,233	26,808		21,064	79%
2020 No Build	2,149	31,382	28,779	1,782	22,846	79%

The No Build analysis indicates that in 2020, the I-81 Viaduct Study Area supply would be adequate to accommodate the demand.

Lighting

Within the I-81 Viaduct Study Area, highway lighting is provided along both I-81 and I-690. In addition, there is a variety of street lighting systems throughout the city street grid, including under-bridge lighting beneath both I-81 and I-690. Highway lighting currently is not provided within the I-481 South Study Area, within the I-481 East Study Area, within the I-481 North Study Area or along sections of I-481 between the study areas. The following describes the type and extent of existing lighting within the Project Area.

Lighting Criteria and Existing Lighting Levels: The lighting level criteria for existing I-81 and I-690 fall under the "Freeway" classification, as shown in **Table 5-15**. These freeways are within the metropolitan area in or near the City of Syracuse central core, and therefore, the appropriate lighting level would be 0.6 foot-candles (fc). The lighting level criteria for the majority of the other vehicular roadways within the Project Area fall under the "Local" classification, whereas the appropriate lighting level would generally be 0.3 – 0.9 fc depending on the area classification. The lower lighting level of 0.3 fc would be appropriate for local roadways near a residential neighborhood and the higher lighting level of 0.9 fc would be appropriate in more commercial areas that include shopping and retail areas.

Table 5-15
Lighting Criteria

Vehicular Roadways	Classification of Area		
Seeing Task	**Commercial**	**Intermediate**	**Residential**
Freeway	0.6 fc	0.6 fc	0.6 fc
Local	0.9 fc	0.6 fc	0.3 fc

Definition:
Freeway – A divided major highway with full control of access and no crossing at grade
Local – Roadways used primarily for direct access to residential, commercial, or industrial sites.
Fc = foot-candle sites
Reference: Table 14.3 of the IES Lighting Handbook as per the illumination Engineering Society of North America

Existing lighting levels were measured using an Extech Instrument HD450 Datalogging Heavy Duty Light Meter and a selfie stick to hold the reader above the impact of shadows from vehicles and people. Readings were taken approximately six feet from the ground. Data was collected with multiple observations of each corridor. Data was collected first by observing the readings of the meter and noting maximums and minimums for each street.

All corridors exhibited instances of zero foot-candles where lights were either missing or not currently lit. Data was collected by randomly storing readings while traveling the streets. Data was collected for the major corridors using the automatic reading setting of the meter.

Lighting levels were analyzed on both I-81 and on I-690 throughout the project limits. The presence of lighting on I-81 begins just prior to Hiawatha Boulevard interchange with high tower lights. Standard highway lighting starts at this interchange and runs south to just before the I-481 interchange. Lighting is present on I-690 from I-690 interchange 9 to just beyond I-690 interchange 15 (two exits prior to the I-481 interchange with I-690). **Table 5-16** summarizes existing average lighting level measurements.

The existing light levels for I-81 northbound and I-81 southbound are inadequate and do not meet the IES recommended lighting criteria of 0.6 fc for a freeway as indicated in **Table 5-15** above. In summary street lighting exists where appropriate but does not meet current recommended lighting standards for the roadway classification.

Table 5-16
Existing Light Level Measurements

Measured Foot-Candle (FC) Readings			
Roadway	Highest FC	Lowest FC	Avg. FC
I-81 Northbound	2.23	0	0.37
I-81 Southbound	2.23	0	0.36

Existing Light Fixture Types

- **Northbound and southbound I-81 - Freeway** - Light fixtures are traditional cobra-head roadway lighting. Light fixtures are mounted to a davit arm that is connected to a pole +/- 20 feet above finished grade. The fixtures have a high-pressure sodium lamp. The poles are installed on both sides of the freeway at staggered locations. The northbound and southbound interchange consists of three lanes of traffic in each direction separated by a concrete center median. Ownership and maintenance jurisdiction information for roads, highways, bridges, and lighting within the Project Area can be found in **Appendix C-6**.
- **Northbound and southbound I-81 - Beneath the Viaducts** - Light fixtures beneath the viaduct are cobra head light fixtures mounted to bridge steel. The fixture layout does not consider the tunnel effect that the viaduct creates when entering the area beneath the viaduct during the day when the sun is shining. The fixtures appear to be randomly located for general lighting; the locations have not been adjusted to lessen the driver's perception of the tunnel effect. In addition, the lights beneath the viaduct appear to be on continually during the year.
- **Local Roadways** - Lighting conditions on Catherine Street, Almond Street, North Crouse Avenue, South Crouse Avenue, Irving Avenue, West Genesee Street, James Street, Erie Boulevard, Harrison Street, Adams Street, West Street, MLK, Jr. East, Renwick Avenue, and Butternut Street were reviewed. The following summarizes the existing lighting:
- **Catherine Street**: (Burnet Avenue to Erie Boulevard)
  - Cobra-head fixtures on davit arm mounted on the traffic signal poles at Catherine Street and Burnet Avenue.
  - Abutment standard wall pack lights beneath I-690.
  - Cobra head fixtures on utility poles from I-690 to Erie Boulevard.
- **Almond Street**: (Erie Boulevard to Van Buren Street)
  - Cobra-head fixtures on utility poles from Erie Boulevard to E. Fayette Street.
  - Acorn Globe on decorative poles with two fixtures per pole (E. Fayette Street to E. Genesee Street where Almond Street passes beneath I-81).
  - Cobra-head fixtures, bridge mounted from E. Genesee Street to Van Buren Street.
  - Northbound Almond between E. Adams Street and E. Genesee Street - Cobra heads on standard davit arm poles.
- **North Crouse Street**
  - Cobra-heads on davit arm mounted on the traffic signal poles at North Crouse Street and Burnet Avenue.

  - Abutment standard wall pack lights beneath I-690.
  - Cobra-head fixtures on utility poles from Burnet Avenue to Erie Boulevard.
- **South Crouse Street**
  - Cobra-head fixtures on davit arms from Erie Boulevard to E. Fayette Street.
  - Cobra-head fixtures on utility poles from E. Fayette Street to Adams Street.
  - Acorn lights South of Adams Street.
- **Irving Avenue**
  - Cobra-head fixtures on utility poles from E. Fayette Street to Madison Street.
  - Cobra-head fixtures on davit arms from Madison Street to Harrison Street.
  - Cobra-head fixtures on utility poles from Harrison Street to Adams Street.
  - Cobra-head fixtures on davit arms at corner of Adams Street.
- **West Genesee Street**
  - Tear drop on a decorative arm on utility poles (limits to West Street).
  - Cobra head fixtures on davit arm mounted on the signal at W. Genesee Street and West Street.
  - Cobra-head fixtures mounted on West Street bridges.
  - Cobra-head fixtures on davit arms from West Street to Wallace Street.
  - Acorn lights on decorative green poles (Wallace Street to Clinton Street).
- **James Street**
  - Acorn lights on decorative green poles (N. Clinton Street to N. Salina Street).
  - Cobra-head fixtures on davit arms from N. Salina Street to Burnet Avenue.
- **Erie Boulevard**
  - Acorn lights on decorative green poles (N. Salina Street to S. Warren Street).
  - Cobra-head fixtures on davit arms from S Warren Street to Almond Street.
  - Wall packs on piers of I-81.
  - Cobra-head fixtures on utility poles from Almond Street to S. Crouse Avenue.
- **Harrison Street**
  - Acorn globe on decorative poles (S. Salina to S. Warren Street).
  - Tear drop fixtures on decorative poles (S. Warren Street to Almond Street).
  - Cobra-head fixtures on utility poles from Almond Street to S. Crouse Avenue.
- **Adams Street**
  - Cobra-head fixtures on davit arms (S. State Street to Almond Street).
- **North West Street**
  - Cobra-head fixtures on standard arms and pole (I-690 to Erie Boulevard).
- MLK, **Jr. East/E Castle Street**
  - Cobra-head fixtures on utility poles from Salina Street to Renwick Avenue.
- **Renwick Avenue**
  - Cobra-head fixtures on utility poles from MLK, Jr. East to I-81 bridges.

- Bridge-mounted cobra-heads under I-81 bridges (not working during site visit).
- Cobra-head fixtures on davit arms (I-81 bridges to New York, Susquehanna and Western Railway Bridge).
- Walk pack lights on retaining wall beneath the railroad and Fineview Place bridges.
- Cobra-head fixtures on utility poles from Fineview Place Bridge to Van Buren Street.

Ownership and Maintenance Jurisdiction

Refer to **Appendix C-6.6, Table C-6.6-1** for the ownership and maintenance jurisdiction of the various roads, highways, bridges, and lighting within the project area.

5.3.2 MULTIMODAL

Existing Pedestrian Conditions

Pedestrians are prohibited on I-690, I-81, and I-481 by state law.

Sidewalks are not continuous in the I-81 Viaduct Study Area. There is no sidewalk on the west side of Almond Street between Genesee Street and Adams Street, nor is there one on the west side of Renwick Avenue between Van Buren Street and MLK, Jr. East. There is no sidewalk on the east side of West Street between Genesee Street and the on-ramp to West Street at Erie Boulevard, or on the north side of Water Street from Almond Street to its eastern termination at South Beech Street. North of the I-690 corridor, there are no sidewalks in the following areas:

- South side of Burnet Avenue from Catherine to Crouse Avenue,
- Evans Street,
- North side of Butternut Street from the existing I-81 on-ramp near State Street to the existing I-81 off ramp near Franklin Street,
- West side of State Street from Butternut to Isabella Street,
- East side of Genant Drive,
- South side of Spencer from Clinton to Solar Street,
- Either side of Court Street from Genant Drive to Clinton Street,
- East side of Clinton Street from Genant Drive to Division Street and from West Kirkpatrick Street to Bear Street,
- West side of Clinton Street from Spencer Street to Bear Street,
- Either side of Court Street from Clinton Street to the existing bridge over I-81,
- West side of Lodi Street from Bear Street to just south of Hiawatha Street,
- East side of Lodi Street from Wolf Street to Hiawatha Boulevard,
- Either side of Bear Street to the east and west beyond the bridge over I-81,
- Hiawatha Boulevard from I-81 to the east,
- East Glen Avenue from Brighton Avenue west to the existing bridge over I-81,
- East side of Brighton Avenue north of the Brighton Towers driveway, and the

- West side of Brighton Avenue south of the Brighton Towers driveway to Seneca Turnpike.

Where sidewalks exist within the project area, they range in width from approximately four feet to approximately 17 feet wide. Some sidewalks within the I-81 Viaduct Study Area are paved over by adjacent driveways and parking lots creating an unsafe condition and gaps in pedestrian connectivity. This condition exists on the north side of Genesee Street between Plum Street and West Street, intermittently on the west side of Lodi Street between Wolf Street and Bear Street, south side of Erie Boulevard from west of State Street to east of Townsend Street, on both sides of Water Street from State Street to west of McBride Street, on the north side of Burnet Avenue from Catherine Street to east of Crouse Avenue, and between Canal Street and Erie Boulevard on Crouse Avenue, University Avenue, and Lodi Street.

The sidewalk on the east side of Renwick Avenue, beneath the New York Susquehanna and Western Railway is in a deteriorated condition hindering ADA-compliant pedestrian access.

Most intersections within the I-81 Viaduct Study Area have curb ramps, but many do not meet current Americans with Disabilities Act Accessibility guidelines (ADAAG) or Public Rights-of-Way Accessibility Guidelines (PROWAG), and NYSDOT *Highway Design Manual* Chapter 18 standards. Pedestrian signals with push buttons and marked crosswalks are in place in some locations, but are not consistent across the Project Area. In many cases, marked crosswalks are worn or no longer visible. Some locations exhibiting non-compliant conditions include Almond Street, at both the Harrison and Adams Street intersections, crosswalks are missing from the north side of the intersection for east-west pedestrian traffic due to conflicts with vehicular turning movements. At the Willow Street intersections with Warren and Pearl Streets, no crosswalks are provided for north-south pedestrian traffic. At the intersection of James Street and Oswego Boulevard, no crosswalk is provided at the west side of the intersection. The Onondaga Creekwalk is a shared-use (bicycle and pedestrian) path that, with the exception of the block between Spencer Street and West Kirkpatrick Street, follows the alignment of Onondaga Creek from the Inner Harbor to Wallace Street. Between Wallace Street and Fayette Street, the Creekwalk is diverted away from the creek onto the adjacent city sidewalk system for several blocks. The lowest sections of the Creekwalk between Genesee Street and Plum Street flood frequently when the Onondaga Creek rises during stormwater events. The resulting operational closures of the Creekwalk in this area cause temporary pedestrian and bicycle network disconnections.

As part of its *University Hill Transportation Study* (2006/2007), SMTC provided an overview of existing pedestrian and bicycle conditions and made recommendations for potential improvements. The *University Hill Transportation Study* focused on conditions within University Hill and considered connectivity between University Hill and Downtown. The study identified the I-81 elevated highway and its bridge piers as obstacles to pedestrian and bicyclist mobility. It noted the width of Almond Street, as well as inadequate pedestrian infrastructure and multiple vehicular turning movements on the street, as concerns.

In 2010, SMTC released the *Almond Street Corridor Pedestrian Study* to address potential increasing pedestrian activity associated with anticipated growth in the University Hill area. This growth was expected to result in increased pedestrian activity crossing Almond Street between E. Genesee Street and Adams Street (under I-81), which is within the I-81 Viaduct Study Area. Two of the locations lacking crosswalks noted above – the north side of Harrison Street at Almond Street, and the north side of Adams Street at Almond Street are within this area of increased pedestrian activity related to the expansion of hospital related housing on the west side of the viaduct. The *Almond Street Corridor Pedestrian Study* identified various constraints in this corridor, such as incomplete or inadequate pedestrian infrastructure, uninviting pedestrian environment, and dangerous pedestrian and vehicle conflicts. In addition, the study noted that there are no designated bike lanes along Almond Street, requiring bicyclists to use general travel lanes.

As part of the Safety Cost and Benefits Analysis performed for the project, a review of crash data for 105 intersections indicated a total of 41 crashes involving pedestrians over the three-year analysis period.

No Build Pedestrian Conditions

The No Build Alternative would retain the highway in its existing condition, implementing ongoing maintenance and repairs as needed to keep it safe for the traveling public. Therefore, the deficiencies and lack of connectivity that characterize the existing condition would remain under the No Build Alternative. However, as part of other projects and ongoing maintenance activities, NYSDOT and the City of Syracuse would continue to upgrade the existing facilities to meet current PROWAG standards.

Existing Bicycle Conditions

Bicyclists are prohibited on I-690, I-81, and I-481 by state law.

Existing bicycle facilities within the Project Area include the Connective Corridor, the Empire State Trail, the Onondaga Creekwalk shared-use (bicycle and pedestrian) path, and several city streets with bike lanes. These facilities are dispersed and do not form an interconnected network.

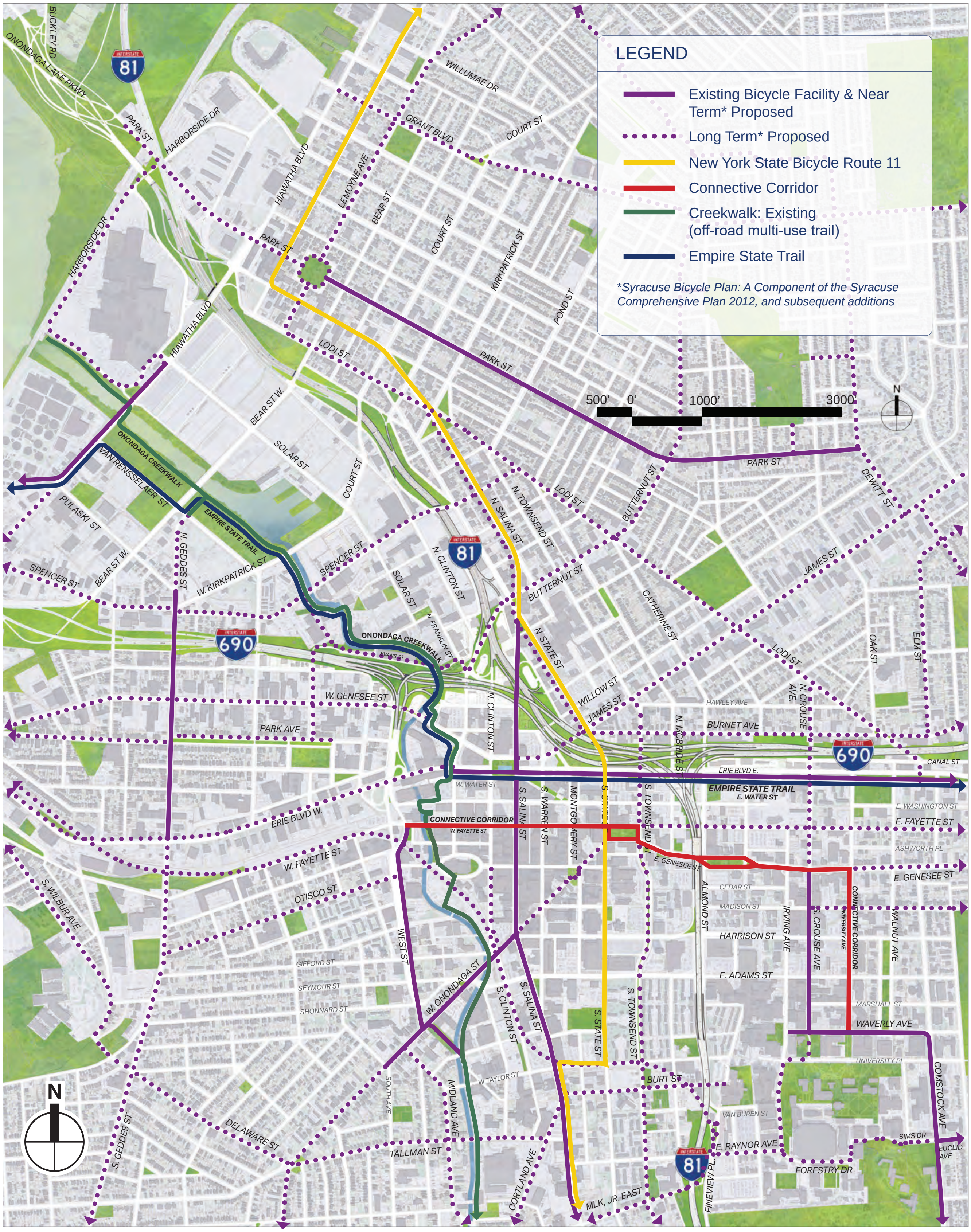
Several initiatives have been underway in the City of Syracuse to enhance bicycle and pedestrian connectivity. As shown in **Figure 5-16**, designated bicycle infrastructure has been established (or is planned) throughout the City. As discussed above, some of these routes are part of local bicycle and pedestrian initiatives, such as the City/SMTC Bikeway and Creekwalk, while others are part of larger regional routes, such as New York State Bicycle Route 11 and the Empire State Trail. In addition, Syracuse University has worked to enhance bicycle and pedestrian infrastructure by developing the Connective Corridor, which is a two-mile separated bicycle facility that crosses east-west under the viaduct and connects the University Hill area with Downtown business and residential districts. However, the existing bicycle infrastructure does not provide an interconnected system of bike routes for commuting, and the bicycle infrastructure along the I-81 viaduct (near Downtown, Southside, and University Hill) is lacking, thereby limiting bicycle connectivity between areas east and west of I-81.

As part of the Safety Cost and Benefits Analysis performed for the project, a review of crash data for 105 intersections indicated a total of 19 crashes involving bicycles over the three-year analysis period.

No Build Bicycle Conditions

The No Build Alternative would retain the highway in its existing condition, implementing ongoing maintenance and repairs as needed to keep it safe for the traveling public. Therefore, the deficiencies and lack of connectivity that characterizes the existing condition would remain under the No Build Alternative. However, NYSDOT and City of Syracuse may implement improvements in the future by other projects.

12.20.21



Existing City Bicycle Facility

Proposed City Bicycle Facility*

* Syracuse Bicycle Plan: A Component of the Syracuse Comprehensive Plan, 2012

Designated Planned Bicycle Facilities

Figure 5-16

Pedestrian and Bicycle Level of Service

Pedestrian Level of Service

Similar to vehicular LOS evaluation, pedestrian LOS is a qualitative measure used to describe the experience of a user on an urban street segment. Factors considered for pedestrians on a facility include average pedestrian space on a sidewalk, sidewalk presence, and pedestrian travel speeds. The overall LOS score for a pedestrian facility is determined by evaluating smaller pieces of the facility individually, and then determining the overall LOS facility score.

A pedestrian segment includes a link (space between two signalized intersections), a signalized intersection, and a factor for difficulty crossing the roadway at the link. For this project, there are multiple segments within each pedestrian facility. Each signalized intersection and link between intersections was evaluated. The aggregate of the pedestrian segments was used to determine a facility LOS score. The LOS criteria are listed in **Table 5-17**, from the 2016 Highway Capacity Manual. If a pedestrian facility does not have a sidewalk for a certain direction of travel along a segment, regardless of the LOS score for other segments of the facility, it will receive a failing LOS value due to an inadequate amount of space provided.

Table 5-17
Pedestrian Level of Service Criteria

Pedestrian Level of Service (LOS) Score	Level of Service By Average Pedestrian Space (ft2/p)					
	>60	>40-60	>24-40	>15-24	>8-15	≤8
≤2.00	A	B	C	D	E	F
>2.00-2.75	B	B	C	D	E	F
>2.75-3.50	C	C	C	D	E	F
>3.50-4.25	D	D	D	D	E	F
>4.25-5.00	E	E	E	E	E	F
>5.00	F	F	F	F	F	F

Bicycle Level of Service

The bicycle LOS score is a performance measure used for on-street bicycle facilities. Similar to the pedestrian LOS score, a bicycle facility is comprised of segments, which include links and the downstream intersection. The facility LOS aggregates the performance of these individual segments to obtain an overall LOS score. Features affecting a bicycle user's experience include traffic characteristics, geometric elements, and pavement conditions. The **Table 5-18** outlines LOS for bicycle facilities based on the 2016 Highway Capacity Manual.

Table 5-18
Bicycle Level of Service Criteria

LOS	LOS Score
A	≤2.00
B	>2.00-2.75
C	>2.75-3.50
D	>3.50-4.25
E	>4.25-5.00
F	>5.00

Existing Pedestrian and Bicycle Level of Service

The Highway Capacity Software (HCS7) was used to conduct the LOS evaluation for pedestrian and bicycle facilities. The following five pedestrian and four bicycle facilities were evaluated for the existing and future conditions during the AM and PM peak hours (refer to **Figure 5-17**).

- **Pedestrian Facilities**
  - Adams Street from State Street to Crouse Avenue
  - Almond Street from the intersection of Oakwood Avenue and East Castle Street to the intersection of Burnet Avenue and Almond Street
  - Crouse Avenue from Water Street to Burnet Avenue
  - Erie Boulevard: from Salina Street to Crouse Avenue
  - Harrison Street from Townsend Street to Almond Street
- **Bicycle Facilities**
  - Almond Street from the intersection of Oakwood Avenue and East Castle Street to the intersection of Burnet Avenue and Almond Street
  - Crouse Avenue: from Water Street to Burnet Avenue
  - Harrison Street from Townsend Street to Almond Street
  - Water Street from Salina Street to Crouse Avenue

Representative pedestrian counts were taken at various locations within the project area. For analysis purposes, an assumed bicycle volume of ten bicycles per hour per direction was used.

HCS7 accounts for traffic characteristic data, geometric design data, and some additional data required to determine a LOS score. For traffic characteristics, turning movement volumes, peak hour factors, signal timings, mid-segment speeds, heavy vehicle percentages, mid-segment traffic volumes, and percentage of on-street parking occupancies were entered to complete the analysis. For geometric design data, elements used in the analysis include number of intersection and segment lanes, typical section elements such as vehicle and bicycle lane widths, curb presence, sidewalk presence and width, buffers, and parking lanes. Other data used in the analysis include pavement conditions for bicyclists and midsegment crossing information for pedestrians. The results are presented in **Table 5-19**. Note that bicycle segments may not extend the entire length for both directions in a facility, and only those segments where bicycles can travel with vehicles were included.

Three pedestrian segments currently provide an unacceptable LOS F. Although the LOS scores for these facilities do not correspond to a failing LOS, they are LOS F due to the inadequate pedestrian space standards. At least one segment in each of these facilities lacks pedestrian accommodations, and pedestrians need to either use the roadway or cross the street to walk on the sidewalk on the opposite side of the road. The following pedestrian facilities operate at LOS E or F.

- Pedestrian facility at Almond Street, southbound (AM and PM)
- Pedestrian facility at Crouse Avenue northbound (AM and PM)
- Pedestrian facility at Erie Boulevard eastbound (AM and PM)

The existing bicycle facilities evaluated have acceptable levels of service.

3.11.21

Pedestrian Study Route

Bicycle Study Route

Pedestrian and Bicycle Study Route

Existing Pedestrian and Bicycle Level of Service

Figure 5-17

Table 5-19
2013 Existing Pedestrian and Bicycle Level of Service Analysis

Facility Type	Facility Name		2013 AM LOS Score	2013 AM LOS	2013 PM LOS Score	2013 PM LOS
Pedestrian	Adams Street	EB	3.88	D	3.84	D
	Almond Street	NB	3.40	C	3.50	C
		SB	3.20	F	3.54	F
	Crouse Avenue	NB	3.47	F	4.55	E
	Erie Boulevard	EB	3.40	F	3.43	F
	Harrison Street	WB	3.88	D	3.80	D
Bicycle	Almond Street	NB	3.93	D	3.93	D
		SB	3.80	D	3.92	D
	Crouse Avenue	NB	4.11	D	4.25	D
		SB	3.07	C	2.98	C
	Harrison Street	WB	4.06	D	4.04	D
	Water Street	EB	3.59	D	3.39	C
		WB	3.33	C	3.47	C

Future No Build Pedestrian and Bicycle Level of Service

Table 5-20 summarizes the LOS results for 2026 and 2056 No Build conditions for the pedestrian and bicycle facilities. No physical changes to the facilities were assumed, but turning movement volumes at intersections and mid-segment traffic volumes along each link were modified based on traffic volumes from the project's vehicular traffic analyses. For the majority of the facilities, negligible changes in the LOS score are expected. Changes in the LOS score do not increase or decrease consistently across facilities. This is because the No Build conditions do not exhibit a steady increase in turning movement volumes at intersections, since future traffic volumes were developed using the I-81 Project Travel Demand Model, which accounts for future development projects and associated traffic demand.

Transit

Existing Transit Conditions

Public transportation services in the Project Area are provided by the Central New York Regional Transit Authority (Centro). Centro currently operates fixed bus routes mainly in the city of Syracuse and suburban Onondaga County. The routes operate on a hub-and-spoke route system with the majority of the routes traveling to the Centro Transit Hub located in the heart of Downtown Syracuse (at the corner of Adams Street and South Salina Street). In addition to the fixed bus routes, Centro also operates Syracuse University shuttle routes, paratransit, and special services for local schools and special events. The core ridership within the bus system is made up of transit-dependent markets such as densely populated and low-income neighborhoods, and Syracuse University and other similar institutions.

Table 5-20
2026 and 2056 No Build Alternative Pedestrian and Bicycle Level of Service Analysis

Facility Type	Facility Name		2026				2056			
			AM		PM		AM		PM	
			LOS Score	LOS	LOS Score	LOS	LOS Score	LOS	LOS Score	LOS
Pedestrian	Adams Street	EB	3.83	D	3.85	D	3.84	D	3.87	D
	Almond Street	NB	3.39	C	3.51	D	3.39	C	3.51	D
		SB	3.22	F	3.55	F	3.24	F	3.58	F
	Crouse Avenue	NB	3.53	F	3.63	F	3.53	F	3.63	F
	Erie Boulevard	EB	3.40	F	3.43	F	3.42	F	3.44	F
	Harrison Street	WB	3.92	D	4.04	D	3.99	D	4.07	D
Bicycle	Almond Street	NB	3.94	D	3.93	D	3.95	D	3.94	D
		SB	3.81	D	3.82	D	3.82	D	3.83	D
	Crouse Avenue	NB	4.20	D	4.27	E	4.23	D	4.26	E
		SB	2.90	C	2.94	C	2.93	C	3.00	C
	Harrison Street	WB	4.05	D	4.04	D	4.09	D	4.06	D
	Water Street	EB	3.59	D	3.34	C	3.62	D	3.47	C
		WB	3.15	C	3.24	C	3.20	C	3.37	C

The Syracuse Transit System Analysis (STSA), completed by the NYSDOT in 2014, in coordination with Syracuse Metropolitan Transportation Council and as part of the I-81 Corridor Study, identifies a continuum of transit services, from basic bus service to bus rapid transit (BRT) and light rail transit (LRT). Based on the STSA results, several corridors and strategies are recommended for further study and implementation. These recommendations include:

- Pursue higher-intensity transit services within the two corridors including (1) the Destiny USA/Regional Transportation Center (RTC) to Syracuse University and (2) James Street/South Avenue: Onondaga Community College (OCC) to East Syracuse.
- Begin a commuter-based express bus service along I-81 from Central Square to Downtown/University Hill.
- Construct a new transit hub on University Hill.
- Optimize basic bus service on a number of high-use corridors, such as Destiny USA/RTC to Syracuse University.

Future No Build Transit Conditions

SMTC conducted the "Syracuse Metropolitan Area Regional Transit Study Phase 1 (SMART 1)" study. It began in June 2015 to pursue higher-intensity transit services within the two corridors (Destiny USA/RTC to Syracuse University and OCC to East Syracuse) recommended by the STSA. Strategies for transit service enhancement include the improvement of existing bus services, introduction of bus rapid transit (BRT), and implementation of light rail transit (LRT) or streetcars.

It is expected that both STSA and SMART 1 would help Centro establish the basis to pursue Federal Transit Administration (FTA) New Starts or Small Starts funding. Since the determination of specific transit enhancements and their relation to the I-81 Project Area is unknown at this time, it is important for the I-81 build alternatives to have flexible roadway configurations, which would not preclude any future transit system improvements such as setting aside potential right of way for future dedicated bus lanes or other recommendations that may physically alter the streets.

Airports, Railroad Stations, and Ports

Syracuse Hancock International Airport is located approximately 5.3 miles north of the I-81/I-690 interchange and no conflicts exist with the flight paths of aircraft using this airport.

The Syracuse Amtrak railroad station is located in the northeastern corner of the I-81 Viaduct Study Area at the William F. Walsh Regional Transportation Center, which is also adjacent to the Destiny USA shopping mall. The station is located approximately two miles north of the I-81/I-690 interchange and no conflicts exist with the Amtrak station or access to the station.

The Inner Harbor is a former port facility located approximately 0.3 miles north of I-690 and 0.3 miles west of I-81, on the south end of Onondaga Lake, near the outlet of Onondaga Creek. The Inner Harbor is part of the Barge Canal system and is no longer used for commercial purposes, but it is used for recreational purposes.

Access to Recreation Areas (Parks, Trails, Waterways, State Lands)

There are numerous parks and recreational areas within the project limits that are accessed from the existing city street system. There are no parks or recreational areas that are directly adjacent to an interstate interchange within the Project Area. Wilson Park and Forman Park are both City of Syracuse parks accessed from Almond Street in the Project Area. Parks accessed from other city streets near the Project Area including Clinton Square, Firefighters' Park, Libba Cotten Grove, Roesler Park, Leavenworth Park, Ormand Spencer Park, Franklin Square Park, Union Park, and Washington Square Park. In addition, various bike facilities and shared-use (bicycle and pedestrian) paths within the Project Area are accessed from the city street system, including the statewide Empire State Trail, the Connective Corridor bicycle facility, and the Creekwalk shared-use (bicycle and pedestrian) facility. Onondaga Lake and the Inner Harbor, both of which are part of the Erie Canal, are accessed from the city street system. There are no non-NYSDOT owned state lands within the I-81 Viaduct Project Area, but there are two wildlife management areas (Hamlin Marsh Wildlife Management Area and the Cicero Swamp Wildlife Management Area) that are located adjacent to the I-481 North Study Area.

Trucks

Existing Truck Conditions

An efficient and effective goods movement system is essential to the economic livelihood of the Syracuse metropolitan area. Compared to other freight modes (rail, water, air etc.), trucking dominates goods movement within and through the City of Syracuse. Truck traffic has the potential to adversely impact the local environment (e.g., emissions, noise, excessive wear on roadways) and, therefore, designated truck routes are established to minimize adverse conditions by directing trucks away from local streets that are inappropriate to serve truck traffic. Trucks are allowed to access locations on local streets for site deliveries (i.e., goods delivery or moving vans); however, they must take the most direct route to and from the designated truck routes.

The existing truck route system within the project area can be classified into through and local truck routes. Through truck routes are the key regional transportation facilities that include I-81, I-90, I-481, I-690, and State Routes 481 and 690. Local truck routes include most principal and minor arterials in the City of Syracuse and its adjacent communities. To estimate truck traffic volumes on designated truck routes, INRIX GPS data was used to develop truck origin-destination (O-D) trip tables through the Origin-Destination Matrix Estimation (ODME) procedure in TransCAD (Note: INRIX provides detailed GPS data about the trips people take, including where they begin and end their journeys and all the waypoints in between). The resulting truck O-D tables were combined with the I-81 Project Travel Demand Model highway network so that TransCAD's Multi-Modal Multi-Class Assignment (MMA Assignment) could be performed to obtain the estimated link truck volumes. Note that due to their potentially greater environmental impacts on communities, only heavy and medium trucks were included in the truck O-D tables. They are defined as follows:

- Medium trucks – include two-axle/six-tire or three-axle single unit trucks
- Heavy trucks – include all tractor-trailer trucks with four or more axles

Based on the MMA assignment results, (medium/heavy) truck volumes during the AM and PM peak hours range from eight to ten percent of total traffic volumes on various sections along I-81, six to nine percent along I-481, and four to six percent along I-690. Compared to the study area freeways, peak-hour truck volumes on the local truck routes are relatively lower. The local routes most frequently used by trucks within the project area include:

- West Street
- Clinton Street
- Salina Street
- State Street
- Genesee Street
- James Street
- Erie Boulevard
- Harrison Street
- Adams Street
- Irving Avenue
- Crouse Avenue
- Teall Avenue
- Bear Street

Truck traffic volumes on these local routes range from a low of approximately five trucks per hour to a high of approximately 45 trucks per hour. Most of the city's truck route corridors experience relatively free-flow traffic movement.

Future No Build Truck Conditions

The No Build Alternative would largely retain the study area roadways in their existing geometric conditions and, therefore, would not result in any significant changes for freight transportation through and into the project area. Generally, the No Build truck travel patterns would be similar to the existing conditions with the exception of truck volumes. Compared to the existing truck volumes, 2056 No Build truck volume percentage increases would range from four to seven percent for various sections along I-81, five to 10 percent along I-481, and five to eight percent along I-690.

5.3.3 INFRASTRUCTURE

Existing Highway Section

I-81 is a limited-access highway, with two or three lanes in each direction through Syracuse. Traveling north from the southerly I-81/I-481 interchange (I-81 Interchange 16A), I-81 is on embankment and generally consists of 12-foot lanes, 4-foot median side shoulders, and 8-foot outside shoulders. I-81 consists of four travel lanes (two lanes in each direction) south of the I-481 interchange and six lanes (three lanes in each direction) between the I-481 interchange and the Adams Street interchange. The 2.5-mile segment of I-81 between I-481 and the New York Susquehanna, and Western (NYS&W) Railway passes Morningside and Oakwood Cemeteries as it travels through the south part of the city.

Once I-81 crosses the NYS&W Railway, it transitions from an embankment to a viaduct (an elevated bridge with multiple spans). The 1.5-mile viaduct section generally consists of 12-foot lanes, 2.5-foot median side shoulders, and 2.5-foot outside shoulders. South of Adams Street, the section consists of six travel lanes (three lanes in each direction); north of Adams Street, the section consists of four travel lanes (two lanes in each direction). Local streets pass beneath and along the viaduct through neighborhoods including Southside, University Hill, and Downtown. North of Fayette Street, I-81 turns westward and continues on a viaduct with a series of ramps connecting I-81 with I-690. These ramps provide direct access from northbound I-81 to eastbound I-690 and from westbound I-690 to southbound I-81, but there are no direct connections between southbound I-81 and westbound I-690 or from eastbound I-690 to northbound I-81. The two highways use separate viaducts as they travel east-west along the north side of Downtown Syracuse until turning to the northwest in the vicinity of Salina Street.

North of I-690, I-81 initially transitions from a viaduct to a depressed highway and then ascends to ground level near Spencer Street, where it traverses a former warehouse and industrial area and then passes Destiny USA, a 2.4-million-square-foot shopping mall at the intersection of Onondaga Lake Parkway and Hiawatha Boulevard. Within this 1.5-mile section, I-81 generally consists of three 12-foot travel lanes in both directions with 4-foot median side shoulders, and 6- to 10-foot outside shoulders. The transition from two to three lanes begins just north of Salina Street in the northbound direction; the southbound transition from three to two lanes occurs at the Clinton Street exit.

Upon exiting the I-81 Viaduct Project Area north of Hiawatha Boulevard, I-81 passes a collection of low- and mid-rise hotels, as well as a few office parks surrounding the interchange with the New York State Thruway (I-90). I-81 then travels through mostly low-density, suburban commercial areas as it passes west of Syracuse Hancock International Airport. Continuing north to I-481, the highway serves the low-density residential and commercial uses of the northern suburbs. The section of I-81 north of Hiawatha Boulevard continues as a six-lane (three lanes in each direction) section for approximately 17 miles to the north before transitioning back to a 4-lane section just north of Central Square (Exit 32).

I-690 is about 14 miles long, beginning on the west at Interchange 39 on I-90 in Van Buren and traveling in a southeasterly direction through Geddes, Syracuse, and East Syracuse where it terminates at I-481 in DeWitt on the east. As I-690 travels through Downtown Syracuse within the I-81 Viaduct

Study Area, there is an interchange at West Street and West Genesee Street (Exit 11/12), the partial interchange with I-81, and a partial interchange at Townsend Street/McBride Street (Exit 13). I-690 generally consists of six 12-foot travel lanes (three lanes in each direction), but includes several segments that are four lanes (two lanes in each direction), including the segment between West Street and State Street within the Project Area. The median side shoulders generally vary from 3.5 to 6 feet, and outside shoulders vary from 4 to 10 feet. Within the I-81 interchange area, I-690 is primarily on viaduct.

I-481 is a 15-mile interstate highway that loops through the eastern suburbs of Syracuse, bypassing the city. I-481 generally consists of four 12-foot travel lanes (two lanes in each direction) with 6-foot median side shoulders and 10-foot outside shoulders. I-481 begins at I-81 (Interchange 16A) in the southern part of Syracuse and travels northeasterly through Onondaga County. I-481 becomes a north-south roadway through DeWitt and East Syracuse, where it intersects with I-690 and I-90. After the interchange with I-90, I-481 takes a northwesterly alignment through Cicero. I-481's interstate designation ends at Interchange 29 in North Syracuse, where it rejoins I-81. After Interchange 29, the highway continues as NY 481 to Oswego. Just north of the interchange with I-690, I-481 traverses the CSX rail yards on an approximately 2,100-foot-long bridge. On the bridge, both the median side shoulder and the outside shoulder narrow to approximately 3 feet.

Where I-81 passes through Downtown Syracuse (as a viaduct), the local street network is characteristic of a typical city street grid, with east-west streets passing beneath the viaduct and Almond Street traveling north-south beneath and adjacent to the viaduct. Local streets also pass along and beneath the I-81 and I-690 interchange. Local streets comprise a mix of one- and two-way streets. Most streets provide some level of pedestrian accommodations, with sidewalks at least on one side of the street, though some sidewalks are discontinuous. Pedestrian crossings across Almond Street (beneath the I-81 viaduct) are limited, and at some locations, crosswalks are not provided at all legs of the intersection. Designated bicycle facilities are also limited in the I-81 Viaduct Study Area, with the exception of Genesee Street, which carries the Connective Corridor.

Geometric Design Elements Not Meeting Minimum Standards

As discussed previously, over 200 non-standard and non-conforming features exist along the sections of I-81, I-690, and I-481 in the Project Area. In particular, the I-81/I-690 interchange is a complex intersection of two elevated highways with multiple entrance and exit ramps. The intricate movements through which drivers must navigate, combined with the abundance of non-standard and non-conforming features, contribute to the high-crash conditions in the corridor. Existing non-standard features within the Project Area includes inadequate stopping sight-distances, shoulder widths, maximum grades, horizontal curve radii, and superelevation rates.

In addition to the 10 critical design elements designated by FHWA as the controlling criteria for design of projects on the National Highway System (NHS) network, and as listed in the Design Criteria tables in **Appendix C-6**, there are a number of other recommended design parameters established by NYSDOT and AASHTO that are typically used during the design of highway and bridge projects. When a roadway's geometry fails to meet these parameters, it may contribute to conditions that cause traffic congestion, reduce safety, and impede emergency response, thereby contributing to potential traffic incidents. These parameters typically include median width; ramp spacing; acceleration and deceleration lane lengths; clear zone; control of access; the type of the design vehicle; the Level of

Service (LOS); and the intensity of rainfall for design of storm drainage facilities. Where highway design parameters, proposed to be retained, are significantly below that required by established practice, NYSDOT HDM Chapter 5.1.2 requires an explanation similar to that of a non-standard feature. Within the Project Area, a number of ramps provide inadequate acceleration/deceleration length. In several locations, ramps are too closely spaced and fail to conform to AASHTO's recommended design standards. Additionally, the medians in some areas are narrow, affording only enough space for concrete barriers that separate opposing traffic lanes. As discussed above, these conditions are considered Non-Conforming Features, which contribute to traffic congestion, reduce safety, and impede emergency response, thereby contributing to potential traffic incidents. A summary of the existing non-standard features and non-conforming features is included in **Table 5-21** and a detailed listing of existing non-standard features and non-conforming features is included in **Appendix C-6**.

Table 5-21
Summary of Existing Non-Standard and Non-Conforming Features

Highway Segment1	Non-Standard Features (Number of Occurrences)					Non-Conforming Features (Number of Occurrences)			Total
	Shoulder Width	Maximum Grade	Horizontal Curve Radius	Stopping Sight[2] Distance	Super-elevation (Banking)	Median Width	Ramp Spacing	Accel/ Decel Length	
Viaduct	15	0	0	8	4	1	0	0	28
I-81/I-690 Interchange	20	2	9	18	18	0	5	2	74
I-81 Northern Segment	6	0	3	15	2	0	5	2	33
I-690 / West Street	11	0	1	7	8	0	2	0	29
I-690 Eastern Segment	9	0	0	2	2	1	0	0	14
I-481 Segment	8	1	1	1	19	0	3	0	33
TOTAL	**69**	**3**	**14**	**51**	**53**	**2**	**15**	**4**	**211**

Notes:
1. For the purposes of Table 5-21, the Highway Segments are generally described as follows:
Viaduct is the highway segment between MLK, Jr. East and Genesee Street.
I-81/I-690 Interchange includes I-81 between Genesee St. and Butternut St. and I-690 between Franklin St. and Almond St.
I-81 Northern Segment is the highway section between Butternut St. and Hiawatha Blvd.
I-690/West Street is the highway section between Leavenworth Ave. and Franklin St.
I-690 Eastern Segment is the highway section between Catherine St. and Beech St.
The I-481 Segment includes the I-481 North, South, and East Study Areas.
2. Stopping sight distance includes horizontal stopping sight distance (HSSD) and vertical stopping sight distance for crest vertical curves.

Pavement and Shoulder

The pavement and shoulders along I-81, I-690, I-481, and their associated ramps within the project corridor are in good condition and exhibit no major indications of pavement deterioration. The following summarizes the existing surface scores and pavement condition.

- I-81 from the southern I-481 interchange to Hiawatha Boulevard: Average surface score is 7 with isolated spalling and alligator cracking as the dominant distress types.

- I-690 from Hiawatha Boulevard to Lodi Street: Average surface score is 7 with isolated alligator cracking as the dominant distress type.
- I-481 from the southern I-81 interchange to I-690: Average surface score is 7. No dominant distress types are noted in the pavement condition report.
- I-481 from I-690 to the northern I-81 interchange: Average surface score is 6 with general alligator cracking noted as the dominant distress.

NYSDOT determined that due to a number of factors, including profile changes, horizontal alignment changes, and construction phasing implications, pavement rehabilitation would not be considered, therefore an existing Pavement Evaluation study was not warranted. In addition, a large number of local roads within the project area are owned and maintained by the city of Syracuse. Of the city owned roads which are also part of the Federal Aid highways system, approximately 10 percent have a pavement condition that is considered Excellent with approximately 30 percent considered Good, Fair, or Poor. Further, pavement evaluation of the local street grid was deemed not warranted due to its expansiveness and the lack of definition of those streets that could become part of the Project.

Drainage Systems

The Project contains open channels, ditches, storm sewers, combined sewers, and culverts that convey stormwater runoff to Onondaga Creek, Mud Creek, Butternut Creek, and associated tributaries. Any drainage system proposed to service the project alternatives should be designed to maintain the existing drainage patterns to the extent reasonable and match or reduce pre-developed runoff rates across the Project Area. Additional design considerations include incorporating green infrastructure to improve water quality in Onondaga Lake and downstream receiving watercourses

The drainage system within the I-81 Viaduct Study Area primarily consists of a closed sewer network owned by the City of Syracuse and Onondaga County. This closed drainage system contains drainage inlets, bridge deck drains, manholes, and storm pipes that convey runoff to Onondaga Creek, a tributary to Onondaga Lake. The I-81 viaduct itself drains from small inlets on the bridge deck through 6-inch-diameter pipes that are supplied through the structure to connect to the city street drainage system.

The city street drainage system comprises a network of small diameter pipes that drain to larger diameter county interceptor sewers. Most of the city storm drainage system, and thus the county interceptors, handles a combination of storm water and sanitary sewage, and are referred to as combined sewers.

Moving from south to north along the I-81 corridor through Syracuse, the primary drainage outlets include a 36-inch-diameter combined sewer that drains west along East Raynor Avenue, a 66-inch-diameter combined sewer that drains west along Harrison Street, a 24-inch-diameter combined sewer that drains west just south of Genesee Street, a 3- by 5-foot rectangular combined sewer that drains west along Fayette Street, and a 7.5- by 10.5-foot rectangular combined sewer that drains west along Erie Boulevard. The I-690 corridor drains into the system of combined sewers on city streets, which are tributary to the large rectangular combined sewer draining west on Erie Boulevard. Similarly, stormwater runoff from north of I-690 along the I-81 corridor drains into a series of city sewers tributary to four county interceptor sewers, including a 72-inch combined sewer near East Belden

Avenue, a 60-inch combined sewer near Butternut Street, a 48-inch combined sewer near Bear Street, and a 33-inch combined sewer along Hiawatha Boulevard. The combined sewer network and interceptor sewer system that collects all drainage within the I-81 Viaduct Study Area ultimately drains to the project outlet at Onondaga Creek after treatment at the county wastewater plant.

During wet weather events, stormwater flows to the existing combined sewer system can overload the city street drainage system, resulting in combined sewer overflows to Onondaga Creek. These overflows increase pollution to Onondaga Lake and are a priority water pollution concern of Onondaga County and the New York State Department of Environmental Conservation (NYSDEC). The county is under a consent order to reduce the volume of runoff to the combined sewer network to decrease the frequency and magnitude of overflows. In furtherance of this goal, in 2011, Onondaga County initiated a comprehensive stormwater management plan. Known as the "Save the Rain" initiative, this plan aims to reduce the amount of stormwater discharged to the combined sewer system by incorporating green and gray infrastructure. Green infrastructure generally includes practices that promote the ground infiltration of stormwater such as porous pavement, green roofs, and rain gardens. Gray infrastructure may include the construction of additional storm sewers to separate the stormwater and sanitary sewage flows from the existing combined sewers or the use of storage facilities to control the release rate of runoff. The NYSDEC and the U.S. Army Corps of Engineers have stated that the I-81 Viaduct Project should maximize the use green infrastructure practices to the extent possible to improve water quality in Onondaga Lake.

In addition, to preventing overflows and improving water quality, reducing runoff to the city and county combined sewers is important from a capacity and flooding perspective. Three locations within the I-81 Viaduct Study Area have been identified as having ongoing drainage and maintenance concerns. These locations include: the existing I-81 underpass at Butternut Street, which has a known history of flooding that occurs during heavy rainfall events, primarily due to insufficient capacity of the existing combined sewer, the I-81 northbound to I-690 eastbound ramp is subject to re-occurring flooding and roadway ponding due to issues with the existing drainage structures, especially drainage grates located in the median, between the ramp and I-690 mainline, as they are subject to plugging and clogging with debris and dirt that collects in the median, and low points on West Street in the vicinity of eastbound I-690 are subject to re-occurring flooding when existing drainage structures are covered with debris and further exasperated by the existing shoulder cross slope which does not readily direct flow away from the travel lanes.

The I-81 Viaduct Study Area and the I-481 North, East, and South Study Areas are all subject to the "Save the Rain" initiative. The I-481 study areas generally incorporate an open drainage system that allow for greater ground infiltration and are less complex in nature than the I-81 Viaduct Study Area.

The existing drainage pattern of the I-481 North Study Area and existing I-81/I-481 interchange ("the I-81/I-481 northern interchange") is to the west. Ditches and swales along I-481 convey roadway runoff to Mud Creek, the primary drainage outlet for the I-481 North Study Area. Mud Creek passes through the northern interchange via a series of culverts including an existing 11'x7' arch corrugated metal pipe carrying Mud Creek under I-81. The channel banks and low-lying areas adjacent to Mud Creek comprise the FEMA 100-year floodplain and floodway and include environmentally sensitive wetlands (see **Section 6-4-7, Water Resources** for further details). Although current FEMA maps depict roadway flooding along the existing highway ramps to I-81, comparing the FEMA flood elevations to the existing roadway elevation data in these areas suggests that pavement flooding does not occur for the FEMA 100-year storm event within the I-81/I-481 northern interchange or adjacent areas. Two additional FEMA floodplain and floodway crossings occur on I-81 north of the I-81/I-481 northern interchange, both of which are tributary to Mud Creek. There are no known drainage issues or reports of pavement flooding associated with the I-481 North Study Area.

The I-481 East Study Area consists of an open drainage system tributary to Butternut Creek and the North Branch of Ley Creek. A portion of I-481 crosses over a low-lying area comprising wetlands and the floodplain overflow of Butternut Creek. There are no known drainage issues or reports of pavement flooding in the I-481 East Study Area.

The I-481 South Study Area contains no regulatory floodplains or reported incidents of flooding. The existing I-81/I-481 southern interchange features ditches and swales that drain to an existing storm sewer network constructed in the 1960s along I-81 north of this interchange. The drainage outlet is an existing 84" reinforced concrete pipe that drains northwest along West Ostrander Avenue towards Onondaga Creek. In addition, portions of the I-481 South Study Area drain east along I-481 towards Butternut Creek. There are no known drainage issues or reports of pavement flooding in the South Study Area.

Geotechnical

The project study area lies within the Ontario Lowlands physiographic province. This region extends from Lake Ontario to the north, to Glaciated Alleghany Plateau province to the south, which begins just south of the I-81/I-481 interchange (the boundary is the edge of the escarpment formed by the Onondaga limestone). Dominant features of the Ontario Lowlands are glacial till plains and proglacial lacustrine plains. The glacial till deposits range from loose to exceptionally dense in consistency. Associated with the lacustrine silt and clay deposits are the related course-grained lacustrine soils found on beach ridges and deltas. Swamp deposits, which are vestiges of the proglacial lakes, also occur. The Lowlands also feature subdued morainic topography and, in places, ice-contact deposits, including prominent drumlins.

The subsurface ground conditions within the project study area were evaluated using extensive historical soil borings, which totaled over one thousand boring log records performed in the 1960s by the New York State Department of Public Works. These soil boring log records primarily concentrated along the existing bridge footprints within the I-81 Viaduct Study Area. In addition, ten new soil borings were performed in 2015 by NYSDOT at selected locations north and south of the I-690 & I-81 interchange, in areas where proposed alternative alignments were outside the coverage limits of the historical soil boring information. The subsurface conditions consist of manmade fill of variable thickness underlain by natural soils and bedrock. The subsurface strata for the proposed alignments areas, beginning at the ground surface, are described below.

Fill: Fill Stratum is composed of loose to medium dense sand and gravel with some silt and clay mixed with construction and foreign material such as cinders and fragments of concrete. Within the City of Syracuse, the thickness of Fill Stratum can be up to 50 feet, but it generally extends to a depth of about 5 to 15 feet below existing ground.

Soft Clay/Silt: This stratum consists of very soft to soft silt and clay with some peat, muck, and marl at some locations. When encountered, this stratum was observed below Fill Stratum, and its thickness ranged from a few feet to over 60 feet (in the vicinity of Harrison Street).

Sand/Silt/Gravel: The Sand/Silt/Gravel Stratum consists of dense to very dense mix of sand, silt, and gravel and occasional weathered rock. This stratum was encountered below Fill or Soft Clay/Silt Strata, and its thickness ranged from a few feet to over 60 feet around Cedar Street.

Weathered Rock: Weathered Rock stratum consists of weathered and decomposed shale mixed with sand, silt, and gravel. When encountered, this stratum was observed below Sand/Silt/Gravel Stratum and varied in thickness from a few feet to about 20 feet around Dyer Street. The determination of the top and bottom of this layer was difficult due to the nature of the material and the drilling methods used for the available historic boring logs.

Bedrock: The Bedrock consists of shale and dolostone of Syracuse formation with occasional gypsum. The strength and weathering of the bedrock could not be quantified based on the available data. The depth of this stratum was determined based on rock cores obtained at the historic borings. This stratum was encountered below Weathered Rock or Sand/Silt/Gravel Strata. The depth to this stratum is the greatest around Cedar Street and about 100 feet. Bedrock Stratum appears to be shallower within the northern portion of the proposed alignments and deeper in the middle of the alignments. See geotechnical profile, **Figure 5-18**.

Groundwater: The reported elevation of the groundwater at the time of borings (1960s) ranged from 375 to 410 feet. Artesian water head up to 7 feet above existing grade was reported at underlying bedrock about 0.75 to 1.0 miles east of the I-81 viaduct during subsurface explorations in 2015 (NYS DOT, 2016).

South Interchange Sinkholes: Sinkholes caused by karstic bedrock conditions are present at the southerly region of the I-81/I-481 South Interchange. Currently, NYSDOT is aware of the existence of two sinkholes at the following locations:

- Area north of East Seneca Turnpike roadway, between I-81 Northbound and southbound I-81 bridges
- Area east of southbound I-81 roadway, approximately 970 feet north of East Seneca Turnpike

Study of the overall existing soil borings data and record plans indicates that the underlying soils at the Project Area generally consist of silt and clay with bedrock or shale. The depth of bedrock varies along the project alignment from approximately 20 – 70 feet below ground. As such, during final design, the foundation design for a new structure in the area would need to address the risk of sink holes, which may include the use of pile foundations to bedrock where appropriate.

Structures

Existing bridges within the I-81 Viaduct Study Area were originally constructed during the Interstate era from the 1950's to the 1970's. These interstate highway bridges are regulated by FHWA and are owned and maintained by NYSDOT. To monitor the structural adequacy of highway bridges, FHWA has established a National Bridge Inventory (NBI) condition rating system. A bridge that is considered "structurally deficient" has a condition rating of 4 or less (based on a scale from 0 [failing condition] to 9 [excellent condition]) for the deck, superstructure, or substructure. Similarly, NYSDOT uses a bridge inspection program to evaluate structural conditions of bridge elements and assigning to it a descriptive Condition State (CS) assessment of "good", "fair", "poor", "severe", or "unknown" (Ratings CS-1 to CS-5). NYSDOT inspects highway bridges at least every two years to assess their

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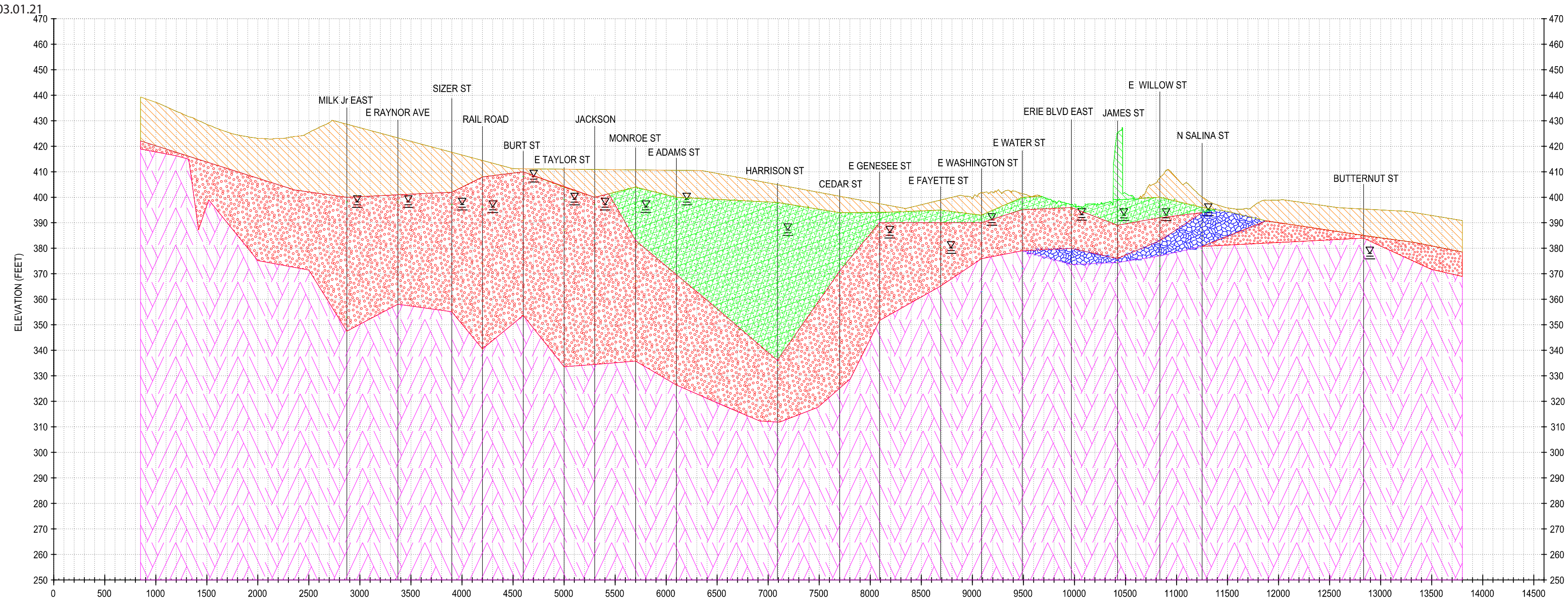


GEOTECHNICAL PROFILE ADJACENT TO I-81

HOR: 500′ 0 500′ 1000′

VER: 20′ 10′ 0 20′ 40′

- *Fill*
- *Soft Clay/Silt*
- *Sand/Silt/Gravel*
- *Weathered Rock*
- *Rock*
- *Approx. Ground Winter Table*

I-81 Viaduct Project

Geotechnical Profile

Figure 5-18

structural conditions, which informs the FHWA NBI ratings and NYSDOT condition ratings. Condition ratings that are deficient do not necessarily indicate unsafe traveling conditions in the near term but are used to prioritize areas of repair and maintenance and identify areas that may need more extensive measures to address future deterioration.

In addition to the structural rating, older bridges may not have been built to current standards, and a number of dimensional aspects, such as deck geometry (e.g., lane widths, shoulder widths), load carrying capacity, approach roadway alignment and vertical clearances may affect the bridges' effectiveness to carry traffic on or under the structure. These bridges are not necessarily in poor structural condition but may not operate with optimal efficiency.

Many of the existing I-81 bridges in the I-81 Viaduct Study Area are structurally deficient and/or were not built to current standards. Similarly, existing I-690 bridges within the I-81 Viaduct Study Area, built in the 1960s, are similar. These existing bridges need to be replaced because of their overall age, condition, functionality, as well as geometric deficiencies. Existing bridges in the I-481 South Study Area, the I-481 East Study Area, and the I-481 North Study Area are more modern structures and have fewer structural and geometric deficiency needs.

The I-81 Corridor Study provided a detailed assessment of bridge ratings in the I-81 Viaduct Study Area. **Table 1-1** shows a summary of the major bridges within the I-81/I-690 interchange area that are classified as structurally deficient or were not built to current standards, but within the I-81 Viaduct Study Area, a total of three bridges are classified as structurally deficient per NYSDOT and FHWA standards and approximately 20 bridges were not built to current standards. Over 25 existing bridges meet the NYSDOT "deficient" condition rating of less than 5.0 (based on prior NYSDOT rating system).

Considering the level of capital investment needed where more long-term solutions are deemed necessary to correct structural deficiencies, NYSDOT determines whether bridges can achieve desirable lifespans through rehabilitation or whether replacement is required. Based on the evaluation of the bridges within the I-81 Viaduct Study Area, NYSDOT recommended replacement of all of the bridges along the I-81 viaduct and within the I-81/ I-690 interchange. Some of the remaining approach bridges within the I-81 Viaduct Study Area may be suitable for rehabilitation or may require replacement depending on the alternative and are discussed later in this chapter.

In order to have a better understanding of the structural condition of existing bridges outside of the I-81 Viaduct Study Area, the NYSDOT Biennial bridge inspection reports were reviewed to assess the overall bridge conditions and identify additional evaluations that should be conducted. Based on this review, an in-depth bridge inspection program was developed to determine existing bridge conditions and to establish the rehabilitation work that may be necessary. As part of the in-depth bridge inspection program, deck evaluation, seismic screening, and fatigue evaluation were also performed. The existing bridges inspected were located primarily along the I-481 corridor, between north and south interchanges, where rehabilitation or reconstruction of bridges would need to be evaluated as part of the proposed Community Grid Alternative. Bridges in the I-81 Viaduct Study Area were not included in the in-depth inspection because under both build alternatives, the magnitude of the alignment changes coupled with the deteriorated condition of the existing bridges, resulted in a decision that all bridges would be replaced completely to meet the current design standards. Because of the in-depth inspection, rehabilitation of existing bridges along the I-481 corridor was determined to be cost effective. It was also determined that any bridges that need to be widened as a result of this Project would be rehabilitated as part of this Project and the remaining bridges along I-481 would be addressed by the NYSDOT maintenance program. **Appendix C-6.7** provides a list of the existing bridges inspected as well as the types of evaluations performed. A summary of inspection reports (condition state rating system) is included in **Appendix A-2**.

In-depth Inspection

As part of the in-depth bridge inspection program, 65 bridges were further evaluated along the I-481 corridor and at select locations on I-690 and I-81. Visual and hands-on inspections were performed by walking, ladder, bucket truck or Under Bridge Inspection Unit (UBIU) where required. All bridge superstructure and substructure components were evaluated to determine the extent of deterioration or any structural deficiencies. Furthermore, 100% hands-on inspection of fatigue-prone elements were inspected. Concrete spalled and delamination at the deck, pier, and abutments were documented. Existing girders were inspected for section loss and deteriorations. The In-depth bridge inspection indicated that existing bridges generally have minor to moderate deteriorations at the deck and substructures elements, whereas steel girders were generally in satisfactory condition with no substantial section loss. Maintenance and repairs would be required to eliminate these deficiencies and restore these existing bridges in good state of repair. Refer to **Appendix C-6**, **Table C-6.7-1** for a listing of the bridges and types of evaluations performed.

Load Rating

The Level One load ratings were performed in accordance with AASHTO Manual for Bridge Evaluation, NYSDOT Bridge Manual, and NYSDOT design policy. Existing bridge inventory and operating rating of H20, HS20, and alternate military vehicles loading capacity were determined by using AASHTOWARE bridge rating program and MDX for straight and curved girder respectively. Updated information since the last inspection, such as newly added overlay, bridge appurtenances, and section loss found, if any, during the In-depth inspection were incorporated to assess the bridge rating capacity. All existing bridges exhibited satisfactory rating and capacity, except BIN 1069170 - EB I-481 exit over Butternut Creek (culvert). The inventory level rating of BIN 1069170 was unsatisfactory. However, operating level rating was satisfactory. Therefore, no load posting is required.

Seismic Assessment

The seismic assessment was performed in accordance with FHWA Seismic Retrofitting Manual for Highway Structures. The purpose of the assessment is to determine if seismic retrofits are warranted at the superstructure to substructure connection or further seismic evaluation of the structure at locations such as bearings, pedestals width, and abutment seat width would be required. The assessment identified retrofit recommendations and further seismic evaluation requirements that would be necessary. The assessment further identified that 14 out of 65 existing bridges would require abutment/pier seat width improvement.

Fatigue Analysis

Fatigue evaluation was conducted to assess the remaining life of fatigue-prone wielding components located at girder cover plates and diaphragm connection plates. Specifically, existing bridge with AASHTO Category D, E, and E' fatigue-prone details require 100 percent hands-on inspection unless proven to be exempt. The fatigue evaluation was performed in accordance with the AASHTO Guide Specification for Fatigue Evaluations of Existing Steel Bridges, 1990. Fatigue-prone welds identified in the biennial inspection reports were located on record drawings and confirmed visually in the field. Additional information concerning fatigue-prone welds located in BIN folders was also obtained and reviewed prior to inspection. Fatigue-prone details would require routine inspection to ensure the integrity of the structure until these details are repaired or eliminated. There are 26 out of 65 existing bridges exhibited fatigue-prone details with exhausted remaining safe fatigue life. Addressing fatigue prone elements on those structures impacted by the project is recommended (refer to S**ections 5.5.3** and **5.6.3** for description of which bridges are included in the respective alternatives).

Deck Evaluation

A deck evaluation was performed to document and determine existing conditions of the bridge decks. Any existing bridge decks that rated 5 or better (based on latest bridge inspection report available at the time of field inspection and in accordance with the NYSDOT Bridge Inspection Manual, 2014 condition rating system) received a deck evaluation and inspection, as well as selected deck coring. Bridge decks with a condition rating less than 5 were excluded from the deck evaluation. The deck evaluations were performed in accordance with NYSDOT Bridge Deck Evaluation Manual. Tests performed on the concrete cores included compressive strength and chloride-ion content in accordance with ASTM C42-13 and AASHTO T 260-97 (2005), respectively. The coring samples testing results showed that overall, existing concrete decks compressive strength was greater than 3000 PSI and chloride-ion content exceeded allowable 1.3 lb/cy of concrete. This level of concrete (1.3 lb/cy) at which accelerated rates of steel corrosion could occur, especially when moisture is present. Based on the deck evaluation findings, deck options were considered, including deck overlay, partial depth reconstruction, and complete deck replacement. Existing bridge deck with susceptible high chloride-ion content is recommended to be rehabilitated or replaced. New deck would extend the life expectancy of the structure and mitigate excessive future maintenance costs.

16-Foot Clearance Network

A 16-foot designated vertical clearance network for the movement of large vehicles, and the transport of people, products, construction equipment, and military equipment for national defense has been established through the Syracuse area. The Strategic Highway Corridor Network (STRAHNET) 16-foot clearance route, also referred to as an Urban Access Corridor, includes the entire I-481 corridor in the north-south direction, I-90 in the east-west direction, and I-81 between I-90 and the northern I-81/I-481 interchange. The section of I-81 between the southern I-81/I-481 and the I-90 interchanges is exempted from the 16-foot clearance network and the section of I-690 between the western I-90/I-690 interchange and the eastern I-481/I690 interchange is exempted from the 16-foot clearance network. There are no identified needs or future plans that would require other corridors to be designated as the Department utilizes special hauling permits to route over height vehicles to designated routes. Additionally, FHWA has agreed that all exceptions to the 16-foot vertical clearance standard for the rural Interstate and the single routing in urban areas will be coordinated with the Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA) of the Department of Defense. This agreement applies whether it is a new construction project, a project that does not provide for correction of an existing substandard condition, or a project which creates a substandard condition at an existing structure. Furthermore, it applies to the full roadway width including shoulders for the through lanes, and to ramps and collector-distributor roadways in Interstate-to-Interstate interchanges.

Hydraulics of Bridges and Culverts

While the Project includes a large number of bridges, only a few bridges span a watercourse. The I-690 bridges and associated West Street interchange ramps span Onondaga Creek, and the proposed bridge pier locations for both alternatives may infringe on the 100-year flood boundary. Due to the high elevation of the existing bridges over the creek, and that there are no known hydraulic issues associated with the existing bridges in this area, a hydraulic analysis will not be required until design advances.

Guide Railing, Median Barriers and Impact Attenuators

Due to the size of the Project Area, the large number of lane miles, and the urban nature of the I-81 Viaduct Study Area, there are extensive lengths of concrete barrier, concrete median barrier, impact attenuators, and steel guiderail. There are no known issues or problems with the existing guiderail systems, but because of the extensive amount of reconstruction, it is anticipated that barrier systems and impact attenuators would be replaced in areas of full reconstruction, vertical profile modifications, horizontal alignment shifts and new noise barriers are proposed within the clear zone. In other areas, case by case analysis would determine if the existing rail system would be replaced or retained.

Utilities

Because of the urban nature and size of the Project Area, there are an extensive number and network of utilities, both private and public, aboveground and below ground. A summary of the utilities and utility owners is included in **Table 5-22**.

Table 5-22
Existing Utilities

Owner	Type
Onondaga County Department of Environmental Protection (OCDWEP)	Sanitary Sewers, Combined Sewers, Sanitary Force Mains & Storm Sewers
Onondaga County Water Authority (OCWA)	Water Transmission mains
City of Syracuse	Sanitary Sewer, Combined Sewers, Storm Sewers, Water
Syracuse University	Underground Telephone
Syracuse University	Underground Steam, Condensate and Chilled Water Service & Return Lines
Alliance	Natural Gas Pipelines
National Grid	Natural Gas Pipelines, Underground Electric, Overhead Electric
AT&T	Underground Fiber Optic
Verizon	Underground Fiber Optic Underground Telephone
Windstream	Underground Fiber Optic
Elantic	Underground Fiber Optic, Overhead Fiber Optic
Light Tower	Underground Fiber Optic, Underground Telephone
Level 3 Com	Underground Fiber Optic
Spectrum Cable	Underground Cable TV

Railroad Facilities

CSX Railroad – The two-track CSX railroad mainline is located on the north side of the city of Syracuse and generally operates east-west. The only potential crossing of the CSX mainline that may be impacted by this Project is located in the I-481 East Study Area where I-481 spans the CSX rail yard, north of the I-690 interchange.

Amtrak – Amtrak railroad utilizes the CSX mainline, providing intercity passenger service, including regular scheduled service to the Syracuse Amtrak station. As noted above, the Syracuse Amtrak station is located in the northeastern corner of the I-81 Viaduct Study Area at the William F Walsh Regional Transportation Center.

New York, Susquehanna & Western Railway (NYS&W) – NYS&W operates a freight railroad that runs primarily south from Syracuse toward Binghamton. The southern end of the existing I-81 viaduct spans the NYS&W single-track mainline. A short distance to the south, the NYS&W spans Renwick Avenue.

5.3.4 POTENTIAL ENHANCEMENT OPPORTUNITIES

Landscape

Terrain

The majority of the I-81 Viaduct Study Area is located in an urban environment and the Project Area along the I-481corridor can be characterized as suburban environment. The terrain in the overall Project Area is rolling, with portions of the Project Area in Downtown Syracuse exhibiting less topographic change because of its position in the Onondaga Lake plain.

Unusual Weather Conditions

The Project Area is subject to lake effect snow conditions.

Visual Resources

Visual resources within the project site and surrounding area are described in **Section 6-4-3, Visual Resources** of the FDR/FEIS.

Opportunities for Environmental Enhancements

As discussed in **Sections 5.5 and 5.6**, the Viaduct Alternative and the Community Grid Alternative both provide opportunities for pedestrian and bicycle accommodation and safety improvements and aesthetic enhancements to the general area. Streetscape and gateway enhancements will be considered as part of the design and are described in for the Viaduct Alternative in **Section 5.5** and for the Community Grid Alternative in **Section 5.6**.

5.4 DESIGN CRITERIA FOR REASONABLE ALTERNATIVE(S)

5.4.1 DESIGN STANDARDS

The following design standards and resources were consulted to develop the Critical Design Element and Other Design Parameters for this Project:

- NYSDOT Highway Design Manual (HDM)
- NYSDOT Bridge Manual (BM)
- American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities 4th edition (2012)
- AASHTO A Policy on Geometric Design of Highways and Streets 6th edition (2011)
- National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide, 2nd edition.

5.4.2 CRITICAL DESIGN ELEMENTS

The design criteria applicable to the project roadways consisted of 11 critical design elements as described in the NYSDOT HDM (Chapter 2). Other design parameters, such as acceleration lane length, are found in AASHTO's *A Policy on Geometric Design of Highways & Streets* (2011). A list of the critical design elements follows.

1 Design Speed*
2 Lane Width*
3 Shoulder Width*
4 Maximum Grade*
5 Horizontal Curve Radius*
6 Superelevation*
7 Stopping Sight Distance*
8 Vertical Clearance*
9 Cross Slope (Pavement)*
10 Design Loading Structural Capacity*
11 Americans with Disabilities (ADA Compliance) **

* Designated by FHWA as the ten controlling criteria for design of projects on the National Highway System (NHS).

** ADA Compliance applies to non-interstate and non-freeway/expressway facilities only.

Refer to **Appendix C-6** for a list of critical design elements for each specific type of highway, including expressway ramps and local streets that are impacted by this Project.

5.4.3 OTHER DESIGN PARAMETERS

In addition to the 11 critical design elements described above, other design parameters established by NYSDOT and AASHTO that are typically used during the design of highway and bridge projects include the type of the design vehicle; the Level of Service (LOS) to be provided, which identifies the ease with which traffic can move along the roadways; the intensity of rainfall for design of storm drainage facilities; and the length of speed change lanes both during acceleration and deceleration. Refer to **Appendix C-6.4** for the following tables that provide additional design parameters. **Table C-6.4-1** lists other highway design parameters used to develop the project design. **Table C-6.4-2** lists the design vehicles used for various highway types. **Table C-6.4-3** lists the primary design values for a paved shared-use path. **Table C-6.4-4** lists the primary design values for raised cycle tracks. **Table C-6.4-5** lists design parameters for railroad related elements of work.

5.5 ENGINEERING CONSIDERATIONS OF THE VIADUCT ALTERNATIVE

5.5.1 OPERATIONS (TRAFFIC AND SAFETY) AND MAINTENANCE

Functional Classification and National Highway System

Under the Viaduct Alternative, the Functional Classifications and NHS designations would not change for the majority of highways and streets. However, as shown in **Table 5-23**, the following changes are anticipated under the Viaduct Alternative.

Table 5-23
Proposed Functional Classification – Viaduct Alternative

Roadway	Road Segment	Existing Functional Class	Proposed Functional Class	Existing NHS (Y/N)	Proposed NHS (Y/N)
Genant Drive	Bear St. to Court St. (1)	Urban Minor Arterial	Urban Local	No	No

Notes: A portion of Genant Drive would be removed on the south side of Bear Street.

Control of Access

Access to the various city and local streets within the Project Area would remain generally uncontrolled. Access to all sections of interstate within the Project Area would remain fully controlled. Access control would also be provided on all interstate and expressway ramps and at the ramp termini, except at three locations. Refer to **Appendix A-3, Table A-3.2** for a list of these locations and Exhibits A-3-2.1 to A-3-2.4, which follow **Table A-3.2** and provide justification to retain these as non-conforming features.

Traffic Control Devices

Traffic Signals

Under the Viaduct Alternative, the traffic signal that currently exists at the intersection of Townsend Street and the westbound I-690 off-ramp would be removed, as the westbound I-690 off-ramp would be relocated to Catherine Street. Multiple intersections would need to be created or reconstructed to accommodate new approaches and lane configurations. To safely accommodate vehicle and pedestrian movements under the Viaduct Alternative, it would be necessary to install new traffic signals or replace existing traffic signal equipment to conform to modified geometrics and phasing where appropriate.

Due to modifications to the city streets and interstate on- and off-ramps, new signalized intersections would be created under the Viaduct Alternative as follow:

- Almond Street at Van Buren Street
- Catherine Street at the westbound I-690 Off-Ramp
- Court Street at Genant Drive
- MLK, Jr. East at the northbound I-81 Off-Ramp
- MLK, Jr. East at southbound I-81 On-Ramp
- I-81 South Off-Ramp/Genant Drive at Spencer Street
- North West Street at NY 5/West Genesee Street

Intersections that would receive traffic signal replacements under the Viaduct Alternative are listed below:

- Almond Street at Burt Street
- Almond Street at E. Adams Street
- Almond Street at E. Fayette Street
- Almond Street at E. Washington Street
- Almond Street at E. Water Street
- Almond Street at Harrison Street
- Almond Street at the southbound I-81 Off-Ramp
- Almond Street at NY 92/East Genesee Street
- Almond Street/Catherine Street at NY 5/Erie Boulevard East

- Catherine Street at Burnet Avenue
- I-81 South On-Ramp/Genant Drive at Bear Street
- Irving Avenue at Van Buren Street
- North Clinton Street at NY 5/West Genesee Street
- North Franklin Street at NY 5/West Genesee Street
- North Franklin Street/Butternut Street/Websters Landing (future North Franklin/Websters Landing)
- North State Street at Butternut Street
- South Crouse Avenue at East Adams Street
- South Crouse Avenue at Harrison Street
- South Crouse Avenue at NY 92/East Genesee Street

Coordination between newly installed or replaced traffic signals would be through the existing centrally controlled traffic signal communication system. Inductance loops disturbed by the Project would be replaced in kind. Pedestrian signals and push buttons would be included as part of the new signal system and pedestrian countdown timers would be provided at redesigned intersections where appropriate.

Signs

New signs would be added where required and existing signs replaced as needed with new signs meeting current Manual on Uniform Traffic Control Devices (MUTCD) standards. Signage would be installed to ensure motorists situate their vehicles in the appropriate lanes to complete desired maneuvers and to promote wayfinding to relocated interstate access points. Signs would be installed on overhead sign structures or standard posts as appropriate and as needed to handle the necessary loading.

Pavement Markings

New pavement markings would be installed within the project limits in accordance with MUTCD standards. Crosswalks would be installed at all crossing locations. Stop bars would be placed at all approaches to signalized intersections and all stop-controlled approaches at unsignalized intersections. Lane striping and arrow markings would be provided to delineate the through and auxiliary turn lanes required to meet traffic operational requirements.

Intelligent Transportation Systems (ITS)

The Regional Architecture used to plan and develop the current NYSDOT Region 3 ITS system was published in August 2002 and was based on the National ITS Architecture current at that time. The National ITS Architecture has been updated as Ver. 5 in 2003, Ver. 6 in 2007, and Ver. 7 in 2012 with additional updates in Ver. 7.1 published in 2015.

Under any build alternative, the Region 3 published vision represented by the Regional Architecture should be updated from the 2002 version to align with the current technologies for security, detection, communication, and data archiving that have emerged and matured since this Architecture was developed.

The existing ITS system would be minimally affected by the Viaduct Alternative. CCTV and sensors are currently mounted on poles up to 100 feet in height with integrated lowering systems and wireless communications. VMS signs are roadside shoulder mounted with wireless communications. There are no devices mounted to the viaduct. Six camera locations and three VMS locations would need to be removed and replaced to the new shoulder as the roadway is widened. New equipment may include additional cameras, signs, or sensors to supplement and improve the existing system and should follow a similar placement strategy to remain clear of the viaduct. This would ease construction of the viaduct modifications and limit operational and maintenance issues created by mounting vibration sensitive electronic devices on the elevated structures.

Similarly, any new technology included in service packages identified during a Regional Architecture update, such as Bluetooth sensors for travel time calculation, wrong way detection systems including sensors, flashers and signs, should be placed outside of the viaduct envelope to the greatest extent possible, on shoulders and supported by lowering devices.

Existing equipment should be adjusted and supplemented prior to construction to provide ITS benefits to the work zone. Additional Smart Work Zone equipment, operated and maintained by the Contractor with access provided for NYSDOT and stakeholder agencies, should also be implemented during construction wherever the roadway is left open to traffic to ensure incidents are minimized and addressed as quickly as possible.

Speeds and Delay

Speed and Travel Time Estimates

Travel time and travel speed projections for the 2026 and 2056 Viaduct Alternative conditions were performed using the VISSIM models developed for the Project. **Tables 5-24 and 5-25** present the estimated travel times, speed and delay for each of 11 travel routes by direction during the AM and PM peak hours. 2026 and 2056 freeway speeds throughout the project area for the AM peak hour would range from 55 to 63 mph and from 53 to 63 mph, respectively. For the PM peak hour, 2026 and 2056 freeway speeds would range from 52 to 63 mph and from 51 to 63 mph, respectively. 2026 and 2056 Viaduct Alternative travel speeds on most freeway routes would increase slightly compared to corresponding No Build travel speeds. Most notably, travel speeds would increase along southbound I-81 during the AM peak hour, as congestion approaching Downtown would be improved under the Viaduct Alternative.

Arterial travel speeds throughout the project area during the AM peak hour would range from 7 to 25 mph and from 6 to 22 mph in 2026 and 2056, respectively. During the PM peak hour, arterial travel speeds would range from 6 to 23 mph in 2026 and from 6 to 25 mph in 2056. 2056 arterial travel speeds would be similar to their corresponding 2026 arterial speeds. Similar to the existing and No Build conditions, a vast majority of arterial routes under the 2026 and 2056 Viaduct Alternative traffic conditions could be characterized as low-speed routes because their travel speeds are less than 20 mph during one or more peak hours.

Travel times for key origin-destination pairs in Onondaga County were estimated using output from VISSIM traffic simulations as well as the I-81 Project Travel Demand Model. **Table 5-26** summarizes the average travel times for trips traveling between these origin-destination pairs during the AM and PM peak periods.

Traffic Volumes

A future Build year condition represents a future-year growth scenario, including all planned/committed transportation projects that are included in the No Build, as well as the I-81 Viaduct Project alternatives. Two future Build years were analyzed - the ETC year 2026 and design year 2056. The primary tool used for estimating future Build year traffic volumes is the I-81 Project Travel Demand Model. This model is based on the SMTC regional travel demand model developed by the Syracuse Metropolitan Transportation Council (SMTC), with additional refinements to improve model accuracy within the Project area. The I-81 Project Travel Demand Model predicts traffic volumes as a result of the anticipated changes in land use, population, economic activity, and transportation system. AM and PM peak volumes were forecasted separately for the 2026 and 2056 Build years. Demand reductions to account for changes in telecommuting behavior were not applied to the analysis of the completed Viaduct Alternative under ETC and ETC+30 conditions.

Future Build traffic volumes under the Viaduct Alternative for the 2026 and 2056 analysis years and for the AM and PM peak hours for all interstate segments, ramp connections, and intersection turning movements are located in **Appendix C-3**. **Table 5-27** shows the weekday AM and PM peak hour traffic volumes for key segments on the interstate freeways and several local roadways in the project area.

Generally, traffic volume increases under the Viaduct Alternative would be fairly uniform and modest when comparing 2056 to 2026, and the evening peak would exceed the morning peak in terms of overall traffic in both years.

Traffic volumes would be higher on I-81 compared to the No Build condition because additional traffic would be attracted to I-81 in response to improvements introduced under the Viaduct Alternative. Traffic volume would decrease on some local streets and parallel portions of I-481, as these alternate routes would become comparatively less desirable after operational improvements are implemented on I-81.

Traffic increases under the Viaduct Alternative would be most pronounced on I-690 west of the West Street interchange and on I-81 south of the Court Street interchange. This is largely due to the nearby interconnect ramps from southbound I-81 to westbound I-690 and from eastbound I-690 to northbound I-81 which would be provided under the Viaduct Alternative. The additional interconnect ramps attract traffic onto the interstate segments west and north of the main I-81/I-690 interchange. This traffic would be removed from local streets and parallel routes west of Onondaga Lake.

Under the Viaduct Alternative, the southbound I-81 exit to Butternut Street and the slip ramp to Salina Street would not be provided. Traffic exiting southbound I-81 to access downtown areas would be consolidated onto Clinton Street and, therefore, traffic would increase along that arterial. High traffic volumes would persist on Almond, Harrison, and Adams Streets, as access to I-81 would continue to be provided via these roadways.

Table 5-24
2026 No Build and Viaduct Alternative Travel Time, Delay and Speeds

ID	Route	Direction	Travel Time (min)				Travel Delay (min)				Travel Speed (mph)				Speed Limit	
			No Build		Viaduct		No Build		Viaduct		No Build		Viaduct		No Build	Viaduct
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	(mph)	(mph)
1	I-81 from Exit 17 to Exit 29N	NB	14	14	13	13	2	2	2	2	54	54	57	57	45-65	45-65
		SB	16	13	12	12	5	2	1	1	44	53	58	59	45-65	45-65
2	I-481 from Exit 2 to Exit 8	NB	13	13	13	13	0	1	1	0	63	63	62	63	65	65
		SB	13	13	13	13	0	0	0	0	63	63	63	63	65	65
3	I-690 from Exit 8 to Exit 17	EB	9	9	9	9	1	0	0	0	51	53	55	55	45-55	45-55
		WB	9	10	9	9	0	1	0	1	56	51	55	52	45-55	45-55
4	Irving Avenue from Raynor Avenue to Fayette Street	NB	4	4	3	4	1	1	1	1	22	21	25	23	30	30
		SB	4	6	4	5	1	3	1	2	19	14	19	17	30	30
5	Almond Street from Van Buren Street to Burnet Avenue	NB	6	6	6	7	3	3	3	4	15	16	14	13	30	30
		SB	7	6	6	7	4	3	3	4	12	14	15	13	30	30
6	State Street from Adams Street to Butternut Street	NB	5	8	5	6	3	6	3	4	12	8	13	10	30	30
7	Clinton Street from Websters Landing to Adams Street	SB	3	5	3	5	2	3	2	3	15	10	15	10	30	30
8	West Street from Adams Street to Genesee Street	NB	2	2	3	3	1	1	1	2	22	21	18	16	35	35
		SB	3	2	3	2	2	1	1	1	14	19	17	19	35	35
9	Fayette Street from Walnut Avenue to West Street	EB	6	6	6	8	4	4	4	7	8	9	8	6	30	30
		WB	6	7	7	7	5	5	5	5	8	7	7	8	30	30
10	Harrison Street from Comstock Avenue to West Street	WB	8	7	7	8	6	5	5	6	8	8	8	7	30	30
11	Adams Street from West Street to Comstock Avenue	EB	8	9	9	8	6	7	7	6	7	7	7	7	30	30

Table 5-25
2056 No Build and Viaduct Alternative Travel Time, Delay and Speeds

ID	Route	Direction	Travel Time (min)				Travel Delay (min)				Travel Speed (mph)				Speed Limit	
			No Build		Viaduct		No Build		Viaduct		No Build		Viaduct		No Build	Viaduct
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	(mph)	(mph)
1	I-81 from Exit 17 to Exit 29N	NB	14	13	12	13	3	2	1	2	53	54	59	57	45-65	45-65
		SB	17	13	13	12	6	2	2	2	42	53	55	57	45-65	45-65
2	I-481 from Exit 2 to Exit 8	NB	13	14	13	15	0	1	0	2	63	62	63	55	65	65
		SB	13	15	13	13	0	2	0	0	63	55	63	63	65	65
3	I-690 from Exit 8 to Exit 17	EB	10	10	9	9	1	1	0	0	50	49	53	55	45-55	45-55
		WB	12	10	9	10	3	1	0	1	40	51	56	51	45-55	45-55
4	Irving Avenue from Raynor Avenue to Fayette Street	NB	4	6	4	4	2	3	2	1	19	14	19	21	30	30
		SB	4	6	4	5	2	3	2	2	19	13	18	15	30	30
5	Almond Street from Van Buren Street to Burnet Avenue	NB	6	9	7	8	3	6	4	5	14	9	13	11	30	30
		SB	7	6	7	6	4	3	4	4	13	14	12	13	30	30
6	State Street from Adams Street to Butternut Street	NB	5	6	5	7	3	4	3	4	12	10	12	10	30	30
7	Clinton Street from Websters Landing to Adams Street	SB	3	4	4	4	2	2	2	2	15	13	14	13	30	30
8	West Street from Adams Street to Genesee Street	NB	2	2	3	2	1	0	1	1	21	27	18	25	35	35
		SB	2	2	2	3	1	0	1	1	19	28	22	18	35	35
9	Fayette Street from Walnut Avenue to West Street	EB	6	6	6	8	4	4	4	7	9	9	8	6	30	30
		WB	7	7	9	7	5	5	8	6	7	7	6	7	30	30
10	Harrison Street from Comstock Avenue to West Street	WB	7	8	6	8	5	6	4	6	9	7	10	8	30	30
11	Adams Street from West Street to Comstock Avenue	EB	7	8	7	7	5	6	5	5	8	8	8	9	30	30

Table 5-26
No Build and Viaduct Alternative Origin-Destination Travel Times (Minutes)

	Year	2026				2056			
	Peak	AM		PM		AM		PM	
Origin	Destination	No Build	Viaduct	No Build	Viaduct	No Build	Viaduct	No Build	Viaduct
Baldwinsville	Cicero	22	22	23	23	23	23	23	23
	Destiny USA	22	23	20	21	23	24	21	22
	Downtown	21	22	20	21	22	22	21	21
	Fairmount	18	18	18	18	18	18	18	18
	Fayetteville/Manlius	31	30	31	31	32	31	38	31
	LaFayette	32	31	31	31	34	32	32	31
	Liverpool	15	15	15	15	15	15	16	16
	St. Joseph's Hospital	22	22	21	21	23	22	21	21
	University Hill	26	24	25	23	27	25	23	23
Cicero	Baldwinsville	21	21	23	23	21	21	23	23
	Destiny USA	12	11	11	11	11	11	11	10
	Downtown	16	13	14	14	15	13	13	12
	Fairmount	22	20	23	21	21	20	22	21
	Fayetteville/Manlius	19	19	20	20	18	18	24	19
	LaFayette	27	24	25	24	27	23	24	24
	Liverpool	13	13	14	14	13	13	13	13
	St. Joseph's Hospital	15	13	12	13	15	12	12	13
	University Hill	20	17	18	16	20	17	16	15
Destiny USA	Baldwinsville	22	22	25	25	22	23	26	26
	Cicero	11	11	13	12	10	10	11	11
	Downtown	8	7	9	9	7	8	8	8
	Fairmount	12	12	15	14	12	12	15	14
	Fayetteville/Manlius	17	17	20	19	17	18	25	19
	LaFayette	19	18	20	19	19	19	19	19
	Liverpool	8	9	10	10	8	9	9	10
	St. Joseph's Hospital	7	7	8	8	7	7	7	8
	University Hill	12	11	13	11	12	12	11	11
Downtown	Baldwinsville	19	20	21	22	19	21	21	24
	Cicero	15	14	15	16	13	14	14	14
	Destiny USA	5	5	5	5	5	5	5	5
	Fairmount	12	13	14	15	12	14	13	16
	Fayetteville/Manlius	15	15	18	18	15	15	23	17
	LaFayette	17	16	17	17	16	16	17	17
	Liverpool	9	9	9	10	8	9	9	10
	St. Joseph's Hospital	3	3	3	3	3	3	3	3
	University Hill	7	7	8	7	6	6	7	7

Table 5-26 (cont'd)
No Build and Viaduct Alternative Origin-Destination Travel Times (Minutes)

	Year	2026				2056			
	Peak	AM		PM		AM		PM	
Origin	Destination	No Build	Viaduct	No Build	Viaduct	No Build	Viaduct	No Build	Viaduct
Fairmount	Baldwinsville	17	17	18	18	18	18	19	19
	Cicero	23	22	23	22	22	21	22	21
	Destiny USA	13	12	13	12	13	13	13	12
	Downtown	13	14	12	12	14	14	13	13
	Fayetteville/Manlius	22	22	23	22	24	22	30	23
	LaFayette	24	23	23	23	26	24	24	23
	Liverpool	17	16	17	16	17	17	17	17
	St. Joseph's Hospital	14	14	13	12	15	14	13	13
	University Hill	17	16	16	14	19	17	15	15
Fayetteville/ Manlius	Baldwinsville	29	29	31	31	30	30	30	32
	Cicero	19	19	20	20	19	19	17	19
	Destiny USA	15	15	16	16	15	15	14	16
	Downtown	16	17	16	17	17	17	15	17
	Fairmount	22	22	24	24	23	23	22	24
	LaFayette	18	18	19	19	18	18	20	19
	Liverpool	19	19	20	20	19	19	18	21
	St. Joseph's Hospital	15	15	16	15	15	15	14	16
	University Hill	18	17	18	17	19	17	16	17
LaFayette	Baldwinsville	30	29	31	30	32	30	32	31
	Cicero	25	24	25	25	26	24	24	24
	Destiny USA	16	15	15	15	17	15	16	15
	Downtown	17	16	16	16	19	16	15	16
	Fairmount	23	22	24	23	25	22	24	23
	Fayetteville/Manlius	18	18	22	19	18	18	25	19
	Liverpool	20	19	19	19	21	19	20	19
	St. Joseph's Hospital	18	17	18	18	20	18	16	17
	University Hill	16	14	16	14	18	14	14	14
Liverpool	Baldwinsville	13	13	15	15	14	14	14	14
	Cicero	14	14	15	15	13	13	14	14
	Destiny USA	6	7	6	7	6	7	6	8
	Downtown	10	8	9	9	10	8	9	8
	Fairmount	16	16	18	17	16	15	18	17
	Fayetteville/Manlius	20	18	20	19	20	18	26	20
	LaFayette	22	19	20	19	22	19	20	20
	St. Joseph's Hospital	10	8	8	8	10	8	8	8
	University Hill	15	12	13	11	15	12	12	11

Table 5-26 (cont'd)
No Build and Viaduct Alternative Origin-Destination Travel Times (Minutes)

	Year	2026				2056			
	Peak	AM		PM		AM		PM	
Origin	Destination	No Build	Viaduct	No Build	Viaduct	No Build	Viaduct	No Build	Viaduct
St. Joseph's Hospital	Baldwinsville	21	20	21	22	20	20	22	23
	Cicero	13	12	13	14	12	12	12	12
	Destiny USA	3	3	3	3	3	3	4	3
	Downtown	4	4	3	3	3	3	3	3
	Fairmount	14	13	14	15	13	13	14	15
	Fayetteville/Manlius	14	14	17	16	14	14	22	16
	LaFayette	18	17	18	18	18	17	18	18
	Liverpool	7	7	7	8	7	7	8	8
	University Hill	7	7	8	8	7	7	7	8
University Hill	Baldwinsville	21	20	24	22	21	21	24	23
	Cicero	16	15	18	17	15	14	16	15
	Destiny USA	6	6	9	7	7	6	7	7
	Downtown	6	6	6	6	6	5	6	6
	Fairmount	14	13	17	15	14	13	16	15
	Fayetteville/Manlius	15	15	18	17	15	15	24	17
	LaFayette	16	13	18	14	16	14	16	15
	Liverpool	10	10	13	11	10	10	12	11
	St. Joseph's Hospital	6	6	7	6	6	6	6	6

Table 5-27
2026 and 2056 Viaduct Alternative Traffic Volumes at Key Locations

Location	Direction	2026				2056			
		AM		PM		AM		PM	
		No Build	Viaduct	No Build	Viaduct	No Build	Viaduct	No Build	Viaduct
I-81 Just North of Colvin Street Interchange	NB	3,032	3,610	2,957	3,573	3,412	3,876	3,101	3,718
	SB	2,357	2,419	3,519	3,279	2,480	2,667	3,815	4,136
I-81 Just South of Bear Street Interchange	NB	2,484	3,319	5,945	7,267	2,688	3,473	6,322	7,758
	SB	5,254	5,425	3,529	4,325	5,681	5,778	3,820	4,703
I-481 Just South of I-690 Interchange	NB	3,492	3,364	2,784	2,648	3,722	3,682	2,958	2,821
	SB	2,030	2,020	3,565	3,580	2,203	2,243	3,814	3,849
I-481 Just North of I-690 Interchange	NB	2,304	2,280	3,025	2,828	2,551	2,531	3,267	3,066
	SB	2,740	2,739	2,459	2,453	3,083	3,094	2,797	2,783
I-690 Just West of West Street Interchange	EB	4,512	5,524	2,545	3,836	4,893	6,007	2,801	4,178
	WB	1,974	2,772	4,024	4,791	2,178	3,039	4,386	5,182
I-690 Just East of Teall Avenue Interchange	EB	3,560	3,761	4,795	4,636	3,711	3,738	4,965	4,807
	WB	3,977	3,938	3,937	4,016	4,271	4,219	4,061	4,147
West Street Just South of Fayette Street	NB	495	411	833	693	438	415	782	737
	SB	1,022	840	655	473	1,082	896	698	494
Clinton Street Just North of Onondaga Street	NB					196		265	
	SB	546	514	483	459	424	535	327	500
Salina Street Just North of Onondaga Street	NB	318	345	419	442	282	330	437	453
	SB	362	378	283	309	440	410	370	326
State Street Just North of Harrison Street	NB	167	282	235	353	153	185	278	299
	SB	375	383	323	315	429	403	329	307
Almond Street Just North of Harrison Street	NB	713	520	519	632	747	593	517	686
	SB	1,528	1,525	1,004	896	1,584	1,696	1,159	1,090
Irving Avenue Just North of Harrison Street	NB	120	134	275	262	140	139	318	280
	SB	554	459	358	351	633	565	391	410
Crouse Avenue Just North of Harrison Street	NB	178	141	383	304	174	149	371	321
	SB		168		105		176		123
Erie Boulevard Just East of Almond Street	EB	363	358	357	386	417	360	399	405
	WB	273	289	395	463	313	311	447	480
Fayette Street Just East of Almond Street	EB	276	218	157	144	285	233	185	161
	WB	152	106	294	251	157	109	297	259
Genesee Street Just East of Almond Street	EB	357	429	461	501	370	491	478	543
	WB	369	399	372	291	386	417	436	312
Harrison Street Just East of Almond Street	EB	49	117	54	84	113	135	79	92
	WB	838	833	1,651	1,926	913	938	1,867	2,147

Level of Service and Mobility

At Project Completion & Design Year

The Viaduct Alternative would relieve the existing/No Build traffic congestion issues on southbound I-81, the Harrison/Adams Street interchange, and Almond Street by providing additional capacity to directly relieve bottlenecks, as well as establishing alternative access points that redirect demand from the congested areas. The Viaduct Alternative would accomplish this by providing the following improvements:

- Reconstructing the existing two-lane section of southbound I-81 between the entrance-ramp from eastbound I-690 and the Harrison Street exit to provide an additional auxiliary lane.
- Reconstructing the existing single-lane Harrison Street exit-ramp to provide two lanes.
- Widening the Harrison Street exit-ramp approach to Almond Street from one to two lanes.
- Reconfiguring the Harrison Street/Almond Street intersection by providing an exclusive right-turn lane that would accommodate the movement from westbound Harrison Street to the northbound I-81 entrance-ramp continuously.
- Constructing a new partial interchange on I-81 south of Adams Street at MLK, Jr. East. This new access point would accommodate commuting traffic traveling from locations south of the city to University Hill and would relieve some of the traffic demand currently served by Almond Street and the Harrison/Adams Street interchange.
- Relocating primary access from University Hill to eastbound I-690 from the Harrison/Adams Street interchange to a new entrance-ramp north of Erie Boulevard on Almond Street.

A comprehensive description of the Viaduct Alternative is provided in **Chapter 3, Alternatives**.

Future Viaduct Alternative Level of Service

Freeway Level of Service:

Based on VISSIM delay calculations, future Viaduct Alternative freeway levels of service (LOS) were calculated for all the basic freeway segments, freeway ramps, and weaving segments within the Project Area (see **Appendix C-3**). **Table 5-28** shows 2026 and 2056 freeway LOS conditions resulting from the Viaduct Alternative traffic on selected critical sections of I-81, I-481, and I-690.

Table 5-28
2026 and 2056 Viaduct Alternative Freeway LOS Analysis

Segment	Type	2026				2056			
		AM		PM		AM		PM	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
Northbound I-81									
between Interchange 16 (US 11) on-ramp and Exit 16A (Northbound I-481)	BFS	15.3	B	12.5	B	16.9	B	13.8	B
at Exit 16A (I-481 Northbound)	Diverge	13.6	B	10.0	A	15.6	B	11.1	B
between Interchange 16A (I-481 Northbound) off and on-ramps	BFS	9.6	A	9.1	A	10.7	A	9.9	A
between Interchange 16A (Northbound I-481) on-ramp and Exit 17 (S. Salina St, Brighton Av)	Weave	12.4	B	9.0	A	13.5	B	10.7	B
between Interchange 17 (S. Salina St, Brighton Av) off and on-ramps	BFS	16.1	B	11.8	B	17.5	B	13.9	B
at Interchange 17 (S. Salina St) on-ramp	Merge	19.0	B	15.4	B	20.1	C	17.4	B
between Interchange 17 (S. Salina St) and Interchange 17 (E. Colvin St) on-ramps	BFS	20.3	C	15.8	B	21.7	C	18.2	C
between Interchange 17 (E. Colvin St) on-ramp and MLK, Jr. East off-ramp	Weave	22.4	C	19.8	B	23.1	C	22.2	C
between MLK, Jr. East off-ramp and Adams St off-ramp	BFS	9.9	A	4.3	A	23.6	C	19.6	C
between Adams St off-ramp and Eastbound I-690 off-ramp	BFS	19.7	C	23.2	C	19.5	C	22.7	C
at Exit to Eastbound I-690	Diverge	13.1	B	13.6	B	11.7	B	18.9	B
between Eastbound I-690 off-ramp and Harrison St on-ramp	BFS	12.0	B	15.6	B	12.1	B	20.4	C
at Harrison St on-ramp	Merge	9.9	A	17.9	B	8.8	A	20.1	C
at Westbound I-690 off-ramp	Diverge	15.0	B	25.1	C	11.9	B	28.1	D
between off-ramp to Westbound I-690 and Pearl St on-ramp	BFS	9.1	A	23.6	C	8.8	A	26.3	D
at Pearl St on-ramp	Merge	5.5	A	18.4	B	5.7	A	19.4	B
at Westbound I-690 on-ramp	Merge	11.7	B	26.2	C	10.8	B	20.9	C
between on-ramp from Westbound I-690 and on-ramp from Eastbound I-690	BFS	10.1	A	30.6	D	9.7	A	26.8	D
between on-ramp from Eastbound I-690 and Bear St off-ramp	Weave	10.3	B	22.5	C	9.0	A	24.2	C
at Exit to Bear St	Diverge	10.1	B	22.9	C	10.2	B	23.5	C
between Exit to Bear St and off-ramp to Exit 23 (Hiawatha Blvd)	BFS	11.3	B	26.3	D	8.0	A	28.1	D
between Exit 23(Hiawatha Blvd) off-ramp and on-ramp from Bear St	BFS	10.1	A	22.6	C	7.7	A	25.2	C
at Bear St on-ramp	Merge	7.6	A	17.7	B	6.1	A	20.1	C
at Interchange 23 (Hiawatha Blvd) on-ramp	Merge	14.6	B	28.2	D	15.5	B	29.4	D
between Interchange 23 (Hiawatha Blvd) on-ramp and Exit 25 (7th North St)	BFS	10.8	A	22.7	C	11.5	B	23.9	C
at Exit 25 (7th North St)	Diverge	13.0	B	24.2	C	13.9	B	25.6	C
between Interchange 25 (7th North St) off and on-ramps	BFS	11.1	B	26.4	D	12.0	B	28.1	D
between Interchange 25 (7th North St) on-ramp and Exit 25A (I-90)	Weave	9.3	A	28.1	D	10.1	B	23.8	C

Table 5-28 (cont'd)
2026 and 2056 Viaduct Alternative Freeway LOS Analysis

Segment	Type	2026				2056			
		AM		PM		AM		PM	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
Northbound I-81									
between Interchange 25A (I-90) off and on-ramps	BFS	10.6	A	27.2	D	11.6	B	28.2	D
at Interchange 25A (I-90) on-ramp	Merge	13.0	B	25.6	C	14.1	B	26.7	C
at Exit 26 (US 11)	Diverge	9.7	A	18.6	B	10.5	B	19.4	B
between Exit 26(US 11) off-ramp and Exits 27 (Airport Blvd) off-ramp	BFS	9.5	A	22.3	C	11.0	B	24.4	C
between Interchange 27 (Airport Blvd) off and on-ramps	BFS	6.2	A	17.4	B	7.1	A	19.1	C
at Interchange 27 (Airport Blvd) on-ramp	Merge	8.8	A	20.8	C	9.7	A	22.6	C
between Interchange 27 (Airport Blvd) on-ramp and Interchange 28 (Taft Rd) on-ramp	BFS	8.7	A	21.6	C	9.7	A	23.7	C
at Interchange 28 (Taft Rd) on-ramp	Merge	11.1	B	21.9	C	12.0	B	23.2	C
between Interchange 28 (Taft Rd) on-ramp and Exit 29S (I-481 Southbound)	BFS	10.7	A	24.8	C	11.7	B	26.9	D
at Exit 29S (I-481 Southbound)	Diverge	9.7	A	19.4	B	10.5	B	20.6	C
between Exit 29S (I-481 SB) and NY-481 Southbound on-ramp	BFS	9.8	A	23.4	C	10.7	A	25.4	C
between Interchange 29N (NY-481) on and off-ramps	Weave	7.6	A	18.2	B	8.3	A	20.6	C
between Exit 29N (NY-481 NB) and I-481 Northbound on-ramp	BFS	7.1	A	14.4	B	7.8	A	16.1	B
at Interchange 29S (I-481) on-ramp	Merge	8.8	A	17.1	B	9.6	A	18.4	B
between Interchange 29N (I-481) on-ramp and Exit 30 (NY-31)	BFS	7.3	A	18.6	C	8.1	A	20.7	C
Southbound I-81									
between Interchange 30 (NY-31) and Interchange 29N (I-481) off-ramp	BFS	21.4	C	12.1	B	24.1	C	13.8	B
at Exit 29N (NY-481)	Diverge	21.4	C	12.0	B	24.2	C	13.7	B
between Exit 29N (Northbound NY-481) and I-481 Northbound on-ramp	BFS	20.8	C	11.2	B	23.5	C	12.9	B
between Interchange 29S (I-481) on- and off-ramps	Weave	17.2	B	9.1	A	21.1	C	10.6	B
between Exit 29S (Southbound I-481) and NY-481 Southbound on-ramp	BFS	17.5	B	9.8	A	20.2	C	11.3	B
at Interchange 29N (NY-481) on-ramp	Merge	24.7	C	15.6	B	26.7	C	16.7	B
between Interchange 29S (I-481) on-ramp and Exit 28 (Taft Rd)	BFS	26.9	D	15.9	B	29.6	D	17.1	B
at Exit 28 (Taft Rd)	Diverge	20.3	C	13.4	B	21.2	C	14.1	B
between Exit 28 (Taft Rd) and Exits 27-26 (Airport Rd)	BFS	24.1	C	13.9	B	26.8	D	15.1	B
at Exits 27-26 (US 11)	Diverge	18.2	B	12.1	B	20.3	C	13.0	B
between Interchange 27 (Airport Rd) off and on-ramps	BFS	20.6	C	11.4	B	22.9	C	12.5	B
at Interchange 27 (Airport Rd) on-ramp	Merge	20.8	C	15.7	B	22.6	C	17.1	B
between Interchange 27 (Airport Rd) and Interchange 27-26 (US 11) on-ramps	BFS	23.5	C	15.6	B	26.1	D	17.2	B

Table 5-28 (cont'd)
2026 and 2056 Viaduct Alternative Freeway LOS Analysis

Segment	Type	2026				2056			
		AM		PM		AM		PM	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
at Interchange 26 (US 11) on-ramp	Merge	17.5	B	16.3	B	18.8	B	17.1	B
between Interchange 27-26 (US 11) on-ramp and Exit 25A (I-90) off-ramp	BFS	20.4	C	16.8	B	22.4	C	17.9	B
between Interchange 25A (I-90) off and on-ramps	BFS	25.0	C	19.3	C	27.4	D	20.5	C
between Interchange 25A (I-90) on-ramp and Exit 25 (7th North St)	Weave	20.5	C	16.0	B	22.4	C	16.9	B
between Interchange 25 (7th North St) off and on-ramps	BFS	22.2	C	17.3	B	24.6	C	18.5	C
between Interchange 25 (7th North St) on-ramp and Exit 23A (Hiawatha Blvd)	Weave	20.3	C	16.3	B	22.4	C	17.7	B
between Exit 23A (Hiawatha Blvd) and Old Liverpool Rd on-ramp	BFS	24.2	C	18.1	C	26.6	D	19.8	C
at Old Liverpool Rd./NY-370 on-ramp	Merge	26.0	C	21.8	C	28.0	C	19.5	B
at N. Clinton St off-ramp	Diverge	22.9	C	17.9	B	24.6	C	16.9	B
between N. Clinton St off and on-ramps	BFS	20.5	C	16.0	B	23.3	C	15.5	B
at N. Clinton St on ramp	Merge	19.8	B	16.9	B	27.8	C	17.2	B
between N Clinton St on-ramp and Clinton St off-ramp	BFS	23.2	C	18.9	C	25.7	C	20.2	C
at Clinton St off-ramp	Diverge	15.2	B	13.7	B	17.9	B	13.6	B
at Westbound I-690 off-ramp	Diverge	18.1	B	17.9	B	19.8	B	19.2	B
at Eastbound I-690 off-ramp	Diverge	20.5	C	17.8	B	23.7	C	25.6	C
between offramp to Eastbound I-690 and on-ramp from Eastbound I-690	BFS	24.0	C	18.1	C	27.0	D	21.0	C
between Eastbound I-690 on-ramp and Harrison St off-ramp	Weave	26.2	C	15.9	B	32.5	D	18.8	B
between Harrison St off-ramp and Westbound I-690 on-ramp	BFS	15.1	B	16.5	B	15.4	B	17.6	B
at Westbound I-690 on-ramp	Merge	12.8	B	14.3	B	12.9	B	15.9	B
between Westbound I-690 on-ramp and Adams St on-ramp	BFS	19.5	C	21.6	C	19.1	C	24.9	C
at Adams St on-ramp	Merge	13.4	B	19.0	B	13.6	B	20.1	C
between Adams St on-ramp and MLK, Jr. East on-ramp	BFS	14.0	B	19.5	C	13.4	B	19.8	C
at MLK, Jr. East on-ramp	Merge	14.0	B	22.6	C	11.9	B	21.7	C
between MLK, Jr. East on-ramp and Exit 17 (S. Salina St, Brighton Av) off-ramp	BFS	15.9	B	20.5	C	16.3	B	26.1	D
at Exit 17 (S. State St, S. Salina St, Brighton Av)	Diverge	15.9	B	20.5	C	16.4	B	22.4	C
between Exit 17 (S. Salina St, Brighton Av) off and on-ramps	BFS	7.1	A	14.3	B	7.2	A	16.9	B
at Brighton Av on-ramp	Merge	9.8	A	13.3	B	9.8	A	16.7	B
at Exit off-ramp to Northbound I-481	Diverge	6.8	A	12.4	B	6.8	A	14.5	B
between Interchange 16A (I-481) off and on-ramps	BFS	10.5	A	14.1	B	10.8	A	16.2	B
at Interchange 16A (I-481) on-ramp	Merge	9.9	A	15.0	B	10.7	B	15.3	B

Table 5-28 (cont'd)
2026 and 2056 Viaduct Alternative Freeway LOS Analysis

Segment	Type	2026				2056			
		AM		PM		AM		PM	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
Northbound I-481									
between on-ramp from Southbound I-81 and Exit 1 (Brighton Av, Rock Cut Rd)	Weave	5.9	A	8.4	A	6.1	A	9.7	A
between Interchange 1 (Brighton Av, Rock Cut Rd) off and on-ramps	BFS	7.4	A	8.7	A	7.8	A	9.8	A
at Interchange 1 (Brighton Av, Rock Cut Rd) on-ramp	Merge	9.1	A	8.6	A	9.6	A	9.7	A
between Interchange 1 (Brighton Av, Rock Cut Rd) and Exit 2 (Jamesville Rd)	BFS	11.7	B	11.7	B	12.3	B	13.1	B
at Exit 2 (Jamesville Rd)	Diverge	7.8	A	7.7	A	8.1	A	8.7	A
between Interchange 2 (Jamesville Rd) off and on-ramps	BFS	9.4	A	7.3	A	10.0	A	8.5	A
at Interchange 2 (Jamesville Rd) on-ramp	Merge	10.9	B	8.9	A	11.6	B	9.8	A
between Interchange 2 (Jamesville Rd) on-ramp and Exit 3E (Eastbound NY-5)	BFS	14.7	B	11.9	B	15.6	B	13.2	B
at Exit 3E (Eastbound NY-5)	Diverge	10.5	B	8.6	A	11.0	B	8.8	A
between Interchange 3E (Eastbound NY-5) off and on-ramps	BFS	12.6	B	9.6	A	13.9	B	10.5	A
between Interchange 3E (Eastbound NY-5) on-ramp and Exit 3W (Westbound NY-5)	Weave	10.0	A	8.8	A	11.1	B	9.4	A
between Interchange 3W (Westbound NY-5) off and on-ramps	BFS	12.5	B	10.7	A	14.1	B	11.4	B
at Interchange 3W (Westbound NY-5) on-ramp	Merge	16.7	B	12.0	B	17.8	B	12.5	B
between Interchange 3W (Westbound NY-5) on-ramp and Exit 4 (Westbound I-690)	BFS	20.3	C	13.9	B	22.1	C	14.6	B
at Exit 4 (Westbound I-690)	Diverge	13.7	B	10.3	B	14.5	B	10.8	B
between Interchange 4 (I-690) off and on-ramps	BFS	11.9	B	16.4	B	12.8	B	17.0	B
at Interchange 4 (Eastbound I-690) on-ramp	Merge	14.3	B	20.1	C	14.2	B	21.2	C
between Interchange 4 (Eastbound I-690) on-ramp and Exit 5E (Kirkville Rd)	BFS	20.5	C	28.2	D	20.5	C	29.6	D
at Exit 5E (Kirkville Rd)	Diverge	14.8	B	32.4	D	15.3	B	26.1	C
between Interchange 5E (Kirkville Rd) off and on-ramps	BFS	19.1	C	23.8	C	18.5	C	24.4	C
between Interchange 5E (Kirkville Rd) on-ramp and Exit 5W (Kirkville Rd)	Weave	13.4	B	17.3	B	13.0	B	18.2	B
between Interchange 5W (Kirkville Rd) off and on-ramps	BFS	14.1	B	21.7	C	13.8	B	22.8	C
at Interchange 5W (Kirkville Rd) on-ramp	Merge	10.7	B	16.0	B	10.8	B	17.2	B
between Interchange 5W (Kirkville Rd) on-ramp and Exit 6 (I-90)	BFS	16.0	B	24.6	C	16.1	B	26.5	D
at Exit 6 (I-90)	Diverge	15.4	B	30.5	D	15.3	B	32.0	D
between Interchange 6 (I-90) off and on-ramps	BFS	10.7	A	12.6	B	10.8	A	14.0	B
at Interchange 6 (I-90) on-ramp	Merge	9.2	A	11.1	B	9.5	A	12.4	B
at Exit 7 (NY-298 Bridgeport Rd)	Diverge	11.4	B	13.4	B	12.0	B	14.9	B

Table 5-28 (cont'd)
2026 and 2056 Viaduct Alternative Freeway LOS Analysis

Segment	Type	2026				2056			
		AM		PM		AM		PM	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
between Interchange 7 (NY-298 Bridgeport Rd) off and on-ramps	BFS	9.0	A	11.7	B	8.9	A	13.2	B
at Interchange 7 (NY-298 Bridgeport Rd) on-ramp	Merge	6.7	A	11.1	B	6.8	A	12.6	B
between Interchange 7 (NY-298 Bridgeport Rd) on-ramp and Exit 8 (Northern Blvd)	BFS	10.0	A	16.1	B	10.1	A	18.2	C
at Exit 8 (Northern Blvd)	Diverge	7.2	A	11.5	B	7.3	A	13.0	B
between Interchange 8 (Northern Blvd) off and on-ramps	BFS	7.3	A	12.7	B	7.5	A	14.4	B
at Interchange 8 (Northern Blvd) on-ramp	Merge	6.5	A	15.4	B	6.9	A	17.3	B
between Interchange 8 (Northern Blvd) on-ramp and Exit 9N (Northbound I-81)	BFS	9.7	A	22.1	C	10.2	A	24.5	C
at Exit 9N (Northbound I-81)	Diverge	7.4	A	17.6	B	7.9	A	19.6	B
Southbound I-481									
at Interchange 9N (Northbound I-81) on-ramp	Merge	16.3	B	8.8	A	22.2	C	11.1	B
between Interchange 9N (Northbound I-81) on-ramp and Exit 8 (Northern Blvd)	BFS	20.4	C	12.8	B	23.9	C	14.1	B
at Exit 8 (Northern Blvd)	Diverge	15.4	B	9.1	A	17.7	B	10.2	B
between Interchange 8 (Northern Blvd) off and on-ramps	BFS	14.1	B	10.0	A	16.4	B	10.8	A
at Interchange 8 (Northern Blvd) on-ramp	Merge	12.1	B	8.0	A	13.9	B	8.7	A
between Interchange 8 (Northern Blvd) on-ramp and Exit 7 (NY-298 Bridgeport Rd)	BFS	17.8	B	12.0	B	20.5	C	13.0	B
at Exit 7 (NY-298 Bridgeport Rd)	Diverge	15.5	B	8.7	A	18.0	B	9.5	A
between Interchange 7 (NY-298 Bridgeport Rd) off and on-ramps	BFS	13.6	B	10.7	A	15.5	B	11.4	B
at Interchange 7 (NY-298 Bridgeport Rd) on-ramp	Merge	11.8	B	11.2	B	13.6	B	12.8	B
between Interchange 7 (NY-298 Bridgeport Rd) and Exit 6 (I-90)	BFS	17.1	B	15.9	B	19.6	C	17.9	B
at Exit 6 (I-90)	Diverge	12.9	B	12.6	B	15.1	B	14.5	B
between Interchange 6 (I-90) off and on-ramps	BFS	14.8	B	12.7	B	17.1	B	14.2	B
at Interchange 6 (I-90) on-ramp	Merge	15.5	B	13.1	B	17.4	B	14.5	B
between Interchange 6 (I-90) on-ramp and Exit 5W (Kirkville Rd)	BFS	21.3	C	18.1	C	24.0	C	20.0	C
at Exit 5W (Kirkville Rd)	Diverge	15.4	B	12.4	B	17.4	B	13.8	B
between Interchange 5W (Kirkville Rd) off and on-ramps	BFS	18.2	C	16.6	B	20.7	C	18.4	C
between Interchange 5W (Kirkville Rd) on-ramp and Exit 5E (Kirkville Rd)	Weave	14.7	B	12.2	B	17.1	B	14.2	B
between Interchange 5E (Kirkville Rd) off and on-ramps	BFS	19.6	C	15.6	B	22.5	C	18.1	C
at Interchange 5E (Kirkville Rd) on-ramp	Merge	16.0	B	14.7	B	18.1	B	16.5	B
between Interchange 5E (Kirkville Rd) on-ramp and Exit 4 (Westbound I-690)	BFS	23.3	C	20.7	C	26.3	D	23.4	C

Table 5-28 (cont'd)
2026 and 2056 Viaduct Alternative Freeway LOS Analysis

Segment	Type	2026				2056			
		AM		PM		AM		PM	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
at Exit 4 (Westbound I-690)	Diverge	24.9	C	14.3	B	29.2	D	22.8	C
between Interchange 4 (I-690) off and on-ramps	BFS	10.9	A	12.8	B	12.7	B	14.6	B
at Interchange 4 (Eastbound I-690) on-ramp	Merge	10.0	A	16.1	B	10.0	B	17.1	B
between Interchange 4 (Eastbound I-690) on-ramp and Exit 3W (Westbound NY-5)	BFS	12.5	B	20.9	C	12.6	B	24.4	C
at Exit 3W (Westbound NY-5)	Diverge	11.8	B	20.7	C	11.9	B	24.5	C
between Interchange 3W (Westbound NY-5) off and on-ramps	BFS	11.0	B	17.3	B	11.1	B	22.8	C
between Interchange 3W (Westbound NY-5) on-ramp and Exit 3E (Eastbound NY-5)	Weave	11.2	B	22.9	C	11.0	B	35.1	E
between Interchange 3E (Eastbound NY-5) off and on-ramps	BFS	8.1	A	8.8	A	8.6	A	9.4	A
at Interchange 3E (Eastbound NY-5) on-ramp	Merge	8.5	A	11.0	B	9.0	A	11.6	B
between Interchange 3E (Eastbound NY-5) on-ramp and Exit 2 (Jamesville Rd)	BFS	8.7	A	11.2	B	9.2	A	12.1	B
at Exit 2 (Jamesville Rd)	Diverge	13.0	B	16.9	B	13.8	B	18.2	B
between Interchange 2 (Jamesville Rd) off and on-ramps	BFS	9.8	A	11.1	B	10.3	A	12.0	B
at Interchange 2 (Jamesville Rd) on-ramp	Merge	10.5	B	9.5	A	11.2	B	10.2	B
between Interchange 2 (Jamesville Rd) on-ramp and Exit 1 (Brighton Av)	BFS	15.1	B	14.0	B	16.1	B	15.1	B
at Exit 1 (Brighton Av)	Diverge	12.5	B	12.2	B	13.4	B	13.0	B
at ramps to Northbound and Southbound I-81	Diverge	14.2	B	11.8	B	15.4	B	12.7	B
at E. Brighton Av on-ramp	Merge	16.6	B	9.1	A	17.6	B	12.2	B
Eastbound I-690									
between Interchange 7 (NY-297) and Interchange 8 (State Fair Blvd) on-ramps	BFS	31.6	D	15.8	B	32.3	D	17.8	B
at Interchange 8 (State Fair Blvd) on-ramp	Merge	22.6	C	14.9	B	22.9	C	16.3	B
at Exit 8 (Hiawatha Blvd)	Diverge	24.5	C	15.0	B	23.8	C	16.1	B
between Exit 8 (Hiawatha Blvd) and Exit 9 (Bear St)	BFS	30.5	D	15.4	B	32.1	D	16.9	B
at Exit 9 (Bear St)	Diverge	22.8	C	11.7	B	21.6	C	13.0	B
between Exit 9 (Bear St) and Interchange 10 (N. Geddes St) on-ramp	BFS	31.9	D	14.6	B	37.8	E	16.0	B
between Interchange 10 (N. Geddes St) on-ramp and Exit 11 (West St)	Weave	32.6	D	17.5	B	42.6	E	26.0	C
at Exit to I-81	Diverge	29.7	D	22.2	C	34.0	D	24.5	C
between off-ramp to I-81 and on-ramp from West St	BFS	19.1	C	12.7	B	21.0	C	14.7	B
at West St on-ramp	Merge	14.4	B	11.7	B	16.2	B	13.7	B
between Interchange 11 (West St) on-ramp and I-81 Southbound bound on-ramp	BFS	22.0	C	17.1	B	23.6	C	19.6	C
at on-ramp from Southbound I-81	Merge	20.8	C	18.2	B	21.7	C	19.0	B

Table 5-28 (cont'd)
2026 and 2056 Viaduct Alternative Freeway LOS Analysis

Segment	Type	2026				2056			
		AM		PM		AM		PM	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
at Northbound I-81 on-ramp	Merge	24.2	C	16.4	B	19.3	B	16.8	B
between Almond St on-ramp and on-ramp from Northbound I-81	BFS	32.5	D	21.2	C	25.5	C	21.7	C
at Almond St on-ramp	Merge	30.5	D	33.1	D	20.8	C	25.4	C
at Exit 14 (Teall Av)	Diverge	36.0	E	22.6	C	25.5	C	25.8	C
between Interchange 14 (Teall Av) off and on-ramps	BFS	19.3	C	22.7	C	20.2	C	22.8	C
at Interchange 14 (Teall Av) on-ramp	Merge	18.5	B	22.8	C	18.8	B	23.0	C
at Exit 15 (Midler Av)	Diverge	21.9	C	20.9	C	18.9	B	21.1	C
between Interchange 15 (Midler Av) off and on-ramps	BFS	16.0	B	22.4	C	16.4	B	22.7	C
at Interchange 15 (Midler Av) on-ramp	Merge	13.8	B	19.7	B	14.4	B	18.9	B
between Interchange 15 (Midler Av) on-ramp and Exits 16S-N (Thompson Rd)	BFS	17.3	B	24.8	C	17.8	B	25.4	C
at Exits 16S-N (Thompson Rd) and Exit 17 (Bridge St)	Diverge	12.9	B	18.2	B	13.5	B	18.5	B
Westbound I-690									
between Interchange 16S-N (Thompson Rd) off and on-ramps	BFS	9.9	A	14.2	B	8.1	A	14.7	B
at Interchange 16S-N (Thompson Rd) on-ramp	Merge	10.9	B	16.6	B	9.3	A	17.3	B
between Interchange 16S-N (Thompson Rd) and Interchange 17 (Bridge St) on-ramps	BFS	12.0	B	19.0	C	10.0	A	19.9	C
at Interchange 17 (Bridge St) on-ramp	Merge	12.7	B	17.4	B	11.0	B	17.7	B
at I-481 ramps	Diverge	13.6	B	22.8	C	11.6	B	23.5	C
at I-481 on-ramp	Merge	19.7	B	9.8	A	21.4	C	10.8	B
at Exit 17 (Bridge St)	Diverge	14.4	B	8.9	A	15.7	B	9.7	A
at Exit 16N-S (Thompson Rd)	Diverge	15.3	B	7.9	A	17.1	B	8.7	A
between Interchange 16N-S (Thompson Rd) off and on-ramps	BFS	17.9	B	9.5	A	19.6	C	10.4	A
at Interchange 16N-S (Thompson Rd) on-ramp	Merge	16.4	B	16.6	B	17.6	B	17.4	B
at Exit 15 (Midler Av)	Diverge	16.0	B	19.3	B	16.9	B	20.0	B
between Interchange 15 (Midler Av) off and on-ramps	BFS	19.6	C	19.0	C	21.0	C	20.1	C
at Interchange 15 (Midler Av) on-ramp	Merge	19.2	B	21.0	C	20.5	C	21.6	C
at Exit 14 (Teall Av)	Diverge	18.2	B	19.8	B	19.2	B	20.0	C
between Interchange 14 (Teall Av) off and on-ramps	BFS	18.5	C	20.3	C	19.7	C	21.0	C
at Exit 14 (Teall Av) on-ramp	Merge	22.6	C	27.0	C	24.2	C	27.1	C
at Almond St off-ramp	Diverge	13.3	B	19.4	B	18.7	B	19.9	B
between Southbound I-81/Almond St. off-ramp and off-ramp to Northbound I-81	BFS	14.1	B	19.7	C	13.9	B	20.1	C

Table 5-28 (cont'd)
2026 and 2056 Viaduct Alternative Freeway LOS Analysis

Segment	Type	2026				2056			
		AM		PM		AM		PM	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
at Northbound I-81 off-ramp	Diverge	14.1	B	19.7	B	14.0	B	19.9	B
between off-ramp to Northbound I-81 and * off-ramp	BFS	12.9	B	14.7	B	13.2	B	18.3	C
at Exit 11 (West St) off-ramp	Diverge	8.3	A	9.5	A	8.7	A	12.0	B
between Exit 11 (West) off-ramp and Northbound I-81 on-ramp	BFS	8.8	A	9.0	A	8.8	A	12.9	B
at on-ramp from Northbound I-81	Merge	13.0	B	16.7	B	13.2	B	20.0	B
at on-ramp from Southbound I-81	Merge	17.4	B	27.5	C	17.7	B	26.5	C
between Exit 11 (West) on-ramp and Exit 10 (N. Geddes St) off-ramp	Weave	12.9	B	25.4	C	12.3	B	22.5	C
between Exit 10 (N. Geddes St) and Interchange 9 (Bear St) on-ramp	BFS	12.0	B	19.2	C	13.2	B	26.3	D
at Interchange 9 (Bear St) on-ramp	Merge	12.8	B	18.8	B	13.5	B	26.5	C
between Interchange 9 (Bear St) and Interchange 8 (State Fair Blvd) on-ramps	BFS	13.7	B	22.8	C	14.6	B	29.8	D
at Interchange 8 (Hiawatha Blvd) on-ramp	Merge	13.9	B	17.8	B	14.8	B	27.6	C
between Interchange 8 (State Fair Blvd) on-ramp and Exit 7 (NY-297)	BFS	14.9	B	25.7	C	16.0	B	33.6	D

Since the Viaduct Alternative would correct most non-standard and non-conforming highway features within the Project Area and make improvements at existing/No Build locations identified as congested, it would substantially improve traffic operational conditions on I-81, I-481, and I-690 during the AM and PM peak hours. In comparison to 2026 and 2056 No Build condition LOS results, the numbers of freeway segments, ramp junctions, and weaving sections operating unacceptably would be reduced by 94 and 92 percent, respectively, under the Viaduct Alternative.

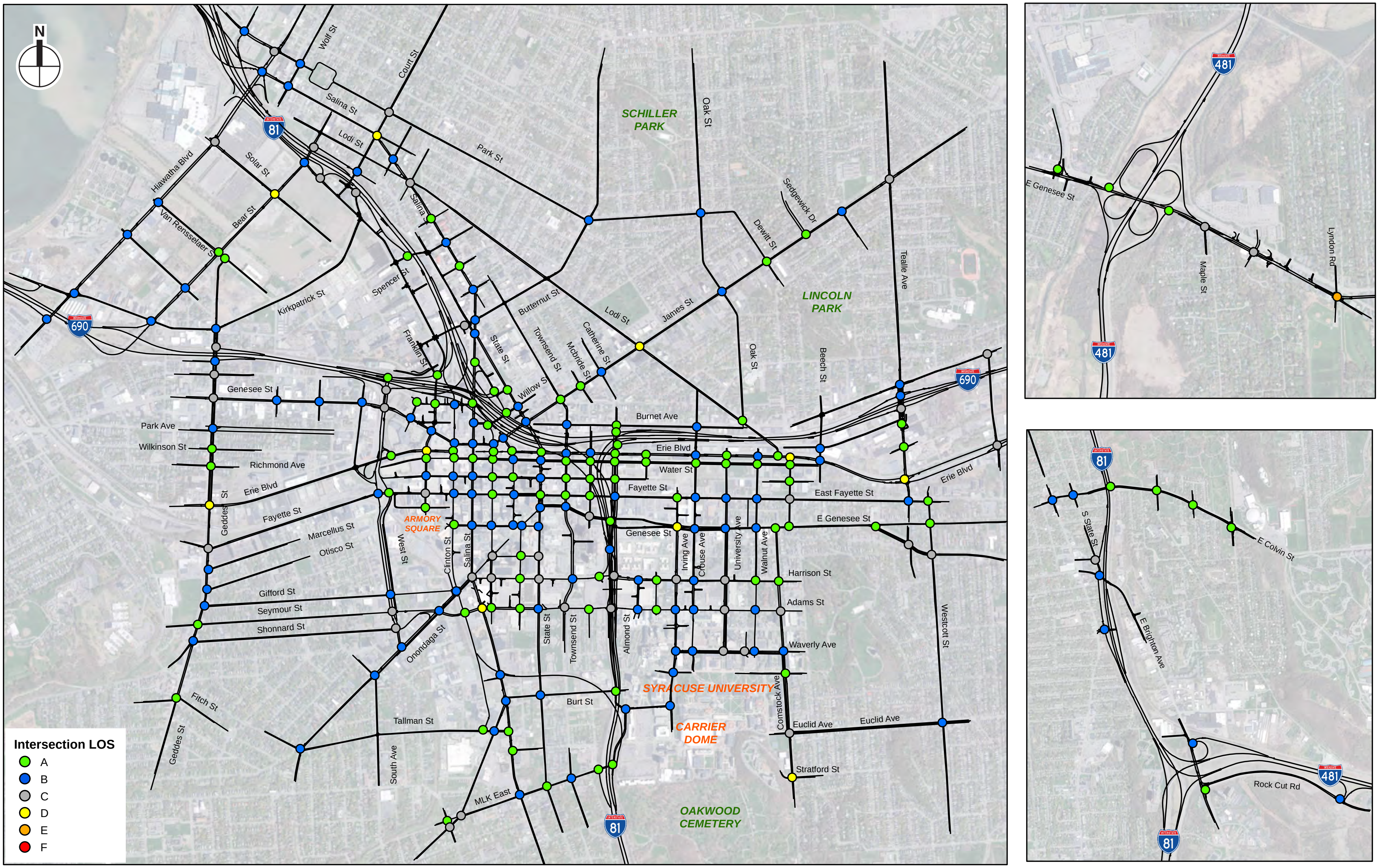
The freeway segments that would operate at LOS E or worse under 2026 and/or 2056 Viaduct conditions include:

- Southbound I-481 weave between the Interchange 3W (Westbound NY-5) on-ramp and Exit 3E (Eastbound NY-5) (2056 PM);
- Eastbound I-690 BFS between Exit 9 (Bear Street) and the Interchange 10 (N. Geddes Street) on-ramp (2056 AM);
- Eastbound I-690 weave between the Interchange 10 (N. Geddes Street) on-ramp and Exit 11 (West Street) (2056 AM);

Eastbound I-690 diverge at Exit 14 (Teall Avenue) (2026 AM)

Intersection Level of Service:

Based on VISSIM delay calculations, **Figures 5-19 through 5-22** show the projected intersection LOS for the Viaduct Alternative. More detailed LOS analyses for 290 intersections are included in **Appendix C-3**.

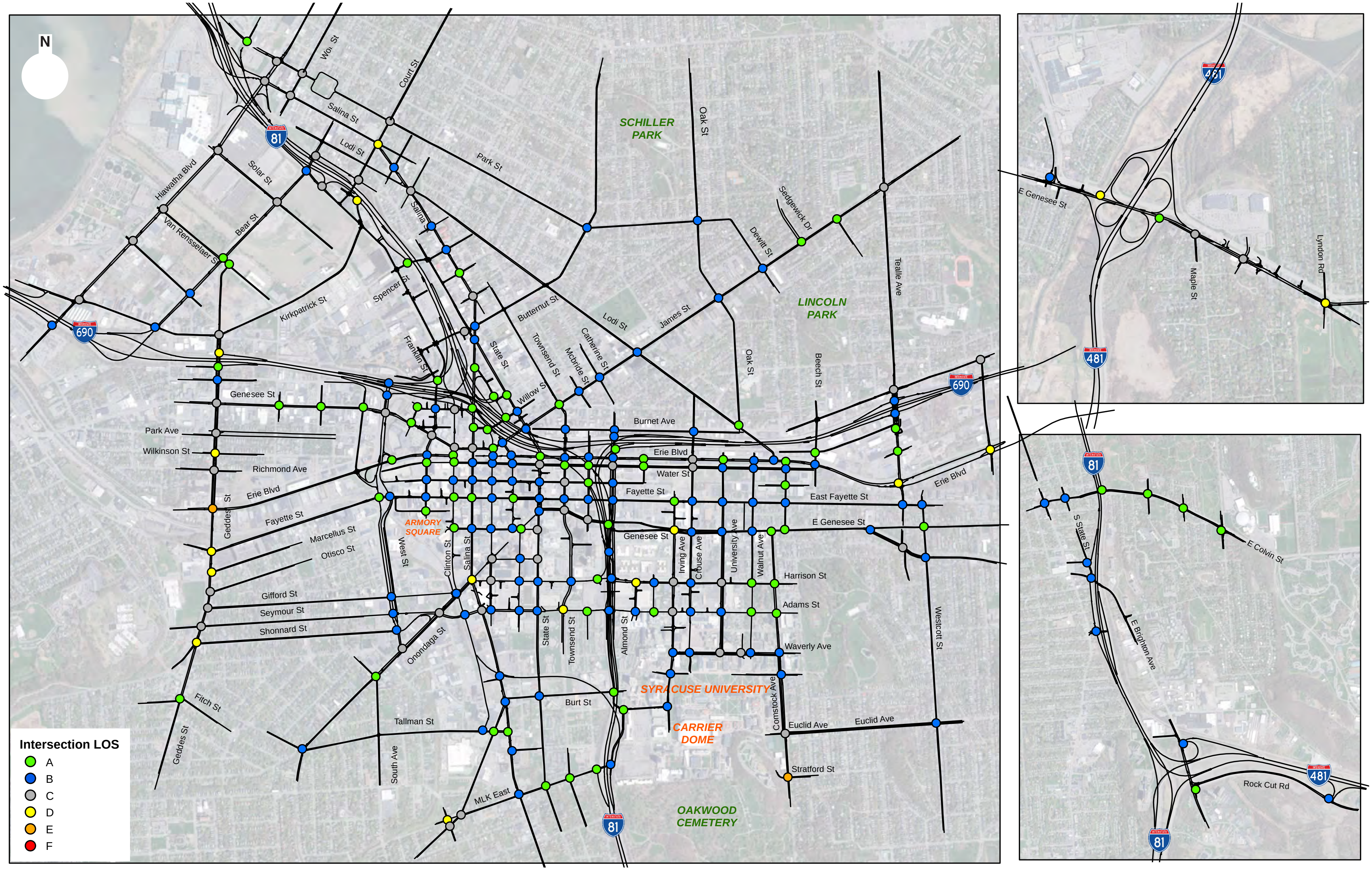


Intersection Levels of Service — Viaduct 2026 AM

Intersection Levels of Service
Viaduct 2026 AM

I-81 Viaduct Project

Figure 5-19

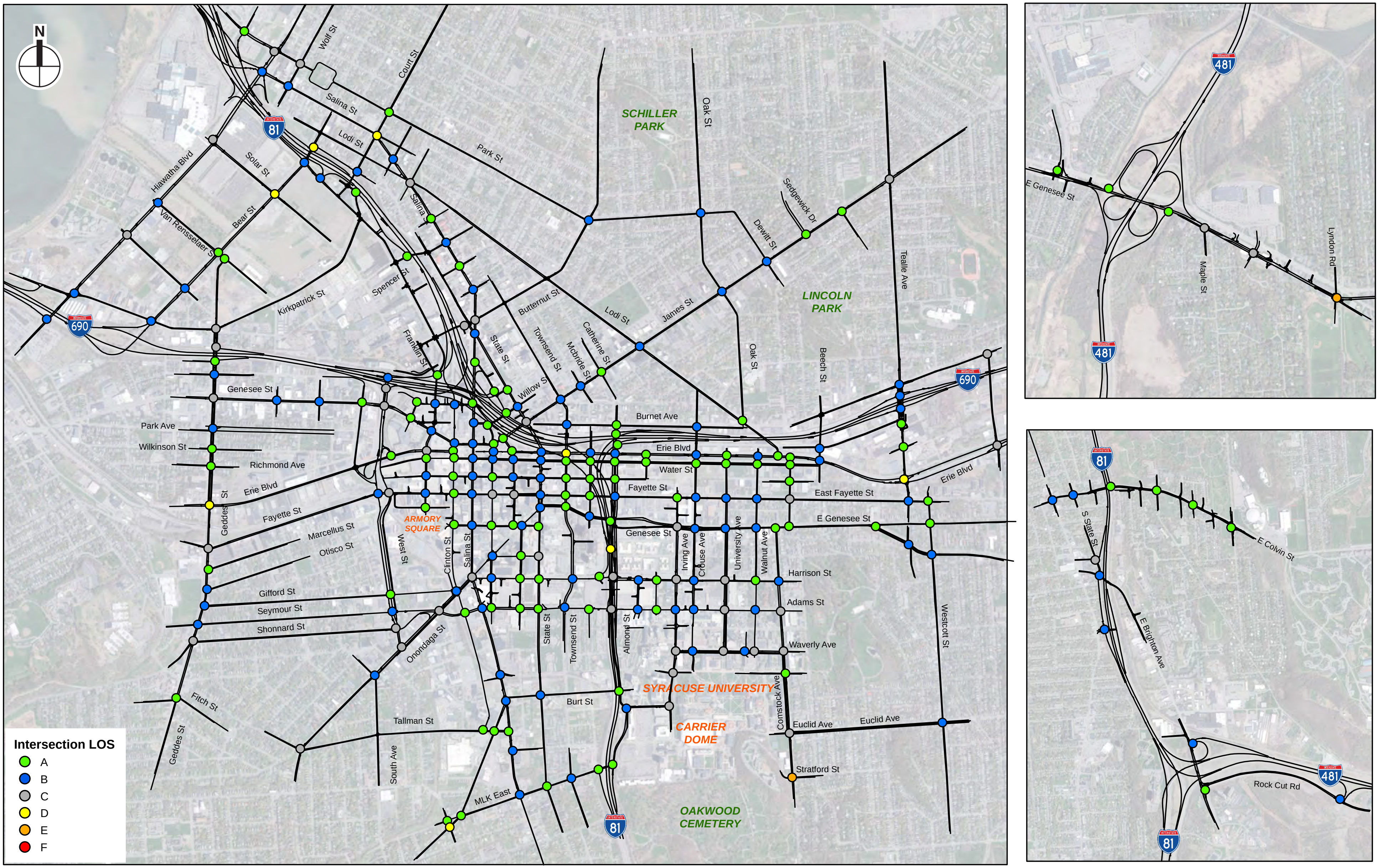


Intersection Levels of Service — Viaduct 2026 PM

Intersection Levels of Service
Viaduct 2026 PM

I-81 Viaduct Project

Figure 5-20

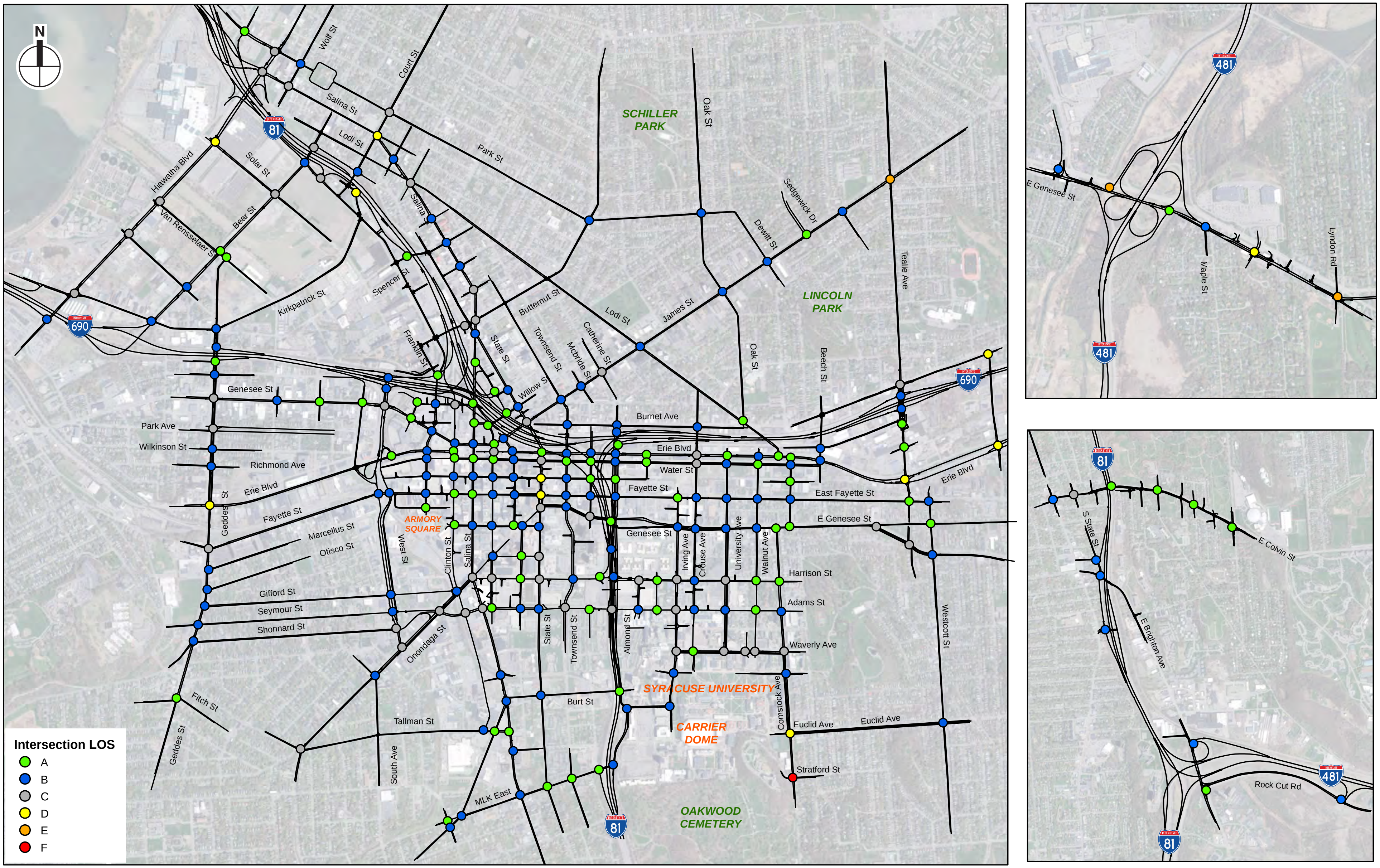


Intersection Levels of Service
Viaduct 2056 AM

I-81 Viaduct Project

Figure 5-21

4.8.21



Intersection Levels of Service
Viaduct 2056 PM

I-81 Viaduct Project

Figure 5-22

One intersection would operate at LOS E or LOS F during the 2026 AM peak hour and two intersections would operate at LOS E or F during the 2056 AM peak hour. During the PM peak hour, two intersections would operate at LOS E of F in 2026 and four intersections would operation and LOS E or F in 2056. The following is a summary of locations that would operate at unacceptable levels:

- Comstock Avenue at Stratford Street (2026 PM, 2056 AM, 2056 PM);
- N./S. Geddes Street at Erie Boulevard W. (2026 PM);
- NY 5/E. Genesee Street at the southbound I-481 off-ramp (2056 PM);
- NY 5/E. Genesee Street/Highbridge Road at Bridlepath Road/Lyndon Road (2026 AM, 2056 AM, 2056 PM);
- Teall Avenue at James Street (2056 PM)

Compared to the No Build condition, the number of intersections operating at LOS E or F under the Viaduct Alternative would be reduced in 2026 from eleven to three. In 2056, the number of intersections operating at LOS E and F would be reduced from ten to four.

Work Zone Safety & Mobility:

The Work Zone Traffic Control (WZTC) and staging concepts developed for the Project and described in **Chapter 4, Construction Means and Methods** balance the provision of work zone safety with the need to provide mobility for all road users, while maintaining a realistic construction schedule. The staging concepts presented provide the Contractor with sizeable areas for off-line demolition and construction, which in addition to improving the efficiency of the work and reducing both cost and schedule, also provides a considerable separation between motorists and the work zone. This would increase safety for both construction workers and the traveling public. The staging also avoids numerous traffic pattern changes throughout the duration of the Project, particularly for interstate motorists, thereby reducing the impacts associated with traffic pattern adjustments.

NYSDOT has determined that the Project is significant per 23 CFR 630.1010 and therefore, as the project design is developed and refined, a Traffic Management Plan (TMP) will be developed in compliance with 23 CFR 630. 1012. The Traffic Management Plan will address both Traffic Operations (TO) and Public information (PI) strategies for the Project. TO strategies will include identifying and ratifying agreements for all TO elements impacted or related to the Project in both the temporary and permanent condition. TO elements will include maintenance responsibilities, temporary access requirements and agreements, safety patrol and/or vehicle recovery requirements and cost sharing agreements for utility usage. The aim of the TO strategies is to provide a detailed understanding of the role and responsibilities of all parties throughout the duration of the Project. The PI strategies will detail how the project development and construction impacts are communicated to road users and other stakeholders. The PI will identify stakeholders and detail the communication requirements and methods for each. PI elements will likely include Public Outreach through community events, internet, mailings, radio, and local television.

Building on the WZTC and staging strategies presented in **Chapter 4, Construction Means and Methods**, the TMP will include a Temporary Traffic Control (TCC) plan in compliance with Chapter

6 of the Manual of Uniform Traffic Control Devices (MUTCD), which will facilitate the reasonably safe and efficient road user flow and highway worker safety.

Safety Considerations, Crash History and Analysis

Vehicle trajectories produced by the VISSIM simulation model were input to SSAM (see Future No Build Safety Considerations for a description of SSAM) to generate traffic conflicts and associated surrogate safety measures. Safety MOEs for the Viaduct Alternative are compared to the No Build condition for 2056 peak hours in **Table 5-29**. The frequency of rear-end conflicts under the Viaduct Alternative would decrease by 12 percent compared to No Build conditions. Speeding and following too closely are common driver behaviors on freeways and are known to precipitate rear-end conflicts.

Table 5-29
Safety Measures of Effectiveness – No Build and Viaduct Alternatives (2056)

Scenario	No Build			Viaduct		
MOE/Peak	AM	PM	AM+PM	AM	PM	AM+PM
Rear End Conflicts	58,459	90,618	149,077	50,349	80,749	131,098
Lane Change Conflicts	55,435	100,854	156,289	57,691	94,002	151,692
Crossing Conflicts	113,459	211,899	325,359	110,985	213,891	324,875
Total Conflicts	227,353	403,371	630,724	219,025	388,641	607,666

Lane changing conflicts would decrease by 3 percent due to a reduction in the number of interchange on- and off-ramps, the addition of auxiliary lanes, and the lengthening of acceleration/deceleration lanes. Crossing conflicts would remain similar. The total number for all conflict types would decrease by 4 percent, indicating that a safety benefit in the form of a reduction in the number of crashes could be expected.

Safety Cost and Benefits Analysis

A crash cost and benefit analysis was performed to identify the annual cost of crashes for the Viaduct Alternative and the relative benefit compared to No Build conditions. The analysis methodology to determine the No Build crash cost is described in **Section 5-3-1** (Future No Build Safety Considerations) and detailed analyses are provided in **Appendix C-4.** Based on crash history, and geometric modifications and projected traffic volumes under the Viaduct Alternative at each analysis location, Safety Benefits Evaluation Forms (Form TE-164) were completed. The analysis results indicate an annual crash cost of $38,317,598 for the Viaduct Alternative. Compared to the annual crash cost of $41,363,370 for the No Build Alternative, this represents and annual safety cost benefit of $3,045,772.

Construction Traffic Analysis

Introduction

In an effort to minimize the total duration of construction and the resulting disturbances associated with its construction, aggressive construction schedules have been established for the I-81 Viaduct Project. For the Viaduct Alternative, seven years has been determined to be the minimum construction duration. To achieve this schedule and allow for traffic to be maintained in and through the Project Area, the Project would be constructed in several major phases as follows:

- Phase 1 – Preparatory Phase, focusing on permanent and/or temporary improvements to certain bridges and interchanges, as well as local street improvements
- Phase 2A – I-690 Eastbound Reconstruction
- Phase 2B – I-690 Westbound Reconstruction
- Phase 3 – I-81 Shutdown and Reconstruction

Complete descriptions of all construction phases, and means and methods are presented in **Chapter 4, Construction Means and Methods**.

Traffic analyses were conducted to assess operating conditions and to identify temporary roadway improvements that would be necessary during construction of the Viaduct Alternative. The intent of the traffic analysis is to verify that adequate traffic operations could be maintained during construction and to identify improvements needed to address congestion during construction. Construction Phase 3, which entails closure of northbound and southbound I-81 between MLK, Jr. East and Butternut Street, for a duration of two years, was studied as the worst-case scenario. Traffic analysis for Phase 2A, which involves reconstruction of eastbound I-690, is discussed under the Community Grid Alternative (which also involves closing eastbound I-690 and detouring traffic onto local streets during construction) and traffic conditions are expected to be similar for Phase 2A under each alternative. A detailed Traffic Management Plan including all construction phases would be developed during the final design phase of project development.

Traffic Model Development for Analysis of Construction Conditions

A Dynamic Traffic Assignment (DTA) based VISSIM model was developed to evaluate traffic operations during construction of the I-81 Viaduct Project alternatives. DTA modeling was selected for its ability to dynamically reroute traffic in response to the proposed capacity reductions during construction.

Based on the larger VISSIM microsimulation model developed for the project, a DTA subarea model was developed to include locations where construction activities would have the greatest effect on traffic operations. This focus area includes the portion of I-81 from Hiawatha Boulevard to Colvin Street and I-690 from State Fair Boulevard to Midler Avenue. The area analyzed also includes substantial, portions of the surrounding local street network consisting of more than 200 intersections. The focus area boundaries were designed to encompass detour routes within the City of Syracuse and surrounding portions of the transportation network, to facilitate evaluating local trip diversions that would occur in response to construction activities.

An existing conditions DTA model was calibrated to observed field conditions to serve as a baseline for the construction analysis. StreetLight Insights, a Location Based Services (LBS) big data platform, was used to determine Origin-Destination trip matrices for 15-minute time intervals within the AM and PM peak periods for the existing conditions model. To represent roadway conditions during construction of the Viaduct Alternative, the existing conditions DTA model network was modified to incorporate the roadway geometrics proposed under Phase 3 of construction.

The I-81 Project Travel Demand Model network also was modified to reflect construction conditions and was used to identify changes in regional travel patterns that would occur during construction for locations beyond the limits the DTA model focus area. The trip matrices for the DTA focus area were adjusted accordingly to reflect the regional travel pattern changes predicted by the I-81 Project Travel Demand Model.

For the construction traffic analyses, the NYSDOT has considered the effects of telecommuting and major construction activities on travel behavior and patterns. It is widely accepted by professional transportation organizations and research institutions that the trend towards increased telecommuting that occurred in 2020 will continue and result in a permanent shift in travel behavior. Telecommuting will become increasingly common and continue to grow as a result of improved technologies and more relaxed Work From Home (WFH) policies adopted by employers, as well as changing employee preferences and attitudes. These conclusions are consistently supported by surveys and research conducted by Institute of Transportation Engineers (ITE) and universities.

ITE published a study titled "What a Transportation Professional Needs to Know about Counts and Studies during a Pandemic," released in late July 2020, which provides an overview of available and ongoing research and industry guidance. One major source cited was the Survey of Business Uncertainty, prepared by the Federal Reserve Bank of Atlanta in partnership with the University of Chicago Booth School of Business and Stanford University (SBU study). The SBU study concluded that prior to the increase in telecommuting that occurred in 2020, WFH would grow from 5 to 16 percent, representing an 11 percent increase. This behavior is expected to continue to increase in the coming years.

In acknowledgment of this new paradigm, the permanent effects of the ongoing and unprecedented increase in telecommuting that occurred in 2020 have been considered in the traffic projections applied to the construction traffic analyses conducted for the I-81 Viaduct Project. As a result, total traffic demand was reduced by a global factor of 10 percent. This is based on the assumption that the shift in telecommuting trends in the Syracuse area, which contains a broad range of economic activities, will be consistent with the broader national survey results.

In addition to the traffic demand reduction described above, a 10 percent global reduction factor was applied to account for changes in driver behavior typically experienced in response to public outreach and transportation management planning efforts as travelers alter their commuting patterns, forgo trips, or choose alternative travel options as a result of the construction. Therefore, a total reduction of 20 percent was assumed, considering both increased telecommuting and public outreach efforts such as travel advisories. These factors were considered separately and in addition to adjustments in regional travel patterns predicted by the I-81 Project Travel Demand Model. Demand reductions to account for changes in telecommuting behavior were not applied to the analysis of the completed alternatives under ETC and ETC+30 conditions.

Traffic Volumes

The closure of I-81 and associated ramp connections would result in substantial travel pattern changes due to the diversion of through-trips (i.e. trips currently passing through Syracuse without an origin or destination in Syracuse) to I-481 and the local streets, as well as the diversion of local trips that are redirected to alternative access points due to multiple ramp closures. Five of the proposed eight interstate direct connector ramps between I-81 and I-690 would also be closed while three connections (i.e., westbound I-690 to northbound I-81, southbound I-81 to eastbound I-690, and eastbound I-690 to southbound I-81) would be open. The West Street interchange would also be fully operational. While the I-81 viaduct is closed, I-81 traffic from the north, with destinations in Syracuse, would divert to the reconstructed eastbound I-690 (constructed in Phase 2) and proceed east to I-481. For through traffic originating from the south, the reverse movement would be used.

It should be noted that approximately 12 percent of the total traffic volume currently using I-81 through Downtown Syracuse is attributed to through traffic having both origins and destinations beyond the limits of the two I-81 interchanges with I-481. This through traffic would likely detour to I-481 during Phase 3.

The remaining traffic travelling to or through Downtown from the south would need to exit I-81 at MLK, Jr. East (new ramps constructed during Phase 1) at the southern end and traffic from the north would exit at Clinton/Franklin Street at the north end, and various city streets would be used to complete their trips. Heavier usage of north-south arterials is expected due to the displaced I-81 traffic movements during this phase, as well as major east-west streets providing connectivity back to the interstate system. Most of the local streets would have already been improved as part of the city street improvements proposed during Phase 1.

Table 5-30 compares peak hour traffic volumes for the existing condition and the Viaduct Alternative during construction on key roadway segments and indicates substantial traffic volume increases on I-481, Clinton Street, Salina Street, Renwick Avenue, Pearl Street, and Genesee Street.

Truck Diversion Routes

For the Viaduct Alternative, traffic conditions under Phase 3 were identified as the worst-case scenario during construction. This phase would entail closure of northbound and southbound I-81 between MLK, Jr. East and Butternut Street, for a duration of two years. Depending on their trip origins and destinations (O-D), all I-81 and some I-690 truck traffic would be diverted to local roads or other freeways. The following summarizes the analysis of the maximum diversion potentials for truck traffic diverted from I-81 and I-690 to other roadway facilities paralleling I-81 and I-690. Note that some truck traffic between specific O-D pairs might not involve route diversion during construction; their inclusion in the discussion is simply for completeness of the truck O-D flow summary.

Truck Traffic from the West

<u>Destinations East of Syracuse:</u> Traffic destined to a location east of Syracuse would stay on eastbound I-690. Truck traffic returning to the west would stay on westbound I-690.

<u>Destinations South of Syracuse:</u> Traffic destined to locations south of Syracuse would exit eastbound I-690 at West Street, travel south on West Street to Shonnard Street, then east on Shonnard Street, continue east onto Adams Street, and then travel south on State Street (SR-11) where they would re-enter southbound I-81 at interchange 17. Traffic returning to the west would use the same route in reverse (except they would use Seymour Street rather than Shonnard Street). Depending on trip destinations, longer distance traffic may stay on eastbound I-690 to I-481, and then use southbound I-481 to southbound I-81. Traffic returning to the west could use the same route in reverse, as the newly-constructed westbound I-690 would be open to traffic during this phase.

Table 5-30
Existing Condition and Viaduct Alternative Construction Phase 3 Peak Hour Traffic Volumes

Location	Direction	AM		PM	
		Existing	Viaduct Construction[1]	Existing	Viaduct Construction[1]
I-81 Just North of Colvin Street Interchange	NB	2,871	669	2,937	912
	SB	2,292	385	3,394	1,177
I-81 Just South of Court/Spencer Street interchange	NB	2,464	1,107	5,787	2,082
	SB	5,413	1,005	3,425	2,005
I-481 Just South of I-690 Interchange	NB	3,310	3,663	2,657	3,316
	SB	1,904	3,129	3,430	4,706
I-481 Just North of I-690 Interchange	NB	2,135	2,347	2,902	3,148
	SB	2,602	2,891	2,329	2,696
I-690 Just West of West Street Interchange	EB	4,193	2,233	2,331	1,953
	WB	1,835	821	3,790	2,630
I-690 Just East of Teall Avenue Interchange	EB	3,480	2,413	4,649	3,404
	WB	3,949	2,658	4,057	3,065
Clinton Street Just North of Genesee Street	SB	612	556	285	527
Salina Street Just North of Genesee/James Streets	NB	204	336	368	993
	SB	859	458	367	650
Almond Street Just South of Harrison Street	NB	1400	217	2,059	517
	SB	942	280	1,708	83
Harrison Street Just East of Almond Street	EB	65	37	54	95
	WB	825	409	1,648	358
Adams Street Just East of Almond Street	EB	1,615	221	790	192
Renwick Avenue Just South of Van Buren Street	NB	173	406	108	750
	SB	121	388	201	640
Pearl Street Just North of Willow Street	NB	164	290	522	1,173
Genesee Street Just East of West Street	EB	1,044	1,077	523	777
	WB	310	341	677	641
Franklin Street Just North of Genesee Street	NB	286	164	617	420
	SB	335	326	227	366

[1] Traffic reduced by 20% to account for increased telecommuting (10%) and public outreach/transportation management planning (10%)

<u>Destinations North of Syracuse:</u> Traffic destined to locations north of Syracuse would use the same routes that they currently use. Truck traffic would use the eastbound I-690 Exit at Bear Street and follow Bear Street to access northbound I-81. Traffic returning to the west would use the same route in reverse.

Truck Traffic from the East

<u>Destinations West of Syracuse:</u> Truck traffic destined to locations west of Syracuse would use westbound I-690, whereas traffic returning to the east would use eastbound I-690.

<u>Destinations South of Syracuse:</u> Traffic destined to locations south of Syracuse would exit westbound I-690 at the new Catherine Street exit, travel southbound on Almond Street, and re-enter southbound I-81 at the new partial interchange at MLK, Jr. East. Traffic returning to the east side of Syracuse would use the same route in reverse. Depending on the trip origins, some truck traffic would use eastbound I-690 to I-481, and then follow southbound I-481 to southbound I-81.

<u>Destinations North of Syracuse:</u> Traffic destined to a location north of Syracuse would use westbound I-690 and the new westbound I-690 connector ramp to northbound I-81. Until the southbound I-81 to eastbound I-690 ramp is opened early in Phase 3, traffic returning to the east side of Syracuse would use the southbound exit at Clinton Street, travel eastbound on Erie Boulevard, and re-enter eastbound I-690 at the new Catherine Street entrance-ramp. Alternatively, traffic may travel eastbound on I-690 and then northbound on I-481.

Truck Traffic from the North

<u>Destinations West of Syracuse:</u> Traffic destined to locations west of Syracuse would use the same routes that they currently use. This route involves using the southbound I-81 exit at Bear Street and following Bear Street to access westbound I-690. Traffic returning to the north would use the same route in reverse.

<u>Destinations East of Syracuse:</u> Traffic with destinations east of Syracuse would use the southbound I-81 exit at Clinton Street, travel east on Erie Boulevard, and re-enter eastbound I-690 at the new Catherine Street entrance-ramp. Alternatively, traffic could follow southbound I-481 to westbound I-690.

<u>Destinations South of Syracuse:</u> Truck traffic with destinations south of Syracuse would use the southbound I-81 exit at Clinton Street, travel eastbound on Erie Boulevard and either follow State Street to I-81 Interchange 17, or follow Almond Street south and re-enter I-81 at the new partial interchange at MLK, Jr. East. Traffic returning to the north would use the same route in reverse. Alternatively, longer distance truck traffic could follow southbound I-481.

Truck Traffic from the South

<u>Destinations West of Syracuse:</u> Traffic destined to locations west of Syracuse would use the new partial interchange at MLK, Jr. East, travel northbound on Almond Street to Erie Boulevard, and re-enter westbound I-690 at West Street. Traffic returning to the south could use the same route in reverse, or to avoid the construction zone, trucks would travel south of West Street to Shonnard Street, then east to Adams Street, then south on either Salina Street or State Street and reenter southbound I-81 at Exit 17.

Destinations East of Syracuse: Traffic with destinations east of Syracuse would use the new partial interchange at MLK, Jr. East, travel northbound on Almond Street, and re-enter eastbound I-690 at the new Catherine Street ramp. Traffic returning to the south would use the same route in reverse. Alternatively, traffic could follow northbound I-481 and westbound I-690 to locations east of Syracuse.

Destinations North of Syracuse: Traffic destined to locations north of Syracuse would use the new partial interchange at MLK, Jr. East, travel northbound on Almond Street, then westbound on Erie Boulevard, northbound on State Street, then westbound on E. Willow Street, and north on Pearl Street to access the northbound I-81 entrance-ramp at Pearl Street. Traffic returning to the south would use the southbound I-81 exit at Clinton Street and then travel southbound on either State Street or Almond Street as described above. Alternatively, longer distance traffic could follow northbound I-481.

In addition to the truck detour analysis described above, the truck model also was used to identify the simulated diversion routes and their associated truck volumes due to the presence of construction activities in the project area. The model produced truck diversion patterns very similar to those based on the truck detour analysis. Major diversion routes were found to be:

- Clinton Street
- Salina Street
- State Street
- Almond Street
- Genesee Street
- Erie Boulevard
- Adams Street

Truck diversion volumes on specific links along these routes would range from two to 38 trucks per hour during the AM peak hour, and from 2 to 30 trucks per hour during the PM peak hour. In addition, ramps used by trucks to exit or re-enter the freeways would accommodate higher truck volumes (60 to 140 trucks per hour). While most of the City's truck route corridors have reserve capacity to accommodate additional truck traffic, routes (or specific intersections) requiring mitigation measures to accommodate diverted traffic are discussed in the following sub-section.

In addition to the Downtown and University Hill areas, some other major routes such as US Route 20 and NY State Routes 173, 41, and 41A also were investigated for truck diversion patterns. The truck model indicates that NY State Routes 41 and 41A would not be expected to experience increases in truck volumes in the AM and PM peak hours. The truck volume increase along US Route 20 (between NY-91 to the east and NY-80 to the west) is projected to be approximately 11 trucks per hour in the peak direction during peak hours. Similarly, the truck volume increase along US State Route 173 is expected to be approximately 12 trucks in the peak direction in the AM peak hour and ten trucks in the PM peak hour.

Level of Service and Mobility

Mitigation Measures

To address congestion under the construction scenario, several temporary roadway improvements were developed (see **Table 5-31**). In addition, traffic signal modifications would be introduced at intersections along affected corridors to facilitate traffic flow and promote signal coordination. These mitigation measures were assumed to be in place and are reflected in the analysis of traffic operations that are presented for conditions during construction of the Viaduct Alternative.

Table 5-31
Viaduct Alternative: Mitigation Measures

Location	Temporary Mitigation Measures/Improvements	Permanent Mitigation Measures/Improvements
Southbound I-81 at Clinton/Salina Street off-ramp	Widen to two lanes	Provide a single-lane off-ramp
Southbound I-81 on-ramp from MLK, Jr. East	Construct new ramp with a second lane added; lane can be dropped on the ramp before merging with mainline	Provide a single lane on-ramp
Intersection of MLK, Jr. East and I-81 Southbound on-ramp	Add eastbound right-turn bay (approx. 150')	Provide a single lane for the eastbound approach
Northbound I-81 on-ramp from Pearl Street	Add second lane starting from the intersection of Pearl and Hickory Streets; continue both lanes	Provide a two-lane on-ramp to Northbound I-81. One lane from Hickory Street and a second is added from the slip lane coming from southbound Pearl Street
Intersection of Pearl and Hickory Streets	Install temporary signal; restripe two northbound approach lanes to provide an exclusive left-turn lane and a shared left-turn/through/right-turn lane	Restore current configuration
Intersection of Southbound I-81 off-ramp and Salina Street	Install temporary signal	Remove Southbound I-81 off-ramp to Salina Street
Genesee Street westbound between Franklin and Wallace Streets	Remove parking lane; provide two westbound travel lanes	Restore current configuration
Intersection of Genesee and Wallace Streets	Restripe two westbound approach lanes to prohibit westbound left-turns from West Genesee Street onto Wallace Street	Restore current configuration
Intersection of Genesee and Franklin Streets	Remove parking (approx. 75') along westbound approach to create an auxiliary through lane; Restripe two westbound approach lanes to provide a shared left-turn/through lane and a shared through/right-turn lane	Restore current configuration
Intersection of James and State Streets	Add protected eastbound left-turn signal phase	Restore current phasing
Southbound N Clinton Street between Southbound I-81 off/on ramps and Court Street (New)	Add a second lane	Provide a single lane
Intersection of N Clinton Street and Court Street (New)	Stripe two southbound approach lanes to provide 1) left turns and through traffic; and 2) through traffic and right turns	Stripe as a single share lane serving all movements
Eastbound Court Street between N Clinton Street and Genant Drive	Add a second lane	Provide a single lane

Table 5-31 (cont'd)
Viaduct Alternative: Mitigation Measures

Location	Temporary Mitigation Measures/Improvements	Permanent Mitigation Measures/Improvements
Intersection of Genant Drive and Court Street (New)	Stripe two eastbound approach lanes to provide a shared left-turn/through lane and a shared through/right-turn lane	Stripe as a single shared lane serving all movements
Eastbound Court Street between Genant Drive and Sunset Avenue	Add a second lane	Restore current configuration
Intersection of Court Street and Sunset Avenue	Stripe two eastbound approach lanes to provide an exclusive left-turn lane and a shared through/right-turn lane	Stripe as a single share lane serving all movements
Northbound Columbus Avenue between Fayette Street and Erie Boulevard	Add a second lane	Restore current configuration
Intersection of Columbus Avenue and Fayette Street	Stripe two southbound lanes to provide an exclusive left-turn lane and a shared through/right-turn lane	Restore current configuration

In addition to the Phase 3 improvements discussed above, a comprehensive Traffic Management Plan would be developed during the final design phase of project development. The Traffic Management Plan would comprise all major construction phases and sub-phases, as well as system-wide measures to efficiently and safely serve the needs of the Project Area; reduce traffic volumes during construction; minimize traffic diversions to local streets and other routes; and ensure compatibility with the social, economic, and land use character of the Project Area. Potential measures to be evaluated may include:

- Implementation of expanded and improved Intelligent Transportation Systems
- Continued refinement of construction staging
- Expanded highway traffic enforcement
- Additional local arterial traffic operations improvements
- Expanded local arterial traffic enforcement
- Pedestrian improvement measures
- Park-and-ride facilities
- Rideshare action plan
- Truck routing measures
- Information telephone hotline
- Media campaign
- Public involvement program
- Signal Retiming
- Planned and Unplanned Traffic Incident Management

- Transportation Demand Management measures (e.g., guaranteed ride home, car sharing, and carpool matching)
- Creating additional bus routes or adding buses to existing routes

Freeway Level of Service

To evaluate traffic operations on freeway segments outside of the DTA model focus area, such as on I-481 and I-90, the I-81 Project Travel Demand Model was used to calculate volume-to-capacity (v/c) ratios during Viaduct construction. This assessment determined that all freeway segments outside of the DTA focus area exhibit v/c ratios less than 1.0, indicating sufficient capacity would exist on these portions of the freeway system.

To evaluate freeway operations in the construction focus area, the DTA focus model was used to predict density and LOS. The analyses indicate that all freeway segments within the construction focus area would operate acceptably at LOS D or better, except for southbound I-81 at the Spencer Street exit ramp, which would operate at LOS F during the AM peak hour.

Refinements to construction staging and mitigation measures would be developed during the final design stage of the project to improve LOS further.

Intersection Level of Service

AM and PM peak hour capacity analyses were conducted for 202 intersections in the construction focus area. Traffic would increase substantially at intersections adjacent to ramps where the mainline interstate closures begin and end. Clinton and Salina Streets would experience heavy traffic as they connect directly to the last exits before the southbound I-81 mainline closure. Closure of the Harrison Street on-ramp to northbound I-81 would cause traffic from downtown destined to northbound I-81 to divert to Pearl Street and other streets, largely via State Street. MLK, Jr. East and Renwick Avenue would experience heavy traffic as the MLK, Jr. East interchange ramps would provide the first available entrance point to southbound I-81 and the last exit from northbound I-81 south of the mainline shutdown.

Of the 202 intersections studied, the vast majority (97 and 99 percent in the AM and PM peak hours, respectively) would operate acceptably (LOS D or better). With the identified mitigation measures in place, several intersections would operate at LOS E or F, as follows:

- Adams Street and McBride Street (LOS F, AM Peak Hour)
- Adams Street and Townsend Street (LOS E, AM Peak Hour)
- Spencer Street and Genant Drive (LOS F, AM Peak Hour)
- State Street and Ash Street (LOS E, AM Peak Hour)
- State Street and Butternut Street (LOS E, AM Peak Hour)
- Clinton Street and Websters Landing (LOS F, AM Peak Hour)
- Geddes Street and Van Rensselaer Street (LOS F, PM Peak Hour)
- Salina Street and Hiawatha Blvd (LOS E, PM Peak Hour)

- Teall Avenue and Erie Boulevard (LOS E, PM Peak Hour)

Refinements to construction staging and mitigation measures would be developed during the final design stage of the project to improve LOS further.

Travel Times

Peak hour travel times for the Existing Condition and the Viaduct Alternative during construction Phase 3 on routes between major freeway interchanges in Onondaga County are presented in **Figure 5-23**. Travel times were estimated using output from VISSIM traffic simulations, as well as the I-81 Project Travel Demand Model. On most freeway segments, travel times would remain unchanged or increase by one to two minutes during construction. However, travel times would increase by five to six minutes on the connection between the southern I-81/I-481 interchange and I-81/I-690 as a result of the closure of the I-81 viaduct through downtown Syracuse. The vast majority of through trips on I-81 (over 95 percent) would travel on the signed detour route and would not experience significant disruption during peak hours; travel times on I-481 would increase by one minute or less.

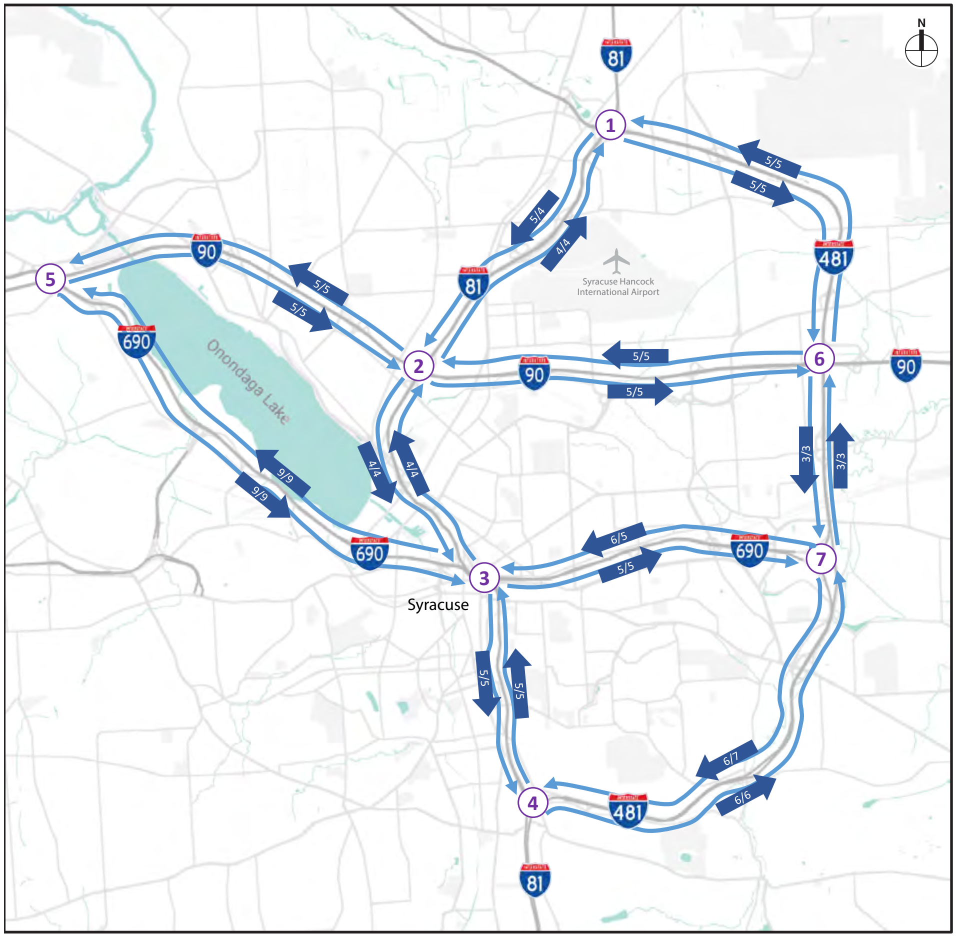
Queues

The average (50th percentile) and 95th percentile queues at critical locations for existing conditions and during Viaduct Alternative construction are presented in **Table 5-32**. During construction of the viaduct, in the AM peak hour, queues are expected to form on northbound I-81 just upstream of mainline closures at the exit ramp to MLK, Jr. East and on southbound I-81 before the exit to Spencer Street. The queuing would be most pronounced in the AM peak hour. The longest 95th percentile queue (3,677 feet) is anticipated to occur on southbound I-81 at the exit to Spencer Street. This queue would form as morning commuting traffic entering the city from the north exits I-81 to access alternative routes prior to the downstream full mainline freeway closure. Although queues would occur on the freeway system upstream of major lane reductions and full closures, these queues would not extend to the next upstream interchange and would be infrequent, as the 50th percentile queues would be minor.

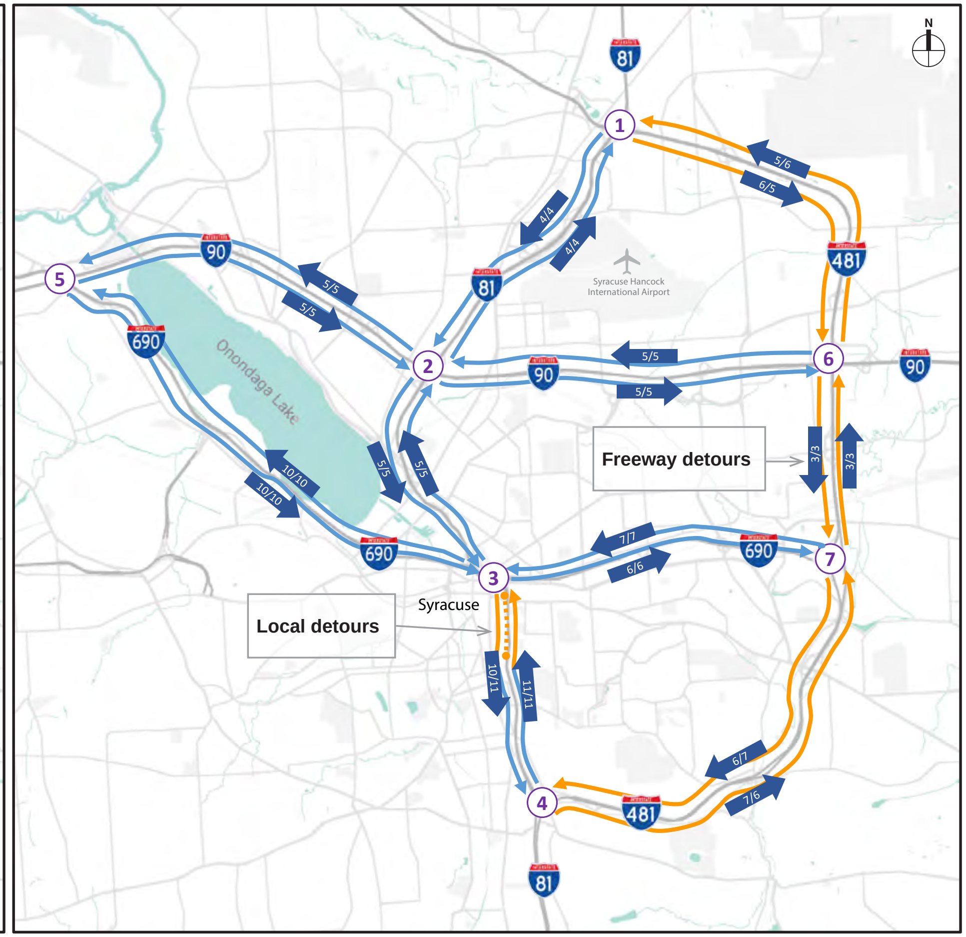
Impacts on Police, Fire Protection, and Ambulance Access

The Viaduct Alternative would not have adverse impacts on ambulance access or police and fire protection. Traffic analyses show improved levels of service within the project limits.

Reduced congestion near the I-81 interchange at Harrison and Adams Streets improves mobility through the geographic center of the city. The additional access point to and from I-81 located at East MLK, Jr. East and the conversion of Crouse Avenue to two-way operation south of Genesee Street improves access to the major Hospitals on University Hill and provides emergency responders with additional routing options. Increased mobility and reduced travel times within the Project Area would be expected to improve response times during peak hours.



Existing Condition



Viaduct Alternative – Phase 3

Signed detour routes
Available highway routes
Limits of highway closure
AM/PM *Travel time in minutes*

Existing Condition and Viaduct Alternative During Construction Peak Hour Travel Times

Figure 5-23

Table 5-32
Queue Lengths (Feet) at Select Locations for Existing Condition and During Viaduct Alternative Construction

Peak Location	AM		PM	
	50th Percentile	95th Percentile	50th Percentile	95th Percentile
Existing Conditions				
Northbound I-81 exit to Harrison St/Adams St	1,309	1,785	23	552
Southbound I-81 exit to Clinton St/Salina St	90	155	1	12
Southbound I-81 before exit to Spencer St	292	878	9	57
Southbound I-81 before exit to Butternut/Franklin St	447	720	0	3
Eastbound I-690 exit to West St	0	219	0	0
Westbound I-690 before exit to Geddes St	0	0	1	3
Viaduct Conditions				
Northbound I-81 before exit to MLK	59	1,179	0	0
Southbound I-81 exit to Clinton St/Salina St	0	152	0	490
Southbound I-81 before exit to Spencer St	20	3,677	0	0
Southbound I-81 before exit to Butternut/Franklin St	0	434	0	807
Eastbound I-690 exit to West St	315	927	42	60
Westbound I-690 before exit to Geddes St	0	0	0	131

Parking Regulations and Parking-related Issues

Future Parking Impacts Analysis Methodology

Beyond its construction year, the I-81 Viaduct Project would not further affect parking supply and demand beyond its construction year. The Project itself, regardless of the alternative, will not require supply changes nor will it generate parking between 2020[3] and 2050. Therefore, parking supply and demand was evaluated for 2020, but not beyond. Information was gathered to estimate parking supply and demand changes by 2020 due to known development projects through internet research and coordination with a number of local agencies and other stakeholders. It is assumed that any future parking demand generated beyond the I-81 Viaduct Project's construction year would not be a result of the I-81 Viaduct Project and will be accommodated as part of any future development processes through zoning requirements and/or market demand.

The effects on parking within the I-81 Viaduct Study area were determined based on the preliminary design for the Viaduct Alternative. If the affected area encompassed a parking facility or building that generates parking demand, it was noted along with the effects on parking supply. It was conservatively assumed for this analysis, that any supply within the affected area would be lost. For example, it was assumed that all existing parking under the viaduct would be lost and no new parking supply would

3 The original analysis was based on an ETC of 2020, and while the ETC has been revised to 2026, the ETC change does not change the analysis or conditions, therefore the 2020 analysis is still valid.

be included. Any potential reintroduction of parking, post construction, will be addressed as part of mitigation measures.

The anticipated work may affect an entire parcel (building and parking area), the building only, the parking area only, or a portion of the parking on-site. For this analysis, a loss of a building assumes loss of demand and the loss of a parking facility assumes loss of supply. Based on the preliminary design, approximate estimates (25, 50, 75, or 100 percent loss) were made for parking supply lost or demand affected. New on-street parking supply would be included on reconstructed Almond and West Street and some existing on-street parking would be replaced along Genesee Street. The future No Build year's supply and demand were used as a baseline since it is the scenario in which the Viaduct Alternative does not occur so there is no change to parking supply or demand as a result of this project. Applying the associated changes in supply and demand under the Viaduct Alternative to the No Build year's supply and demand provides an estimate of the future year supply and demand.

Results of Future Parking Impacts Analysis

With implementation of the Viaduct Alternative, 40 off-street parking facilities (total of 2,282 spaces) and 79 on-street spaces would be affected. Most of the off-street facility disturbances would be adjacent to or beneath the existing viaduct. Most of the on-street parking loss would occur on the roadways that would be reconfigured as part of this alternative, such as Genesee Street, North Salina Street and Crouse Avenue.

Overall, the loss of supply is estimated to be approximately 2,361 spaces and the reduction in demand would be approximately 582 spaces in 2020. As shown in **Table 5-33**, parking supply under the Viaduct Alternative in 2020 would be 83 percent utilized, a four percent increase from the No Build Alternative. As noted in **Section 5.3**, the effective supply is the overall supply reduced for planning purposes to account for user familiarity and potential weather impacts. Since the I-81 Viaduct Project would not affect parking beyond its construction, future parking supply and demand was not evaluated beyond 2020. More detailed information is included in **Appendix C-5**.

Table 5-33
Viaduct Alternative Parking Supply and Demand Summary

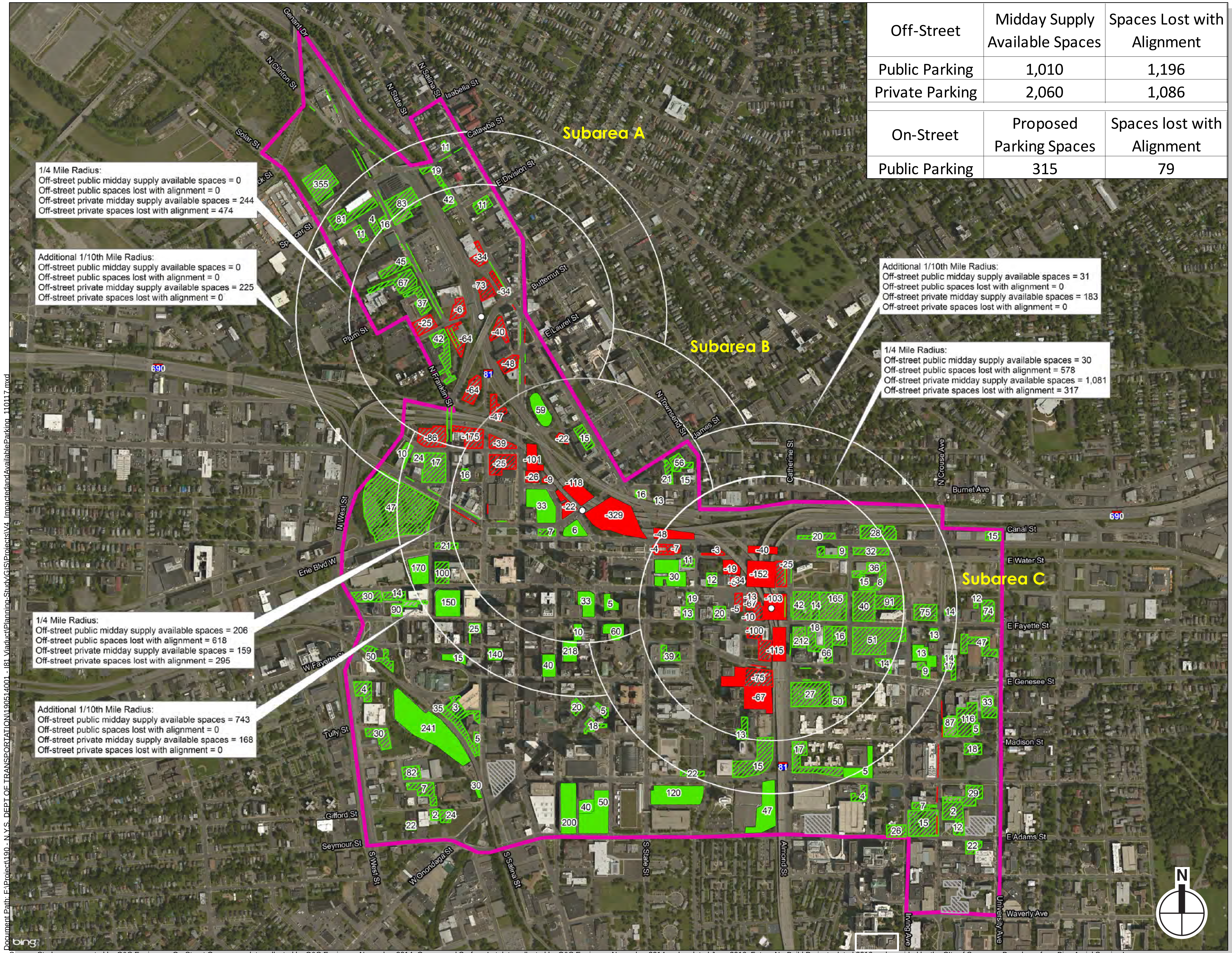
Analysis Year	Change in Supply	Supply	Effective Supply	Change in Demand	Demand	Utilization
Existing Conditions	-	29,233	26,808	-	21,064	79%
2020 No Build	2,149	31,382	28,779	1,782	22,846	79%
2020 Build	-2,046	29,336	26,902	-582	22,264	83%

Although the entire study area would have sufficient supply to accommodate demand, there are two additional factors that needed to be considered when determining the Projects' complete impact on parking demand and supply: (1) the geographic distribution of available parking; and (2) the type of parking (public vs. private) available.

Despite the entire study area having sufficient supply to accommodate demand, the geographic distribution of available parking may not align with the distribution of demand. As shown in **Figure 5-24**, there would be a disproportionate loss of parking along the I-81 alignment. It was assumed that

3.11.21

Off-Street	Midday Supply Available Spaces	Spaces Lost with Alignment
Public Parking	1,010	1,196
Private Parking	2,060	1,086
On-Street	**Proposed Parking Spaces**	**Spaces lost with Alignment**
Public Parking	315	79



Source: Study areas created by C&S Engineers. On-Street Occupancy data collected by C&S Engineers November 2014. Garage and Surface Lot data collected by C&S Engineers November 2014 and updated June 2016. Future No-Build Projects dated 2016 and provided by the City of Syracuse. Base layer from Bing Aerial Service Layer

Viaduct Alternative — Lost and Available Parking
Figure 5-24

the majority of commuters are generally willing to walk up to ¼-mile from their parking facility to their final destination. Therefore, there is a need to identify or provide available parking within the general vicinity of the parking loss.

The Viaduct Alternative would result in a loss of approximately 1,196 spaces in public off-street parking facilities and 1,086 spaces in private off-street facilities. There also would be a net gain of approximately 236 public on-street spaces (79 on-street spaces lost, but 315 on-street spaces added), as shown in **Table 5-34**. For the purposes of this analysis, public facilities are those where the public can purchase the rights to park regardless of the owner of the facility. A private facility is one on privately held land and is available only to employees or visitors of a specific building or institution. With regard to loss of supply, any parking facility owned by a municipality or public agency is considered public, even if it is only open to employees and not the general public. In terms of available supply, it was assumed that any parking owned by University Hill institutions that are for their employees, patients, or visitors are considered private.

Table 5-34
Viaduct Alternative Public/Private Supply and Demand Summary

	Spaces Lost	Spaces Gained
Public Facilities – Off-Street	1,196	-
Public Facilities – On-Street	79	315
Total Public Facilities Impact	**-960**	
Private Facilities – Off-Street	1,086	-
Total Parking Impact	**-2,046**	
Total Change in Demand	**-582**	

Mitigation (Permanent) of Public Off-Street Spaces Lost

Mitigation for parking impacts is considered based on the number of parking spaces being lost as a result of the Viaduct Alternative and varies for public versus private facilities. Impacts to private facilities will be mitigated through the real estate process and will comply with the New York State Eminent Domain Procedure Law (Articles 1 through 7). Property owners would be compensated for any impacts to private parking facilities that result from permanent impacts. Also, as part of the parking analysis, a parcel-by-parcel review of potential parking impacts was conducted, and it was determined that no additional buildings or businesses would need to be acquired because of permanent parking impacts. Additionally, it was determined that further opportunities to avoid, minimize, and mitigate permanent parking impacts would be considered during final design.

Potential mitigation measures to address the reduction in public parking supply (1,196 spaces as shown in **Table 5-34**) include a combination of the following:

- Implementation of transportation demand management (TDM) measures to reduce the demand for parking (refer to recommendations in the Syracuse Metropolitan Transportation Council Downtown Syracuse TDM Study);
- Maximize the available public parking within the I-81 Viaduct Study Area through promotion of available parking, improving the pedestrian environment and/or provision of shuttle services;

- Replacement of parking supply under I-81 and I-690; and
- Development of new parking supply in the form of surface lots.

To identify if parking loss could be mitigated using these measures, estimates were made regarding location and size of the currently available or potential new parking facilities. The inventory data indicates there may be available supply in the most southwestern portions of the parking study area, but the demand and supply that is being impacted is in the northeastern portion of the parking study area, therefore, the available supply may not be considered feasible for mitigation purposes.

Surveys of Syracuse employees indicate they typically are willing to walk ¼ mile from where they park to their destination. This provides a reference for considering available existing parking and locations for new or replacement parking to be considered to mitigate losses within a reasonable distance. An additional 0.1 mile beyond the ¼ mile area was also considered to account for the distribution of demand within the ¼-mile radius and potential spaces that could be used as mitigation if infrastructure improvements were available to encourage users to park farther away from where they park now. The existing parking loss generally follows the I-81 alignment through the I-81/I-690 interchange and is linear in nature along I-81 for approximately one mile, exceeding the typical walking distance. Therefore, it is necessary to subdivide this area of parking loss into three smaller subareas (A, B, and C) for evaluation purposes. Based on the typical walking distance, subareas defined by ¼-mile radii (with an additional 0.1 mile) were drawn along I-81 within the I-81/I-690 interchange and used to evaluate parking impacts and corresponding areas for potential mitigation.

Figure 5-25 shows the potential mitigation areas associated with parking losses as described above. The mitigation areas are labeled as Subareas A, B, and C, corresponding to their location along the I-81 highway alignment. **Table 5-35** summarizes the potential to mitigate the parking loss through:

- The use of existing available public parking supply (1,010 spaces);
- Potential replacement of parking below I-81 and I-690 (2,821 spaces); and
- The development of new surface parking lots (664 spaces).

The potential mitigation measures could provide a total of 4,495 spaces, which is more than needed to address the loss of 1,196 spaces. For the purposes of this analysis, to identify the required mitigation, replacing the number of public spaces lost due to the Viaduct Alternative was determined versus minimizing demand (i.e., implementing TDM strategies or maximizing existing parking facilities with available spaces). Defining how existing available parking supply could be maximized in various parking lots by relocating impacted parkers individually is not practical. Therefore, the mitigation options considered for further evaluation were replacing existing parking or developing new parking surface lots.

3.17.22

Potential Replacement and New Parking	
	1/4 Mile Radius
Spaces in Subarea A	752
Spaces in Subarea B	1,312
Spaces in Subarea C	1,421

Viaduct Alternative — Potential Parking Replacement and Mitigation
Figure 5-25

Table 5-35
Viaduct Alternative Parking Mitigation Summary

Area (1/4-mile radii + additional 0.1 mile)	Loss of Public Spaces	Available Public Spaces (Figure 5-24)	Potential Replacement Spaces (Figure 5-25)	New Potential Surface Lots (Figure 5-25)	Total Potential Mitigation Spaces
Subarea A	0	0	616	136	752
Subarea B	618	949	1,237	75	2,261
Subarea C	578	61	968	453	1,482
Total	1,196	1,010	2,821	664	4,495

Notes: Number of available public parking spaces within the subarea, which is defined as a ¼-mile radius + 0.1 mile.

Specific options were considered to provide replacement public parking spaces for the loss of 1,196 public off-street parking spaces using a minimal number of parking facilities in centralized locations within Subareas B and C. Locations were considered that would not require additional property takings, would not be desirable for commercial development, and would not impact City zoning or any potential new greenspace or gateway-type areas. The preferred parking mitigation option for the Viaduct Alternative is shown in **Figure 5-26**.

The five parking lot locations shown are further refined compared to how they are shown in **Figure 5-25** due to a closer evaluation of the existing right-of-way and how the parcel can be used based on the preliminary design plans for the Viaduct Alternative. The number of spaces identified are based on full utilization of the available parcels and assumes 350 square feet per space would be required. These five locations would provide each Subarea with necessary replacement parking and provide a total of 1,196 spaces to mitigate the 1,196 spaces to be replaced, as summarized in **Table 5-36**.

The mitigation options and preferred options presented in this section reflect an updated analysis and supersede the conclusions and assumptions described in Chapter 6 of **Appendix C-5**.

Table 5-36
Viaduct Alternative Preferred Parking Mitigation Option

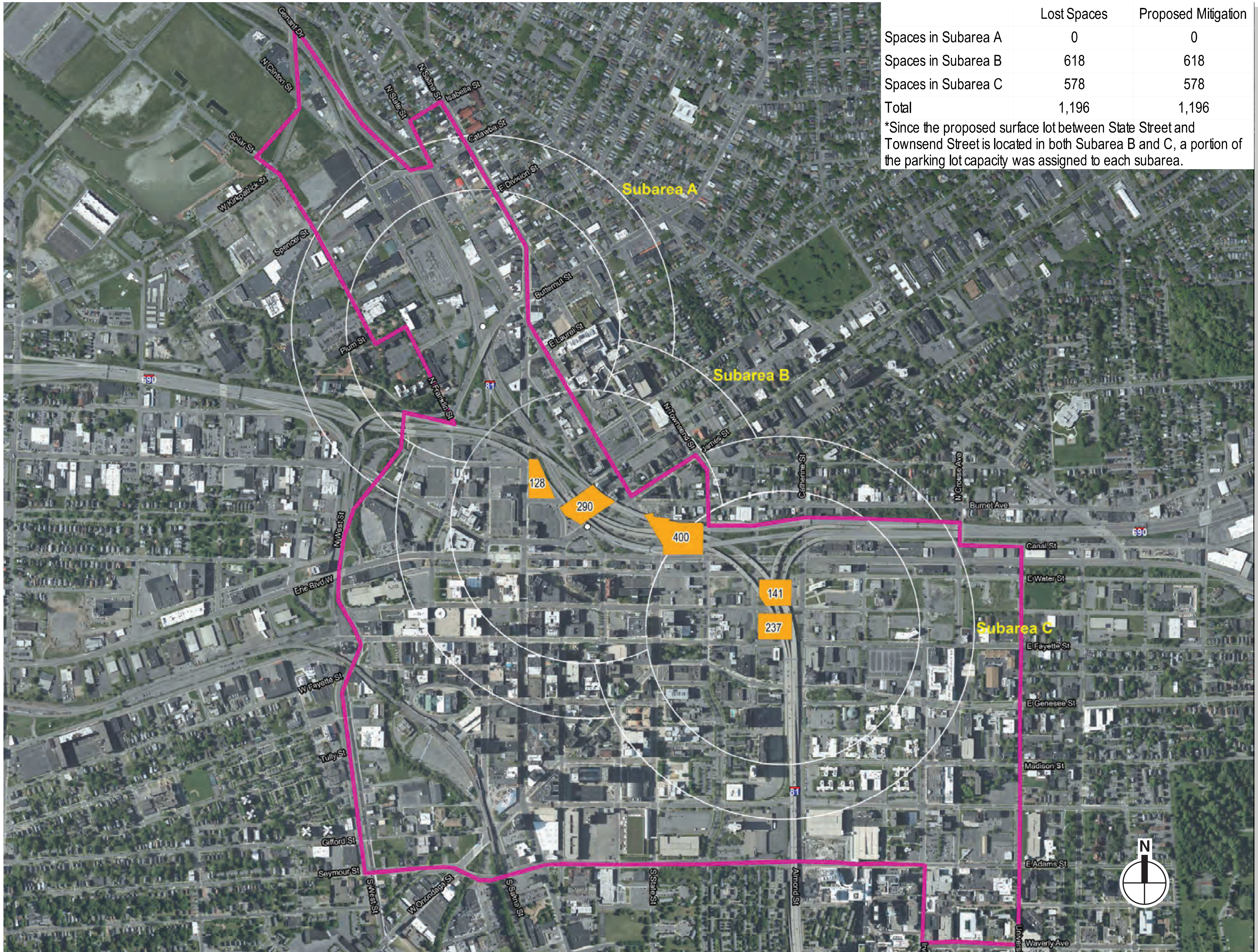
Area (1/4-mile radii + additional 0.1 mile)[1]	Loss of Public Spaces	Spaces to be Replaced[2]	Proposed Mitigation Option
Subarea A	0	0	0
Subarea B	618	464	618[2]
Subarea C	578	434	578[2]
Total	1,196	898	1,196

Notes:
1- Subarea is defined as a ¼-mile radius + 0.1 mile.
2- Since the proposed surface lot between State Street and Townsend Street is located in both Subareas B and C, a portion of the lot capacity was assigned to each subarea.

3.17.22

	Lost Spaces	Proposed Mitigation
Spaces in Subarea A	0	0
Spaces in Subarea B	618	618
Spaces in Subarea C	578	578
Total	1,196	1,196

*Since the proposed surface lot between State Street and Townsend Street is located in both Subarea B and C, a portion of the parking lot capacity was assigned to each subarea.



Study Area

Off-Street Parking Surface Lot Mitigation Parking

0 500 1000 FEET

1" = 450'
When printed at 22" x34"

Viaduct Alternative — Preferred Mitigation Option

Figure 5-26

Temporary Parking Impacts and Mitigation

The potential temporary loss of parking during construction within the study area was determined using the same methodology associated with determining the permanent impacts. While the permanent impacts were determined using preliminary designs for each alternative, areas of proposed temporary easements were included to identify additional impacts during construction. Temporary impacts exceed the anticipated permanent impacts due to the need to use additional space outside work areas to conduct the work itself, but the timeframe of the impacts will vary depending on the location and type of work to be completed in the area.

The anticipated work may result in the temporary loss of an entire parcel (building and parking area), the building only, the parking area only, or a portion of the parking on-site. For this analysis, a loss of a building resulted in the loss of demand and the loss of a parking facility resulted in the loss of supply. Based on the preliminary design and temporary easement areas, assumptions were made for parking supply lost or demand impacted for the purposes of this analysis (25, 50, 75, or 100 percent loss).

The associated change in supply and demand was applied to the No Build year's supply and demand to provide the estimated temporary impacts to parking for each alternative.

As a result of the Viaduct Alternative, 44 off-street parking facilities are expected to be temporarily lost to some degree (2,501 spaces) along with 305 on-street spaces. As shown in **Figure 5-27**, most of the off-street facility impacts are adjacent to or under the existing viaduct. Temporary on-street impacts are mostly noted along Genesee Street.

Overall, the loss of supply is estimated to be 2,806 spaces and the reduction in demand is 582 spaces, as shown in **Table 5-37**. Parking utilization is expected to increase six percent during construction compared to the No Build scenario. Utilization is expected to drop back down to 83 percent after construction without any proposed mitigation measures, as noted in **Table 5-33**.

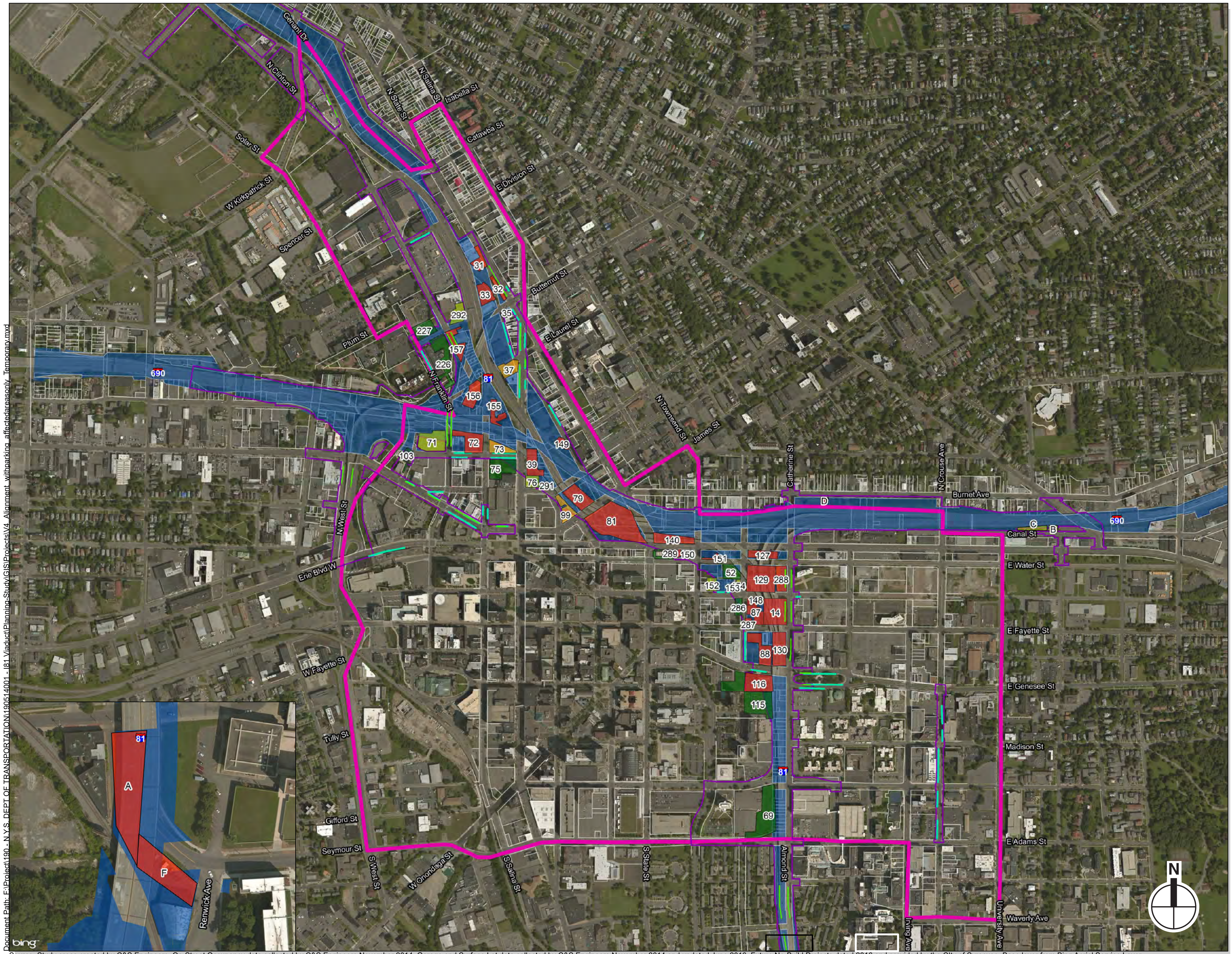
Table 5-37
Viaduct Alternative Parking Supply and Demand Summary - Temporary

Analysis Year	Change in Supply	Supply	Effective Supply	Change in Demand	Demand	Utilization
Existing Conditions		29,233	26,808		21,064	79%
2020 No-Build	2,149	31,382	28,779	1,782	22,846	79%
2020 Temporary - Viaduct Alternative	-2,806	28,577	26,206	-582	22,264	85%

The Viaduct Alternative will result in a loss of 1,206 spaces in public off-street parking facilities and 1,295 spaces in private off-street facilities temporarily during construction. There is also an anticipated loss of 305 public on-street spaces throughout construction.

Similar to the mitigation measures noted previously to address the reduction in parking supply after construction, mitigation for temporary parking impacts varies for public versus private facilities. As part of the real estate process, and in accordance with New York State Eminent Domain Procedure Law (Articles 1 through 7), property owners would be compensated for any impacts to private parking facilities that result from temporary impacts. However, as part of the parking analysis, a parcel-by-parcel review of potential parking impacts was conducted, and it was determined that no additional

3.11.21



Source: Study areas created by C&S Engineers. On-Street Occupancy data collected by C&S Engineers November 2014. Garage and Surface Lot data collected by C&S Engineers November 2014 and updated June 2016. Future No-Build Projects dated 2016 and provided by the City of Syracuse. Base layer from Bing Aerial Service Layer

Study Area

Temporary Impacts Boundary

On-Street Parking Impact Area

Proposed on-street parking

Impacted on-street parking

Tax Parcel Boundaries

Off-Street Parking Supply

25% Impact

50% Impact

75% Impact

100% Impact

**Labeled by FID#*

*** Temporary off-street impacts include those located in the MHB, MHBWOA, METS-P, MFS-P & MEPS-P*

0 500 1000 FEET

1" = 450'
When printed at 22" x34"

I-81 Viaduct Project

Viaduct Alternative — Temporary Parking Impacts During Construction
Figure 5-27

buildings or businesses would need to be acquired because of temporary parking impacts during construction. Additionally, it was determined that further opportunities to avoid, minimize, and mitigate temporary parking impacts would be considered during final design.

The mitigation of temporary public impacts would fall under two categories:

- The implementation of transportation demand management (TDM) measures to reduce demand for parking (refer to recommendations in the Syracuse Metropolitan Transportation Council Downtown Syracuse TDM Study) and
- Maximize the available public supply within the study area through the promotion of available parking, improving the pedestrian environment, and/or provision of shuttle services.

The identification of specific mitigation measures for temporary impacts would be addressed during final design in order to take into consideration the variation in the potential length of the impact and best practices during construction. The type of work, as well as construction phasing, would make the length of impacts vary from short- (weeks) to long-term (years), which would play a role in determining the required mitigation.

As with the anticipated permanent impacts, most of the parking supply that is anticipated to be impacted temporarily is located beneath or adjacent to the viaduct and accommodates employee demand from a number of significant generators such as the city and state government buildings and University Hill institutions. Using potential replacement parking areas or new surface parking lots or garages within existing or proposed right-of-way that could mitigate permanent impacts would not be available during construction to address temporary impacts. The NYSDOT is committed to mitigating temporary employee parking demand associated with the Viaduct Alternative using a combination of available spaces in existing parking areas not impacted by construction and remote parking facilities with shuttles, the details of which would be considered during final design.

A detailed breakdown of anticipated temporary impacts is included in **Appendix C-5**.

Lighting

Under the Viaduct Alternative, all existing highway lighting within the I-81 Viaduct Study Area would need to be replaced. This would include lighting on I-81, from south of the MLK, Jr. East Bridge to the vicinity of Bear Street. It is anticipated that the existing high mast lighting in the vicinity of Hiawatha Boulevard would remain. Similarly, the existing highway lighting along I-690, between Leavenworth Avenue and Lodi Street, would be replaced.

In addition to highway lighting, it is expected that replacement lighting would be provided on reconstructed city streets, as well as under bridge lighting, sidewalk and shared-use (bicycle and pedestrian) paths lighting, and gateway and special area lighting. Lighting on controlled access facilities and local streets are consistent with lighting warrants in Chapter 12 of the Highway Design Manual and NYSDOT's "Policy of Highway Lighting." Local lighting upgrades will require that the City of Syracuse consents to assume operational and maintenance costs for all future lighting installations. This agreement shall be confirmed when design advances.

Roadway lighting is constantly changing due to changes in technology and other factors that are associated with outdoor lighting. Some of the issues to be considered include lighting pollution that is created by glare, light trespass, and urban sky glow. Lighting glare causes reduced visual performance, which reduces the ability of the driver to distinguish objects clearly. Lighting options considered should be of low vertical illuminance and increasing the mounting height and the spacing between poles.

Light trespass and urban sky glow is allowing roadway lighting to illuminate the areas along a roadway with the light that is around the light pole. This may illuminate residential areas and affect the performance of security cameras in commercial areas. Fixtures in these areas should consider cut-off technology or shields to minimize the amount of light trespass and sky glow. Energy consumption is another consideration. The cost of energy consumption is a real cost to the owner of the light fixtures, and with improvements in technology, coupled with reduced maintenance costs due to a long-life expectancy, LED street light fixtures are proving to be a viable option that could be considered as an option.

Replacement highway lighting, for I-81 and I-690, would be designed based on Illuminating Engineering Society (IES) RP-9 recommended values for Freeway A, Type R3 Pavement, as summarized in **Table 5-38**.

In addition to highway lighting, it is expected that replacement lighting would be provided on city streets that are reconstructed, as well as under bridge lighting, sidewalk and shared-use (bicycle and pedestrian) paths lighting, gateway and special area lighting. Design criteria for additional lighting classifications are summarized in **Table 5-39**.

Table 5-38
Viaduct Alternative—Recommended Lighting Values: Luminance

Item	IES Recommended Value	Calculated Value (1)
Avg. Illuminance (cd/m2)	≥0.6	0.6
Uniformity (Avg./Min Ratio)	≤3.5	1.6
Uniformity (Max/Min Ratio)	≤6.0	3.8
Veiling Luminance Ratio	≤0.3	0.3
Small Target Visibility	3.2	2.4

Notes:
The calculated values were determined using the aid of Visual Lighting Software's Roadway tool. For the purposes of this analysis, the fixture was assumed to be a Lithonia, type DSX1 60LED with 700mA driver, Type 5 distribution at 4000°K. The calculations were performed using one side of the Freeway, with 4 lanes @12' per lane with a 10' median, type R3 pavement, with a fixture height of 30'. The optimal spacing of the fixture in order to achieve the Illuminating Engineering Society (IES) recommended values, which are shown on the table above, was calculated to be 240' spacing per side, with fixtures staggered at 120'.

Table 5-39
IES Recommended Horizontal Illumination of Roadways and Walkways

	Classification of Area	
Vehicular Roadways	**Commercial**	**Residential**
Local Roadway/City Street	0.9 FC	0.4 FC
Pedestrian Walkways/Shared-use		
Sidewalks	0.9 FC	0.2 FC

FC = foot-candle, which is a measurement of illuminance or light intensity.
Reference: Table 14.3 of the Illuminating Engineering Society (IES) Lighting Handbook as per the illuminating Engineering Society of North America.

In-kind replacement lighting for city streets, sidewalks and shared-use (bicycle and pedestrian) paths, that involve entering into an agreement with a public utility company, is subject to review and approval by the Commissioner of Public Works and the Mayor of the City of Syracuse. Special use lighting is subject to approval by the City of Syracuse Common Council and would require modification or establishment of special lighting districts. Special Lighting Districts are those areas in the City that have petitioned the Common Council and have been granted, by ordinance, to allow for street lighting different than standard lighting, and may typically be identified by decorative features or underground wiring. With the benefit of this special lighting come additional costs that are placed on the tax bills of the property owners within these districts.

Specific to the City of Syracuse, whenever the residents of any street, or portions of a street, desire to establish, modify or extend special or ornamental street lighting, they must present to the council a petition representing a minimum of seventy-five percent of the property frontage on both sides of the street or street segment where the special lighting is proposed to be established. The cost of the lighting would be assessed to the property owners based on lineal foot of property frontage, however, a maximum cost of lighting to be assessed to the property owners would be established and certified by the commissioner of public works and the council by ordinance and any excess cost would be borne by the city at large. In general, if existing lighting is impacted by a state highway project, the state would pay the cost of installing replacement light fixtures, and the cost for maintenance would either be through a tariff rate with National Grid or through the City of Syracuse which would be responsible for maintenance.

Ownership and Maintenance Jurisdiction

Under the Viaduct Alternative, NYSDOT would continue ownership and maintenance responsibilities for the Interstate highway system, would retain ownership of the arterials listed in **Appendix C-6**, and would continue to contract with the City of Syracuse for the maintenance of these facilities. The ownership and maintenance responsibilities for all other local roads would remain the same under this alternative.

A maintenance agreement with the City of Syracuse would be necessary for maintenance of new sidewalks and shared-use paths and to facilitate energizing and maintenance of any new lighting constructed along city streets as well as the state-owned lighting along I-81 and I-690 within the city limits. Similar maintenance agreements would be necessary with other municipalities where sidewalk, shared-use paths or lighting would be constructed as part of this Project.

Constructability Review

An initial constructability review was conducted during preliminary design to evaluate current alternative designs and staging schemes, to identify potential constructability issues and innovative means and methods that may apply, identify additional construction related impacts, identify potential for additional right-of-way impacts, and evaluate the overall project schedule to identify strategies that will improve constructability while accelerating the overall construction schedule. As a result of this evaluation, it was determined that the Viaduct Alternative is constructible and there were no major concerns regarding additional right-of-way.

The construction schedule was a major outcome of this evaluation. Several construction schedules were identified based on the degree to which traffic could be detoured. It was determined that identifying strategies to reduce the overall project schedule resulted in improving constructability but caused a larger impact to traffic. The most aggressive schedule identified for the Viaduct Alternative was a six-year schedule. As detailed in **Chapter 4, Construction Means and Methods**, a six-year schedule would only be possible through use of longer-term shutdowns of interstate segments. By employing a strategy that takes a section of interstate out of service for an extended period of time, more work can be fully built out in one phase; thus, the number of construction stages is dramatically reduced, productivity increases, the overall timeframes are reduced, and the constructability improves.

As noted, the constructability evaluation was conducted early in preliminary design. It is anticipated that as design progresses, a Value Engineering analysis would be required per 23 USC 106(e) and 23 CF 627.5 for Design-Bid-Build procurement contracts according to FHWA and NYSDOT policy. Design-Build projects are exempt from Value Engineering reviews as this type of procurement is a best value selection process. A constructability review would be performed by an independent review team and would be coordinated with a Value Engineering review. A Value Engineering (VE) review is a systematic process designed to focus and improve upon the major elements of complex or high cost projects. The main objectives of a VE review are to make recommendations on how to optimize construction scheduling, performance, constructability, maintainability, environmental awareness, safety, and cost-effectiveness.

In the case of major projects that are more complex and contain more risk elements than others, a rigorous cost estimating process becomes even more critical. Cost estimates were first developed early in the project's planning stage and have been periodically updated as the design alternatives have been refined. As the project continues through the Project Development Process, cost estimates will become increasingly refined and should reflect the project's actual costs more accurately. As indicated in the FHWA Major Project Delivery timeline, there are generally two formal Cost Estimate Reviews - one at the end of the NEPA process and the other before the start of construction.

5.5.2 MULTIMODAL

Pedestrians

Pedestrians will continue to be prohibited on I-690, I-81, and I-481 by state law.

Pedestrian facilities would be reconstructed along all city streets that are impacted by this alternative and would be designed consistent with New York State Complete Streets legislation, consistent with

NYSDOT's PSAP standards where appropriate and consistent with current NYSDOT HDM Chapter 18 standards, which meet PROWAG requirements.

In accordance with the Project's objectives, the Viaduct Alternative would result in improved pedestrian accommodation, connectivity, and safety. In total, approximately 5.4 miles of new/reconstructed sidewalk and 2.1 miles of new/reconstructed shared-use path would be constructed as part of this alternative. Pedestrian facilities would be provided on both sides of Almond Street from Erie Boulevard to Van Buren Street, thereby eliminating the existing gaps that would remain under the No Build Alternative.

Pedestrian connectivity between Downtown and University Hill neighborhoods would be improved by providing crosswalks for all pedestrian movements at the Harrison Street intersection. Where crosswalks pass through raised median areas below the interstate viaduct at Genesee, Harrison, and Adams streets, pedestrian refuge areas will be provided with protective bollards. Between Fayette Street and Water Street, bump outs will be provided to narrow east-west pedestrian crossings of Almond Street. At the Almond Street intersections with Jackson Street, Taylor Street, Burt Street, and Van Buren Street crosswalks will be provided to facilitate pedestrian east-west connectivity below the interstate viaduct. Between Erie Boulevard and Burnet Avenue, pedestrian facilities would be provided on the west side of the street only so as to avoid conflicts with the EB I-690 and WB I-690 ramps.

Pedestrian connectivity will be improved along the Clinton Street corridor from Bear Street south to the realigned Butternut Street, then south on the Clinton Street extension to Franklin Street. A sidewalk segment on the east side of Clinton Street will not be provided so as to avoid conflicts with the SB I-81 ramps. The realigned Court Street bridge and connection to Clinton Street will create a new pedestrian link between the Northside and Inner Harbor. The shared-use (bicycle and pedestrian) path from Bear Street to Hiawatha Boulevard and Lodi Street, and new sidewalks on Bear Street from Lodi Street to Solar Street will create new pedestrian connections between the Northside and Lakefront neighborhoods.

In addition, the travel lane widths within the segment of Renwick Avenue, between MLK, Jr. East and Van Buren Street, would be reduced slightly to allow the sidewalk on the east side of the street to be replaced, along with an approximately 3-foot wide buffer strip between the curb and sidewalk, which will improve pedestrian accommodation and safety and improve the connection between the Southside and University Hill.

The removal of the overpass at West Street and Genesee Street would allow for several pedestrian enhancements in the area. A sidewalk would be provided on the east side of West Street between Genesee Street and Erie Boulevard where none currently exists or would exist under the No Build Alternative. A sidewalk would be provided on the north side of Genesee Street between Plum Street and West Street. Crosswalks at West and Genesee Street would utilize medians to provide protected pedestrian refuges.

A new shared-use (bicycle and pedestrian) path would be provided on the west side of Onondaga Creek where none currently exists or would exist under the No Build Alternative. The new shared-use (bicycle and pedestrian) path would provide connectivity to destinations north and south of the Project Area via new connections to the Onondaga Creekwalk. Raising a portion of the existing Onondaga Creekwalk to the 10-year storm elevation will reduce the frequency of trail closures caused by flooding events in Onondaga Creek. Curb ramps, crosswalks, pedestrian signals with push buttons and sidewalks would be provided throughout the project limits. These facilities would improve pedestrian safety and enhance pedestrian connections in the local street network within the Project Area and improve connectivity between the Park Avenue neighborhood, the Downtown business district, and other key destinations. Refer to **Chapter 3, Alternatives**, for a detailed description of proposed pedestrian facilities.

Bicyclists

Bicyclists will continue to be prohibited on I-690, I-81, and I-481 by state law.

The *Syracuse Bike Plan*, a section of the *Syracuse Comprehensive Plan 2040,* lays out a detailed vision for an interconnected bike network throughout the city. This Project builds on the city's vision of a bike network that provides connectivity between neighborhoods, the Downtown business district, and other key destinations. Facilities would be developed consistent with *AASHTO Guide for the Development of Bicycle Facilities 2012 Fourth Edition* and New York State Complete Streets legislation.

The Viaduct Alternative would result in improved bicycle accommodation, connectivity, and safety. In total, approximately 2.1 miles of new/reconstructed shared use path, 0.2 miles of new cycle track and 0.2 miles of new/reconstructed on-street bike lane would be constructed as part of this alternative. A new dedicated bicycle facility would be provided on Almond Street between the Empire State Trail on Water Street and Van Buren Street where none currently exists or would exist under the No Build Alternative. From the Empire State Trail on Water Street to the Connective Corridor on Genesee Street, a two-way raised cycle track would be provided on the west side of Almond Street. From Genesee Street to Fineview Place, a two-way shared-use (bicycle and pedestrian) path would be provided on the west side of Almond Street and extended to Raynor Avenue via shared lane markings on Fineview Place. A two-way raised cycle track would be provided on the west side of Salina Street between Laurel Street and Herald Place. Bike lanes would be provided on McBride Street between Burnet Avenue and the Empire State Trail on Water Street, Bike lanes would be provided on Lodi Street between Burnet Avenue and Canal Street and connected to the Empire State Trail on Water Street via shared lane markings on Canal and Walnut Streets. Bike lanes would be provided on the new Butternut Street Bridge that would connect to proposed shared lane facilities on Salina and State Streets to the east, and to proposed shared lane facilities on North Clinton Street and Franklin Street to the west. The new Butternut Street bike lanes would connect to new shared lane facilities on Franklin and Evans Streets, and to a new shared-use (bicycle and pedestrian) path on the west side of Onondaga Creek. Additionally, a new shared-use (bicycle and pedestrian) path segment would be provided to connect the existing Onondaga Creekwalk to the bike facilities accessible at the intersection of Franklin Street and Evans Street. The new Spencer Street Bridge would include bike lanes that would extend east to Salina Street via Catawba, and west to Clinton Street with new bike lanes. Clinton Street will include shared lane markings from the new Spencer Street bike lanes south to the new Butternut Street bike lanes and the new Franklin Street shared lane markings. A two-way shared-use (bicycle and pedestrian) path would be provided on the east side of I-81 between Bear Street and Hiawatha Boulevard and connect future city-proposed facilities on Lodi Street and Lemoyne Avenue. These new facilities would enhance bicycle connections in the local street network within the Project Area and improve connectivity between neighborhoods, the Downtown business district, and other key destinations. Refer to **Chapter 3, Alternatives**, for additional description of proposed bicycle facilities.

Pedestrian and Bicycle Level of Service

Table 5-40 summarizes pedestrian and bicycle LOS under the Viaduct Alternative for the same facility routes as analyzed for Existing and No Build conditions.

Table 5-40
2026 and 2056 Viaduct Alternative Pedestrian and Bicycle Level of Service Analysis

Facility Type	Facility Name		2026				2056			
			AM		PM		AM		PM	
			LOS Score	LOS	LOS Score	LOS	LOS Score	LOS	LOS Score	LOS
Pedestrian	Adams Street	EB	3.86	D	3.52	D	4.00	D	3.52	D
	Almond Street	NB	3.36	C	3.45	C	3.36	C	3.49	C
		SB	3.14	C	3.31	C	3.15	C	3.40	C
	Crouse Avenue	NB	3.41	C	3.47	C	3.42	C	3.48	C
		SB	3.39	C	3.39	C	3.40	C	3.41	C
	Erie Boulevard	EB	3.44	F	3.51	F	3.41	F	3.48	F
	Harrison Street	WB	3.67	D	3.83	D	3.72	D	3.86	D
Bicycle	Almond Street	NB	3.40	C	3.43	C	3.47	C	3.44	C
		SB	3.35	C	3.45	C	3.44	C	3.47	C
	Crouse Avenue	NB	3.99	D	4.05	D	3.99	D	4.06	D
		SB	3.35	C	3.36	D	3.37	C	3.38	C
	Harrison Street	WB	4.05	D	3.99	D	4.07	D	4.02	D
	Water Street	EB	3.47	C	3.26	C	3.50	D	3.53	D
		WB	3.37	C	3.31	C	3.47	C	3.36	C

Of the nine routes analyzed, one facility would operate at LOS F, which is an improvement compared to the No Build Alternative. For the pedestrian facilities, both Crouse Avenue and Almond Street would improve from a failing to an acceptable LOS. The Viaduct Alternative proposes improved pedestrian and bicycle accommodations along Almond Street, including separated shared-use paths, as well additional sidewalk connections which would be absent in the No Build Alternative. Crouse Avenue would provide additional sidewalk connections on the northern section of the facility, improving the pedestrian LOS. All LOS scores would increase, with the exception of Adams Street and Erie Boulevard, where LOS would negligibly decrease from the No Build Alternative to the Viaduct Alternative.

Transit

No changes in bus service are proposed under the Viaduct Alternative. However, potential minor impacts on existing operations are projected due to the proposed modifications of the following freeway and arterial roadways:

- At I-81 Interchange 18, access from the northbound I-81 entrance-ramp from Harrison Street to eastbound I-690 would not possible
- New on-ramp at Almond Street to eastbound I-690 would replace existing Harrison Street and McBride Street on-ramps

- Provision of missing I-81/I-690 connections
- Existing Pearl Street and Butternut Street on-ramps would be replaced with a single on-ramp at Pearl Street
- Realignment of Butternut Street bridge
- Existing Franklin Street/West Street and Clinton Street/Salina Street off-ramps would be replaced with a single off-ramp at Clinton Street
- I-690 Interchange 11 (West Street) and removal of the West Street Overpass
- I-690 Interchange 13 (westbound exit-ramp would be relocated from Townsend Street to Almond Street)

These roadway modifications under the Viaduct Alternative may require rerouting of buses for portions of their existing bus service routes. This may subsequently affect bus stop locations and possibly schedules. Based on the Centro route guide, potential bus routes affected include:

- Route 22 James Street – Route 298
- Route 46 Liverpool – Route 57 – Great Northern Mall
- Route 48 Liverpool – Morgan Road – Avon Parkway – Grampian Road
- Route 50 Destiny USA via I-81
- Route 82 Baldwinsville
- Route 84 Mattydale
- Route 86 Henry Clay Boulevard
- Route 88 North Syracuse
- Route 148 Liverpool – Morgan Road
- Route 162 Manlius via I-690 – Widewaters Parkway
- Route 184 Mattydale – Allen Road
- Route 186 Henry Clay Boulevard – Wetzel Road
- Route 188 North Syracuse - Cicero
- Route 246 Oswego – Syracuse via Fulton/Phoenix
- Route 248 Liverpool – Morgan Road
- Route 286 Henry Clay Boulevard – Wetzel Road
- Route 288 North Syracuse – Cicero – Central Square
- Route 362 DeWitt – Widewaters Parkway
- Route 323x James Street – East Syracuse – Minoa Express
- Route 388 Central Square
- Route 550 Destiny USA

Although many bus routes potentially would be affected by the implementation of Viaduct Alternative, the impacted portions of the existing bus routes would not be long (compared with the entire length of the routes) and, therefore, the expected delays, detours, and bus stop relocation should be minimal.

Airports, Railroad Stations, and Ports

No changes are proposed; no conflicts are expected.

Access to Recreation Areas (Parks, Trails, Waterways, and State Lands)

No changes are proposed that would preclude access to any recreation area, and no conflicts are expected.

At Almond Street and West Genesee Street, pedestrian access to Forman Park would be improved via the removal of an existing east bound to west bound vehicular turn lane for Genesee Street. Forman Park, Wilson Park, the Connective Corridor, and the Empire State Trail will be more accessible for bicycle users with the addition of new bicycle infrastructure on Almond Street.

The project changes at West Street and Genesee Street will expand access for pedestrian and bicyclists to the Onondaga Creekwalk via new sidewalks and shared-use (bicycle and pedestrian) path segments.

The bicycle facility at Lodi Street will improve accessibility to Ormand Spencer Park.

Trucks

Under the Viaduct Alternative, truck travel patterns (in terms of travel routes and traffic volumes) on the local streets would be similar to No Build conditions. However, trucks would use I-81 and I-690 more extensively for north-south and east-west travel through the Syracuse region and for pick-up and delivery to distribution centers within the project area. Overall, the Viaduct Alternative will improve highway freight movement through and into the project area by adding capacity on I-81 (including the I-81/I-690 missing connectors), reducing delays, and improving safety. These improvements would increase operating efficiency and reduce operating costs for the trucking industry.

5.5.3 INFRASTRUCTURE

Proposed Highway Section

Refer to **Appendix A-1** for proposed typical sections.

Right-of-way

Section 6-3-1, Land Acquisition, Displacement, and Relocation identifies the property needs for each project alternative.

Curb

Within the project construction limits, the majority of I-81 and I-690 non-bridge sections, including the ramps, would include a mountable curb (Type PT100). The mountable curb would be placed at the outside edge of shoulder to help reduce the amount of untreated storm water by directing runoff to the new closed drainage system. Curbing would not be provided at the southern and northern ends of I-81, where adequate right-of-way exists for open ditches and swales. In addition, six-inch-high non-mountable curbing would be provided along both sides of city streets within limits of reconstruction and existing curbing would be preserved in sections programed for mill and inlay treatment. Refer to typical sections in **Appendix A-1** for more specific detail of curbing types and limits.

Grades

All segments of I-81 and I-690 within the project limits, and their associated ramps, would meet the maximum grade criteria listed in **Appendix C-6**. In addition, the proposed grades for reconstructed local streets would meet maximum grade criteria, except for the existing grade of Van Buren Street, which will be retained as a non-standard feature. Refer to **Appendix A-1** for profiles of all reconstructed sections of highway and local streets.

Intersection Geometry and Conditions

Under the Viaduct Alternative, a large number of intersections would be reconstructed to meet geometric standards, address traffic operational needs, and pedestrian and bicycle accommodation. Some of the more substantial intersection work would include:

- West Street/W. Genesee Street – Currently, this grade-separated crossing provides no direct connection between West Street and Genesee Street. The eastbound I-690 exit ramp connects to both West Street and Genesee Street. The West Street overpass would be removed as part of the Viaduct Alternative and replaced with an at-grade signalized intersection. The new intersection would provide for all traffic movements and enhance pedestrian and bicycle accommodation.
- MLK, Jr. East/Southbound I-81 entrance ramps – A new, signalized intersection would be created at the southbound I-81 entrance ramp. The addition of a new ramp intersection at this location would necessitate closure of the driveway on the north side of MLK, Jr. East, which provides access to a parking lot on the east side of the Dr. King Elementary School. Access from the existing parking to the north onto Raynor Avenue would not be affected.
- MLK, Jr. East/Renwick Avenue/Northbound I-81 exit ramp – A new northbound I-81 exit ramp would terminate at the existing junction of MLK, Jr. East and Renwick Avenue. A new signalized intersection would be created to accommodate the new ramp, as well as to improve pedestrian and bicycle accommodation.
- Renwick Avenue/Fineview Place – The existing un-signalized intersection at Renwick Avenue/Fineview Place would be reconstructed to improve intersection geometrics, improve traffic operations, increase the separation from the adjacent Van Buren Street intersection, help calm traffic, and improve pedestrian and bicycle accommodation.
- Renwick Avenue/Van Buren Street – This un-signalized intersection would be replaced with a signalized intersection. In addition, the intersection geometrics would be improved to increase the separation from the adjacent Fineview Place intersection, help calm traffic, and improve pedestrian and bicycle accommodation.
- Van Buren Street/Irving Avenue – This signalized intersection would be modified slightly to accommodate separate turn lanes at the intersection. The intersection modifications would primarily involve repaving, restriping, and replacement of the signals and signing. In addition, sidewalk ramps would be reconstructed as needed to meet current standards, and deteriorated sections of curbing and sidewalk would be replaced

- Almond Street/Catherine Street Corridor, Burt Street to Burnet Avenue – All intersections along the Almond Street/Catherine Street corridor would be reconstructed. The intersections would be designed to accommodate traffic operational needs and improve pedestrian and bicycle accommodation. All signals and traffic control systems would be replaced.
- Crouse Avenue, Adams Street to E. Genesee Street – This section of Crouse Avenue would be converted from a one-way to a two-way street. The intersection modifications would primarily involve repaving, restriping, and replacement of the signals and signing. In addition, sidewalk ramps would be reconstructed as needed to meet current standards, and deteriorated sections of curbing and sidewalk would be replaced.
- Butternut Street, Spencer Street, Court Street, and Bear Street – Due to the widening and reconstruction of the northern section of I-81, the various crossing street bridges would be replaced, and the adjoining intersections on both sides of I-81 would be modified or reconstructed as necessary. All impacted intersections would be modified to meet geometric requirements, accommodate traffic operational needs, and enhance pedestrian and bicycle accommodation.
- Clinton Street – All intersections from Bear Street south to the realigned Butternut Street, and beyond on the Clinton Street extension to Franklin Street would be reconstructed. A new, signalized intersection would be created at the southbound I-81 exit and entrance ramps. The intersections would be designed to accommodate traffic operational needs and improve pedestrian and bicycle accommodation in designated segments. All signals and traffic control systems would be replaced.
- Genant Drive – Due to the widening of the northern section of I-81, and reconfiguration of the SB exit and entrance ramps connecting to North Clinton Street and Bear Street, Genant Drive would be removed just north of Court Street, and south of Spencer Street. Genant Drive would be two-way from its northern termination to Court Street, and one way south bound between Court Street and Spencer Street. West Division would change to a dead-end condition. All impacted intersections would be modified to meet geometric requirements, accommodate traffic operational needs, and enhance pedestrian accommodation.

The full extent of intersection work under the Viaduct Alternative is shown on the plans in **Appendix A-1**.

Roadside Elements

- Where appropriate, snow storage areas would be provided adjacent to the curbs on all reconstructed streets.
- A shared-use (bicycle and pedestrian) path would be provided along the west side of Almond Street between Fineview Place and Erie Boulevard. A network of shared-use (bicycle and pedestrian) paths would be constructed in the West Street area to enhance connectivity to the existing Creekwalk.
- With few exceptions, minimum five-foot-wide sidewalks would be constructed along both sides of all reconstructed city streets and all sidewalk ramps would be upgraded to meet current ADA standards.

- Driveways onto city streets would be modified to comply with City of Syracuse standards and current NYSDOT "Policy and Standards for Design of Entrances to State Highways" for roadways on the state system.
- Clear Zone - The design clear zones shown in **Table 5-41** were established in accordance with the NYSDOT HDM and the AASHTO Roadside Design Guide. Clear zones would be further evaluated when design advances to adjust for slopes, roadway curvature, etc. Where fixed objects and other hazards within the clear zone cannot be removed, roadside appurtenances, such as guide rail, would be considered.

Table 5-41
Roadside Elements – Clear Zone

Route Name	Design Speed	Clear Zone[1]
I-81, I-481 south interchange to I-481 north interchange.	60 mph	30 ft.
I-690, Leavenworth Ave to Lodi St.	60 mph	30 ft.
Ramps (45-50)	45-50 mph	26 ft.
Ramps (40)	40 mph	17 ft.
City Streets	35 mph	Note 2

Notes:
1. Clear zone values taken from Table 10-1 from the NYSDOT Highway Design Manual are un-adjusted. When design advances, adjusted clear zone will be determined from adjustments made from minimum curvature and Table 10-2 from the NYSDOT Highway Design Manual.
2. Suggested minimum clear zone is 1.5 ft. and 3.0 ft. at intersections.

Special Geometric Design Elements

Non-standard Features

During the alternatives development phase, efforts were made to ensure that the design complied with the geometric features and cross-sectional elements set forth in **Section 5.4**, Design Criteria for Reasonable Alternatives. In addition, existing roadside design features within the project corridor were analyzed against these criteria to identify existing features that did not meet the current design standards. For any feature that does not meet the criteria, a completed Non-Standard Feature Justification Form is required. For the Viaduct Alternative, a total of 14 non-standard geometric features are recommended to be retained. As shown in **Table 5-42**, this includes seven non-standard features on the interstate mainline segments of the Project, one on an interstate ramp and an additional seven non-standard features are recommended to be retained for local streets within the Project Area. See **Appendix A-3-1** for the Non-Standard Feature Justification forms for each of these design elements that are recommended to be retained.

Non-Conforming Features

In addition to the critical design elements depicted in Chapter 2 of the NYSDOT HDM, many other design features were taken into consideration during the development of the Viaduct Alternative following normally accepted engineering policies. Due to the constrained right-of-way, location of some buildings, and limited distance between adjacent intersections, some design elements, such as ramp spacing, broken back curves, compound curve ratio and level of service, were adjusted to develop an alternative that met the Project's purpose and need while avoiding undesirable impacts. Refer to **Appendix A-3, Table A.3-2** for a listing of non-conforming design elements, followed by a justification of the retention of each non-conforming feature. **Table A.3-2** also includes a listing of locations that do not meet recommended design standards for Control of Access. **Table A.3-2** is followed by Access Control Justification forms for each of the non-conforming locations.

Pavement and Shoulder

Due to factors including profile changes, horizontal alignment changes, and construction phasing implications, it was determined that pavement rehabilitation for I-81 and I-690, within the I-81 Viaduct Study Area would not be considered and the pavement would be reconstructed. In addition, the Project also includes a variety of work on city streets. Due to the nature of the work, the anticipated amount of utility relocation work, and the anticipated disturbance from highway and bridge reconstruction, it is assumed that city streets that are widened or re-aligned would be reconstructed, and that city streets proposed for traffic signal replacement and pavement re-striping would be milled and inlaid. In accordance with the NYSDOT Comprehensive Pavement Design Manual, a Pavement Evaluation and Treatment Selection Report (PETSR) has been prepared. The report provides recommendations regarding pavement type and pavement thickness design for new and reconstructed interstates, ramps, state routes, and local roads for the I-81 Viaduct Project. A life cycle cost analysis of both rigid and flexible pavement alternatives was developed. Refer to **Appendix A-4** for a copy of the PETSR.

Table 5-42
Non-Standard Features Recommended to be Retained – Viaduct Alternative

Location	Design Element (1)	Design Criteria (2)	Proposed Design (3)
Northbound I-81 – Horizontal Curve #1	HSSD	570 ft.	438 ft.
Northbound I-81 – Horizontal Curve #2	HSSD	570 ft.	495 ft.
Southbound I-81 – Horizontal Curve #3	HSSD	570 ft.	507/509 ft.
Southbound I-81 – Horizontal Curve #4	HSSD	570 ft.	426/443 ft.
Eastbound I-690 – Horizontal Curve #6	HSSD	570 ft.	509 ft.
I-81 Northern Segment, Butternut St. to Hiawatha Blvd.	Shoulder Width	10 ft.	7 ft.
Interstate Ramp, Southbound I-81 off-ramp to N. Clinton St.	Curve	214 ft.	167 ft.
Almond Street, Renwick Avenue to Burt Street	Horizontal Curve	371 ft.	160 ft.
Fineview Place, Renwick Avenue to Raynor Avenue	Horizontal Curve	188 ft.	40 ft.
Renwick Avenue, MLK, Jr. East to Van Buren Street	HSSD	220 ft.	190 ft.
Van Buren Street, Renwick Avenue to Henry Street	Grade	8% max.	15.52%
Erie Boulevard, vicinity of Almond Street	Shared Lane Width	13 ft.	11 ft.
Irving Avenue, Van Buren Street to Genesee Street	Shared Lane Width	13 ft.	12 ft.
Van Buren Street, Renwick Avenue to Irving Avenue	Shared Lane Width	13 ft.	12 ft.

Notes:
HSSD = Horizontal Stopping Sight Distance
Refer to Design Criteria Tables in Appendix C-6.3.
Refer to Appendix A-3.1 for Non-Standard Feature Justification Forms

Drainage Systems

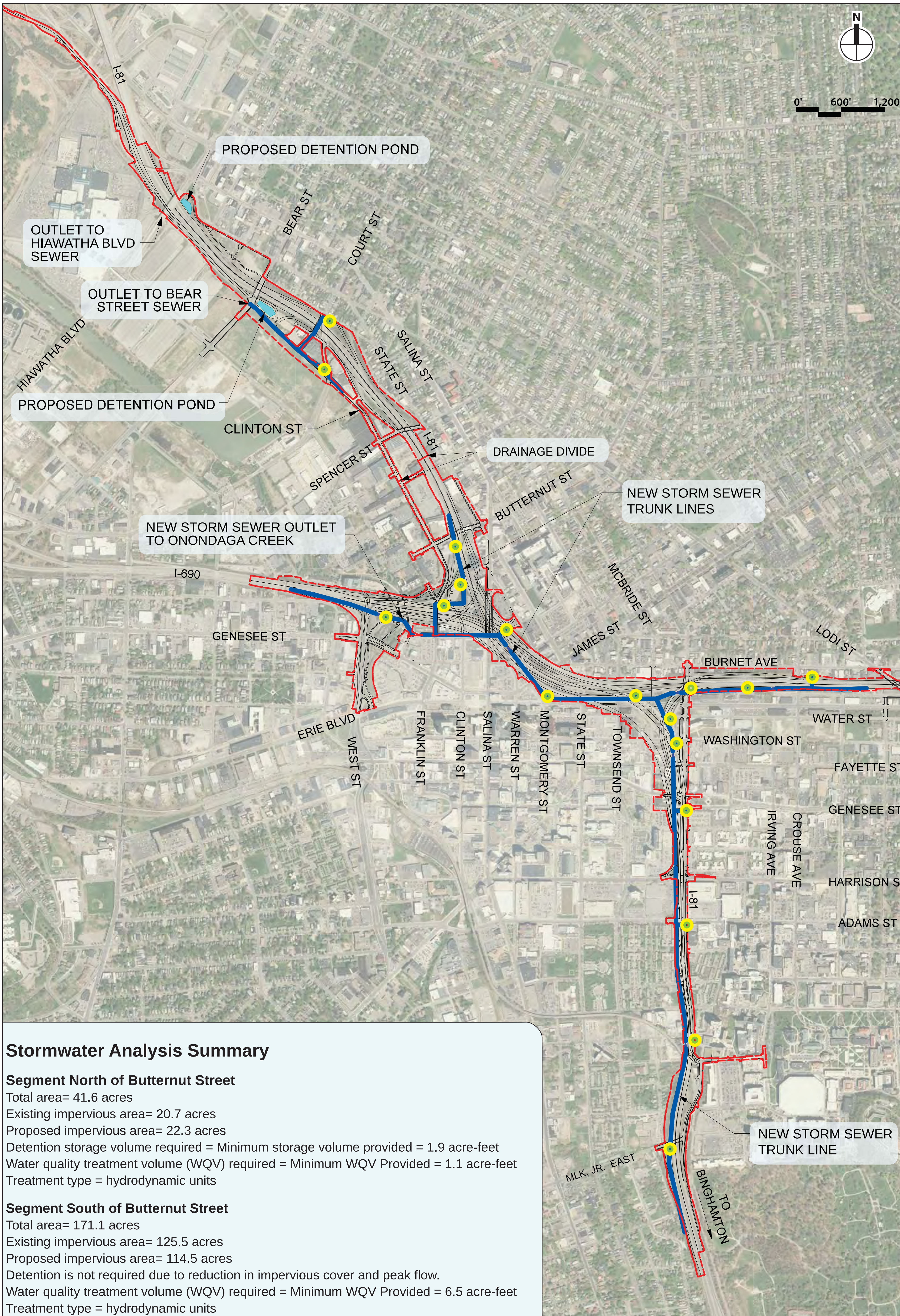
The existing storm sewer systems that serve the I-81 and I-690 highway segments within the I-81 Viaduct Study Area are tributary to Onondaga County and City of Syracuse combined sewers, and are subject to the requirements of the New York Department of Environmental Conservation's (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity (GP-0-20-001). A Stormwater Pollution Prevention Plan (SWPPP) with the appropriate stormwater management and sediment and erosion control measures will be developed for the Project during final design. Stormwater quality treatment will be required for the Project, and the county and city both require a reduction in the amount of stormwater runoff volume that will be discharged into their combined sewer systems.

An analysis of the existing and proposed drainage conditions was undertaken for the Viaduct Alternative. The analysis focused on the stormwater runoff quantity and water quality within the I-81 Viaduct Study Area, which for the purposes of this study is subdivided into the area south of Butternut Street and the area north of Butternut Street (see **Figure 5-28**). The objective of the drainage analysis was to determine that the Viaduct Alternative's proposed development would result in a reduction to peak runoff from the Central Study Area and that water quality requirements are met as defined by the NYSDEC Stormwater Design Manual.

The footprint of the Viaduct Alternative is located within a dense urban area where most existing surfaces and infrastructure are impervious, resulting in a high volume of stormwater runoff and little ground infiltration. Surface runoff in the I-81 Viaduct Study Area drains to catch basins and inlets that are connected to the City of Syracuse combined sewer system, which in turn discharges into the Onondaga County combined sewer system. The existing combined sewer systems are overburdened during wet weather events and do not meet current design standards. As such, the combined sewer system is vulnerable to overflows and the entire I-81 Viaduct Study Area is under substantial restrictions to control water quantity and quality, including a consent order to reduce flows to the combined sewer system.

A reduction in flow to the existing combined sewer system can be accomplished for the portion of the I-81 Viaduct Study Area that is south of Butternut Street, by installing a new separated drainage system consisting of large diameter storm sewer trunk lines along I-81 and I-690. This proposed drainage system is shown conceptually on **Figure 5-28** and is presented in more detail in the Conceptual Drainage Plans included in **Appendix A-1**. The proposed system would include a new outfall to Onondaga Creek and would be subject to permit requirements by the NYSDEC and U.S. Army Corps of Engineers. To obtain the required permits, a detailed hydraulic analysis would be conducted during final design to demonstrate that the project development would not result in adverse impacts to the downstream watercourses.

The Conceptual Drainage Plan for the Viaduct Alternative has been designed to collect the majority of the stormwater runoff from the improved highway portions of I-81 and I-690, although isolated connections to the existing combined sewer system may be needed to avoid substantial utility relocations. Construction of a new storm sewer trunk line may cause conflicts with existing utilities, which would need to be relocated. The conceptual drainage plans in **Appendix A-1** identify potential conflict locations and potential avoidance or relocation options, which would be further developed in final design if the Viaduct Alternative is constructed. The proposed drainage system also would have



Stormwater Analysis Summary

Segment North of Butternut Street
Total area= 41.6 acres
Existing impervious area= 20.7 acres
Proposed impervious area= 22.3 acres
Detention storage volume required = Minimum storage volume provided = 1.9 acre-feet
Water quality treatment volume (WQV) required = Minimum WQV Provided = 1.1 acre-feet
Treatment type = hydrodynamic units

Segment South of Butternut Street
Total area= 171.1 acres
Existing impervious area= 125.5 acres
Proposed impervious area= 114.5 acres
Detention is not required due to reduction in impervious cover and peak flow.
Water quality treatment volume (WQV) required = Minimum WQV Provided = 6.5 acre-feet
Treatment type = hydrodynamic units

Hydrodynamic Unit
Stormwater Analysis Boundary
Proposed Storm Sewer Trunkline
Detention Pond

Viaduct Alternative — Stormwater Management and Treatment, Central Study Area
Figure 5-28

the capacity to intercept minor storm sewer flows from offsite; however, it is important to water quality goals that the proposed system does not capture any combined or sanitary sewer flows.

The main branch of the proposed storm sewer trunk line for the Viaduct Alternative would begin as a 30-inch pipe south of MLK, Jr. East and drain north along Almond Street to Erie Boulevard, then west on Erie Boulevard, northwest on Oswego Boulevard to Herald Place, and finally west along Herald Place to the terminus at a new 96-inch storm sewer outfall to Onondaga Creek. The proposed drainage system also would include branches along Erie Boulevard, east of Almond Street to University Avenue and along I-81 north of I-690 to the Butternut Street area. The proposed drainage system would entail the construction of approximately 18,000 linear feet of storm sewer trunk line.

The proposed Viaduct Alternative drainage system would fulfill the requirements of Onondaga County's "Save the Rain" initiative as it separates stormwater runoff from I-81, I-690, and associated local roads from the existing combined sewer system. Separating storm and sanitary flows from the existing system is a primary goal of the initiative and would be an effective way of improving the water quality of Onondaga Lake. The total runoff to the existing combined sewer system and the county sanitary sewer treatment facility would be substantially reduced, decreasing the likelihood of combined sewer overflows. In addition, the proposed storm sewer system would update the City of Syracuse's drainage infrastructure to current design standards and improve the safety of flood prone areas, including the existing locations with known drainage issues, such as the I-81 underpass at Butternut Street, West Street near I-690 and the northbound I-81 to eastbound I-690 ramp locations described earlier. In addition, the new storm sewer trunk line has been designed to accommodate the 50-year storm event as compared to the normal 10-year storm event standard. The higher storm event standard will provide for resiliency for increased storm events as well as provide for additional future capacity. The exact alignment and scope of the Viaduct Alternative drainage system may be modified in subsequent design phases pending further coordination with property owners, NYSDEC, and NYSDOT. The proposed storm sewer trunk line plan and profile, as presented on the Conceptual Drainage Plan sheets, has been designed to accommodate both the Viaduct and Community Grid Alternatives for the purposes of the FDR/FEIS analysis and would be refined during final design based on the chosen alternative.

Although the Viaduct Alternative proposed drainage system would substantially decrease stormwater runoff to the existing combined sewer network and help to reduce overflows, it would not necessarily reduce the total runoff from the I-81 Viaduct Study Area. The NYSDEC Stormwater Management Design Manual requires runoff to be attenuated to pre-developed conditions using detention and green infrastructure practices. Restricting the build condition flow rates to the pre-development flow rates would also avoid adverse impacts to downstream watercourses, thereby satisfying permit requirements of the NYSDEC and Army Corps of Engineers.

Since the peak flow and the total volume of runoff from the I-81 Viaduct Study Area is directly attributable to the total impervious cover on the site, it is possible to attenuate peak flow and volume of runoff using reduction techniques such as the removal of parking areas in the I-81 and I-690 right-of-way or by using pervious pavements in replacement parking lots as well as other green infrastructure practices. At grade or below grade detention basins were also considered to control runoff but were dismissed as impractical near densely developed portions of the I-81 Viaduct Study Area. Attenuating stormwater runoff by decreasing impervious cover within the I-81 Viaduct Study Area, south of Butternut Street, would be less costly than the use of detention facilities, which in some cases would be less effective in the dense urban setting of the Viaduct Alternative. For the purposes of the FDR/FEIS, all stormwater runoff south of Butternut Street within the I-81 Viaduct Study Area would be attenuated using runoff reduction techniques. North of Butternut Street, construction of detention facilities to contain runoff would be possible since this portion of the I-81 Viaduct Study Area is less congested and would be more suitable for open drainage.

The existing 1-, 10-, and 100-year storm event flow rates for the I-81 Viaduct Study Area were calculated using the TR-55 method (see **Table 5-43**). These existing flow rates were used to establish the criteria for proposed condition runoff rates and can be used to determine the measure of runoff reduction techniques and detention storage volumes required.

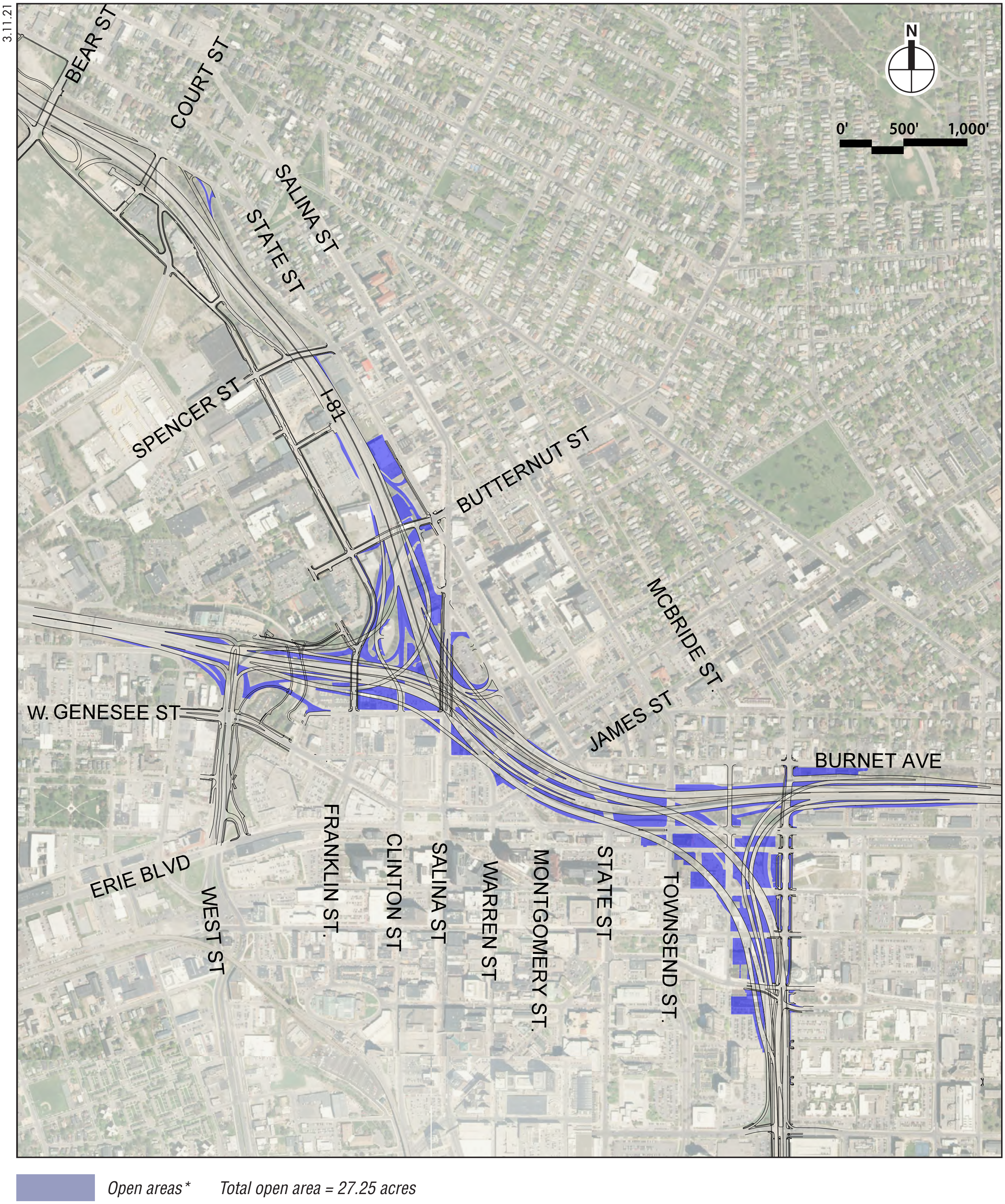
The Viaduct Alternative would require the acquisition of right-of-way and the removal of several bridges, buildings, structures, and parking lots along the I-81 and I-690 corridors. As a result, a number of areas, referred to as "open areas," would be created (see **Figure 5-29**). These areas include locations within the highway right-of-way; their eventual use is undefined, and the type of surface restoration would be under the control of NYSDOT. The total impervious cover would vary depending on the type of surface restoration (i.e., pervious or impervious) chosen for these open areas.

Table 5-43
Stormwater Peak Flow Attenuation (Quantity Control) - Viaduct Alternative

Project Study Area and Drainage Outlet Location Description	Peak Flow (cfs)					
	Existing [1]			Proposed [1,2]		
	1-yr	10-yr	100-yr	1-yr	10-yr	100-yr
I-81 Viaduct Study Area (Drainage Outlet South of Butternut St.)	Total Drainage Area = 171.1 acres					
Total Peak Flow (cfs)	235	462	844	221	450	835
Detention Volume Required	Detention not required as peak flow is reduced in proposed conditions. [1]					
I-81 Viaduct Study Area (Drainage Outlet North of Butternut St.)	Total Drainage Area = 41.6 acres					
Total Peak Flow (cfs)	24	58	117	26	60	120
Proposed Peak Flow Control Practice	Detention Basins					
Storage Volume (ac-ft)	Detention Storage Required			Detention Storage Provided		
	1.9 ac-ft.			minimum 1.9 ac-ft.		

Notes:
1. Rainfall intensity based on NYSDEC Stormwater Management and Design Manual, 1-yr, 10-yr, and 100-yr storm event figures.
2. Of the total disturbed area within the I-81 Viaduct Study Area, approximately 1.8 acres of impervious cover would be removed from the site. The calculations are based on the premise that subsequent restoration of open areas shown in **Figure 5-29** would be controlled so that no more than 35 percent of these areas would be constructed as an impervious surface.
3. The 1-year storage volume required to meet channel protection criteria, in accordance with NYSDEC standards, has been included in the overall storage requirement analysis. The 1-year peak flow reduction would be confirmed during final design.

The analysis of the runoff rates under the proposed conditions was performed by assuming a range of impervious cover ratios for the open areas. The proposed conditions analysis concluded that if the open areas are restricted to contain a maximum of 35 percent impervious cover then the total runoff to the drainage outlet south of Butternut Street would be reduced for all design storms and no further



** Areas within highway right-of-way where surface restoration type (impervious or pervious) can be controlled*

Viaduct Alternative — Open Areas

Figure 5-29

detention or rate controls would be required at this outlet. The proposed conditions flow rates resulting from the analysis have been tabulated in **Table 5-43**. The 35 percent impervious cover restriction to the open areas can be waived if these areas employ other methods of restricting runoff, such as on-site detention storage facilities or pervious pavement with infiltration trenches. These alternative methods of restricting flow require that peak flow and quantity of runoff generated from the other open areas would be equivalent to or less than the peak flow and total runoff generated by the total of the open areas redeveloped to the 35 percent impervious cover target.

The runoff to the drainage outlet north of Butternut Street would be controlled using at-grade detention basins in lieu of a reduction to project impervious area. These detention basins have been sized based on NYSDEC criteria and their locations are shown on **Figure 5-28**, although the locations may be revised in future design phases pending coordination with NYSDEC and NYSDOT. The total storage volume of each basin would reflect the channel protection storage volume, or the volume required for 24 hour extended detention of the post-developed 1-year, 24-hour storm event. The channel protection storage volume requirement would exceed NYSDEC volume requirements for the overbank flood (10-year storm) and extreme flood (100-year storm) and is therefore the controlling volume used for design. The total required and provided storage volumes of the proposed basins are included in **Table 5-43**.

The drainage analysis completed for the FDR/FEIS includes an assessment of NYSDEC water quality requirements. Water quality treatment would be required for the entire Project Area based on the total amount of disturbed and impervious area. Typically, water quality treatment volumes for new bridges and roadway pavements would be accommodated using infiltration basins, pervious pavements, vegetative buffers, and other green infrastructure practices that promote ground infiltration; however, due to the dense urban nature of the I- I-81 Viaduct Study Area, more compact treatment devices also were considered. Options include hydrodynamic treatment systems, offered by several manufacturers that can be custom engineered to fit site constraints and operate under gravity flow conditions. The periodic maintenance and associated costs of these devices would be a factor in the selection of the required treatment system. A detailed evaluation of these water quality treatment devices, which must be coordinated with NYSDEC, would be conducted in future design phases to select the appropriate system for each treatment location. The design of the Conceptual Drainage Plan included in **Appendix A-1** assumes the use of a hydrodynamic type treatment system, which consists of a sediment basin and baffle plate inside a vault, typically 12 feet in diameter or smaller. The preliminary locations of these treatment devices are shown on **Figure 5-28** and on the conceptual drainage plans sheets in **Appendix A-1**. **Table 5-44** contains the required and proposed water quality treatment volumes for the Viaduct Alternative.

The drainage analysis summarized in **Tables 5-43 and 5-44** concluded that all regulatory and permitting requirements for the Viaduct Alternative could be met through a combination of impervious cover restrictions, on-site detention, hydrodynamic treatment systems, and proposed storm sewers. The proposed drainage system described above would reduce the combined sewer overflows at affected drainage outlets, reduce wet weather flow burden at the county sanitary sewer treatment facility, reduce the likelihood of pavement flooding, and improve water quality in Onondaga Lake.

Geotechnical

Study of the overall existing soil borings data and record plans indicated that the underlying soils at the Project Area generally consist of silt and clay with bedrock or shale. The depth of bedrock varies along the project alignment from approximately 20 feet to 70 feet below ground. Specific foundation treatments for new structures in the area would be determined during final design and depending on the location of the proposed substructures and the underlying soils at those locations, the substructures may be founded on deep foundations, spread footings, and/or rock.

Table 5-44
Stormwater Quality Control -Viaduct Alternative

	Existing Impervious Area (ac)	Proposed Impervious Area (1) (ac)	Disturbed Area (ac)	WQv Target Volume (2) (ac-ft.)	RRv Min. (3) Required Volume (ac-ft.)
I-81 Project Area (4)	146.0	144.2	212.7	7.6	0.4
Proposed Water Quality Practice	Hydrodynamic Stormwater Treatment Units and Infiltration/Detention Basins Total Treatment Volume provided > 7.6 ac-ft.				
Proposed Green Infrastructure Practices	Overall reduction in site impervious area. Other potential practices to be considered in final design include vegetated swales, tree planting/tree pits/conservation of existing trees, stormwater planters, and rain gardens.				

Notes:
1. Approximately 1.8 acres of impervious surfaces are removed from the I-81 Viaduct Study Area.
2. Water Quality Target Volume (WQv) is calculated Per NYSDOT HDM Chap.8 Appendix B, for a Redevelopment Project, which is consistent with the NYSDEC Stormwater Management Design Manual. Rainfall intensity is based on NYSDEC Stormwater Management and Design Manual, 1-yr storm event for phosphorus watersheds.
3. For a Redevelopment Project, Minimum Runoff Reduction volume is calculated in accordance with the NYSDEC Stormwater Management Design Manual.
4. MS4 permit requirements could be met through a combination of hydrodynamic treatment systems and green infrastructure practices such as vegetated swales, stormwater planters, and rain gardens.

Structures

As part of this alternative, 49 existing bridges within the I-81 Viaduct Study Area (including the existing I-81 viaduct between the railroad and I-690) would be replaced with approximately 45 new bridges, having a total deck area of about 1,765,000 square feet. In addition, three bridges would be rehabilitated. **Appendix C-6** provides a list of bridges being replaced and/or rehabilitated. All existing structurally deficient bridges within the project area will be replaced, including the three bridges (see **Table 1-1**) within the I-81/I-690 interchange area. All new bridges would conform to the NYSDOT Bridge Manual standards and would incorporate aesthetic treatments where appropriate. Refer to Preliminary Structure Plans in **Appendix A-1** for a listing of new bridges as well as more detailed information for the proposed replacement bridges.

Hydraulics of Bridges and Culverts

As previously noted, only the replacement bridges carrying I-690 and the I-690 ramps over Onondaga Creek would need a hydraulic analysis and there are no known hydraulic issues associated with the existing retaining walls and existing bridge piers. As part of this alternative, the existing piers would be reconstructed as necessary and any replacement piers would be placed further back from the creek than the existing piers. Existing retaining walls would either be removed or partially left in place to help minimize disturbance to the creek and the existing Creekwalk. New retaining walls would also be placed further from the existing creek. As a result, no adverse effects on hydraulics are anticipated, as the existing conditions would be either maintained or improved. In addition, due to the topography of the area and the elevation of the bridges over the creek, it is anticipated that the freeboard provided below all structures at the 100-year flood will be much greater than the 2-foot minimum required; therefore, a hydraulic study will not be required until detailed structural design advances. A Coast Guard Checklist is not required.

Guide Railing, Median Barriers, and Impact Attenuators

All guiderail within the reconstruction limits, including bridge railing, would be replaced. In rehabilitation sections, guiderail and bridge barrier would be evaluated during final design for conformance to design standards and replaced or repaired, if necessary. Replacement guide rail, median barrier and impact attenuators would meet the Manual for Assessing Safety Hardware (MASH) 2016 standards or the most recent version of MASH at time of construction.

Utilities

Due to the urban nature and size of the Project Area, there are an extensive number and network of utilities, both private and public, above ground and below ground. A summary of the major utilities, the utility owners, and the potential conflicts associated with the Viaduct Alternative is included in **Appendix C-6**. For the purposes of this report, major utilities are defined as: all underground electric, fiber optic, or steam facilities (not including services), overhead fiber optic, underground gas lines (8 inches diameter or larger), water mains 16 inches in diameter or larger, and sanitary sewer and storm sewer trunk lines 24 inches in diameter or larger. Utilities of unknown size are also included. Because the depth of many underground utilities is not known, and because the depth of impacts from proposed construction is uncertain, impacts are assumed for any major underground utility in a reconstruction area.

There will be many more impacts to non-major utilities within the project area that are not included in this table, including such things as hydrants, valves, and services. The impacts to those items will need to be addressed as design advances. The cost to relocate all municipally owned utilities (i.e., water, sewer, etc.) would be fully reimbursable; non-municipally owned utilities (i.e., Transportation Corporations or private utilities) would only be reimbursable when on private right-of-way or for lateral crossings of interstate highways. Refer to **Appendix C-6, Table C-6.9** for a listing of potential utility relocations and whether a utility would be reimbursable. The construction cost estimate for the alternative includes the cost of reimbursable utility relocations.

Railroad Facilities

Under the Viaduct Alternative, there would be no impacts to the New York, Susquehanna & Western Railway, but coordination and railroad force account will be required for replacement of the I-81 bridges over the railroad. There are no other impacts to CSX or Amtrak under this alternative.

5.5.4 LANDSCAPE AND ENVIRONMENTAL ENHANCEMENTS

The design concepts and possibilities for enhancements described in this section would be developed and refined, in consideration of public input, during the final design phase of the Project (see **Chapter 9, Agency Coordination and Public Outreach**).

Landscape Development and Other Aesthetics Improvements

NYSDOT would provide or replace landscaping as a part of the overall enhancement and aesthetic improvements for this Project. Streetscape enhancements would be provided along Almond Street and portions of Erie Boulevard, West Street, as well as portions of connecting streets. Streetscape enhancements could include sidewalks, specialty pavements and aesthetic treatments for walkways, site furnishings such as benches and trash receptacles, landscape plantings, and green infrastructure. The enhancements would be designed to provide an overall sense of visual cohesiveness. The streetscape design would promote safe and effective pedestrian and bicyclist circulation and comfort and help facilitate social interaction.

Visual resources within the project site and surrounding area are described in **Section 6-4-3, Visual Resources and Aesthetic Considerations** of the FDR/FEIS.

Environmental Enhancements

Important points of entry from the proposed Interstate Highway system to the street network would be enhanced as gateways. Gateway enhancements would be developed to create a distinct and identifiable sense of entry and sense of place. These enhancements could include establishment of a consistent theme or motif, use of specialty materials and site elements, historical elements, landscaping, signage, aesthetic earth forms, and sculptural elements to mark the entrance to the city. Gateways have been identified at the new West Street and Genesee Street intersection, the Clinton Street exit and on Almond Street between the Adams and Harrison on and off ramps.

The West Street and Genesee Street Gateway would be achieved by the elimination of the elevated highway infrastructure, bringing West Street to surface, and the creation of a normalized intersection. Pedestrian, bicycle, and visual connectivity across West Street would be greatly enhanced. Aesthetic treatments would be used at this intersection to create a heightened sense of arrival into the city. Pedestrian areas at the intersections could be enlarged to accommodate more amenity and for visual impact. Sculptural lighting elements could serve as vertical markers, reinforcing a sense of arrival. Color could be used to enliven and punctuate the space. Sculptural sign walls, landscape and seat walls, and enhanced landscaping could all be used to define a gateway area. Specialty pavements and patterning could be utilized on sidewalks and interpretation on the history of the location could be incorporated into the pavements and plazas. Signage could orient visitors to the Creekwalk, Downtown, and surrounding neighborhoods.

The removal of the highway infrastructure in this location also would allow for the creation of shared-use (bicycle and pedestrian) paths along the west side of Onondaga Creek and the creation of an overlook at the historic Erie Canal Aqueduct under Erie Boulevard. A historic canal theme that builds on the newly visible Erie Canal Aqueduct would provide the basis for the design vocabulary at this location. Canal themed materials could include rustic stone and wood, as well as other industrial themed materials. Consideration of existing Onondaga Creekwalk elements, such as lighting, interpretive signage, furnishings, and pavement materials would be included to integrate with existing adjacent Onondaga Creekwalk segments north and south of the Project Area.

The Clinton Street Gateway is a gateway to the heart of the Downtown business district. Gateway enhancements would include landscape, low site walls, and aesthetic landforms just before passing under the elevated I-690. Other components of the gateway could include lighting, and sculptural elements. Aesthetic enhancements to the I-690 Bridge would reinforce the sense of gateway and arrival. Gateway enhancements could be continued south to Herald Place on Clinton Avenue to further reinforce the gateway corridor experience and establish a rhythm of street trees and streetlights to transition to the city streets beyond the project limits.

Almond Street between the Adams Street and Harrison Street exits is a gateway district to Downtown and University Hill. Almond Street beneath the viaduct would be enhanced in this location to create a sense of gateway and arrival. This could include the use of specialty pavements, signage, and sculptural elements under the viaduct, as well as enhancements to the bridge architecture itself to create a distinct sense of place. Pedestrian areas at the intersections could incorporate similar amenities. Sculptural lighting elements could serve as vertical markers, reinforcing a sense of arrival.

The Northern Gateway along the northern segment of I-81 would be achieved with landscape enhancements and aesthetic treatments to structures. Reconstructed bridges, abutments, and retaining walls would receive aesthetic treatments. Plantings along the highway would be provided to enhance the travel experience and create a sense of arrival.

Improvements to I-81 between Bear Street and Hiawatha Boulevard will replace an existing concrete retaining wall with a planted embankment adjacent to the highway. The new embankment will allow for the creation of a shared-use (bicycle and pedestrian) path and overlook. The overlook would interpret the history of the site related to the Oswego Canal, industrial past, and Northside neighborhood. Elements such as lighting, interpretive signage, furnishings, and pavement materials would be included to integrate the path and overlook with the adjacent Washington Square Park area.

5.6 ENGINEERING CONSIDERATIONS OF THE COMMUNITY GRID ALTERNATIVE

5.6.1 OPERATIONS (TRAFFIC AND SAFETY) AND MAINTENANCE

Functional Classification and National Highway System (NHS)

Under the Community Grid Alternative, the Functional Classifications and NHS would not change for the majority of highways and streets. However, a number of changes would occur and are shown in **Table 5-45.** Under the Community Grid Alternative, existing I-81 between interchanges 16A and 29 would be de-designated as an interstate and re-designated as a Business Loop (see **Table 5-45)** and while not a change in functional classification or NHS, existing I-481 would be re-designated as the new I-81.

Control of Access (Community Grid Alternative)

Access to the various city and local streets within the Project Area would remain generally uncontrolled. Access to all sections of interstate within the Project Area would remain fully controlled. In addition, access to the portion of Business Loop 81 (former I-81), between the existing I-481 south interchange and Van Buren Street and the portion of Business Loop 81 (former I-81), between E.

Willow Street and the existing I-481 north interchange, would remain fully controlled. Access control would also be provided on all interstate and expressway ramps and at ramp termini, except at 19 locations. Refer to **Appendix A-3** for a list of these locations and Exhibits A-3-4.1 to A-3-4.5, which follow **Table A-3.4** and provide justification to retain these as non-conforming features.

Table 5-45
Proposed Functional Classification – Community Grid Alternative

Roadway	Road Segment	Existing Functional Class	Proposed Functional Class	Existing NHS (Y/N)	Proposed NHS (Y/N)
Irving Avenue	Van Buren St. to Genesee St.	Urban Minor Arterial	Urban Principal Arterial-Other	No	No
Irving Avenue	Genesee St. to Fayette St.	Urban Local	Urban Principal Arterial-Other	No	No
Irving Avenue	Fayette St. to I-690.	N/A (does not exist)	Urban Principal Arterial-Other	N/A	No
Crouse Avenue	Waverly Ave. to Genesee St.	Urban Major Collector	Urban Principal Arterial-Other	No	No
Crouse Avenue	Genesee St. to Burnet Ave.	Urban Major Collector	Urban Principal Arterial-Other	No	No
Former I-81	I-481 south interchange to Colvin St.	Urban Principal Arterial-Interstate	Urban Principal Arterial-Other Freeway/Expressway	Yes	Yes
Former I-81(1)	Colvin St. to Butternut St.	Urban Principal Arterial-Interstate	De-designated and removed	N/A	N/A
Former I-81	Butternut St. to I-481 north interchange	Urban Principal Arterial-Interstate	Urban Principal Arterial-Other Freeway/Expressway	Yes	Yes
Almond Street	Van Buren St. to Adams St.	Urban Minor Arterial	Urban Principal Arterial-Other	No	Yes
Catherine Street	Erie Blvd. to Burnet Ave.	Urban Local	Urban Principal Arterial-Other	No	No
Renwick Ave	MLK, Jr. East to Burt St.	Urban Major Collector	N/A – Removed (2)	No	N/A
Relocated E. Glen Ave.	Western highway boundary limit to E. Brighton Ave.	N/A – New Road	Urban Principal Arterial-Other	N/A	Yes
Genant Drive	Bear St. to Court St.	Urban Minor Arterial	Urban Local (3)	No	No
Pearl Street	Erie Blvd to BL 81 On-Ramp (4)	Urban Principal Arterial-Other	Urban Principal Arterial-Other	Yes	Yes
Oswego Blvd.	James St. to BL 81 On-Ramp (5)	Urban Principal Arterial-Other	Urban Principal Arterial-Other	Yes	Yes

Notes:

1. The current elevated section of I-81 as well as Renwick Avenue between MLK, Jr. East and Van Buren Street would be removed and replaced with an at grade arterial between Colvin Street and Van Buren Street.
2. Renwick Avenue would be removed between MLK, Jr. East and Van Buren Street and replaced with the at-grade arterial noted above.
3. A portion of Genant Drive, just south of Bear Street would be removed and the remaining portion changed to Urban Local.
4. Under this alternative, existing Pearl Street would be extended south, from E. Willow St. to Erie Boulevard.
5. Under this alternative, existing Oswego Blvd. would be extended north, from James St. to E. Willow Street.

Traffic Control Devices

Traffic Signals

Under the Community Grid Alternative, the existing traffic signal at the intersection of Townsend Street and the westbound I-690 off-ramp would be removed, as the westbound I-690 off-ramp would be relocated to Crouse Avenue. Multiple intersections would be created or reconstructed to accommodate new approaches and lane configurations. To safely accommodate vehicle and pedestrian movements under the alternative, it would be necessary to install new traffic signals or replace existing traffic signal equipment that conforms to modified geometrics and phasing when appropriate.

New signalized intersections proposed under the Community Grid Alternative include:

- Colvin Street at northbound ramp termini
- Almond Street at Cedar Street
- Almond Street at Van Buren Street
- Almond Street at Taylor Street
- Almond Street at Jackson Street
- Court Street at Genant Drive
- Court Street at Sunset Avenue
- Crouse Avenue at Madison Street
- Crouse Avenue at westbound I-690
- BL 81 Southbound Off-Ramp and On-Ramp at North Clinton Street
- Irving Avenue at Erie Boulevard
- Irving Avenue at Madison Street
- Irving Avenue at Water Street
- Oswego Boulevard at Willow Street
- Pearl Street at James Street
- Pearl Street at E. Willow Street
- Southbound BL 81 off-ramp at Willow Street
- West Street at eastbound I-690 ramps
- West Street at westbound I-690 ramps
- North Clinton Street extension at Butternut Street
- Route 5/92 at southbound new I-81 ramp termini

Intersections that would receive traffic signal replacements under the Community Grid Alternative include:

- Almond Street at Burt Street

- Almond Street at East Adams Street
- Almond Street at East Fayette Street
- Almond Street at East Washington Street
- Almond Street at East Water Street
- Almond Street at Harrison Street
- Almond Street at NY 92/East Genesee Street
- Almond Street/Catherine Street at NY 5/Erie Boulevard East
- Catherine Street at Burnet Avenue
- East Brighton Avenue at Rock Cut Road
- Southbound I-81/Relocated East Glen Avenue at E. Brighton Avenue
- BL 81 Southbound Off-Ramp at N. Clinton Street
- Bear Street at Spencer Street
- Irving Avenue at E. Adams Street
- Irving Avenue at E. Fayette Street
- Irving Avenue at Harrison Street
- Irving Avenue at NY 92/E. Genesee Street
- Irving Avenue at Van Buren Street
- Montgomery Street at Harrison Street
- North Clinton Street at NY 5/W. Genesee Street
- North Crouse Avenue at Burnet Avenue
- North Franklin Street at NY 5/W. Genesee Street
- North Franklin Street/Butternut Street at North Franklin Street
- North State Street at Butternut Street
- North Warren Street at East Erie Boulevard
- North/South Crouse Avenue at Erie Boulevard East
- NY 5/Oswego Boulevard/ at Montgomery Street
- Oswego Blvd at James Street
- South Crouse Avenue at East Adams Street
- South Crouse Avenue at East Fayette Street
- South Crouse Avenue at East Water Street
- South Crouse Avenue at Harrison Street
- South Crouse Avenue at NY 92/East Genesee Street
- South McBride Street at East Adams Street

- South Salina Street at Harrison Street and Onondaga Street
- South Townsend Street at E. Adams Street
- South Townsend Street at Harrison Street
- South Warren Street at Harrison Street
- US 11/South State Street at East Adams Street
- US 11/South State Street at Harrison Street
- Route 5/Route 92 intersection (Lyndon Corners)

Coordination between newly installed or replaced traffic signals would be established through the existing centrally controlled traffic signal communication system. Inductance loops disturbed by the Project would be replaced in kind. Pedestrian signals and push buttons would be included as part of the new signal system and pedestrian countdown timers would be provided at redesigned intersections where feasible.

Signs

New signs would be added where required and existing signs replaced as needed with new signs meeting current MUTCD standards. Signage would be installed to ensure motorists situate their vehicles in the appropriate lanes to complete desired maneuvers and to promote wayfinding to relocated interstate access points. Signs would be installed on standard posts needed to handle the necessary loading.

Under the Community Grid Alternative, re-signing along the interstate system, including overhead signs, would be extensive due to the de-designation of I-81 as an interstate through the city, re-designation of existing I-481 as I-81, and creation/removal/modification of a number of interchanges. In addition, extensive modifications to the city street system will require modification of existing and addition of new vehicular signing, as well as pedestrian/bicycle wayfinding signs.

Pavement Markings

New pavement markings would be installed within the project limits in accordance with MUTCD standards. Crosswalks would be installed at all crossing locations. Stop bars would be placed at all approaches to signalized intersections and all stop-controlled approaches at unsignalized intersections. Lane striping and arrow markings would be provided to delineate the through and auxiliary turn lanes required to meet traffic operational requirements. Pavement symbols and lane markings would also be installed for designated bike lanes, shared travel lanes, cycle tracks, and shared use paths in accordance with MUTCD standards.

Intelligent Transportation Systems (ITS)

The Regional Architecture used to plan and develop the current NYSDOT Region 3 ITS system was published in August 2002 and was based on the National ITS Architecture current at that time. The National ITS Architecture has been updated as Ver. 5 in 2003, Ver. 6 in 2007, and Ver. 7 in 2012 with additional updates in Version 7.1 published in 2015.

Under any build alternative, the NYSDOT Region 3 published vision represented by the Regional Architecture should be updated from the 2002 version to align with the current technologies for security, detection, communication, and data archiving that have emerged and matured since this

Architecture was developed. The Community Grid Alternative represents the largest requirement for modification to the ITS system in Region 3 under this Project. Six camera locations and three VMS signs will need to be removed. Five CCTV and two VMS would replace that equipment. Additionally, the ITS equipment along I-481 should be upgraded to meet the increased AADT as that corridor is re-designated as the new I-81.

This alternative would also see the greatest benefit from an updated Regional Architecture to determine where new technologies and traffic management services will best match the goals of the Region.

The Community Grid Alternative should adjust and supplement the existing equipment prior to construction to provide ITS benefits to the work zone. The Community Grid Alternative would require more temporary CCTV cameras, portable VMS and vehicle sensors forming the Smart Work Zone equipment. This equipment would be operated and maintained by the Contractor with access provided for NYSDOT and stakeholder agencies, implemented during construction wherever the roadway is left open to traffic to ensure incidents are minimized and addressed as quickly as possible.

Speeds and Delay

Speed and Travel Time Estimates

Travel time and travel speed projections for the 2026 and 2056 Community Grid Alternative conditions were performed using the VISSIM models developed for the project. **Tables 5-46 and 5-47** present the estimated travel times, delay and speeds for each of 11 travel routes by direction during the AM and PM peak hours. Under the Community Grid Alternative, Travel-Route 1 would become BL 81 and be a combination of limited-access highway and urban arterial as described in **Chapter 3, Alternatives**. Therefore, speeds would be reduced along sections of this route compared to No Build conditions, due to intersection and traffic signal delay. The average speeds along the entire length of the route would range from approximately 36 to 41 miles per hour during peak hours, with the lower speeds occurring in 2056. Speeds along the other freeways in the project area for the AM peak hour would range from 56 to 65 mph and from 54 to 64 mph in 2026 and 2056, respectively. For the PM peak hour, freeway speeds would range from 50 to 65 mph and from 52 to 63 mph in 2026 and 2056, respectively. 2026 and 2056 Community Grid travel speeds on the former I-481 routes would be similar to their corresponding No Build travel speeds. This is because that under the Community Grid Alternative, a new auxiliary lane would be added to I-481 in each direction between Interchange 5 (Kirkville Road) and Interchange 4 (I-690), as well as to northbound I-481 between Interchange 5 (Kirkville Road) and Interchange 6 (I-90) to compensate for additional traffic on the former I-481. Travel speeds on the former I-81 route (south of I-690) would be slower than No Build speeds because under the Community Grid Alternative, the section between the I-690 interchange and Colvin Street would be replaced by an urban arterial and the section between Colvin Street and the southern I-81/I-481 interchange would operate as a controlled access freeway. In the northbound direction, the southern section of BL 81 would have a transitional posted speed between Colvin Street and just south of MLK, Jr. East to bring traffic speeds down from an expressway to a city street system.

Arterial speeds throughout the project area for the AM peak hour would range from 7 to 22 mph and from 6 to 20 mph in 2026 and 2056, respectively. For the PM peak hour, arterial travel speeds would range from 6 to 29 mph and from 7 to 25 mph in 2026 and 2056, respectively. Similar to the existing and No Build conditions, a vast majority of arterial routes under the 2026 and 2056 Community Grid traffic conditions could be characterized as low-speed routes because their travel speeds are less than 20 mph during one or more peak hours.

Table 5-46
2026 No Build and Community Grid Alternative Travel Time, Delay and Speeds

ID	Route	Direction	Travel Time (min)				Travel Delay (min)				Travel Speed (mph)				Speed Limit	
			No Build		CG		No Build		CG		No Build		CG		No Build	CG
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	(mph)	(mph)
1*	BL 81/former I-81 from Exit 17 to Exit 29N	NB	13	14	18	19	2	2	7	8	56	53	41	39	45-65	30-65
		SB	17	13	20	17	6	2	9	6	41	53	36	41	45-65	30-65
2	New I-81/former I-481 from Exit 2 to Exit 8	NB	13	13	14	13	0	0	1	0	63	63	62	63	65	65
		SB	13	13	13	13	0	0	0	0	63	63	65	65	65	65
3	I-690 from Exit 8 to Exit 17	EB	9	9	8	9	0	0	0	0	52	53	57	56	45-55	45-55
		WB	9	10	9	10	0	1	0	1	55	51	56	50	45-55	45-55
4	Irving Avenue from Raynor Avenue to Fayette Street	NB	6	6	4	3	3	4	1	1	13	13	22	24	30	30
		SB	7	7	3	3	4	5	1	0	11	11	22	29	30	30
5	Almond Street from Van Buren Street to Burnet Avenue	NB	8	9	4	4	5	6	1	2	11	10	21	20	30	30
		SB	8	8	6	6	5	5	3	3	11	11	14	15	30	30
6	State Street from Adams Street to Butternut Street	NB	5	8	5	7	3	5	3	5	12	9	13	9	30	30
7	Clinton Street from Websters Landing to Adams Street	SB	3	5	3	5	2	3	2	3	15	11	15	11	30	30
8	West Street from Adams Street to Genesee Street	NB	2	2	3	3	1	1	1	1	20	21	18	17	35	35
		SB	3	2	3	2	2	1	1	1	13	20	16	20	35	35
9	Fayette Street from Walnut Avenue to West Street	EB	4	4	6	8	2	2	5	7	14	13	8	6	30	30
		WB	4	7	6	8	2	5	4	6	13	7	9	6	30	30
10	Harrison Street from Comstock Avenue to West Street	WB	5	5	8	8	3	3	6	6	12	11	7	8	30	30
11	Adams Street from West Street to Comstock Avenue	EB	6	6	8	8	4	4	6	6	10	10	7	8	30	30

Notes: *Via Almond Street under Community Grid; CG = Community Grid

Table 5-47
2056 No Build and Community Grid Alternative Travel Time, Delay and Speeds

ID	Route	Direction	Travel Time (min)				Travel Delay (min)				Travel Speed (mph)				Speed Limit	
			No Build		CG		No Build		CG		No Build		CG		No Build	CG
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	(mph)	(mph)
1*	BL 81/former I-81 from Exit 17 to Exit 29N	NB	14	13	19	19	3	2	8	7	52	54	39	39	45-65	30-65
		SB	17	13	19	19	6	2	9	8	42	53	36	37	45-65	30-65
2	New I-81/former I-481 from Exit 2 to Exit 8	NB	13	14	13	13	0	1	0	0	64	62	63	63	65	65
		SB	13	15	13	13	0	2	0	0	63	55	64	63	65	65
3	I-690 from Exit 8 to Exit 17	EB	10	10	9	9	1	1	0	0	48	49	55	57	45-55	45-55
		WB	9	10	9	9	0	1	0	0	56	51	56	52	45-55	45-55
4	Irving Avenue from Raynor Avenue to Fayette Street	NB	4	6	4	5	2	3	1	2	18	14	20	18	30	30
		SB	4	6	5	3	2	3	3	1	19	13	15	23	30	30
5	Almond Street from Van Buren Street to Burnet Avenue	NB	4	9	4	5	1	6	1	2	20	9	20	19	30	30
		SB	8	6	6	6	5	3	3	3	11	14	14	14	30	30
6	State Street from Adams Street to Butternut Street	NB	6	6	7	8	3	4	5	6	12	10	9	8	30	30
7	Clinton Street from Websters Landing to Adams Street	SB	3	4	3	4	2	2	2	2	15	13	15	12	30	30
8	West Street from Adams Street to Genesee Street	NB	2	2	4	2	1	0	3	1	21	27	12	19	35	35
		SB	2	2	2	2	1	0	1	1	19	28	20	25	35	35
9	Fayette Street from Walnut Avenue to West Street	EB	7	6	6	7	5	4	5	5	8	9	8	7	30	30
		WB	7	7	8	6	6	5	7	4	7	7	6	9	30	30
10	Harrison Street from Comstock Avenue to West Street	WB	7	8	7	9	5	6	5	7	9	7	9	7	30	30
11	Adams Street from West Street to Comstock Avenue	EB	7	8	7	8	5	6	5	6	8	8	8	8	30	30

Notes: *Via Almond Street under Community Grid; CG = Community Grid

Travel times for key origin-destination pairs in Onondaga County were estimated using output from VISSIM traffic simulations, as well as the I-81 Project Travel Demand Model. **Table 5-48** summarizes the average travel times for trips traveling between these origin-destination pairs during the AM and PM peak periods.

Table 5-48
No Build Alternative and Community Grid Alternative Origin-Destination Travel Times (Minutes)

	Year	2026				2056			
	Peak	AM		PM		AM		PM	
Origin	Destination	No Build	CG	No Build	CG	No Build	CG	No Build	CG
Baldwinsville	Cicero	22	22	23	23	23	23	23	23
	Destiny USA	22	23	20	21	23	24	21	22
	Downtown	21	21	20	21	22	21	21	21
	Fairmount	18	18	18	18	18	18	18	18
	Fayetteville/Manlius	31	31	31	32	32	31	38	32
	LaFayette	32	35	31	35	34	37	32	36
	Liverpool	15	15	15	15	15	15	16	16
	St. Joseph's Hospital	22	21	21	21	23	22	21	22
	University Hill	26	22	25	21	27	24	23	22
Cicero	Baldwinsville	21	21	23	23	21	21	23	23
	Destiny USA	12	11	11	11	11	11	11	11
	Downtown	16	13	14	13	15	12	13	13
	Fairmount	22	21	23	23	21	21	22	22
	Fayetteville/Manlius	19	19	20	20	18	18	24	19
	LaFayette	27	27	25	27	27	27	24	27
	Liverpool	13	13	14	14	13	13	13	13
	St. Joseph's Hospital	15	13	12	12	15	12	12	12
	University Hill	20	16	18	15	20	17	16	15
Destiny USA	Baldwinsville	22	22	25	25	22	23	26	27
	Cicero	11	12	13	13	10	11	11	12
	Downtown	8	7	9	9	7	7	8	9
	Fairmount	12	12	15	15	12	12	15	15
	Fayetteville/Manlius	17	19	20	20	17	18	25	21
	LaFayette	19	23	20	24	19	24	19	25
	Liverpool	8	9	10	10	8	9	9	11
	St. Joseph's Hospital	7	7	8	7	7	7	7	8
	University Hill	12	10	13	10	12	11	11	11

Table 5-48 (cont'd)
No Build and Community Grid Origin-Destination Travel Times (Minutes)

	Year	2026				2056			
	Peak	AM		PM		AM		PM	
Origin	Destination	No Build	CG	No Build	CG	No Build	CG	No Build	CG
Downtown	Baldwinsville	19	21	21	22	19	21	21	23
	Cicero	15	15	15	16	13	14	14	15
	Destiny USA	5	6	5	6	5	5	5	6
	Fairmount	12	14	14	15	12	14	13	15
	Fayetteville/Manlius	15	18	18	19	15	17	23	19
	LaFayette	17	17	17	17	16	16	17	18
	Liverpool	9	10	9	10	8	9	9	10
	St. Joseph's Hospital	3	4	3	3	3	4	3	3
	University Hill	7	7	8	6	6	6	7	7
Fairmount	Baldwinsville	17	17	18	18	18	18	19	19
	Cicero	23	22	23	23	22	22	22	23
	Destiny USA	13	13	13	13	13	13	13	13
	Downtown	13	13	12	13	14	13	13	13
	Fayetteville/Manlius	22	23	23	24	24	22	30	24
	LaFayette	24	27	23	27	26	28	24	28
	Liverpool	17	17	17	17	17	17	17	18
	St. Joseph's Hospital	14	13	13	13	15	14	13	14
	University Hill	17	14	16	13	19	16	15	14
Fayetteville/ Manlius	Baldwinsville	29	28	31	29	30	28	30	30
	Cicero	19	18	20	18	19	17	17	17
	Destiny USA	15	13	16	14	15	13	14	14
	Downtown	16	16	16	16	17	15	15	16
	Fairmount	22	21	24	22	23	21	22	22
	LaFayette	18	18	19	19	18	18	20	19
	Liverpool	19	17	20	18	19	18	18	19
	St. Joseph's Hospital	15	14	16	14	15	14	14	15
	University Hill	18	15	18	15	19	15	16	15

Table 5-48 (cont'd)
No Build and Community Grid Origin-Destination Travel Times (Minutes)

	Year	2026				2056			
	Peak	AM		PM		AM		PM	
Origin	Destination	No Build	CG	No Build	CG	No Build	CG	No Build	CG
LaFayette	Baldwinsville	30	34	31	35	32	35	32	36
	Cicero	25	28	25	27	26	27	24	26
	Destiny USA	16	20	15	20	17	20	16	20
	Downtown	17	16	16	17	19	17	15	16
	Fairmount	23	27	24	28	25	27	24	28
	Fayetteville/Manlius	18	19	22	19	18	18	25	19
	Liverpool	20	24	19	24	21	24	20	24
	St. Joseph's Hospital	18	17	18	18	20	18	16	17
	University Hill	16	14	16	14	18	14	14	14
Liverpool	Baldwinsville	13	13	15	15	14	14	14	14
	Cicero	14	14	15	15	13	13	14	14
	Destiny USA	6	7	6	7	6	7	6	7
	Downtown	10	8	9	8	10	8	9	9
	Fairmount	16	16	18	18	16	16	18	18
	Fayetteville/Manlius	20	19	20	20	20	19	26	21
	LaFayette	22	24	20	23	22	24	20	25
	St. Joseph's Hospital	10	8	8	7	10	8	8	7
	University Hill	15	11	13	10	15	12	12	11
St. Joseph's Hospital	Baldwinsville	21	20	21	22	20	21	22	23
	Cicero	13	13	13	14	12	12	12	13
	Destiny USA	3	3	3	3	3	3	4	4
	Downtown	4	3	3	3	3	3	3	3
	Fairmount	14	13	14	15	13	14	14	16
	Fayetteville/Manlius	14	16	17	18	14	16	22	18
	LaFayette	18	18	18	20	18	19	18	20
	Liverpool	7	7	7	8	7	7	8	8
	University Hill	7	7	8	7	7	8	7	7

Table 5-48 (cont'd)
No Build and Community Grid Origin-Destination Travel Times (Minutes)

	Year	2026				2056			
	Peak	AM		PM		AM		PM	
Origin	Destination	No Build	CG	No Build	CG	No Build	CG	No Build	CG
University Hill	Baldwinsville	21	20	24	22	21	21	24	23
	Cicero	16	16	18	17	15	15	16	16
	Destiny USA	6	6	9	7	7	7	7	7
	Downtown	6	6	6	7	6	6	6	6
	Fairmount	14	13	17	15	14	14	16	15
	Fayetteville/Manlius	15	15	18	16	15	15	24	17
	LaFayette	16	14	18	14	16	15	16	15
	Liverpool	10	10	13	11	10	11	12	12
	St. Joseph's Hospital	6	5	7	7	6	6	6	7

Note: CG = Community Grid

Traffic Volumes

Future Build Year Traffic Volumes

A future Build year condition represents a future-year growth scenario, including all planned/committed transportation projects that are included in the No Build, as well as the I-81 Viaduct Project alternatives. Two future Build years were analyzed - the ETC year 2026 and design year 2056. The primary tool used for estimating future Build year traffic volumes is the I-81 Project Travel Demand Model. This model is based on the SMTC regional travel demand model developed by the Syracuse Metropolitan Transportation Council (SMTC), with additional refinements to improve model accuracy within the Project area. The I-81 Project Travel Demand Model predicts traffic volumes as a result of the anticipated changes in land use, population, economic activity, and transportation system. AM and PM peak hour traffic volumes were forecasted separately for the 2026 and 2056 Build years. Demand reductions to account for changes in telecommuting behavior were not applied to the analysis of the completed Community Grid Alternative under ETC and ETC+30 conditions.

Projected future Build traffic volumes under the Community Grid Alternative for the 2026 and 2056 analysis years and for the AM and PM peak hours are located in **Appendix C-3** for all interstate segments, ramp connections, and intersection turning movements. **Table 5-49** shows the weekday AM and PM peak hour traffic volumes for key segments on freeways and several local roadways in the project area.

Table 5-49
2026 and 2056 Community Grid Alternative Traffic Volumes at Key Locations

Location	Direction	2026				2056			
		AM		PM		AM		PM	
		No Build	CG	No Build	CG	No Build	CG	No Build	CG
I-81 Just North of Colvin Street Interchange (Former I-81 for Community Grid)	NB	3,032	1,287	2,957	917	3,412	1,530	3,101	1,058
	SB	2,357	606	3,519	1,733	2,480	667	3,815	2,027
I-81 Just South of Bear St Interchange (Former I-81 for Community Grid)	NB	2,484	1,951	5,945	5,138	2,688	2,151	6,322	5,534
	SB	5,254	3,437	3,529	2,177	5,681	3,782	3,820	2,398
I-481 Just South of I-690 Interchange (New I-81 for Community Grid)	NB	3,492	4,359	2,784	3,771	3,722	4,647	2,958	4,053
	SB	2,030	2,987	3,565	4,617	2,203	3,233	3,814	4,916
I-481 Just North of I-690 Interchange (New I-81 for Community Grid)	NB	2,304	2,634	3,025	3,438	2,551	2,917	3,267	3,680
	SB	2,740	3,275	2,459	3,067	3,083	3,617	2,797	3,473
I-690 Just West of West Street Interchange	EB	4,512	4,445	2,545	2,662	4,893	4,840	2,801	2,901
	WB	1,974	1,906	4,024	3,708	2,178	2,143	4,386	4,067
I-690 Just East of Teall Avenue Interchange	EB	3,560	3,470	4,795	4,613	3,711	3,609	4,965	4,825
	WB	3,977	4,260	3,937	4,334	4,271	4,548	4,061	4,497
West Street Just South of Fayette Street	NB	495	554	833	966	438	561	782	1,034
	SB	1,022	1,022	655	613	1,082	1,105	698	646
Clinton Street Just North of Onondaga Street	NB					196		265	
	SB	546	751	483	654	424	802	327	697
Salina Street Just North of Onondaga Street	NB	318	393	419	489	282	404	437	520
	SB	362	560	283	406	440	552	370	427
State Street Just North of Harrison Street	NB	167	361	235	535	153	279	278	475
	SB	375	463	323	374	429	523	329	403
Almond Street Just North of Harrison Street	NB	713	976	519	1,378	747	1,060	517	1,452
	SB	1,528	986	1,004	740	1,584	960	1,159	828
Irving Avenue Just North of Harrison Street	NB	120	166	275	498	140	226	318	589
	SB	554	777	358	366	633	906	391	452
Crouse Avenue Just North of Harrison Street	NB	178	272	383	664	174	319	371	755
	SB		288		157		312		167
Erie Boulevard Just East of Almond Street	EB	363	556	357	983	417	582	399	971
	WB	273	781	395	592	313	780	447	593
Fayette Street Just East of Almond Street	EB	276	229	157	258	285	229	185	282
	WB	152	224	294	304	157	256	297	316
Genesee Street Just East of Almond Street	EB	357	341	461	524	370	339	478	585
	WB	369	296	372	222	386	302	436	230
Harrison Street Just East of Almond Street	EB	49	313	54	242	113	344	79	307
	WB	838	521	1,651	1,093	913	564	1,867	1,146
Adams Street Just East of Almond Street	EB	1,742	749	817	563	1,876	858	963	595

Generally, traffic volume increases under the Community Grid Alternative would be fairly uniform and modest when comparing Build year 2056 to 2026, and the evening peak would exceed the morning peak in terms of overall traffic in both years.

The Community Grid Alternative would establish former I-481 as the quickest path for regional north-south travel through the project area. As a result, traffic would increase substantially on former I-481 both north and south of I-690 and decrease on former I-81.

Under the Community Grid Alternative, the southbound former I-81 exit to Butternut Street and the slip-ramp to Salina Street would not be provided. Traffic exiting southbound former I-81 towards downtown is consolidated onto Clinton Street and traffic would increase along the arterial. Traffic would decrease on westbound Harrison Street and eastbound Adams Street, due removal of the elevated former I-81 and associated ramps in their vicinity. Traffic would increase on sections of Almond Street north of former Harrison/Adams Street interchange because Almond Street would accommodate some through traffic, which would be on the elevated former I-81 in the No Build condition. Traffic would increase on eastbound Harrison Street (east of Almond Street) because the portion of Harrison Street (west of Almond Street) would be converted to two-way operation under the Community Grid Alternative, allowing eastbound travel further west and improving network connectivity to the eastbound lanes on Harrison Street. Traffic would increase on Crouse and Irving Avenues, as these routes would be established as direct routes between University Hill and the new I-690 interchange at Crouse and Irving Avenues.

Traffic Redistribution due to Removal of the I-81 Viaduct

Under the Community Grid Alternative, the existing I-81 viaduct between the New York, Susquehanna and Western Railway bridge near Renwick Avenue and the I-81/I-690 interchange would be demolished. Therefore, I-81 traffic would be diverted to other freeways or local roads, depending on the trip types or destinations.

Potential diversion routes for northbound BL 81 traffic would include:

Destinations West of Syracuse: Traffic would use northbound Almond Street to Erie Boulevard and access westbound I-690 at West Street.

Destinations East of Syracuse: Traffic would use Almond Street to Erie Boulevard and re-enter eastbound I-690 at Crouse Avenue. Alternatively, traffic would use the new northbound I-81 (former I-481) and I-690 to locations east of Syracuse.

Destinations North of Syracuse: Traffic would use Almond Street, then travel westbound on Erie Boulevard, and access northbound BL 81 at the Pearl Street on-ramp. Alternatively, longer distance traffic would use new northbound I-81.

Since there is no existing direct connection from southbound I-81 to westbound I-690, only two potential diversion routes for southbound I-81 traffic were identified:

Destinations East of Syracuse: Traffic would use the southbound BL 81 to the eastbound I-690 ramp, much as it does today.

Destinations South of Syracuse: Traffic would use the southbound BL 81 (former I-81) exit to Oswego Boulevard, travel east on Erie Boulevard to southbound Almond Street, then transition back to a freeway section near Colvin Street. Alternatively, longer distance traffic would use new southbound I-81.

Most I-81 traffic is destined for Downtown and University Hill, the two major regional employment centers. These vehicles would disperse among the many roadways parallel to existing I-81 and Almond Street that would provide more direct routes to their various destinations. To identify which roadways (or areas) would be used by local traffic diverted from I-81, screenlines--delineations that extend across a series of roadway links to use in the evaluation of travel movements--were established within the Project's traffic model. The model then estimated the volumes of northbound and southbound traffic traveling on numerous roadways through the study area under the Community Grid and No Build Alternatives to identify where traffic displaced from the viaduct would travel (see **Figures 5-30 and 5-31**).

Screenline A, established between MLK, Jr. East and East Colvin Street, comprises four sections, with each section representing a specific area:

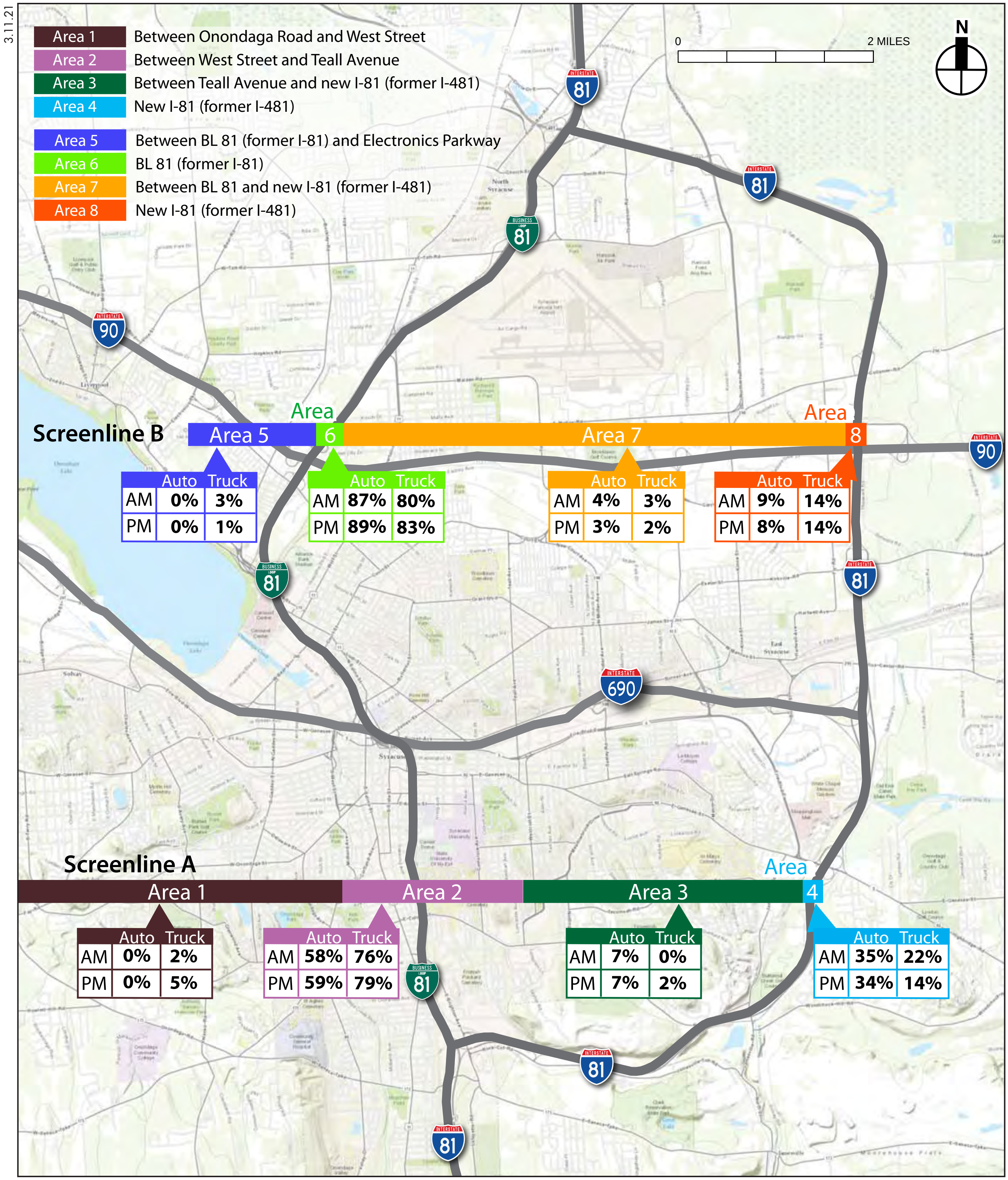
- Area 1 – Between Onondaga Road and West Street
- Area 2 – Between West Street and Teall Avenue
- Area 3 – Between Teall Avenue and new I-81 (former I-481)
- Area 4 – New I-81 (former I-481)

It is anticipated that traffic on northern I-81 (north of I-690) would be less likely to divert than traffic on southern I-81 (south of I-690) traffic because (1) north of I-690, BL 81 would be a high-speed, limited-access facility, (2) there are fewer northern roadways parallel to I-81/Genant Drive to bring traffic directly to Downtown and University Hill, and (3) southbound BL 81 would provide exits to Clinton Street and eastbound I-690.

Screenline B was established to identify roadways (or areas) that would accommodate local traffic diverted from I-81 north of I-690. Screenline B, between Hancock International Airport and I-90, consists of four sections, each representing a specific area:

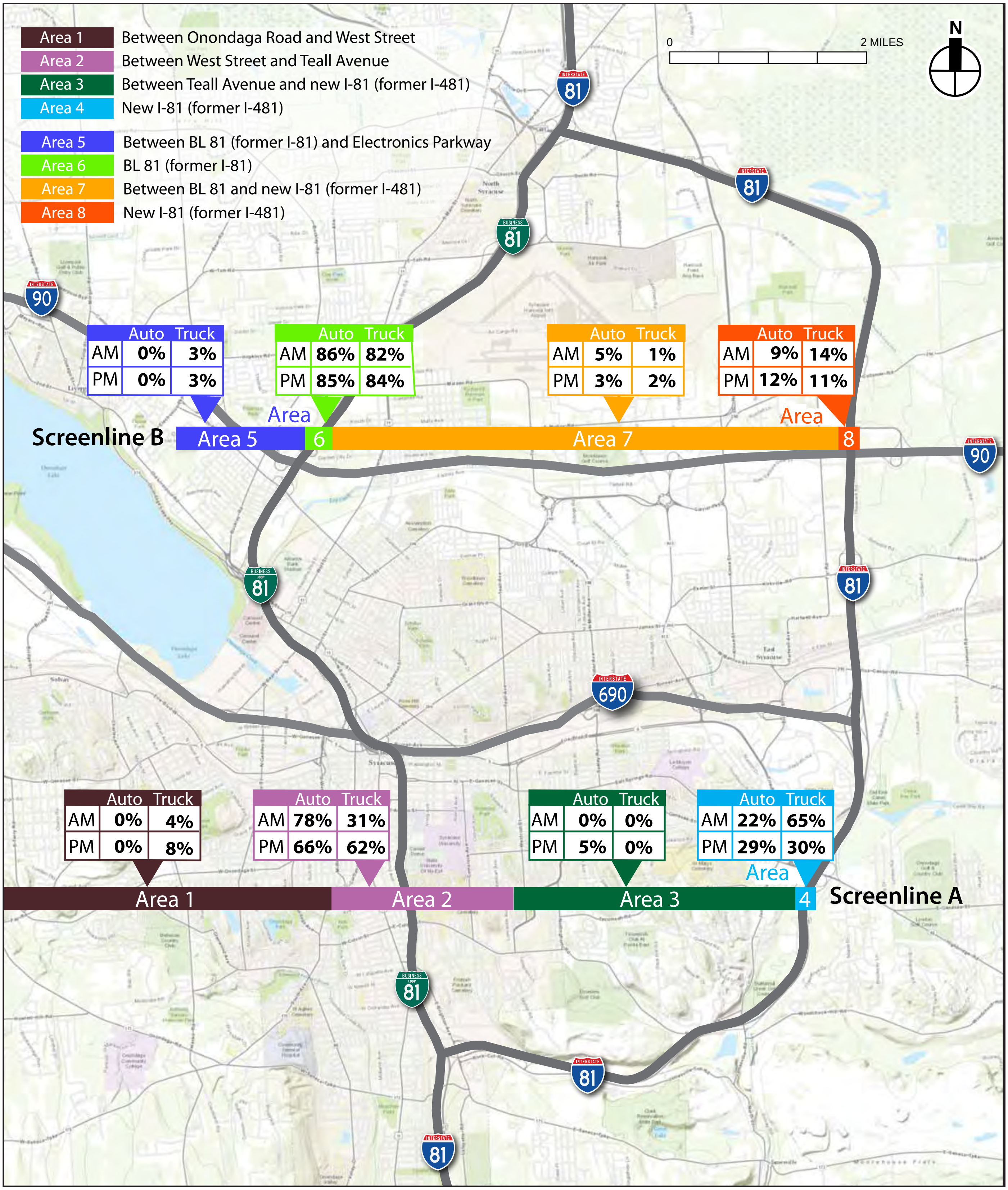
- Area 5 – Between BL 81 and Electronics Parkway
- Area 6 – BL 81
- Area 7 – Between BL 81 and new I-81 (former I-481)
- Area 8 – New I-81 (former I-481)

Tables 5-50 and **5-51** show I-81 traffic diversion patterns at Screenlines A and B, respectively. These tables show the percentage of No Build traffic on I-81 at Screenlines A and B that would use other roadways under the Community Grid Alternative. For example, during the AM peak hour, **Table 5-50** (Screenline A) shows that 0 percent of northbound I-81 automobile traffic would be diverted to roadways within Area 1, 58 percent within Area 2, 7 percent within Area 3, and 35 percent within Area 4.



Community Grid Alternative —
I-81 Northbound Traffic Diversion by Zone
Figure 5-30

3.11.21



Community Grid Alternative
I-81 Southbound Traffic Diversion by Area

Table 5-50
I-81 Traffic Diversion Patterns on Screenline A

Mode	Peak Hour	I-81 Northbound Traffic Diversion Areas				I-81 Southbound Traffic Diversion Areas			
		Area 1	Area 2	Area 3	Area 4	Area 1	Area 2	Area 3	Area 4
Auto	AM	0%	58%	7%	35%	0%	78%	0%	22%
	PM	0%	59%	7%	34%	0%	66%	5%	29%
Truck	AM	2%	76%	0%	22%	4%	31%	0%	65%
	PM	5%	79%	2%	14%	8%	62%	0%	30%

Table 5-51
I-81 Traffic Diversion Patterns on Screenline B

Mode	Peak Hour	I-81 Northbound Traffic Diversion Areas				I-81 Southbound Traffic Diversion Areas			
		Area 5	Area 6	Area 7	Area 8	Area 5	Area 6	Area 7	Area 8
Auto	AM	0%	87%	4%	9%	0%	86%	5%	9%
	PM	0%	89%	3%	8%	0%	85%	3%	12%
Truck	AM	3%	80%	3%	14%	3%	82%	1%	14%
	PM	1%	83%	2%	14%	3%	84%	2%	11%

As shown in **Table 5-50** (Screenline A), during the AM and PM peak hours, approximately 59 percent of northbound I-81 auto traffic would be diverted to roadways within Area 2, and 35 percent would use the new I-81 in Area 4. Similarly, during the AM and PM peak hours respectively, 78 and 66 percent of southbound I-81 auto traffic would be diverted to roadways within Area 2, and 22 and 29 percent of southbound I-81 auto traffic would use the new I-81 in Area 4. Higher percentages of northbound and southbound I-81 auto traffic would use roadways within Area 2 because this area contains many roadways parallel to I-81 which provide access to and from the region's major activities centers including Downtown and University Hill. Traffic volumes on the new I-81 would increase and include additional pass-through trips that currently use northbound or southbound I-81, as well as trips to and from Westcott, Eastwood, and East Syracuse that currently use northbound I-81 to eastbound I-690 (or westbound I-690 to southbound I-81). Higher percentages of northbound and southbound I-81 trucks would use roadways within Areas 2 and 4. During the AM and PM peak hours respectively, 76 and 79 percent of northbound I-81 trucks would be diverted to roadways within Area 2, and 22 and 14 percent of northbound I-81 trucks would use the new I-81 in Area 4. Thirty-one and 62 percent of southbound I-81 trucks would divert to roadways within Area 2 during the AM and PM peak hours, respectively. In addition, 65 and 30 percent of trucks would use the new I-81 during the AM and PM peak hours, respectively. During the AM peak hour, more southbound I-81 trucks pass through the Syracuse region and fewer have destinations in within the city.

As shown in **Table 5-51**, the majority of northbound and southbound I-81 auto traffic would use BL 81 in Area 6 near Screenline B. This is because there are fewer northern roadways parallel to I-81/Genant Drive to bring traffic directly to Downtown and University Hill. Whereas 87 percent of northbound and 86 percent of southbound I-81 auto traffic would use BL 81 during the AM peak hour, 89 percent of northbound and 85 percent of southbound I-81 auto traffic would use BL 81 during the PM peak hour. Approximately 9 percent of northbound or southbound I-81 auto traffic would use the new I-81 in Area 8 during both AM and PM peak hours. This 9 percent of I-81 directional traffic mainly consists of pass-through trips currently using I-81 to travel from the I-81/I-481 southern interchange (Exit 16) to the I-81/I-481 northern interchange (Exit 29) or vice versa. Similar to I-81 auto diversion patterns, higher percentages of northbound and southbound I-81 truck traffic would use roadways within Areas 6 and 8. During the AM and PM peak hours respectively, 80 and 83 percent of northbound I-81 truck traffic would use BL 81 in Area 6. Similarly, 82 and 84 percent of southbound I-81 truck traffic would use BL 81 in the AM and PM peak hours, respectively. Between 11 and 14 percent of northbound and southbound I-81 truck traffic would use the new I-81 in Area 8 during both the AM and PM peak hours. Fewer I-81 trucks would use other roadways in Areas 5 and 7.

Overall, traffic is dispersed more broadly south of I-690 compared to north of I-690 where traffic patterns are not altered as significantly. This is due to the removal of the I-81 viaduct connection south of I-690 under the community grid alternative which causes traffic to be redirected onto various parallel north/south routes to reach major destinations.

Level of Service and Mobility

At Project Completion & Design Year

The Community Grid Alternative would relieve the existing/No Build condition traffic congestion issues on southbound I-81, the Harrison Street/Adams Street interchange, and Almond Street by removing the I-81 interchange at Harrison/Adams Streets, as well as dispersing traffic along many roadways with existing surplus capacity and providing more-direct access to the City's major activity centers. The Community Grid Alternative would provide interstate access at alternative locations and provide capacity improvements on the local street system, in addition to the remaining portions of the interstate system. The Community Grid Alternative would accomplish this by providing the following improvements:

- Redesigning I-481 to accommodate additional traffic currently served by I-81 and re-designating I-481 as the new I-81.
- Constructing a new I-690 interchange at Crouse/Irving Avenues to provide direct access between University Hill and locations to the north, east, and west. Substantial local street improvements would be provided on Crouse Avenue and Irving Avenue to accommodate increased traffic.
- Establishing additional, more-direct access to University Hill and the Southside from points south of the city by providing access to multiple east-west cross streets south of Adams Street, including Van Buren Street, Burt Street, and Taylor Street.
- Providing substantial geometric and capacity improvements on many city streets to accommodate the new travel patterns established by removing the I-81 Viaduct and creating improved access and connectivity to the City's major activity centers.

A description of the Community Grid Alternative is provided in **Chapter 3, Alternatives**.

Future Community Grid Level of Service: Freeway Level of Service

Based on VISSIM delay calculation, projected future Community Grid Alternative freeway levels of service (LOS) were calculated for all the basic freeway segments, freeway ramps, and weaving segments within the Project Area (see **Appendix C-3**). **Table 5-52** shows 2026 and 2056 freeway

LOS conditions resulting from the Community Grid Alternative traffic on selected critical sections of I-81, I-481, and I-690.

Since the Community Grid Alternative would correct most non-standard and non-conforming highway features within the Project Area and make improvements at existing/No Build locations identified as congested, it would substantially improve traffic operational conditions on the freeway system during the AM and PM peak hours. In comparison to No Build condition LOS results, the numbers of freeway segments, ramp junctions, and weaving sections operating unacceptably would be reduced by 94 and 97 percent in 2026 and 2056, respectively, under the Community Grid Alternative.

Table 5-52
2026 and 2056 Community Grid Alternative Freeway LOS Analysis

Segment	Type	2026				2056			
		AM		PM		AM		PM	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
Northbound BL 81 (Former I-81)									
before off-ramp to Northbound Former I-481	BFS	14.9	B	11.2	B	16.2	B	13.1	B
at off-ramp to Northbound Former I-481	Diverge	3.8	A	5.4	A	8.3	A	6.2	A
at off-ramp to Glen Av	Diverge	8.4	A	5.7	A	8.8	A	5.0	A
between Glen Av on and off-ramps	BFS	15.6	B	10.7	A	16.8	B	9.0	A
between Glen Av on-ramp and S. Salina St off-ramp	BFS	10.5	A	7.5	A	13.4	B	6.5	A
at Exit 17 (S. Salina St, Brighton Av) to E Brighton St	Diverge	6.0	A	6.6	A	8.2	A	4.0	A
between Interchange 17 (S. Salina St, Brighton Av) off and on-ramps	BFS	6.7	A	0.6	A	8.7	A	4.2	A
between S. Salina St on-ramp and Colvin St off-ramp	Weave	6.5	A	1.2	A	8.0	A	4.4	A
between Colvin St on and off-ramps	BFS	7.5	A	1.6	A	8.7	A	4.5	A
at Colvin St on-ramp	Merge	8.0	A	2.8	A	10.2	B	7.0	A
at Interchange 19 (N. Salina St, Pearl St) on-ramp	Merge	4.2	A	22.2	C	3.3	A	24.1	C
between on-ramp from Pearl St and Bear St off-ramp	Weave	7.7	A	20.7	C	9.3	A	23.2	C
at Exit to Bear St	Diverge	6.0	A	15.2	B	7.1	A	16.5	B
between Exit to Bear St and off-ramp to Exit 23 (Hiawatha Blvd)	BFS	6.6	A	18.5	B	8.8	A	20.7	C
between Exit 23 (Hiawatha Blvd) off-ramp and on-ramp from Bear St	BFS	5.3	A	14.4	B	6.4	A	16.8	B
at Bear St on-ramp	Merge	6.0	A	12.8	B	6.6	A	14.1	B
at Interchange 23 (Hiawatha Blvd) on-ramp	Merge	12.9	B	24.2	C	16.4	B	26.9	C
between Interchange 23 (Hiawatha Blvd) on-ramp and Exit 25 (7th Northbound St)	BFS	9.2	A	18.7	C	12.1	B	20.7	C
at Exit 25 (7th Northbound St)	Diverge	10.8	B	20.1	C	14.0	B	22.1	C
between Interchange 25 (7th Northbound St) off and on-ramps	BFS	9.1	A	21.6	C	12.4	B	24.1	C

Table 5-52 (cont'd)
2026 and 2056 Community Grid Alternative Freeway LOS Analysis

Segment	Type	2026				2056			
		AM		PM		AM		PM	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
between Interchange 25 (7th Northbound St) on-ramp and Exit 25A (I-90)	Weave	7.8	A	20.1	C	10.4	B	23.6	C
between Interchange 25A (I-90) off and on-ramps	BFS	8.6	A	22.9	C	11.6	B	25.3	C
between Interchange 25A (I-90) on-ramp and Exit 26 (US 11)	BFS	9.0	A	20.2	C	11.6	B	22.2	C
at Exit 26 (US 11)	Diverge	8.5	A	17.0	B	10.7	B	18.2	B
between Exit 26 (US 11) and Exits 27-28 (Airport Rd)	BFS	8.4	A	19.9	C	11.4	B	22.3	C
Northbound BL 81 (Former I-81)									
between Interchange 27 (Airport Blvd) off and on-ramp	BFS	5.3	A	15.5	B	6.9	A	17.7	B
at Interchange 27 (Airport Blvd) on-ramp	Merge	8.0	A	19.7	B	9.7	A	22.0	C
between Interchange 27 (Airport Blvd) on-ramp and Interchange 28 (Taft Rd) on-ramp	BFS	7.9	A	20.2	C	9.6	A	22.8	C
at Interchange 28 (Taft Rd) on-ramp	Merge	10.4	B	21.5	C	12.0	B	23.2	C
between Interchange 28 (Taft Rd) on-ramp and Exit 29S (Former I-481 Southbound)	BFS	10.0	A	23.8	C	11.8	B	26.4	D
at Exit 29S (Former I-481 Southbound)	Diverge	9.5	A	18.9	B	11.0	B	20.7	C
between Exit 29S (I-481 Southbound) and NY 481 Southbound on-ramp	BFS	8.9	A	25.8	C	10.5	A	30.1	D
between Interchange 29N (NY 481) on and off-ramps	Weave	6.9	A	36.3	E	7.9	A	39.4	E
between Exit 29N (Northbound NY-481) and Northbound Former I-481 (3 lane)	BFS	6.7	A	16.3	B	7.4	A	15.4	B
between Exit 29N (Northbound NY-481) and Northbound Former I-481 (2 lane)	BFS	9.9	A	19.4	C	10.8	A	21.7	C
at Interchange 29S (Former I-481) on-ramp	Merge	6.5	A	12.7	B	7.5	A	14.8	B
between Interchange 29N (Former I-481) and Exit 30 (NY 31)	BFS	8.3	A	16.6	B	9.7	A	20.0	C
Southbound BL 81 (Former I-81)									
between Interchange 30 (NY-31) on-ramp and Exit 29N (Former I-481)	BFS	21.0	C	12.1	B	27.2	D	13.8	B
at Exit Southbound Former I-81	Diverge	21.6	C	11.7	B	33.9	D	13.3	B
between Southbound Former I-481 off-ramp and Westbound NY 481 off-ramp	BFS	22.2	C	11.9	B	26.7	D	13.3	B
at Exit 29N (NY-481)	Diverge	14.6	B	8.0	A	16.8	B	8.9	A
between Northbound NY-481 off-ramp and Former Northbound I-481 on-ramp	BFS	20.3	C	10.5	A	23.4	C	11.9	B
at Interchange 29S (NY-481) on-ramp	Merge	14.6	B	8.9	A	17.2	B	10.5	B
between Interchange 29S (Former I-481) and Southbound NY 481 on-ramps	BFS	14.4	B	8.0	A	16.5	B	9.1	A
at Interchange 29N (NY 481) on-ramp	Merge	22.4	C	13.2	B	24.6	C	14.0	B
between Interchange 29S (Former I-481) on-ramp and Exit 28 (Taft Rd)	BFS	23.8	C	13.3	B	26.5	D	14.3	B

Table 5-52 (cont'd)
2026 and 2056 Community Grid Alternative Freeway LOS Analysis

Segment	Type	2026				2056			
		AM		PM		AM		PM	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
at Exit 28 (Taft Rd)	Diverge	17.5	B	11.3	B	19.0	B	11.9	B
between Exit 28 (Taft Rd) and Exits 27-26 (Airport Rd) off-ramps	BFS	20.9	C	11.3	B	23.7	C	12.3	B
at Exit 27(Airport Blvd)	Diverge	22.2	C	15.6	B	19.7	B	13.8	B
between Interchange 27 (Airport Rd) off and on-ramps	BFS	17.8	B	8.8	A	20.1	C	9.6	A
at Interchange 27 (Airport Rd) on-ramp	Merge	17.6	B	12.4	B	19.9	B	13.5	B
between Interchange 27 (Airport Rd) and Interchange 27-26 (US 11) on-ramps	BFS	20.3	C	12.4	B	22.9	C	13.5	B
at Interchange 26 (US 11) on-ramp	Merge	16.3	B	13.8	B	17.4	B	14.4	B
between Interchange 26 (US 11) on-ramp and Exit 25A (I-90)	BFS	18.0	C	13.9	B	20.2	C	14.8	B
between Exit 25A (I-90) and Westbound I-90 Exit 36	BFS	21.6	C	15.3	B	24.4	C	16.2	B
between Interchange 25A (I-90) on-ramp and Exit 25 (7th Northbound St)	Weave	17.7	B	12.2	B	19.9	B	12.8	B
between Exit 25 (7th Northbound St) and on-ramp from 7th N St	BFS	18.5	C	12.4	B	21.0	C	13.3	B
between Interchange 25 (7th Northbound St) on-ramp and Exit 23A (Hiawatha Blvd)	Weave	17.0	B	12.1	B	18.9	B	13.0	B
between Exit 23A (Hiawatha Blvd) and Old Liverpool Rd on-ramp	BFS	18.3	C	10.6	A	21.1	C	11.4	B
at Old Liverpool Rd on-ramp	Merge	18.6	B	11.6	B	20.8	C	14.0	B
at N. Clinton St off-ramp	Diverge	17.0	B	10.4	B	19.4	B	13.0	B
between N. Clinton St on and off-ramp	BFS	17.7	B	8.0	A	19.9	C	8.5	A
at N. Clinton St on-ramp	Merge	13.6	B	5.8	A	14.6	B	8.0	A
between N. Clinton St on-ramp and I-690 off-ramp	BFS	20.2	C	12.5	B	22.5	C	13.4	B
at I-690 off-ramp	Diverge	20.1	C	12.3	B	22.1	C	13.1	B
at Clinton St off-ramp	Diverge	25.4	C	6.9	A	27.4	C	9.4	A
between Van Buren Street roundabout and Exit 17 (S. Salina St, Brighton Av) off-ramp	BFS	3.4	A	10.5	A	3.5	A	10.6	A
at Exit 17 (S. Salina St, Brighton Av) off-ramp	Diverge	3.3	A	8.9	A	3.4	A	8.7	A
between Exit 17 (S. Salina St, Brighton Av) off and on-ramps	BFS	1.9	A	6.7	A	1.9	A	7.7	A
at Brighton Av on-ramp	Merge	2.6	A	7.3	A	3.9	A	9.4	A
at Glen Av off-ramp	Diverge	2.6	A	7.5	A	3.4	A	10.0	A
at off-ramp to Northbound Former I-481	Diverge	1.5	A	10.8	B	4.5	A	11.5	B
between off-ramp to Northbound Former I-481 and on-ramp from Southbound Former I-481	BFS	0.4	A	8.1	A	4.1	A	11.6	B
at on-ramp from Glen Av	Merge	1.7	A	6.1	A	3.1	A	8.6	A

Table 5-52 (cont'd)
2026 and 2056 Community Grid Alternative Freeway LOS Analysis

Segment	Type	2026				2056			
		AM		PM		AM		PM	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
at Interchange 16A (Former I-481) on-ramp	Merge	3.7	A	7.8	A	6.0	A	9.7	A
after on-ramp from Southbound Former I-481	BFS	4.7	A	8.9	A	7.5	A	10.9	A
Northbound I-81 (Former I-481)									
at Exit 1 (Rock Cut Rd)	Weave	6.1	A	8.0	A	6.3	A	8.0	A
between Interchange 1 (Brighton Av, Rock Cut Rd) off and on-ramps	BFS	9.1	A	7.2	A	9.6	A	10.9	A
at Interchange 1 (Brighton Av, Rock Cut Rd) on-ramp	Merge	11.9	B	10.8	B	11.6	B	14.1	B
between Interchange 1 (Brighton Av, Rock Cut Rd) and Exit 2 (Jamesville Rd)	BFS	19.6	C	13.2	B	16.1	B	17.3	B
at Exit 2 (Jamesville Rd)	Diverge	13.1	B	8.7	A	10.9	B	11.4	B
between Interchange 2 (Jamesville Rd) off and on-ramps	BFS	14.6	B	11.8	B	14.0	B	16.0	B
at Interchange 2 (Jamesville Rd) on-ramp	Merge	17.1	B	13.7	B	18.1	B	16.8	B
between Interchange 2 (Jamesville Rd) on-ramp and Exit 3E (Eastbound NY-5)	BFS	22.9	C	18.4	C	23.5	C	22.9	C
at Exit 3E (Eastbound NY-5)	Diverge	14.7	B	19.3	B	21.0	C	15.0	B
between Interchange 3E (Eastbound NY-5) off and on-ramps	BFS	19.6	C	17.5	B	22.1	C	21.8	C
between Interchange 3E (Eastbound NY-5) on-ramp and Exit 3W (Westbound NY-5)	Weave	15.2	B	14.2	B	17.5	B	16.9	B
between Interchange 3W (Westbound NY-5) off and on-ramps	BFS	19.2	C	19.0	C	21.8	C	22.8	C
at Interchange 3W (Westbound NY-5) on-ramp	Merge	19.7	B	15.9	B	21.4	C	17.6	B
between Interchange 3W (Westbound NY-5) on-ramp and Exit 4 (Westbound I-690)	BFS	18.3	C	14.5	B	22.0	C	16.4	B
at Exit 4 (Westbound I-690)	Diverge	17.5	B	14.3	B	19.2	B	16.1	B
between Interchange 4 (Westbound I-690) off-and on-ramps	BFS	15.5	B	14.7	B	16.2	B	17.0	B
at Interchange 4 (Eastbound I-690) on-ramp	Merge	11.5	B	19.1	B	16.5	B	21.1	C
between Interchange 4 (Eastbound I-690) on-ramp and Exit 5E (Kirkville Rd)	BFS	11.5	B	18.0	B	15.9	B	19.7	C
at Exit 5E (Kirkville Rd)	Diverge	11.1	B	17.9	B	14.7	B	19.1	B
between Interchange 5E (Kirkville Rd) off and on-ramps	BFS	16.1	B	16.0	B	21.7	C	25.0	C
between Interchange 5E (Kirkville Rd) on-ramp and Exit 5W (Kirkville Rd)	Weave	11.4	B	12.4	B	14.3	B	19.1	B
between Interchange 5W (Kirkville Rd) off and on-ramps	BFS	12.5	B	16.0	B	16.8	B	24.6	C
at Interchange 5W (Kirkville Rd) on-ramp	Merge	9.6	A	11.6	B	12.6	B	17.8	B
between Interchange 5W (Kirkville Rd) on-ramp and Exit 6 (I-90)	BFS	9.4	A	11.7	B	12.6	B	17.8	B

Table 5-52 (cont'd)
2026 and 2056 Community Grid Alternative Freeway LOS Analysis

Segment	Type	2026				2056			
		AM		PM		AM		PM	
		Density	LOS	Density	LOS	Density	LOS	Density	LOS
at Exit 6 (I-90)	Diverge	9.3	A	11.7	B	12.7	B	18.5	B
between Interchange 6 (I-90) off and on-ramps	BFS	10.2	A	10.3	A	13.5	B	16.2	B
at Interchange 6 (I-90) on-ramp	Merge	8.9	A	9.3	A	11.3	B	13.5	B
at Exit 7 (NY-298 Bridgeport Rd)	Diverge	10.6	B	10.6	B	14.3	B	16.6	B
between Interchange 7 (NY-298 Bridgeport Rd) off and on- ramps	BFS	9.2	A	10.3	A	11.5	B	15.3	B
at Interchange 7 (NY-298 Bridgeport Rd) on-ramp	Merge	6.9	A	10.0	A	8.5	A	13.8	B
between Interchange 7 (NY 298 Bridgeport Rd) on-ramp and Exit 8 Northern Blvd)	BFS	10.2	A	14.5	B	12.7	B	20.1	C
at Exit 8 (Northern Blvd)	Diverge	7.3	A	10.2	B	9.1	A	14.3	B
between Interchange 8 (Northern Blvd) off and on-ramps	BFS	7.6	A	11.6	B	9.5	A	15.9	B
at Interchange 8 (Northern Blvd) on-ramp	Merge	6.5	A	14.7	B	8.8	A	15.9	B
between interchange 8 (Northern Blvd) on-ramp and NY481 Westbound off-ramp	BFS	6.2	A	13.0	B	7.5	A	16.7	B
at Exit to Former I-81	Diverge	6.0	A	12.0	B	7.0	A	15.6	B
between split to Former I-481 mainline and Northbound Former I-81 merge	BFS	4.3	A	9.2	A	5.6	A	8.4	A
Southbound I-81 (Former I-481)									
at Interchange 9N (Former I-81) on-ramp	Merge	11.7	B	7.8	A	14.9	B	8.8	A
between Interchange 9N (Northbound Former I-81) on-ramp and Southbound Former I-81 on-ramp	BFS	14.7	B	11.0	B	17.7	B	9.7	A
at Southbound Former I-81 on-ramp	Merge	13.3	B	8.9	A	15.1	B	9.2	A
at Exit 8 (Northern Blvd) off-ramp	Diverge	15.8	B	10.6	B	18.4	B	12.3	B
between Interchange 8 (Northern Blvd) off and on-ramps	BFS	17.2	B	13.3	B	20.0	C	15.2	B
at Interchange 8 (Northern Blvd) on-ramp	Merge	14.1	B	10.4	B	16.2	B	12.0	B
between Interchange 8 (Northern Blvd) on-ramp and Exit 7 (NY-298 Bridgeport Rd)	BFS	21.0	C	15.6	B	24.1	C	18.0	B
at Exit 7 (NY-298 Bridgeport Rd)	Diverge	18.4	B	11.3	B	21.5	C	13.3	B
between Interchange 7 (NY-298 Bridgeport Rd) off and on- ramp	BFS	17.1	B	14.5	B	19.6	C	16.6	B
at Interchange 7 (NY-298 Bridgeport Rd) on-ramp	Merge	14.1	B	13.9	B	16.1	B	16.2	B
between Interchange 7 (NY-298 Bridgeport Rd) and Exit 6 (I-90)	BFS	20.5	C	19.9	C	23.2	C	22.8	C
at Exit 6 (I-90)	Diverge	15.7	B	16.0	B	17.8	B	18.4	B
between Interchange 6 (I-90) off and on-ramp	BFS	18.4	C	16.8	B	20.8	C	19.2	C
at Interchange 6 (I-90) on-ramp	Merge	18.1	B	16.6	B	20.8	C	18.3	B

Table 5-52 (cont'd)
2026 and 2056 Community Grid Alternative Freeway LOS Analysis

Segment	Type	2026				2056			
		AM		PM		AM		PM	
		Density	LOS	Density	LOS	Density	LOS	Density	LOS
between Interchange 6 (I-90) on-ramp and Exit 5W (Kirkville Rd)	BFS	25.4	C	23.0	C	28.8	D	25.6	C
at Exit 5W (Kirkville Rd)	Diverge	16.7	B	14.9	B	19.2	B	16.7	B
between Interchange 5W (Kirkville Rd) off and on-ramps	BFS	21.9	C	21.2	C	24.4	C	23.7	C
between Interchange 5W (Kirkville Rd) on-ramp and Exit 5E (Kirkville Rd)	Weave	17.5	B	15.4	B	20.2	C	17.9	B
between Interchange 5E (Kirkville Rd) off and on-ramps	BFS	23.5	C	20.2	C	26.1	D	23.3	C
at Interchange 5E (Kirkville Rd) on-ramp	Merge	18.3	B	17.6	B	20.2	C	20.0	B
between Interchange 5E (Kirkville Rd) on-ramp and Exit 4 (Westbound I-690)	BFS	18.0	B	16.9	B	19.8	C	19.1	C
at Exit 4 (Westbound I-690)	Diverge	17.7	B	16.6	B	20.0	B	18.7	B
between Interchange 4 (Eastbound I-690) on and off-ramps	BFS	14.1	B	17.1	B	15.6	B	19.7	C
at Interchange 4 (Eastbound I-690) on-ramp	Merge	8.6	A	21.3	C	14.8	B	23.3	C
between Interchange 4 (Eastbound I-690) on-ramp and Exit 3W (Westbound NY-5)	BFS	11.5	B	27.6	D	18.4	C	34.6	D
at Exit 3W (Westbound NY-5)	Diverge	8.6	A	20.6	C	13.6	B	26.4	C
between Interchange 3W (Westbound NY-5) off and on-ramps	BFS	7.4	A	13.2	B	11.5	B	14.7	B
between Interchange 3W (Westbound NY-5) on-ramp and onramp from (Eastbound NY-5)	BFS	8.1	A	9.2	A	11.9	B	9.3	A
at Interchange 3E (Eastbound NY-5) on-ramp	Merge	8.7	A	13.5	B	12.5	B	14.6	B
between Interchange 3E (Eastbound NY-5) on-ramp and Exit 2 (Jamesville Rd)	BFS	8.8	A	15.1	B	13.0	B	16.6	B
at Exit 2 (Jamesville Rd)	Diverge	13.2	B	22.8	C	19.6	B	24.8	C
between Interchange 2 (Jamesville Rd) off and on-ramps	BFS	9.5	A	14.7	B	14.5	B	16.4	B
at Interchange 2 (Jamesville Rd) on-ramp	Merge	7.3	A	10.3	B	10.5	B	11.6	B
between Interchange 2 (Jamesville Rd) on-ramp and Exit 1 (Brighton Av)	BFS	10.9	A	15.5	B	15.7	B	17.3	B
at Exit 1 (Brighton Av)	Diverge	7.1	A	11.0	B	10.8	B	12.7	B
between Exit 1 (Brighton Av) and Southbound Former I-81 merge	BFS	5.3	A	8.7	A	8.5	A	9.7	A
Eastbound I-690									
between Interchange 7 (NY-297) and Interchange 8 (State Fair Blvd) on-ramps	BFS	27.4	D	13.6	B	31.5	D	15.6	B
at Interchange 8 (State Fair Blvd) on-ramp	Merge	19.7	B	13.0	B	22.8	C	14.4	B
at Exit 8 (Hiawatha Blvd)	Diverge	22.6	C	13.9	B	32.7	D	15.5	B
between Exit 8 (Hiawatha Blvd) and Exit 9 (Bear St)	BFS	24.7	C	11.6	B	29.1	D	13.5	B
at Exit 9 (Bear St)	Diverge	19.7	B	12.2	B	21.8	C	13.8	B

Table 5-52 (cont'd)
2026 and 2056 Community Grid Alternative Freeway LOS Analysis

Segment	Type	2026				2056			
		AM		PM		AM		PM	
		Density	LOS	Density	LOS	Density	LOS	Density	LOS
between Exit 9 (Bear St) and Interchange 10 (N. Geddes St) on-ramp	BFS	21.5	C	11.5	B	23.7	C	13.4	B
at Interchange 10 (N. Geddes St) on-ramp and West St off-ramp	Weave	21.2	C	14.1	B	23.1	C	15.7	B
at Exit 11 (West St) off-ramp	Diverge	19.9	B	12.5	B	21.5	C	15.0	B
between West St off-ramp and on-ramp	BFS	18.4	C	14.8	B	19.8	C	16.2	B
at Interchange 11 (West St) on-ramp	Merge	18.8	B	19.0	B	18.2	B	17.2	B
between onramp from Southbound Former I-81 and Irving Av off-ramp	Weave	22.5	C	22.4	C	26.0	C	21.4	C
between Irving Av off-ramp and Crouse Av on-ramp	BFS	19.0	C	20.6	C	20.3	C	21.2	C
between Crouse Av on-ramp and Exit 14 (Teall Av)	Weave	19.3	B	22.6	C	18.5	B	24.1	C
between Interchange 14 (Teall Av) off and on-ramps	BFS	19.2	C	23.0	C	17.9	B	23.8	C
at Interchange 14 (Teall Av) on-ramp	Merge	17.8	B	23.1	C	18.4	B	24.1	C
at Exit 15 (Midler Av)	Diverge	16.4	B	21.1	C	17.2	B	21.8	C
between Interchange 15 (Midler Av) off and on-ramps	BFS	16.5	B	24.0	C	17.6	B	25.3	C
at Interchange 15 (Midler Av) on-ramp	Merge	1.6	A	21.8	C	15.9	B	21.1	C
between Interchange 15 (Midler Av) on-ramp and Exits 16S-N (Thompson Rd)	BFS	1.8	A	27.5	D	19.3	C	28.7	D
at Exits 16S-N (Thompson Rd) and Exit 17 (Bridge St)	Diverge	1.1	A	19.6	B	17.3	B	20.3	C
between Interchange 16S-N (Thompson Rd) off and on-ramps	BFS	1.3	A	17.3	B	11.0	B	18.1	C
at Interchange 16S-N (Thompson Rd) on-ramp	Merge	2.4	A	18.9	B	11.4	B	19.5	B
between Interchange 16S-N (Thompson Rd) and Interchange 17 (Bridge St) on-ramps	BFS	3.4	A	22.8	C	14.0	B	23.7	C
at Interchange 17 (Bridge St) on-ramp	Merge	3.6	A	20.6	C	14.5	B	20.9	C
at Former I-481 ramps	Diverge	3.6	A	26.7	C	16.0	B	27.2	C
Westbound I-690									
at on-ramp from Southbound Former I-481	Merge	23.1	C	18.1	B	25.6	C	19.8	B
at Exit 17 (Bridge St)	Diverge	16.9	B	14.0	B	18.9	B	15.3	B
at Exit 16N-S (Thompson Rd)	Diverge	20.0	B	15.6	B	22.8	C	17.1	B
between Interchange 16N-S (Thompson Rd) off and on-ramps	BFS	21.4	C	18.3	C	24.5	C	19.9	C
at Interchange 16N-S (Thompson Rd) on-ramp	Merge	17.9	B	20.6	C	19.7	B	21.6	C
at Exit 15 (Midler Av)	Diverge	17.1	B	22.2	C	18.8	B	22.9	C
between Interchange 15 (Midler Av) off and on-ramps	BFS	21.2	C	24.2	C	23.6	C	25.5	C
at Interchange 15 (Midler Av) on-ramp	Merge	20.1	C	24.4	C	21.9	C	25.4	C
at Exit 14 (Teall Av)	Diverge	19.0	B	22.7	C	20.7	C	23.7	C
between Teall Av off and on-ramps	BFS	18.8	C	23.9	C	20.5	C	24.7	C

Table 5-52 (cont'd)
2026 and 2056 Community Grid Alternative Freeway LOS Analysis

Segment	Type	2026				2056			
		AM		PM		AM		PM	
		Density	LOS	Density	LOS	Density	LOS	Density	LOS
between Interchange 14 (Teall Av) on-ramp and Crouse Av off-ramp	Weave	17.3	B	23.1	C	18.2	B	23.7	C
between off-ramp to Crouse Av and on-ramp from Irving Av	BFS	18.6	C	26.3	D	24.8	C	27.2	D
between Irving Av on-ramp off-ramp to Northbound Former I-81	Weave	14.0	B	20.7	C	19.0	B	22.5	C
between off-ramp to Northbound Former I-81 and West St off-ramp	BFS	10.8	A	14.5	B	14.1	B	15.6	B
between West St off and on-ramps	BFS	9.5	A	14.9	B	13.0	B	16.5	B
between Interchange 11 (West St) on-ramp and Exit 10 (N. Geddes St)	Weave	8.4	A	15.5	B	12.8	B	17.4	B
between Exit 10 (N. Geddes St) and Interchange 9 (Bear St) on-ramp	BFS	7.8	A	18.0	B	10.7	A	20.1	C
at Interchange 9 (Bear St) on-ramp	Merge	11.8	B	23.8	C	14.6	B	25.3	C
between Interchange 9 (Bear St) and Interchange 8 (State Fair Blvd) on-ramps	BFS	11.3	B	25.6	C	14.4	B	27.8	D
at Interchange 8 (Hiawatha Blvd) on-ramp	Merge	12.4	B	24.7	C	15.5	B	25.1	C
between Interchange 8 (State Fair Blvd) on-ramp and Exit 7 (NY 297, Fairgrounds)	BFS	12.9	B	29.4	D	16.6	B	31.6	D

All basic freeway and merge and diverge segments would operate at LOS D or better except for the weaving section on northbound BL 81 between the Interchange 29N (NY 481) on and off-ramps, which would operate at LOS E in the 2026 and 2056 PM peak hours.

Future Community Grid Level of Service: Intersection Level of Service

Based on VISSIM delay calculations, **Figures 5-32 through 5-35** show the intersection LOS under the Community Grid Alternative. More detailed LOS analyses for 290 intersections are included in **Appendix C-3**.

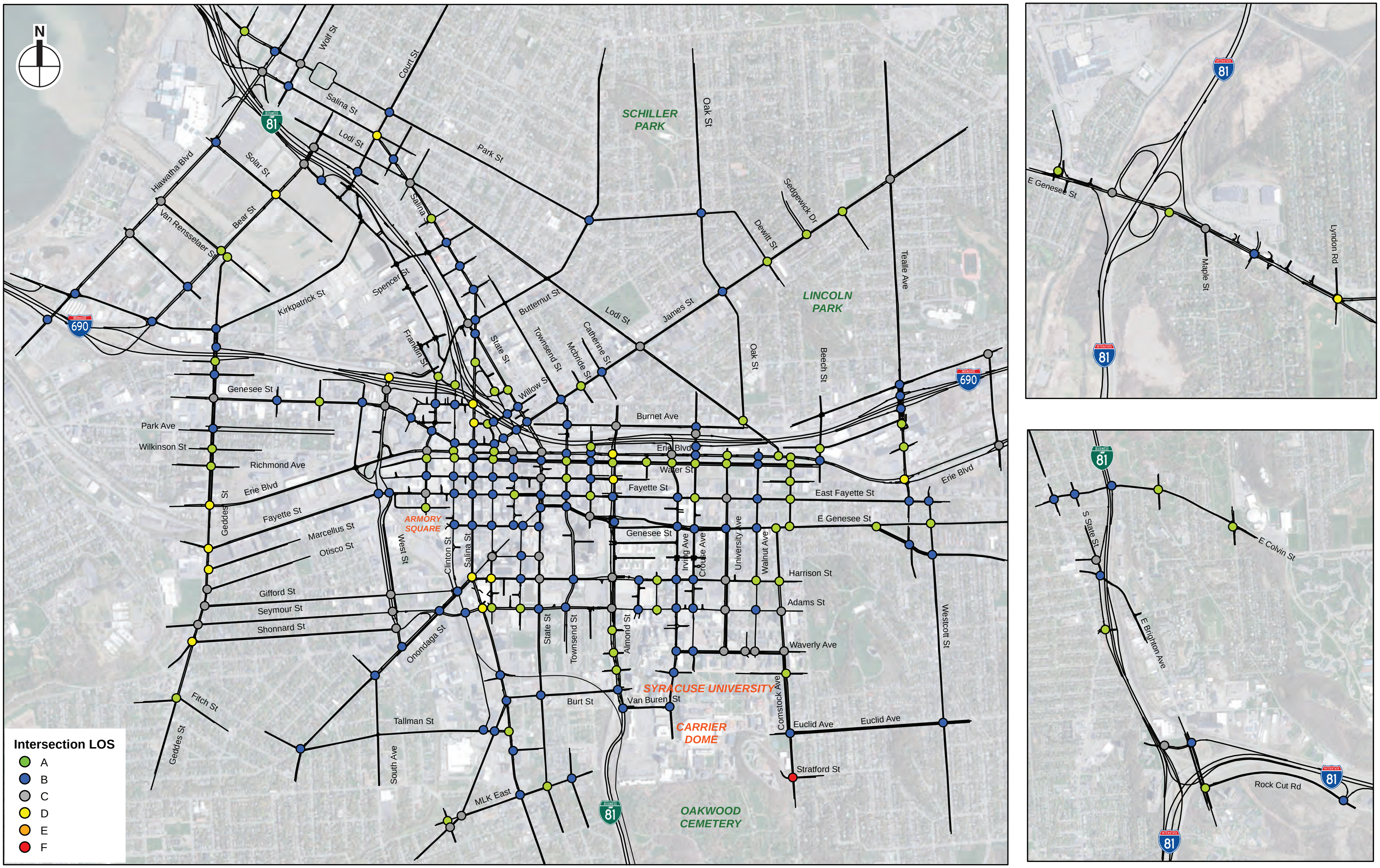
One intersection would operate at LOS F during the 2026 AM peak hour. During the PM peak hour, one intersection would operate at LOS E in 2026 and two intersections would operate at LOS E in 2056. The following is a summary of locations that would operate at unacceptable levels:

- Comstock Avenue at Stratford Street (2026 AM, 2056 PM);
- Teall Avenue at Erie Boulevard E. (2026 PM);
- State Street and Burt Street (2056 PM)

All other study area intersections would operate at LOS D or better under the Community Grid Alternative.

Compared to the No Build condition, the number of intersections operating at LOS E or F would be reduced in 2026 from eleven to three. In 2056, the number of intersections operating at LOS E and F would be reduced from ten to two. Intersection operations would improve under the Community Grid Alternative as a result of capacity improvements on the local street network, redistributing traffic

10.26.21

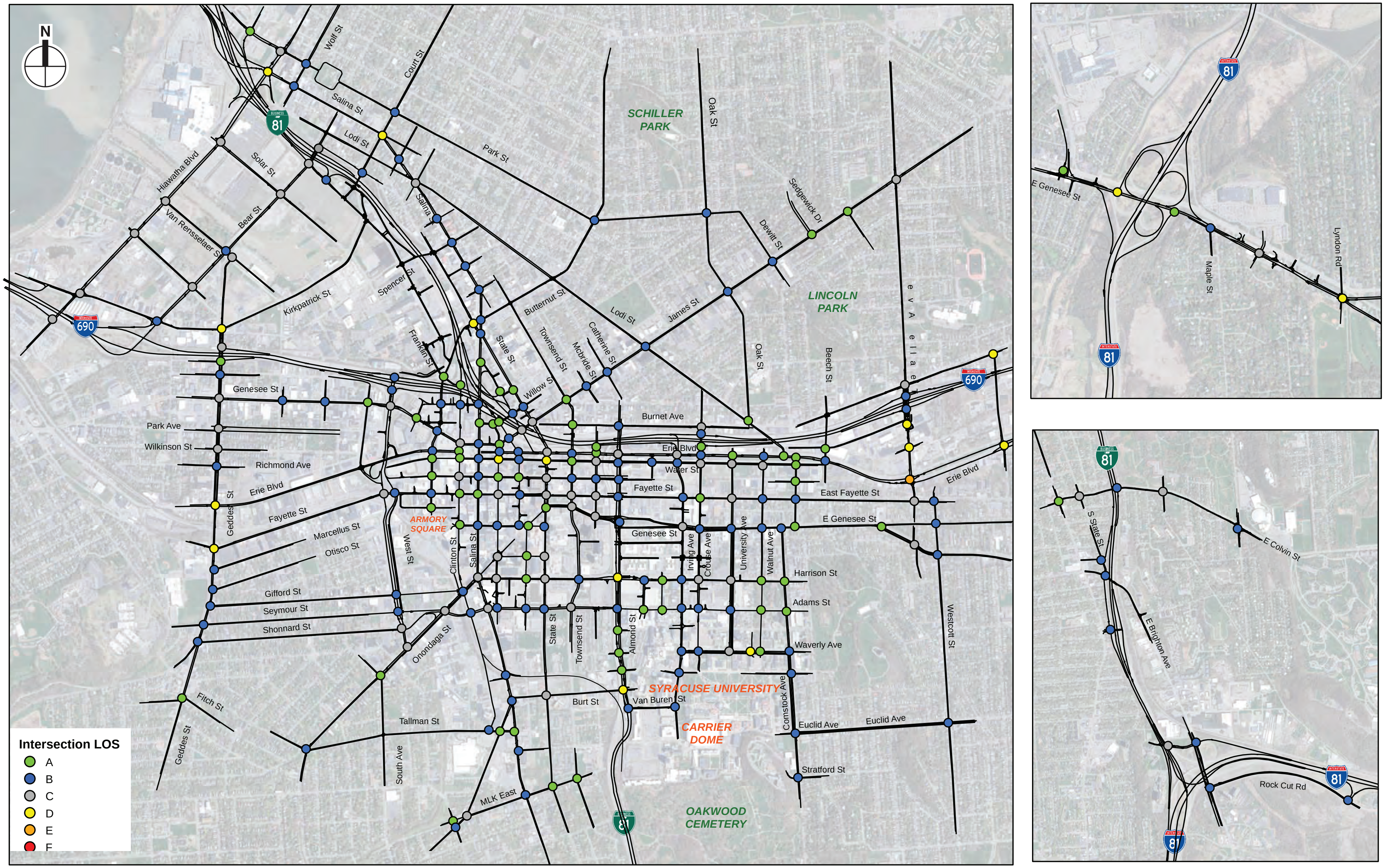


Intersection Levels of Service
Community Grid 2026 AM

I-81 Viaduct Project

Figure 5-32

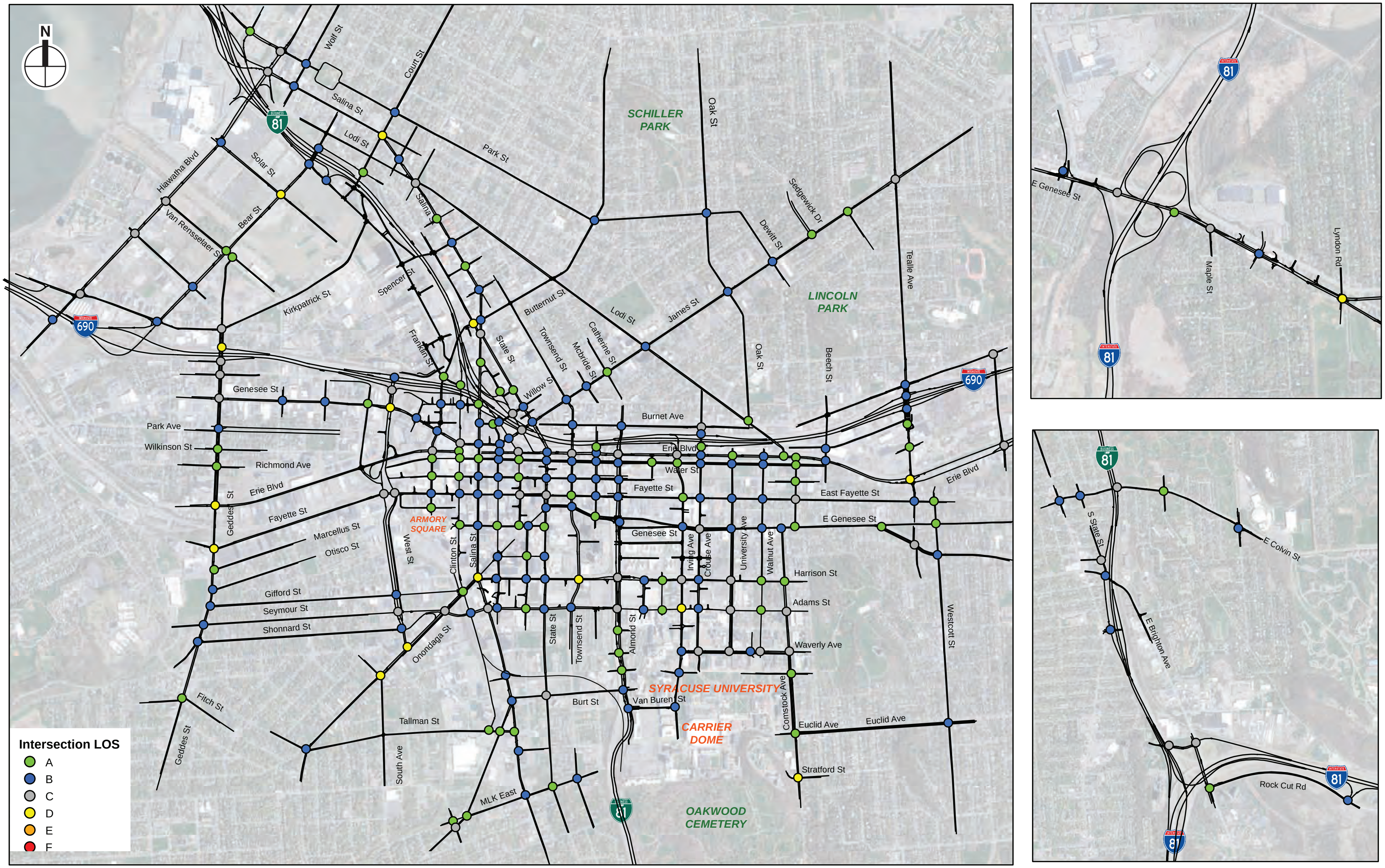
12.21.21



Intersection Levels of Service
Community Grid 2026 PM

Figure 5-33

I-81 Viaduct Project

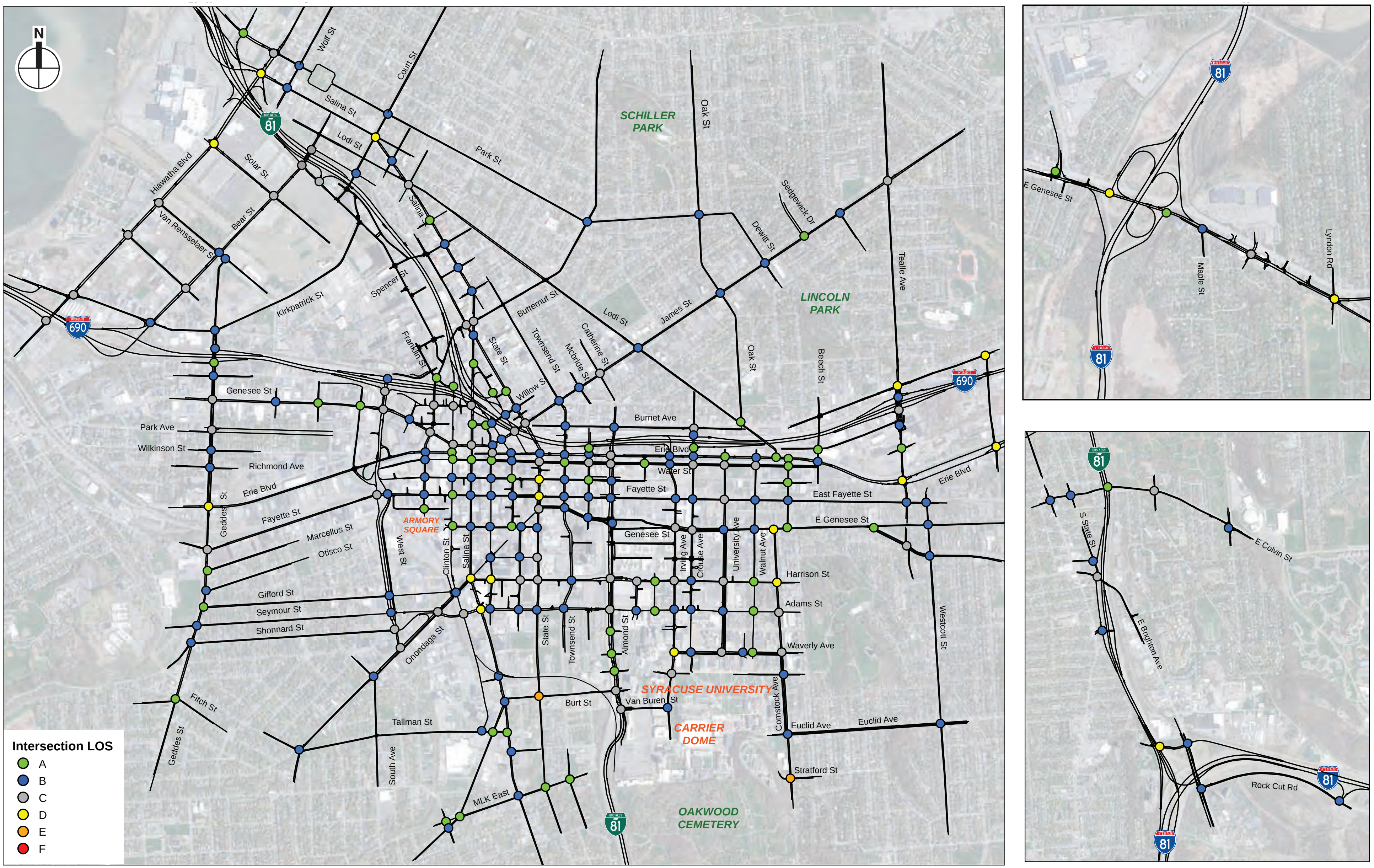


Intersection Levels of Service
Community Grid 2056 AM

I-81 Viaduct Project

Figure 5-34

10.26.21



Intersection Levels of Service
Community Grid 2056 PM

I-81 Viaduct Project

Figure 5-35

to better utilize intersections with surplus capacity, and providing improved access routes to key destinations.

Work Zone Safety & Mobility

The Work Zone Traffic Control (WZTC) and staging concepts developed for the Project and described in **Chapter 4, Construction Means and Methods**, balance the provision of work zone safety with the need to provide mobility for all road users, while maintaining a realistic construction schedule. The staging concepts presented provide the Contractor with sizeable areas for off-line demolition and construction, which in addition to improving the efficiency of the work and reducing both cost and schedule, also provides a considerable separation between motorists and the work zone. This would increase safety for both construction workers and the traveling public. The staging also avoids numerous traffic pattern changes throughout the duration of the Project, particularly for interstate motorists, thereby reducing the impacts associated with traffic pattern adjustments.

NYSDOT has determined that the Project is significant per 23 CFR 630.1010 and therefore as the project design is developed and refined, a Traffic Management Plan (TMP) will be developed in compliance with 23 CFR 630. 1012. The Traffic Management Plan will address both Traffic Operations (TO) and Public information (PI) strategies for the Project. TO strategies will include identifying and ratifying agreements for all TO elements impacted or related to the Project in both the temporary and permanent condition. TO elements will include maintenance responsibilities, temporary access requirements and agreements, safety patrol and/or vehicle recovery requirements and cost sharing agreements for utility usage. The aim of the TO strategies is to provide a detailed understanding of the role and responsibilities of all parties throughout the duration of the Project. The PI strategies will detail how the project development and construction impacts are communicated to road users and other stakeholders. The PI will identify stakeholders and detail the communication requirements and methods for each. PI elements will likely include Public Outreach through community events, internet, mailings, radio, and local television.

Building on the WZTC and staging strategies presented in **Chapter 4, Construction Means and Methods**, the TMP will include a Temporary Traffic Control (TCC) plan in compliance with Chapter 6 of the Manual of Uniform Traffic Control Devices (MUTCD), which will facilitate the reasonably safe and efficient road user flow and highway worker safety.

Safety Considerations, Crash History and Analysis

Vehicle trajectories produced by the VISSIM simulation model were input to SSAM (see Future No Build Safety Considerations for a description of SSAM) to generate traffic conflicts and associated surrogate safety measures. Safety MOEs for the Community Grid Alternative are compared to the No Build condition for 2056 peak hours **Table 5-53**. The frequency of rear-end conflicts under the Community Grid Alter native would decrease by 42 percent. Speeding and following too closely are common driver behaviors on freeways and are known to precipitate rear-end conflicts. Decreased travel on the interstate system under the Community Grid Alternative would contribute to a systemwide decrease in rear-end conflicts. In addition, lane-changing conflicts would decrease by 10 percent, due to a reduction in the number of interchange on- and off-ramps, the addition of auxiliary lanes, and the lengthening of acceleration/deceleration lanes. Crossing conflicts would decrease by 15 percent. The total for all conflict types would decrease by 20 percent, indicating that a substantial safety benefit in the form of a reduction in the number of crashes could be expected.

Table 5-53
Safety Measures of Effectiveness – No Build and Community Grid Alternatives (2056)

Scenario	No Build			Community Grid		
MOE/Peak	AM	PM	AM+PM	AM	PM	AM+PM
Rear End Conflicts	58,459	90,618	149,077	31,725	54,389	86,114
Lane Change Conflicts	55,435	100,854	156,289	45,622	94,667	140,289
Crossing Conflicts	113,459	211,899	325,359	97,804	179,648	277,452
Total Conflicts	227,353	403,371	630,724	175,152	328,704	503,855

Safety Cost and Benefits Analysis

A crash cost and benefit analysis was performed to identify the annual cost of crashes for the Community Grid Alternative and the relative benefit compared to No Build conditions. The analysis methodology to determine the No Build crash cost is described in **Section 5-3-1** (Future No Build Safety Considerations) and detailed analyses are provided in **Appendix C-4.** Based on crash history, and geometric modifications and projected traffic volumes under the Community Grid Alternative at each analysis location, Safety Benefits Evaluation Forms (Form TE-164) were completed. The analysis results indicate an annual crash cost of $38,282,833 for the Community Grid Alternative. Compared to the annual crash cost of $41,363,370 for the No Build Alternative, this represents and annual safety cost benefit of $3,080,537.

Construction Traffic Analysis

Introduction

In an effort to minimize the total duration of construction and the resulting disturbances associated with its construction, aggressive construction schedules have been established for the I-81 Viaduct Project. For the Community Grid Alternative, six years has been determined to be the minimum construction duration. To achieve this schedule and allow for traffic to be maintained in and through the Project Area, the Project would be constructed in several major phases as follows:

- Phase 1 – Preparatory Phase, focusing on conversion of I-481 to serve as the new I-81, closing down and demolishing portions of the existing I-81 viaduct, and initiation/construction of specific Community Grid Improvements within the I-81 Viaduct Study Area
- Phase 2A – I-690 Eastbound Reconstruction
- Phase 2B – I-690 Westbound Reconstruction

For the Community Grid Alternative, the preparatory Phase 1 would include reconstruction of the existing I-81/I-481 northern and southern interchanges, additional capacity improvements along the existing I-481 alignment, construction of the new I-690 interchange at Crouse and Irving Avenues, removal of portions of the existing I-81 viaduct, and many of the local street improvements associated with the alternative. These elements would become permanent features of the transportation system, but also would facilitate traffic flow during Phase 2.

Complete descriptions of all construction phases, and means and methods are presented in **Chapter 4, Construction Means and Methods**.

Traffic analyses were conducted to assess operating conditions and to identify temporary roadway improvements that would be necessary during construction of the Community Grid Alternative. The intent of the traffic analysis is to verify that adequate traffic operations could be maintained during construction. Construction Phase 2A entails an 18-month reconstruction of eastbound I-690, involving closure of the eastbound I-690 roadway between West Street and Crouse Avenue, with eastbound I-690 traffic diverted to alternate routes. Between West Street and Crouse Avenue, a signed detour route will follow West Genesee Street and Erie Boulevard (refer to **Chapter 4, Section 4.4.1** for a more detailed description of the signed detour route). Construction of Phase 2B entails an 18-month reconstruction of westbound I-690 roadway from Leavenworth Avenue (west of the West Street Interchange) and Beech Street. During Phase 2B, the newly constructed I-690 eastbound roadway would be reopened to eastbound I-690 traffic and westbound I-690 traffic would also be shifted onto the newly constructed section of eastbound I-690. Therefore, Phase 2A was studied as the worst-case scenario. A detailed Traffic Management Plan including all construction phases would be developed during the final design phase of project development.

Traffic operations during construction of the Community Grid Alternative were analyzed using a Dynamic Traffic Assignment (DTA) model, in combination with the I-81 Project Travel Demand Model. The modeling process and telecommuting assumptions are identical to those used for the Viaduct Alternative construction traffic analysis, as described in **Section 5.5.1**.

Traffic Volumes

The removal of I-81 through the city and temporary closure of I-690 (and associated connectors/ramps) to eastbound traffic would result in substantial travel pattern changes due to the diversion of through trips (i.e., trips currently passing through Syracuse without an origin or destination in Syracuse) to I-481 and the local streets, as well as the diversion of local trips that are redirected to alternative access points due to multiple ramp closures. It should be noted that approximately 12 percent of the total traffic volume currently using I-81 through Downtown Syracuse is attributed to through-traffic having both origins and destinations beyond the limits of the two I-81 interchanges with I-481. During Phase 2A, much of this through traffic would use the re-designated I-81 (on the existing I-481 alignment) and this would become the permanent condition.

During this phase, traffic currently using eastbound I-690 would be diverted to local roads that would have been improved during Phase 1. Major local street routes anticipated to experience traffic diversions include West Street, Genesee Street, and Erie Boulevard to North Crouse Avenue or Teall Avenue.

Table 5-54 compares peak hour traffic volumes for the existing condition with construction conditions on key roadway segments and indicates substantial traffic volume increases on I-481, Clinton Street, Salina Street, Irving Avenue, Crouse Avenue, Erie Boulevard, and Genesee Street.

Table 5-54
Existing Condition and Community Grid Alternative Phase 2A Peak Hour Traffic Volumes

Location	Direction	AM		PM	
		Existing	CG Construction[1]	Existing	CG Construction[1]
BL 81 Just North of Colvin Street Interchange	NB	2,871	977	2,937	882
	SB	2,292	511	3,394	1,073
BL 81 Just South of Court/Spencer Street interchange	NB	2,464	669	5,787	2,594
	SB	5,413	1,304	3,425	1,155
I-481 Just South of I-690 Interchange	NB	3,310	3,782	2,657	3,422
	SB	1,904	2,830	3,430	4,453
I-481 Just North of I-690 Interchange	NB	2,135	2,200	2,902	3,116
	SB	2,602	3,354	2,329	3,097
I-690 Just West of West Street Interchange	EB	4,193	1,349	2,331	979
	WB	1,835	1,127	3,790	2,764
I-690 Just East of Teall Avenue Interchange	EB	3,480	1,515	4,649	2,512
	WB	3,949	2,738	4,057	3,246
Clinton Street Just North of Genesee Street	SB	612	1,020	285	453
Salina Street Just North of Genesee/James Streets	NB	204	182	368	619
	SB	859	392	367	681
Almond Street Just South of Harrison Street	NB	1,400	407	2,059	590
	SB	942	438	1,708	611
Irving Avenue Just North of Genesee Street	NB	111	166	141	448
	SB	120	175	222	110
Crouse Avenue Just North of Genesee Street	NB	96	319	200	832
	SB	74	506	101	381
Erie Boulevard Just East of Almond Street	EB	322	920	360	930
	WB	363	151	385	158
Harrison Street Just East of Almond Street	EB	65	235	54	127
	WB	825	269	1,648	248
Adams Street Just East of Almond Street	EB	1,615	471	790	416
Pearl Street Just North of Willow Street	NB	164	48	522	444
Genesee Street Just East of West Street	EB	1044	1,439	523	916
	WB	310	179	677	174
Franklin Street Just North of Genesee Street	NB	286	333	617	312
	SB	335	302	227	295

[1] Traffic reduced by 20% to account for increased telecommuting (10%) and public outreach/transportation management planning (10%)

Truck Diversion Routes

For the Community Grid Alternative, traffic conditions under Phase 2A were identified as the worst-case scenario during construction. This phase would involve closing westbound I-690 between Leavenworth Avenue (west of the West Street Interchange) and Beech Street for approximately 18 months. Westbound I-690 traffic would be shifted to the newly-constructed eastbound I-690 lanes, while eastbound I-690 traffic would be diverted to local roads. However, it should be noted that compared to No Build conditions, potential truck diversions under construction phase 2A of the Community Grid Alternative would be caused by the shutdown of westbound I-690 and the removal of the I-81 Viaduct between the New York, Susquehanna and Western Railway bridge at Renwick Street at the south end and the I-690 connector ramps at the north end, which would be demolished (under construction Phase 1) before implementation of Phase 2A construction.

Depending on the trip origins and destinations (O-D), all I-81 and some of I-690 truck traffic would be diverted to other freeways or local roads. The following summarizes the analysis of the maximum diversion potentials for truck traffic expected to be diverted from I-81 and I-690 to other roadway facilities paralleling I-81 and I-690. Note that some truck traffic between specific O-D pairs might not involve route diversion during construction; their inclusion in the discussion is simply for completeness of truck O-D flow summary.

Truck Traffic from the West

Destinations East of Syracuse: Truck traffic with destinations east of Syracuse would exit eastbound I-690 at West Street, travel east on Genesee Street and Erie Boulevard, and re-enter eastbound I-690 at Crouse Avenue. Truck traffic returning to the west would use westbound I-690, which remains open during this phase. Depending on trip destinations, some traffic would use the eastbound I-690 exit at Bear Street and follow State Route 298, while longer distance traffic may stay on I-90 to Exit 34A and then use I-481 to reach their destination. Traffic returning to the west would either use the same route in reverse, or use westbound I-690.

Destinations South of Syracuse: Traffic destined to locations south of Syracuse, would exit eastbound I-690 at West Street, travel southbound on West Street to Shonnard Street, then eastbound on Shonnard Street, continue eastbound onto Adams Street, and then travel south on State Street (SR-11), where they would re-enter the highway at former I-81 interchange 17 and continue south on BL 81 and I-81. Traffic returning to the west would use the same route in reverse (except they would use Seymour Street rather than Shonnard Street) or they may stay on new I-81 and use westbound I-690, which remains open during this phase. Longer distance traffic may stay on I-90 to Exit 34A and then use new I-81 (former I-481) to points south of Syracuse. Traffic returning to the west would either use the same route in reverse or use westbound I-690.

Destinations North of Syracuse: Traffic destined to locations north of Syracuse would use the same routes that they currently use - specifically, using the eastbound I-690 exit at Bear Street, and following Bear Street to access northbound I-81. Traffic returning to the west would use the same route in reverse.

Truck Traffic from the East

Destinations West of Syracuse: Traffic with destinations west of Syracuse would use westbound I-690, which remains open during this phase. Traffic returning to the east would exit at the West Street interchange, travel along eastbound Genesee Street and Erie Boulevard, and use the new Crouse Avenue entrance-ramp to access eastbound I-690.

<u>Destinations South of Syracuse:</u> Traffic destined to locations south of Syracuse would exit westbound I-690 at the new Crouse Avenue exit, travel westbound on Erie Boulevard and southbound on Almond Street, then continue traveling south past Van Buren Street on BL 81 to the southern BL 81/I-81 interchange, where traffic would merge onto southbound I-81.

<u>Destinations North of Syracuse:</u> Traffic with destinations north of Syracuse would exit westbound I-690 at the new Crouse Avenue exit, and travel westbound on Erie Boulevard to State Street, northbound on State Street to westbound E. Willow Street, and then northbound on Pearl Street, where they would re-enter northbound BL 81. BL 81 (southbound) traffic returning to the east side of Syracuse would exit at Clinton Street and use the same route in reverse. Traffic with destinations farther north may travel eastbound on I-690 and then northbound on the new I-81.

Truck Traffic from the North

<u>Destinations West of Syracuse:</u> Traffic destined to locations west of Syracuse would use the same routes that they currently use - specifically using the southbound BL 81 (former I-81) exit at Bear Street, and following Bear Street to access westbound I-690. Traffic returning to the north would use the same route in reverse.

<u>Destinations East of Syracuse:</u> Traffic with destinations east of Syracuse would use the southbound BL 81 (former I-81) exit at Clinton Street, travel eastbound on Erie Boulevard, and re-enter eastbound I-690 at Crouse Avenue. Alternatively, traffic could follow new southbound I-81 (former I-481) to westbound I-690.

<u>Destinations South of Syracuse:</u> Traffic destined to locations south of Syracuse would use the southbound BL 81 (former I-81) exit at Clinton Street, travel eastbound on Erie Boulevard, follow southbound Almond Street, then continue traveling south past Van Buren Street on BL 81 to the southern BL 81/I-81 interchange, where traffic would merge onto southbound I-81. Traffic returning to the north would use the same route in reverse. Alternatively, longer distance traffic would follow new southbound I-81 (former I-481).

Truck Traffic from the South

<u>Destinations West of Syracuse:</u> Traffic with destinations west of Syracuse would either use northbound Almond Street to Erie Boulevard, and re-enter westbound I-690 at West Street or traffic could use Almond Street to Adams Street, then west on Adams Street, continue west on Seymour Street, then north on West Street and re-enter westbound I-690. Traffic returning to the south would either use Erie Boulevard and Almond Street in reverse, or to avoid the construction zone, trucks would travel south on West Street to Shonnard Street, then east to Adams Street, then south on either Salina Street or State Street and reenter southbound BL 81 at existing Exit 17.

<u>Destinations East of Syracuse:</u> Traffic destined to locations east of Syracuse would use northbound Almond Street to Erie Boulevard, and re-enter eastbound I-690 at Crouse Avenue or continue eastbound on Erie Boulevard. Traffic returning to the south would use the same route in reverse. Alternatively, traffic could follow new northbound I-81 (former I-481) and westbound I-690 to locations east of Syracuse.

Destinations North of Syracuse: Traffic with destinations north of Syracuse would use northbound Almond Street, then westbound Erie Boulevard, and re-enter northbound BL 81 at the Pearl Street entrance-ramp. Traffic returning to the south would use the same route in reverse. Alternatively, longer distance traffic could follow new northbound I-81 (former I-481).

In addition to the truck detour analysis described above, the truck model also was used to identify the simulated diversion routes and their associated truck volumes due to construction activities within the project area. The model produced truck diversion patterns very similar to those based on the truck detour analysis. Major local diversion routes were found to be:

- West Street
- Clinton Street
- Salina Street
- Almond Street
- Genesee Street
- Franklin Street
- Water Street
- Erie Boulevard

Truck diversion volumes on these routes would range from ten to 50 trucks per hour during the AM peak hour and from ten to a 40 trucks per hour during the PM peak hour. In addition, ramps used for trucks to exit or re-enter the freeway system would accommodate higher total truck volumes (70 to 150 trucks per hour). While most of the City's truck route corridors have reserve capacity to absorb additional truck traffic, routes (or specific intersections) requiring mitigation measures to accommodate diverted traffic are discussed in the following sub-section.

In addition to the Downtown and University Hill areas, some other major routes such as US Route 20 and NY State Routes 173, 41, and 41A were also investigated for truck diversion patterns. The truck model indicates that NY State Routes 41 and 41A would not be expected to experience substantial increases in truck volumes (two to three trucks per hour) in the AM and PM peak hours. The truck volume increase along US Route 20 (between NY-91 to the east and NY-80 to the west) is projected to be approximately 15 trucks per hour in the peak direction during peak hours. Similarly, the truck volume increase along US State Route 173 is expected to be approximately 20 trucks in the peak direction in the AM peak hour and 18 trucks in the PM peak hour.

Level of Service and Mobility

Mitigation Measures

To address congestion under the construction scenario, several temporary roadway improvements were developed (see **Table 5-55**). In addition, traffic signal modifications would be introduced at locations along affected corridors to facilitate traffic flow and promote signal coordination. These mitigation measures were assumed to be in place and are reflected in the analysis of traffic operations that are presented for conditions during construction of the Community Grid Alternative.

Table 5-55
Community Grid Alternative: Mitigation Measures

Location	Temporary Mitigation Measures/Improvements	Permanent Mitigation Measures/Improvements
Southbound BL 81 at Clinton/Salina Street off-ramp	Provide a two-lane off-ramp	Provide a single-lane off-ramp
Eastbound I-690 at Crouse Avenue on-ramp	Provide a two-lane on-ramp	Provide a single-lane on-ramp
BL 81 Northbound on-ramp from Pearl Street	Add second lane starting from the intersection of Pearl and Hickory Streets, continue both lanes	Provide a two-lane on-ramp
Intersection of Pearl and Hickory Streets	Install temporary signal	Reconstruct Pearl and Hickory as a stop-controlled intersection
Intersection of Pearl and Hickory Streets	Restripe northbound approach to provide an exclusive left-turn lane and a shared left-turn/through/right-turn lane	Reconstruct intersection to allow two free flowing lanes from Pearl Street to connect to Northbound BL 81 on-ramp
Intersection of BL 81 southbound off-ramp and Salina Street	Install temporary signal	Remove Southbound BL 81 off-ramp to Salina Street
Genesee Street westbound between Franklin and Wallace Streets	Remove parking lane, provide two westbound travel lanes	Restore current configuration
Genesee and Wallace Streets	Restripe westbound approach to provide a shared left-turn/through lane and a shared through/right-turn lane	Restore current configuration
Genesee and Franklin Streets westbound approach	Remove parking (approx. 75') to create an auxiliary through lane	Restore current configuration
Genesee and Franklin Streets westbound approach	Restripe westbound approach to provide a shared left-turn/through lane and a shared through/right-turn lane	Restore current configuration
Erie Boulevard and State Street	Create a right turn bay and stripe westbound approach to provide an exclusive left-turn lane, a through lane, and dual right-turn lanes	Maintain additional turn bay and restripe westbound approach to provide an exclusive left-turn lane, two through lanes, and an exclusive right-turn lane
Erie Boulevard and Crouse Avenue	Restripe eastbound approach to provide dual left-turn lanes and shared through/right-turn lane	Restore eastbound approach to current striping
Crouse Avenue between Water Street and Erie Boulevard	Create a third northbound travel lane for a total width of five lanes in this section	Provide two northbound travel lanes for a total width of four lanes in this section
Erie Boulevard and Crouse Avenue	Stripe northbound approach to provide a shared left-turn/through lane, a through lane, and a shared through/right-turn lane	Restripe northbound approach to provide a shared left-turn/through lane and a shared through/right-turn lane
Crouse Avenue and Water Street	Create a third northbound lane starting approx. 100 feet south of the northbound stop bar	Provide two northbound travel lanes for a total width of four lanes in this section
Southbound N Clinton Street between Southbound I-81 off/on ramps and Court Street (New)	Add a second lane	Provide a single lane
Intersection of N Clinton Street and Court Street (New)	Stripe two southbound approach lanes to provide a shared left-turn/through lane and a shared through/right-turn lane	Stripe as a single shared lane serving all movements
Eastbound Court Street between N Clinton Street and Genant Drive	Add a second lane	Provide a single lane
Intersection of Genant Drive and Court Street (New)	Stripe two eastbound approach lanes to provide a shared left-turn/through lane and a shared through/right-turn lane	Stripe as a single shared lane serving all movements
Eastbound Court Street between Genant Drive and Sunset Avenue	Add a second lane	Restore current configuration

Table 5-55 (cont'd)
Community Grid Alternative: Mitigation Measures

Location	Temporary Mitigation Measures/Improvements	Permanent Mitigation Measures/Improvements
Intersection of Court Street and Sunset Avenue	Stripe two eastbound approach lanes to provide an exclusive left-turn lane and a shared through/right-turn lane	Stripe as a single shared lane serving all movements
Northbound Walnut Avenue from Fayette Street to Water Street	Add a second lane	Restore current configuration
Intersection of Walnut Avenue and Erie Boulevard	Stripe two northbound approach lanes to provide an exclusive left-turn lane and a shared left-turn/through/right-turn lane	Restore current configuration
Intersection of Erie Boulevard and Crouse Avenue	Stripe three eastbound approach lanes to provide an exclusive left-turn lane, a shared left-turn/through lane, and a shared through/right-turn lane	Stripe three eastbound approach lanes to provide an exclusive left-turn lane, a through lane, and a shared through/right-turn lane
Intersection of Crouse Avenue and Westbound I-690 Ramps	Stripe two northbound approach lanes to provide an exclusive left-turn lane and a shared left-turn/through lane	Restripe northbound approach to provide an exclusive left-turn lane and a through lane
Westbound I-690 entrance ramp from Crouse Avenue	Widen section of temporary onramp to two lanes for 500 feet west of Crouse Avenue to provide two receiving lanes	Provide a single lane

In addition to the Phase 2A improvements discussed above, a comprehensive Traffic Management Plan (TMP) would be developed during the final design phase of project development. The Traffic Management Plan would comprise all major construction phases and sub-phases, as well as system-wide measures to efficiently and safely serve the needs of the Project Area; reduce traffic volumes during construction; minimize traffic diversions to local streets and other routes; and ensure compatibility with the social, economic, and land use character of the Project Area. Potential measures to be evaluated may include:

- Implementation of expanded and improved Intelligent Transportation Systems
- Continued refinement of construction staging
- Expanded highway traffic enforcement
- Additional local arterial traffic operations improvements
- Expanded local arterial traffic enforcement
- Pedestrian improvement measures
- Park-and-ride facilities
- Rideshare action plan
- Truck routing measures
- Information telephone hotline
- Media campaign
- Public involvement program
- Signal Retiming

- Planned and Unplanned Traffic Incident Management
- Transportation Demand Management measures (e.g., guaranteed ride home, car sharing, and carpool matching)
- Creating additional bus routes or adding buses to existing routes

Freeway Level of Service

To evaluate traffic operations on freeway segments outside of the DTA model focus area, such as on I-481 and I-90, the I-81 Project Travel Demand Model was used to calculate volume-to-capacity (v/c) ratios during Community Grid Alternative construction. The assessment determined that all freeway links outside of the DTA focus area would have v/c ratios less than 1.0, indicating sufficient capacity would exist in these areas.

To evaluate freeway operations in the construction focus area, the DTA focus model was used to predict density and LOS. The analyses indicate that all freeway segments within the construction focus area would operate acceptably at LOS D or better, except for westbound I-690 at the entrance ramp from Midler Avenue (LOS F, AM Peak Hour) and southbound BL 81 at the exit ramp to N. Clinton Street (LOS F, PM Peak Hour).

Refinements to construction staging and mitigation measures would be developed during the final design stage of the project to improve LOS further.

Intersection Level of Service

AM and PM peak hour capacity analyses were conducted for 212 intersections within the construction focus area. Traffic would increase substantially at intersections adjacent to ramps where the mainline interstate closures begin and end. Clinton Street and Salina Street would experience heavy traffic as they connect directly to the last exit before the southbound I-81 mainline closure. Removal of the Harrison Street on-ramp to northbound I-81 would require traffic from downtown destined to northbound I-81 to use to Pearl Street and other routes, largely via State Street. Renwick Avenue would experience heavy traffic, as southbound traffic would use these routes to access the elevated BL 81 and ultimately southbound I-81. Conversely, traffic originating south of the city, would travel these routes as the elevated highway transitions to the surface street network just south of MLK, Jr. East.

Of the 212 intersections studied, the vast majority (100 percent in the AM peak hour and 97 percent in the PM peak hour) would operate at LOS D or better. Six intersections would operate at LOS E or F in the PM peak hour as follows:

- NY 298/Court Street and Genant Drive (LOS F, PM Peak Hour)
- NY 298/Court Street and Sunset Avenue (LOS E, PM Peak Hour)
- Salina Street and Hiawatha Boulevard (LOS F, PM Peak Hour)
- Fayette Street and Columbus Avenue (LOS E, PM Peak Hour)
- N. Clinton Street and Southbound BL 81 Ramps (LOS E, PM Peak Hour)
- Court Street (New/Re-aligned) and N. Clinton Street (LOS F, PM Peak Hour)

Refinements to construction staging and mitigation measures would be developed during the final design stage of the project to improve LOS further.

Travel Times

Peak hour travel times for the Existing Condition and the Community Grid Alternative during construction on routes between major freeway interchanges in Onondaga County are presented in **Figure 5-36.** Travel times were estimated using output from VISSIM traffic simulations, as well as the I-81 Project Travel Demand Model. On most freeway segments, travel times would remain unchanged or increase by one minute during construction. However, travel times would increase by five to six minutes on the connection between the southern I-81/BL 81 interchange and BL 81/I-690 as a result of the removal of the I-81 viaduct through downtown Syracuse. The vast majority of through trips on I-81 (over 95 percent) would travel on the signed detour route and would not experience significant disruption during peak hours; travel times on I-481 would increase by one minute or less.

Travel times on westbound I-690 along the length of the interstate corridor would increase by approximately two minutes during peak hours. The travel time increases in the westbound direction would be less than those in the eastbound direction, since no full freeway closures are proposed in the westbound direction during Stage 2A and local-street detours are not required.

Travel times on eastbound I-690 along the length of the interstate corridor would increase during peak hours because detoured traffic would be routed onto the local signed detour from West Street to Crouse Avenue. Travelers using the local detour route would experience slower average speeds and traffic signal delays. Although eastbound travel time would increase substantially, several other freeways and local streets would function as alternative routes to destinations east of the detour route and would be utilized to avoid local delays. Eastbound I-690 traffic would divert onto numerous paths throughout the network. To facilitate discussion, this traffic is categorized and discussed in terms of the following groups:

Traffic using the signed detour – This group would constitute the smallest fraction (approximately 5 percent) of the existing through traffic on I-690. This group comprises trips originating directly west of the downtown area that are traveling to points east of the downtown area. Travel times for this group would increase the most, by approximately 10 minutes.

Traffic using the other local streets – This group would constitute 15 percent of the existing I-690 traffic that would elect to use other local streets. This group may use no part or only a portion of the signed detour route. This group comprises a mix of users traveling to and from locations surrounding the downtown area. Travel times for this group would also increase by varying amounts averaging less than 10 minutes.

Traffic using other regional freeways - This group would constitute the vast majority (80 percent) of existing I-690 traffic that would detour onto other freeways in the metropolitan area to complete their trips. This group comprises users from surrounding suburbs and locations several miles from the start of the signed detour group who would largely avoid use of the signed detour. This group would use one or more available alternatives to eastbound I-690, such as BL 81, I-90, and existing I-481. These alternative routes would add to the length of these trips, but average speeds would be similar to the

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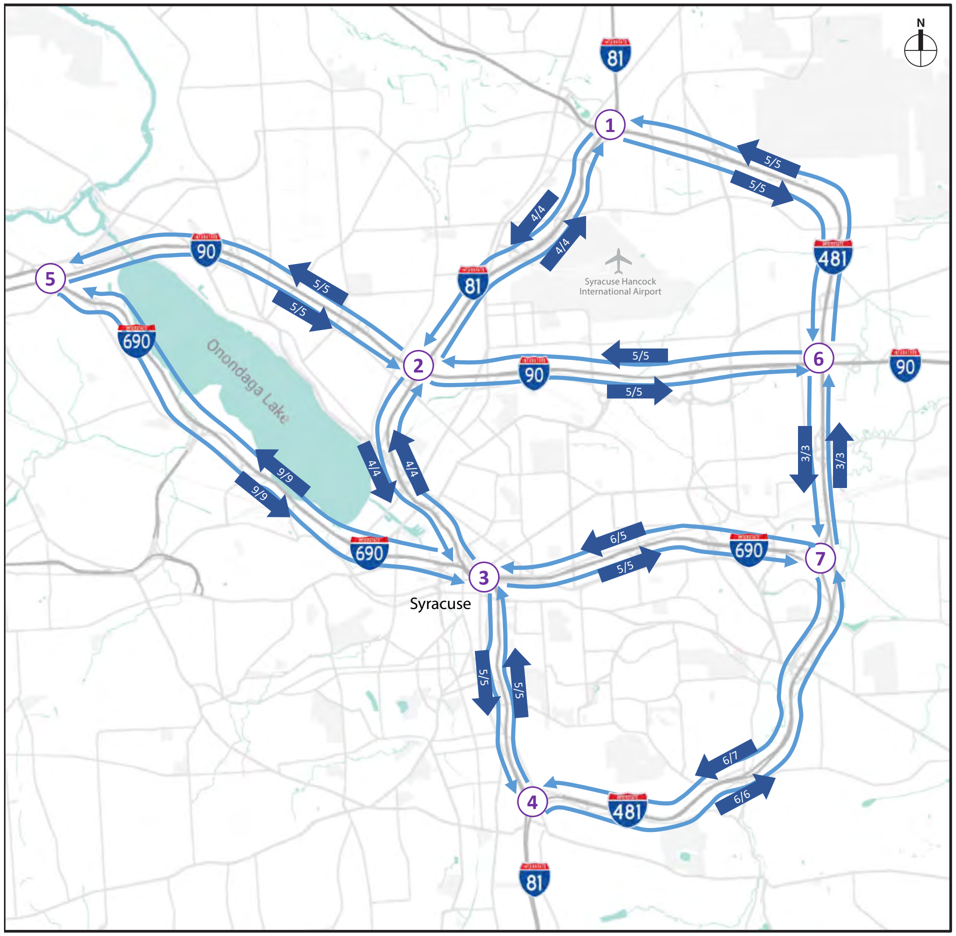
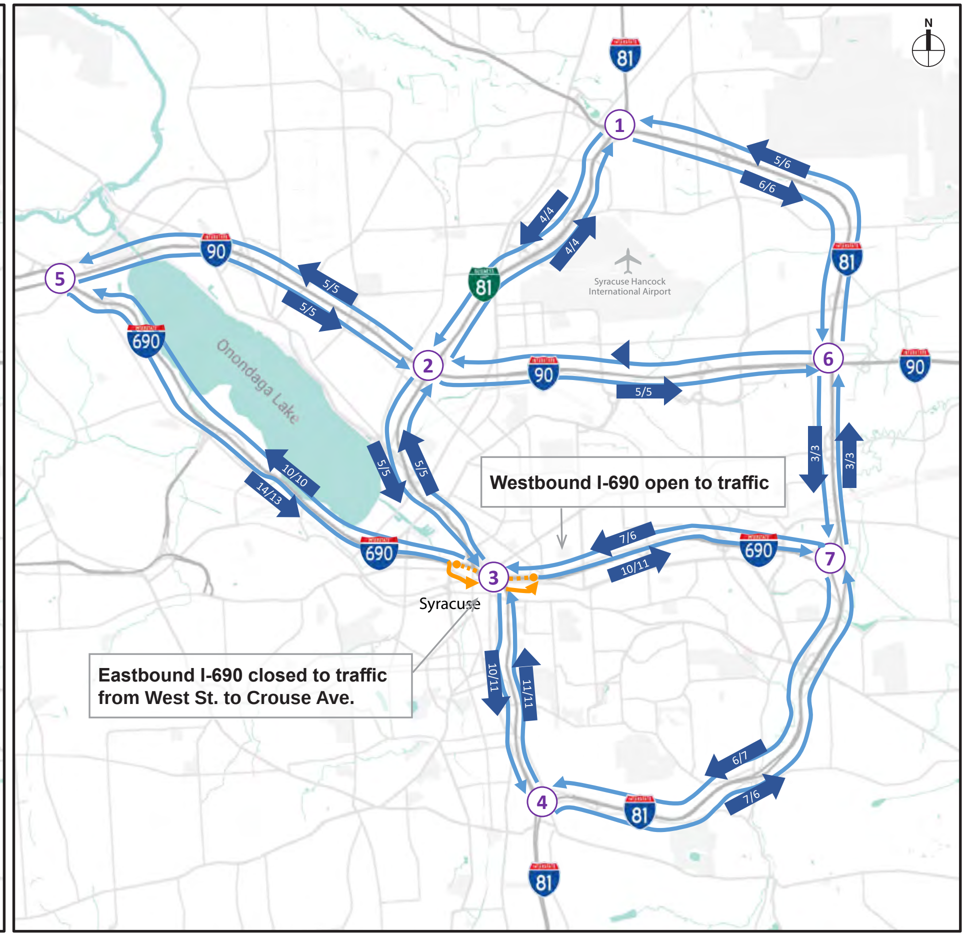


Existing Condition



Community Grid Alternative – Phase 2A

Signed detour routes

Available highway routes

Limits of highway closure

AM/PM *Travel time in minutes*

Existing Condition and Community Grid
During Construction Peak Hour Travel Times

Figure 5-36

existing condition and therefore travel time increases would be modest. Examples of prominent regional detours include:

- Traffic traveling from the I-90/I-690 interchange to Downtown (Location 5 to 3 in Figure 5-36) could reroute onto eastbound I-90 and southbound BL 81 (Location 5 to 2 to 3). This alternative would result in an increased travel time of approximately one minute compared to I-690 under existing conditions, although a toll on I-90 would be incurred.
- Traffic traveling from the I-90/I-690 interchange to the I-690/Former I-481 interchange east of the downtown area (Location 5 to 7) could use eastbound I-90 to southbound Former I-481 (Location 5 to 2 to 6 to 7) as an alternative. This alternative would result in comparable travel time to eastbound I-690 under existing conditions, although a toll on I-90 would be incurred.

Queues

The estimated average (50th percentile) and 95th percentile queues for the existing condition and Community Grid Alternative during construction are presented in **Table 5-56**. During the AM peak hour, queues would form on southbound BL 81 just upstream of mainline closures at the exit ramp to Salina Street as traffic is forced to exit the freeway due to the removal of the I-81 viaduct. The longest 95th percentile queue (1,832 feet) is anticipated to occur on westbound I-690 at the Crouse Avenue exit. This queue would develop as morning commuting traffic entering the city from the east, north, and south converge on the remaining freeway entry point with access to downtown and northbound BL 81. Although queues would form on the freeway system in some locations, these queues are not expected to extend to the next upstream interchange and would be less frequent, as the 50th percentile queues would be much shorter.

Table 5-56
Queue Lengths (feet) at Select Locations during Existing Condition and Community Grid Alternative Construction

Peak Location	AM		PM	
	50th Percentile	95th Percentile	50th Percentile	95th Percentile
Existing Conditions				
Northbound I-81 exit to Harrison St/Adams St	1,309	1,785	23	552
Southbound I-81 exit to Clinton St/Salina St	90	155	1	12
Southbound I-81 before exit to Spencer St	292	878	9	57
Southbound I-81 before exit to Butternut/Franklin St	447	720	0	3
Eastbound I-690 exit to West St	0	219	0	0
Westbound I-690 before exit to Geddes St	0	0	1	3
Community Grid Alternative				
Northbound BL 81/Almond Street at Adams St	0	0	0	4
Southbound BL 81 at exit to Spencer St	0	4	0	28
Southbound BL 81 at exit to N Salina St	10	32	33	388
Eastbound I-690 at entrance from Crouse Ave	9	38	1	8
Eastbound I-690 offramp at SB West St	7	166	196	827
Westbound I-690 at diverge at Crouse Ave	609	1,832	0	0

Impacts on Police, Fire Protection and Ambulance Access

The Community Grid Alternative would not adversely impact ambulance access or police and fire protection overall. Traffic analyses show improved level of service within the project limits.

St. Joseph's hospital would benefit from more-direct high-speed access via the southbound former I-81 exit ramp at Oswego Boulevard. Reduced congestion at the Almond Street intersections with Harrison and Adams Streets would improve mobility on the local street network through the geographic center of the city. The conversion of Harrison Street west of Almond Street, Adams Street west of State Street, and Crouse Avenue south of Genesee Street to two-way operation would provide emergency responders with many additional routing options.

Travel times between areas north of downtown and points south of downtown are expected to increase by as much as five to six minutes under the Community Grid Alternative. However, a new intersection created at Almond Street and Van Buren Street would improve connectivity to the major Hospitals on University Hill from points south, reducing travel distances and partially offsetting the impact of lower travel speeds through the area.

Peak hour travel times within the project area along routes frequently used by emergency responders would decrease compared to the No Build condition in most cases.

Parking Regulations and Parking-related Issues

Future Parking Impacts Analysis Methodology

The I-81 Viaduct Project would not further affect parking supply and demand beyond its construction year. The Project itself, regardless of the alternative, will not require supply changes nor will it generate parking demand between 2020[4] and 2050. Therefore, parking supply and demand was evaluated for 2020, but not beyond. Information was gathered to estimate parking supply and demand changes by 2020 due to known development projects through research and coordination with a number of local agencies and other stakeholders. It is assumed that any future parking demand generated beyond the I-81 Viaduct Project's construction year would not be a result of the I-81 Viaduct Project and will be accommodated as part of any future development processes through zoning requirements and/or market demand.

The effects on parking within the I-81 Viaduct Study Area were determined based on the preliminary design for the Community Grid Alternative. If the affected area encompassed a parking facility or building that generates parking demand, it was noted along with the impacts to parking supply. It was conservatively assumed, for the purpose of this analysis, that any supply within the affected area would be lost. For example, it was assumed that all existing parking beneath the viaduct would be lost and no new parking supply would be included. Any potential reintroduction of parking, post construction, will be addressed as part of mitigation measures.

The anticipated work may affect an entire parcel (building and parking area), the building only, the parking area only, or a portion of the parking on-site. For this analysis, a loss of a building resulted in the loss of demand and the loss of a parking facility resulted in the loss of supply. Based on the preliminary design, estimates (25, 50, 75, or 100 percent loss) were made for the amount of parking

4 The original analysis was based on an ETC of 2020, and while the ETC has been revised to 2026, the ETC change does not change the analysis or conditions, therefore the 2020 analysis is still valid.

supply lost or demand affected. New on-street parking supply would be included on a number of roadways such as Almond Street, North Franklin Street, East Willow Street, Warren Street, Oswego Boulevard, and West Street, and on the proposed extensions of North Irving Avenue, Oswego Boulevard, and Pearl Street. Some existing on-street parking would be replaced along Genesee Street and Erie Boulevard. The future No Build year's supply and demand were used as a baseline since it is the scenario in which the Community Grid Alternative does not occur so there is no change to parking supply or demand as a result of this project. Applying the associated changes in supply and demand under the Community Grid Alternative to the No Build year's supply and demand provides an estimate of the future year supply and demand.

Results of Future Parking Impacts Analysis

With implementation of the Community Grid Alternative, an estimated 22 off-street parking facilities (total of 1,442 spaces) and 147 on-street spaces would be affected. Most of the off-street facility disturbances would be adjacent to or beneath the existing viaduct. Most of the on-street parking loss would occur on the roadways that would accommodate the anticipated distribution of traffic onto other local streets such as Genesee Street, Erie Boulevard, Irving Avenue, and Crouse Avenue.

Overall, the loss of supply is estimated to be 1,589 spaces and the reduction in demand is minimal (2 spaces). However, the Community Grid Alternative includes the addition of 722 on-street parking spaces for a total change in supply as a loss of 867 spaces. As shown in **Table 5-57**, parking supply in 2020 would be 82 percent utilized under the Community Grid Alternative, a three percent increase from No Build conditions. Since the I-81 Viaduct Project would not affect parking beyond its construction year, future parking supply and demand was not evaluated beyond 2020. As noted in **Section 5.3**, the effective supply is the overall supply reduced for planning purposes to account for user familiarity and potential weather impacts. More detailed information is included in **Appendix C-5**.

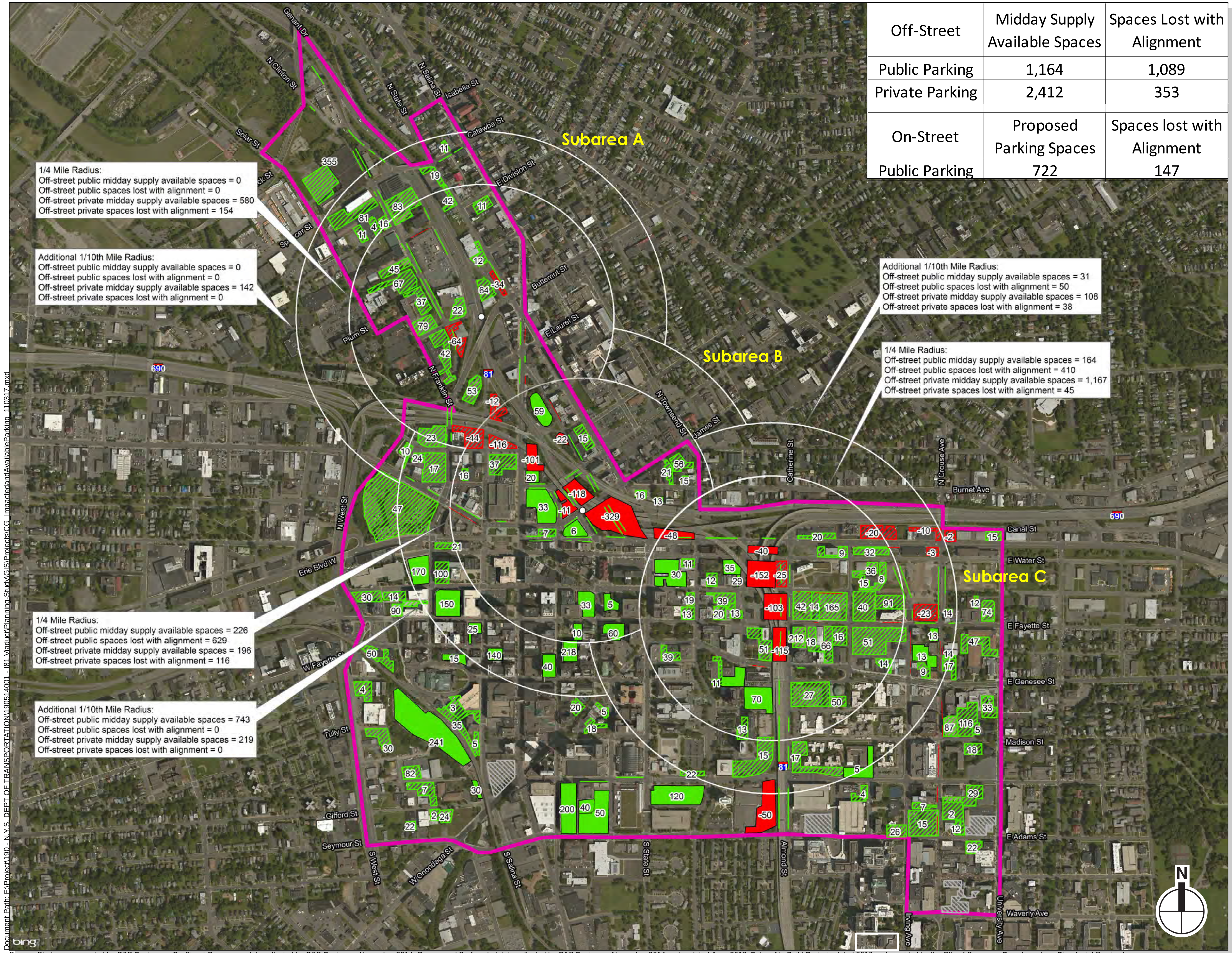
Table 5-57
Community Grid Alternative Parking Supply and Demand Summary

Analysis Year	Change in Supply	Supply	Effective Supply	Change in Demand	Demand	Utilization
Existing Conditions	-	29,233	26,808	-	21,064	79%
2020 No Build	2,149	31,382	28,779	1,782	22,846	79%
2020 Build	-867	30,515	27,984	-2	22,844	82%

Although the entire study area would have sufficient supply to accommodate demand, there are two additional factors that needed to be considered when determining the Projects' complete impact on parking demand and supply: (1) the geographic distribution of available parking; and (2) the type of parking (public vs. private) available.

Despite the entire study area having sufficient supply to accommodate demand, the geographic distribution of available parking may not align with the distribution of demand. As shown in **Figure 5-37**, there would be a disproportionate loss of parking along the I-81 alignment. It was assumed that the majority of commuters are generally willing to walk up to ¼ mile from their parking facility to

Off-Street	Midday Supply Available Spaces	Spaces Lost with Alignment
Public Parking	1,164	1,089
Private Parking	2,412	353
On-Street	**Proposed Parking Spaces**	**Spaces lost with Alignment**
Public Parking	722	147



Source: Study areas created by C&S Engineers. On-Street Occupancy data collected by C&S Engineers November 2014. Garage and Surface Lot data collected by C&S Engineers November 2014 and updated June 2016. Future No-Build Projects dated 2016 and provided by the City of Syracuse. Base layer from Bing Aerial Service Layer

Study Area

On-Street Parking

Proposed On-Street Parking

Impacted On-Street Midday Supply

Off-Street Parking

Available Private Parking

Available Public Parking

Loss of Private Parking

Loss of Public Parking

Loss of Parking for Future No Build Projects

** Available off-street parking labeled by midday available spaces*

** Loss of off-street parking labeled by total spaces*

0 500 1000 FEET

1" = 450'
When printed at 22" x34"

Community Grid Alternative — Lost and Available Parking

Figure 5-37

their final destination. Therefore, there is a need to identify or provide available parking within the general vicinity of the parking loss.

The Community Grid Alternative would result in a loss of approximately 1,089 spaces in public off-street parking facilities and 353 spaces in private off-street facilities. There also would be a net gain of approximately 575 public on-street spaces(147 on-street spaces lost, but 722 on-street spaces added), as shown in **Table 5-58**. For the purposes of this analysis, public facilities are those where the public can purchase the rights to park regardless of the owner of the facility. A private facility is one on privately held land and is available only to employees or visitors of a specific building or institution. Any parking facility owned by a municipality or public agency is considered public, even if it is only open to employees and not the general public. In terms of available supply, it was assumed that any parking owned by University Hill institutions that are for their employees, patients, or visitors are considered private.

Table 5-58
Community Grid Alternative Public/Private Parking Supply and Demand Summary

	Spaces Lost	Spaces Gained
Public Facilities – Off-Street	1,089	-
Public Facilities – On-Street	147	722
Total Public Facilities Impact	**-514**	
Private Facilities – Off-Street	353	-
Total Parking Impact	**-867**	
Total Change in Demand	**-2**	

Mitigation (Permanent) of Public Off-Street Spaces Lost

Mitigation for parking impacts is considered based on the number of parking spaces being lost as a result of the Community Grid Alternative and varies for public versus private facilities. As part of the real estate process, and in accordance with the New York State Eminent Domain Procedure Law (Articles 1 through 7), property owners would be compensated for any impacts to private parking facilities that result from permanent impacts. Also, as part of the parking analysis, a parcel-by-parcel review of potential parking impacts was conducted, and it was determined that no additional buildings or businesses would need to be acquired because of permanent parking impacts. Additionally, it was determined that further opportunities to avoid, minimize, and mitigate permanent parking impacts would be considered during final design.

Potential mitigation measures to address the reduction in public parking supply (1,089 spaces as shown in **Table 5-58**) include a combination of the following:

- Implementation of transportation demand management (TDM) measures to reduce the demand for parking (refer to recommendations in the Syracuse Metropolitan Transportation Council Downtown Syracuse TDM Study),
- Maximize the available public parking within the I-81 Viaduct Study Area through promotion of available parking, improving the pedestrian environment and/or provision of shuttle services,

- Replacement of parking supply under I-690, and
- Development of new parking supply in the form of surface lots.

To identify if parking loss could be mitigated using these measures, estimates were made regarding location and size of the currently available or potential new parking facilities. The inventory data indicates there may be available supply in the most southwestern portions of the parking study area, but the demand and supply that is being impacted is in the northeastern portion of the parking study area, therefore, the available supply may not be considered feasible for mitigation purposes.

Surveys of Syracuse employees indicate they typically are willing to walk ¼ mile from where they park to their destination. This provides a reference for considering available existing parking and locations for new or replacement parking to be considered to mitigate losses within a reasonable distance. An additional 0.1 mile beyond the ¼-mile area also was considered to account for the distribution of demand within the ¼-mile radius and potential spaces that could be used as mitigation if infrastructure improvements were available to encourage users to park farther away from where they park now. The existing parking loss generally follows the I-81 alignment through the I-81/I-690 interchange and is linear in nature along I-81 for approximately one mile, exceeding the typical walking distance. Therefore, it is necessary to subdivide this area of parking loss into three smaller subareas (A, B, and C) for evaluation purposes. Based on the typical walking distance, subareas defined by ¼-mile radii (with an additional 0.1 mile) were drawn along I-81 within the I-81/I-690 interchange and used to evaluate parking impacts and corresponding areas for potential mitigation.

Figure 5-38 show the potential mitigation areas associated with parking losses as described above. The mitigation areas are labeled as Subareas A, B, and C, corresponding to their location along the I-81 highway alignment. **Table 5-59** summarizes the potential to mitigate the parking loss through:

- The use of existing available public parking supply (1,164 spaces),
- Potential replacement of parking below I-690 (649 spaces),
- The development of new surface parking lots (963 spaces)

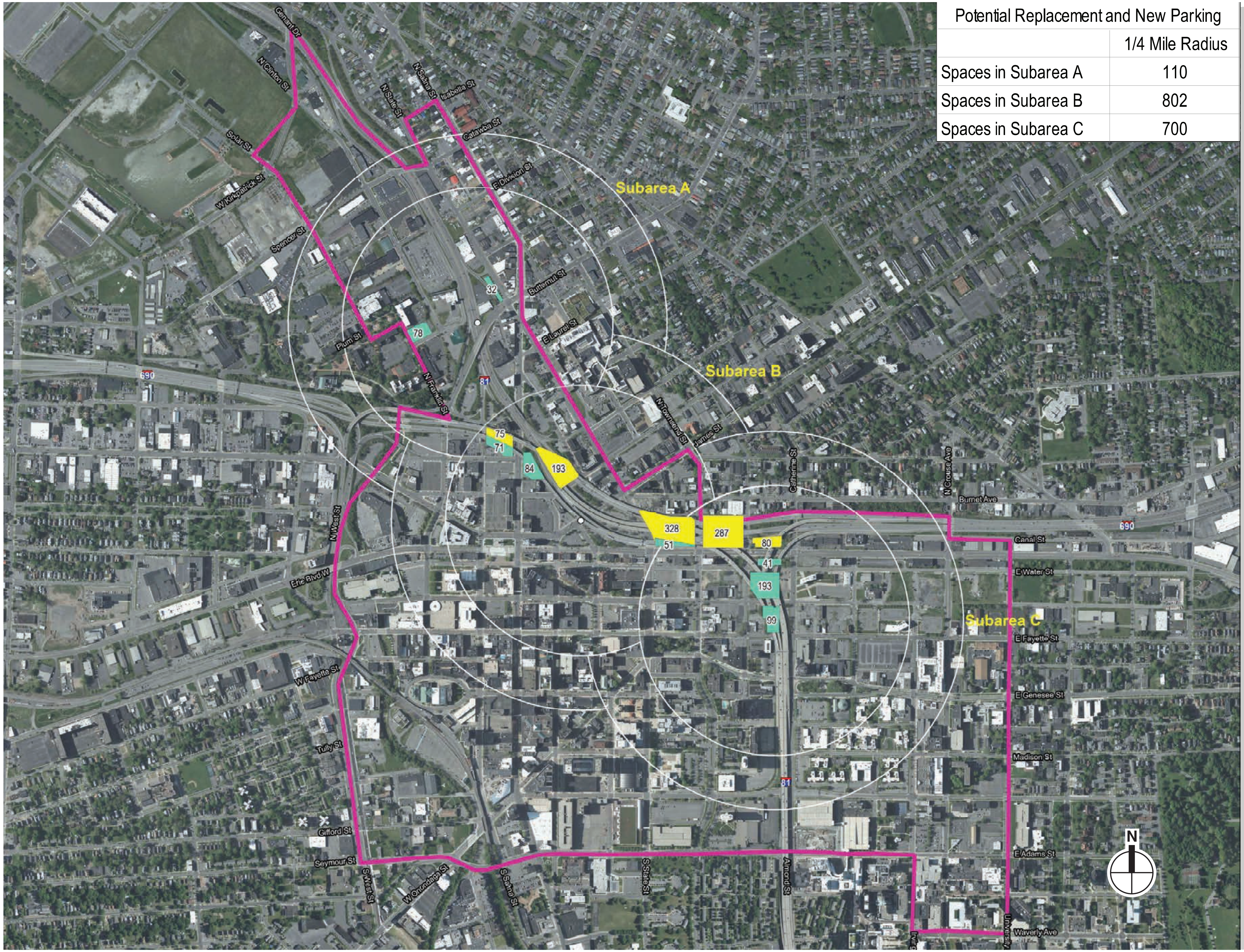
Table 5-59
Community Grid Alternative Parking Mitigation Options Summary

Area (1/4-mile radii + additional 0.1 mile)	Loss of Public Spaces	Available Public Spaces (Figure 5-37)	Potential Replacement Spaces (Figure 5-38)	New Potential Surface Lots (Figure 5-38)	Total Potential Mitigation Space
Subarea A	0	0	110	0	110
Subarea B	629	969	206	596	1,771
Subarea C	460	195	333	367	895
Total	1,089	1,164	649	963	2,776
Notes: Subarea is defined as a ¼-mile radius + 0.1 mile.					

The potential mitigation measures could provide a total of 2,776 spaces, which is more than needed to address the loss of 1,089 public spaces. For the purposes of this analysis to identify the required

3.17.22

Potential Replacement and New Parking	
	1/4 Mile Radius
Spaces in Subarea A	110
Spaces in Subarea B	802
Spaces in Subarea C	700



Study Area

Off-Street Parking

Potential replacement parking labeled by potential parking supply

Potential new surface lots labeled by potential parking supply

0 500 1000 FEET

1" = 450'
When printed at 22" x34"

Community Grid Alternative — Potential Parking Replacement and Mitigation

mitigation, replacing the number of public spaces lost due to the Community Grid Alternative was determined versus minimizing demand (i.e., implementing TDM strategies or maximizing existing parking facilities with available spaces). Defining how existing available parking supply could be maximized in various parking lots by relocating impacted parkers individually is not practical. Therefore, the mitigation options considered for further evaluation were replacing existing parking or developing new parking surface lots.

Specific options were considered to provide replacement public parking spaces through a minimal number of parking facilities in centralized locations within Subareas B and C. Locations were considered that would not require additional property takings, would not be desirable for commercial development, and would not impact City zoning or any potential new greenspace or gateway-type areas. The preferred parking mitigation option for the Community Grid Alternative is shown in **Figure 5-39**.

The five parking lot locations shown are further refined compared to how they are shown in **Figure 5-38** due to a closer evaluation of the existing right-of-way and how the parcel can be used based on the preliminary design plans for the Community Grid Alternative. The number of spaces identified are based on full utilization of the available parcels and assumes 350 square feet per space would be required. These five locations would provide each Subarea with necessary replacement parking and provide a total of 1,089 spaces to mitigate the 1,089 spaces to be replaced, as summarized in **Table 5-60**.

Table 5-60
Community Grid Alternative Preferred Parking Mitigation Option

Area (1/4-mile radii + additional 0.1 mile)[1]	Loss of Public Spaces	Proposed Mitigation Option
Subarea A	0	0
Subarea B	629	629[2]
Subarea C	460	460[2]
Total	1,089	1,089

Notes:
1- Subarea is defined as a ¼-mile radius + 0.1 mile.
2-Since the proposed surface lot between State Street and Townsend Street is located in both Subareas B and C, a portion of the lot capacity was assigned to each subarea.

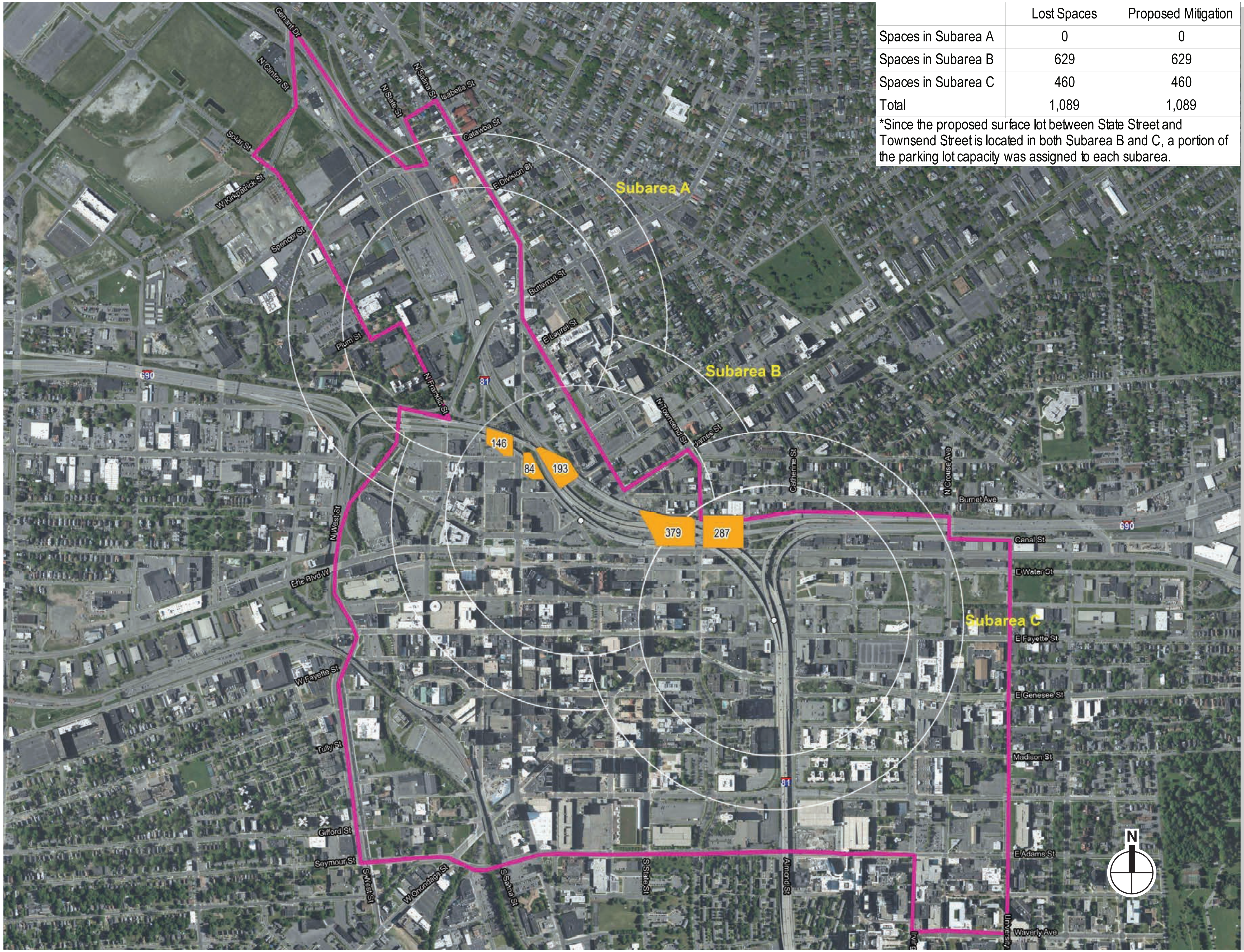
Temporary Parking Impacts and Mitigation

The potential temporary loss of parking during construction within the study area was determined using the same methodology associated with determining the permanent impacts. While the permanent impacts were determined using preliminary designs for each alternative, areas of proposed temporary easements were included to identify additional impacts during construction. Temporary impacts exceed the anticipated permanent impacts due to the need to use additional space outside work areas to conduct the work itself, but the timeframe of the impacts will vary depending on the location and type of work to be completed in the area.

3.17.22

	Lost Spaces	Proposed Mitigation
Spaces in Subarea A	0	0
Spaces in Subarea B	629	629
Spaces in Subarea C	460	460
Total	1,089	1,089

*Since the proposed surface lot between State Street and Townsend Street is located in both Subarea B and C, a portion of the parking lot capacity was assigned to each subarea.



Study Area

Off-Street Parking Surface Lot Mitigation Parking

0 500 1000 FEET

1" = 450'
When printed at 22" x34"

Community Grid Alternative — Preferred Mitigation Option

Figure 5-39

The anticipated work may result in the temporary loss of an entire parcel (building and parking area), the building only, the parking area only, or a portion of the parking on-site. For this analysis, a loss of a building resulted in the loss of demand and the loss of a parking facility resulted in the loss of supply. Based on the preliminary design, assumptions were made for the amount of parking supply lost or demand impacted for the purposes of this analysis (25, 50, 75, or 100 percent loss).

The associated change in supply and demand was applied to the No Build year's supply and demand to provide the estimated temporary impacts to parking for each alternative.

As a result of the Community Grid Alternative, 42 off-street parking facilities (total of 1,838 spaces) are expected to be temporarily lost to some degree along with 1,035 on-street spaces. As shown in **Figure 5-40**, most of the off-street facility impacts are adjacent to or under the existing viaduct. Most of the temporary on-street losses occur on the roadways that may be reconstructed to accommodate the anticipated distribution of traffic onto other local streets such as Genesee Street, Erie Boulevard, Irving Avenue, and Crouse Avenue.

Overall, the loss of supply is estimated to be 2,873 spaces and the reduction in demand is minimal (two spaces), as shown in **Table 5-61**. Parking utilization is expected to increase eight percent during construction compared to the No Build scenario. Utilization is expected to drop back down to 82 percent after construction without any proposed mitigation measures, as noted in **Table 5-57**.

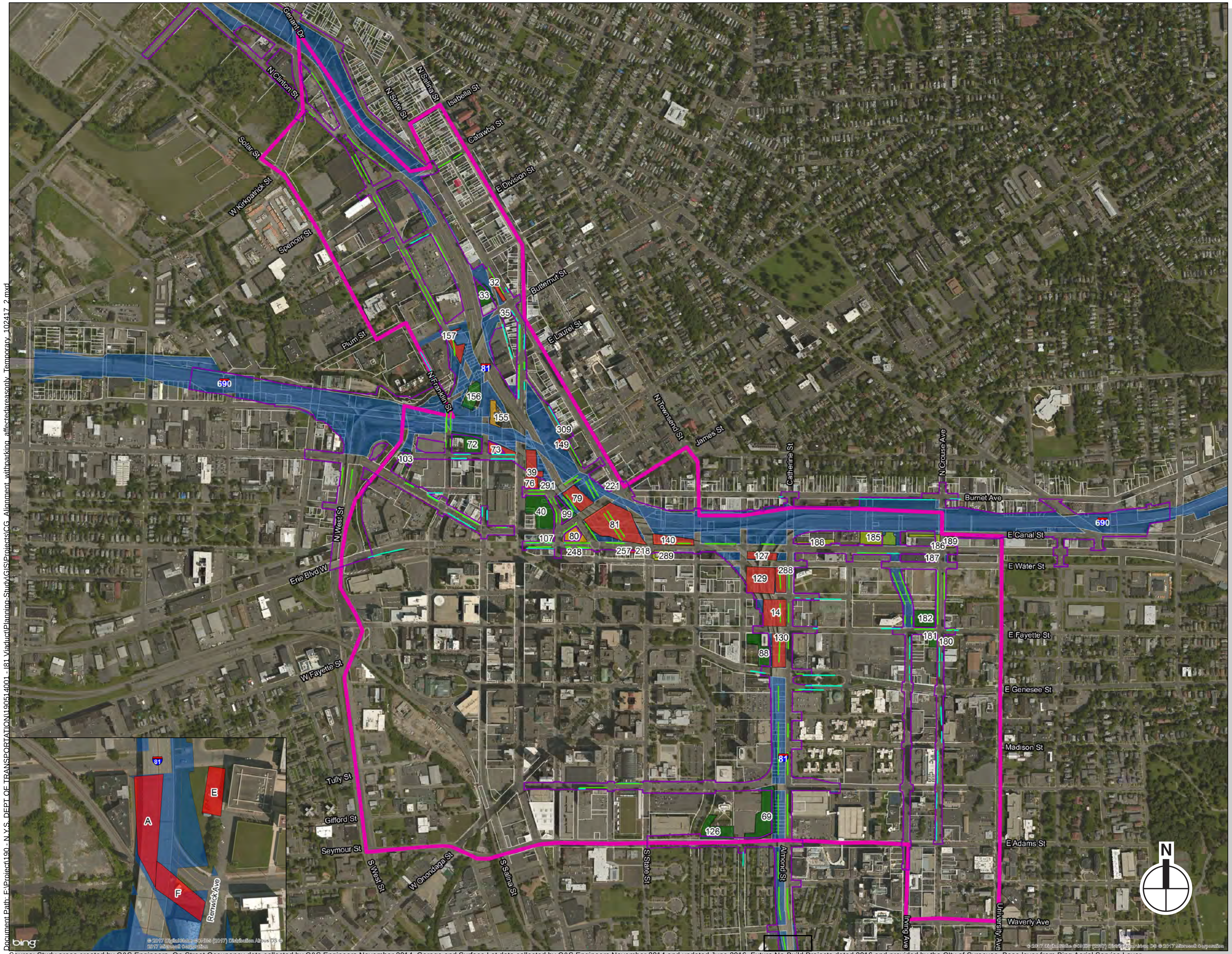
Table 5-61
Community Grid Alternative Supply and Demand Summary - Temporary

Analysis Year	Change in Supply	Supply	Effective Supply	Change in Demand	Demand	Utilization
Existing Conditions		29,233	26,808		21,064	79%
2020 No-Build	2,149	31,382	28,779	1,782	22,846	79%
2020 Temporary – Community Grid Alternative	-2,873	28,509	26,144	-2	22,844	87%

The Community Grid Alternative will result in a loss of 1,168 spaces in public off-street parking facilities and 670 spaces in private off-street facilities temporarily during construction. There is also an anticipated loss of 1,035 public on-street spaces throughout construction.

Similar to the mitigation measures noted previously to address the reduction in parking supply after construction, mitigation for parking impacts varies for public versus private facilities. As part of the real estate process, and in accordance with New York State Eminent Domain Procedure Law (Articles 1 through 7), property owners would be compensated for any impacts to private parking facilities that result from temporary impacts. Also, as part of the parking analysis, a parcel-by-parcel review of potential parking impacts was conducted, and it was determined that no additional buildings or businesses would need to be acquired because of temporary parking impacts during construction. Additionally, it was determined that further opportunities to avoid, minimize, and mitigate temporary parking impacts would be considered during final design.

3.11.21



Study Area
Temporary Impacts Boundary
On-Street Parking Impact Area
Proposed on-street parking
Impacted on-street parking
Tax Parcel Boundaries

Off-Street Parking Supply

25% Impact
50% Impact
75% Impact
100% Impact

*Labeled by FID#

** Temporary off-street impacts include those located in the MHB, MHBWOA, METS-P, MFS-P & MEPS-P

0 500 1000 FEET

1" = 450'
When printed at 22" x34"

Source: Study areas created by C&S Engineers. On-Street Occupancy data collected by C&S Engineers November 2014. Garage and Surface Lot data collected by C&S Engineers November 2014 and updated June 2016. Future No-Build Projects dated 2016 and provided by the City of Syracuse. Base layer from Bing Aerial Service Layer

Community Grid Alternative — Temporary Parking Impacts During Construction

Figure 5-40

The mitigation of temporary public impacts would fall under two categories:

- The implementation of transportation demand management (TDM) measures to reduce demand for parking (refer to recommendations in the Syracuse Metropolitan Transportation Council Downtown Syracuse TDM Study) and
- Maximize the available public supply within the study area through the promotion of available parking, improving the pedestrian environment, and/or provision of shuttle services.

The identification of specific mitigation measures for temporary impacts would be addressed during final design in order to take into consideration the variation in the potential length of the impact and best practices during construction. The type of work, as well as construction phasing, would make the length of impacts vary from short- (weeks) to long-term (years), which would play a role in determining the required mitigation.

As with the anticipated permanent impacts, most of the parking supply that is anticipated to be impacted temporarily is located beneath or adjacent to the viaduct and accommodates employee demand from a number of significant generators such as the city and state government buildings and University Hill institutions. Using potential replacement parking areas or new surface parking lots within existing or proposed right-of-way that could mitigate permanent impacts would not be available during construction to address temporary impacts. The NYSDOT is committed to mitigating temporary employee parking demand associated with the Community Grid Alternative using a combination of available spaces in existing parking areas not impacted by construction and remote parking facilities with shuttles, the details of which would be considered during final design.

A detailed breakdown of anticipated temporary impacts is included in **Appendix C-5.**

Lighting

Under the Community Grid Alternative, all existing highway lighting within the I-81 Viaduct Study Area would need to be replaced. This would include lighting along I-81, from south of the MLK, Jr. East bridge to the vicinity of Bear Street. It is anticipated that the existing high mast lighting in the vicinity of Hiawatha Boulevard would remain. Similarly, the existing highway lighting along I-690, between Leavenworth Avenue and Lodi Street, would be replaced.

In addition to lighting on the highway, replacement lighting would be provided on city streets that are reconstructed, as well as under-bridge lighting, sidewalk and shared-use (bicycle and pedestrian) paths lighting. Gateway and special area lighting also would be possible. Lighting on controlled access facilities and local streets are consistent with lighting warrants in Chapter 12 of the Highway Design Manual and NYSDOT's "Policy of Highway Lighting." Local lighting upgrades will require that the City of Syracuse consents to assume operational and maintenance costs for all future lighting installations. This agreement shall be confirmed when design advances.

Roadway lighting is constantly changing due to changes in technology and other factors that are associated with outdoor lighting. Some of the issues to be concerned with are related to lighting pollution that is created by glare, light trespass, and urban sky glow. Lighting glare causes reduced visual performance, which reduces the ability of the driver to distinguish objects clearly. Lighting options considered should be of low vertical illuminance and should include increasing the mounting height and the spacing between poles.

Light trespass and urban sky glow is allowing roadway lighting to illuminate the areas along a roadway with the light that is around the light pole. This may illuminate residential areas and affect the performance of security cameras in commercial areas. Fixtures in the above areas should consider cut-off technology or shields to minimize the amount of light trespass and sky glow. Another factor to consider is energy consumption. The cost of energy consumption is a real cost to the owner of the light fixtures, and with improvements in technology, coupled with reduced maintenance costs due to a long life expectancy, LED street light fixtures are proving to be a viable option that could be considered as an option.

Replacement highway lighting would be designed based on Illuminating Engineering Society (IES) RP-9 recommended values for Freeway A, Type R3 Pavement, and summarized in **Table 5-62**. Design criteria for additional lighting classifications are summarized in **Table 5-63**.

Replacement lighting for city streets, sidewalks, shared-use (bicycle and pedestrian) paths, and special use lighting under this alternative would be subject to approval by the City of Syracuse and may require modification or establishment of special lighting districts. Special Lighting Districts are those areas in the City that have petitioned the Common Council to allow for street lighting different than standard lighting and may typically be identified by decorative features or underground wiring. With the benefit of this special lighting come additional costs that are placed on the tax bills of the property owners within these districts. Under current City of Syracuse codes and ordinances, even replacement of existing luminaires with LED luminaires would need to be approved through a special lighting district. Any modifications other than standard High-Pressure Sodium luminaires on utility poles would require a public vote for the City to accept it. In general, the state would pay the cost of installing replacement light fixtures for existing lighting that is impacted by a state highway project, and the cost for maintenance would either be through a tariff rate with National Grid or through the City of Syracuse who would be responsible for maintenance.

Table 5-62
Community Grid Alternative - Recommended Lighting Values: Luminance

Item	DOT Recommended Value	Calculated Value [(1)]
Avg. Illuminance (cd/m2)	≥0.6	0.6
Uniformity (Ave/Min Ratio)	≤3.5	1.6
Uniformity (Max/Min Ratio)	≤6.0	3.8
Veiling Luminance Ratio	≤0.3	0.3
Small Target Visibility	3.2	2.4

Note:
1. The calculated values were determined using the aid of Visual Lighting Software’s Roadway tool. For the purposes of this analysis, the fixture was assumed to be a Lithonia, type DSX1 60LED with 700mA driver, Type 5 distribution at 4000°K. The calculations were performed using one side of the Freeway, with 4 lanes @12’ per lane with a 10’ median, type R3 pavement, with a fixture height of 30’. The optimal spacing of the fixture in order to achieve the Illuminating Engineering Society (IES) recommended values, which are shown on the table above, was calculated to be 240’ spacing per side, with fixtures staggered at 120’.

Table 5-63
IES Recommended Horizontal Illumination of Roadways and Walkways

Seeing Task	Classification of Area	
Vehicular Roadways	**Commercial**	**Residential**
Local Roadway/City Street	0.9 FC	0.4 FC
Pedestrian Walkways/Shared-use		
Sidewalks	0.9 FC	0.2 FC

FC = foot-candle, which is a measurement of illuminance or light intensity.

Reference: Table 14.3 of the Illuminating Engineering Society (IES) Lighting Handbook as per the illuminating Engineering Society of North America.

Ownership and Maintenance Jurisdiction

Under the Community Grid Alternative, NYSDOT would continue ownership and maintenance responsibilities for the Interstate Highway System. In addition, NYSDOT would retain ownership of the arterials listed in **Appendix C-6.5**, **Table C-6.5-1** and would continue to contract with the City of Syracuse for the maintenance of these facilities.

With removal of the I-81 viaduct between the railroad and I-690, NYSDOT would retain ownership of former I-81 between the south I-81/I-481 interchange and MLK, Jr. East. In addition, NYSDOT intends to take ownership and maintenance responsibility for the roadway segments that would be part of BL 81, including Renwick Avenue between MLK, Jr. East and Van Buren Street, Almond Street between Van Buren Street and Erie Boulevard, Erie Boulevard between Almond Street and Oswego Boulevard, Pearl Street between Erie Boulevard and the northbound on-ramp and Oswego Boulevard, between Erie Boulevard and the southbound BL 81 off-ramp. NYSDOT and the City of Syracuse will continue to coordinate associated ownership and maintenance roles.

It is anticipated NYSDOT would own and maintain the ramps at the new I-690 interchange at Crouse and Irving Avenues and that the City of Syracuse would own and maintain Crouse and Irving Avenues. The ownership and maintenance responsibilities for all other local roads would remain the same under this alternative.

A maintenance agreement with the City of Syracuse will be necessary for maintenance of new sidewalks and shared-use paths and to facilitate energizing and maintenance of any new lighting constructed along city streets as well as the state-owned lighting along I-81 and I-690 within the city limits. Similar maintenance agreements would be necessary with other municipalities where sidewalk, shared-use paths or lighting would be constructed as part of this Project.

Constructability Review

An initial constructability review workshop was conducted during preliminary design to evaluate current alternative designs and staging schemes, to identify potential constructability issues and innovative means and methods that may apply, identify additional construction related impacts, identify potential for additional right-of-way impacts and evaluate the overall project schedule to identify strategies that will improve constructability while accelerating the overall construction schedule. As a result of this workshop, it was determined that the Community Grid Alternative is constructible, and there were no major concerns regarding additional right-of-way.

The construction schedule was a major outcome of this evaluation. Several construction schedules were identified based on the degree to which traffic could be detoured. It was determined that identifying strategies to reduce the overall project schedule resulted in improving constructability but caused a larger impact to traffic. The most aggressive schedule identified for the Community Grid Alternative was a five-year schedule. As detailed in **Chapter 4, Construction Means and Methods**, a five-year schedule would only be possible through use of longer-term shutdowns of interstate segments. By employing a strategy that takes a section of interstate out of service for an extended period of time, more work can be fully built out in one phase; thus, the number of construction stages is dramatically reduced, productivity increases, the overall timeframes are reduced, and the constructability improves.

As noted, the constructability evaluation was conducted early in preliminary design. It is anticipated that as design progresses, a Value Engineering analysis would be required per 23 USC 106(e) and 23 CFR 627.5 for Design-Bid-Build procurement contracts according to FHWA and NYSDOT policy. Design Build projects are exempt from Value Engineering reviews as this type of procurement is a best value selection process. A constructability review would be performed by an independent review team and would be coordinated with a Value Engineering review. A Value Engineering (VE) review is a systematic process designed to focus and improve upon the major elements of complex or high cost projects. The main objectives of a VE review are to make recommendations on how to optimize construction scheduling, performance, constructability, maintainability, environmental awareness, safety, and cost-effectiveness.

In the case of major projects that are more complex and contain more risk elements than others, a rigorous cost estimating process becomes even more critical. Cost estimates were first developed early in the project's planning stage and have been periodically updated as the design alternatives have been refined. As the project continues through the Project Development Process, cost estimates will become increasingly refined and should reflect the project's actual costs more accurately. As indicated in the FHWA Major Project Delivery timeline, there are generally two formal Cost Estimate Reviews - one at the end of the NEPA process and the other before the start of construction.

5.6.2 MULTIMODAL

Pedestrians

Pedestrians will continue to be prohibited on I-690, I-81, I-481 and on the freeway sections of BL 81 by state law.

Pedestrian facilities would be reconstructed along all city streets that are impacted by this alternative and would be designed consistent with New York State Complete Streets legislation, consistent with NYSDOT’s PSAP standards where appropriate and consistent with current NYSDOT, HDM Chapter 18 standards, which meet PROWAG requirements.

In accordance with the Project’s objectives, the Community Grid Alternative would result in improved pedestrian accommodation, connectivity, and safety. In total, approximately 12.5 miles of new/reconstructed sidewalk and 2.0 miles of new/reconstructed shared-use path would be constructed as part of this alternative. Pedestrian facilities would be provided on both sides of Almond

Street from Burnet Avenue to Van Buren Street, and along the west side of BL 81 between Van Buren Street and MLK, Jr. East, thereby eliminating the existing gaps, which would remain under the No Build Alternative. Pedestrian safety and comfort would be improved on Almond Street, with a narrower roadway, curb bump outs at intersections, and a protected median. Pedestrian crossing distances on Almond Street would be narrower and will be more visible to motorists than in the existing condition and under the No Build Alternative.

Pedestrian connectivity between the Downtown and University Hill neighborhoods would be improved by providing crosswalks for all pedestrian movements at the Harrison Street and Adams Street intersections. Pedestrian refuge areas with protective bollards will be provided where crosswalks pass through raised median areas on Almond Street. Between Adams Street and Erie Boulevard, bump outs will be provided to narrow east-west pedestrian crossings of Almond Street. At the Almond Street intersections with Jackson Street, Taylor Street and Burt Street, crosswalks will be provided to facilitate pedestrian east-west connectivity.

The railroad bridge that carries the New York Susquehanna and Western Railroad over Renwick Avenue would be rebuilt and lengthened, allowing a shared-use (bicycle and pedestrian) path beneath the bridge on the west side and a sidewalk with buffer beneath the bridge on the east side. These improvements would provide safe pedestrian and bicycle access and improve pedestrian connectivity between the Southside, Downtown, and University Hill where none currently exists or would exist under the No Build Alternative.

Pedestrian connectivity will be improved along the Clinton Street corridor from Bear Street south to the realigned Butternut Street, then south on the Clinton Street extension to Franklin Street. A sidewalk segment on the east side of Clinton Street will not be provided so as to avoid conflicts with the SB BL 81 ramps. The realigned Court Street bridge and connection to Clinton Street will create a new pedestrian link between the Northside and Inner Harbor. The shared-use (bicycle and pedestrian) path from Bear Street to Hiawatha Boulevard and Lodi Street, and new sidewalks on Bear Street from Lodi Street to Van Rensselaer Street will create new pedestrian connections between the Northside, the Lakefront neighborhoods, the Creekwalk and the Empire State Trail.

The removal of the overpass at West Street and West Genesee Street would allow for several pedestrian enhancements in the area, including providing sidewalks where there are currently gaps in pedestrian connectivity. Pedestrian sidewalks would be provided on the east side of West Street between Genesee Street and Erie Boulevard, and on the north side of Genesee Street between Plum Street and West Street where none currently exists or would exist under the No Build Alternative. Crosswalks at West Street and Genesee Street would utilize medians to provided protected pedestrian refuges. A new shared-use (bicycle and pedestrian) path would be provided on the west side of Onondaga Creek where none currently exists or would exist under the No Build Alternative. Raising a portion of the existing Onondaga Creekwalk to the 10-year storm elevation will reduce the frequency of trail closures caused by flooding events in Onondaga Creek. Curb ramps, crosswalks, pedestrian signals with push buttons, and sidewalks, would be provided throughout the project limits. These facilities would improve pedestrian safety and enhance pedestrian connections in the local street network within the Project Area and improve connectivity between the Park Avenue neighborhood, the Onondaga Creekwalk, the Downtown business district, and other key destinations. Refer to **Chapter 3, Alternatives**, for a detailed description of proposed pedestrian facilities.

Bicyclists

Bicyclists will continue to be prohibited on I-690, I-81, and I-481 by state law.

The *Syracuse Bike Plan*, a section of the *Syracuse Comprehensive Plan 2040,* lays out a detailed vision for an interconnected bike network throughout the city. This Project builds on the city's vision of a bike network that provides connectivity between neighborhoods, the Downtown business district, and other key destinations. Facilities would be developed consistent with *AASHTO Guide for the Development of Bicycle Facilities 2012 Fourth Edition* and New York State Complete Streets legislation

The Community Grid Alternative would result in improved bicycle accommodation, connectivity, and safety. In total, approximately 2.0 miles of new/reconstructed shared use path, 1 mile of new cycle track and 1.7 miles of new/reconstructed on-street bike lane would be constructed as part of this alternative. New bicycle facilities would be provided on Almond Street between Burnet Avenue and MLK, Jr. East where none currently exists or would exist under the No Build Alternative. From Burnet Avenue to Erie Boulevard, one-way bike lanes would be provided on each side of Almond Street; from Erie Boulevard to Adams Street one way raised cycle tracks would be provided on each side of Almond Street; and from Adams Street to the MLK, Jr. East/Leon Street intersection, a shared-use (bicycle and pedestrian) path would be provided on the west side of Almond Street/BL 81. Shared lane facilities would be provided on both sides of MLK, Jr. East between Leon Street and Oakwood Avenue. This new bicycle facility on Almond Street would connect to a new shared-use (bicycle and pedestrian) path between Burt Street and Raynor Avenue that would be separated from the highway and provide improved connectivity from the Southside, Downtown, and University Hill.

The railroad bridge that carries the NYS&W over Renwick Avenue would be rebuilt and widened to provide for the shared-use (bicycle and pedestrian) path to pass beneath the bridge on the west side allowing for bicycle accommodation where none currently exists or would exist under the No Build Alternative.

Harrison Street, which would be reconstructed from Almond Street to Townsend Street, would be converted from a one-way to a two-way street between Almond Street and Salina Street. One-way raised cycle tracks would be provided on both sides of Harrison Street between Almond Street and Townsend Street. A raised two-way cycle track would be provided on the west side of Salina Street between Laurel Street and Herald Place; a raised two-way cycle track would be provided on State Street between James Street and the Empire State Trail on Water Street and on Crouse Avenue between Burnet Avenue and the Empire State Trail on Water Street. Bike lanes would be provided on Lodi Street between Burnett Avenue and Canal Street and connecting to the Empire State Trail on Water Street via shared lane markings on Canal Street and Walnut Street where none currently exists or would exist under the No Build Alternative. One-way bike lanes on each side of the street would be provided on the new Butternut Street Bridge that would connect to proposed shared lane facilities on Salina and State streets to the east, and to a new shared lane facility on Franklin Street to the west. The new Franklin Street facility would connect to a new facility on Evans Street, and the Evans Street facility would connect to a new shared-use (bicycle and pedestrian) path on the west side of Onondaga Creek. A new shared-use (bicycle and pedestrian) path would be provided to connect the existing Onondaga Creekwalk to the intersection of Franklin Street, Evans Street, and Websters Landing. The new Spencer Street Bridge would include bike lanes that would extend east to Salina Street via Catawba, and west to Clinton Street with new bike lanes. Clinton Street will include shared lane markings from the new Spencer Street bike lanes south to the new Butternut Street bike lanes and the new Franklin Street shared lane markings. A two-way shared-use (bicycle and pedestrian) path would be provided on the east side of I-81 between Bear Street and Hiawatha Boulevard and connect future city-proposed facilities on Lodi Street and Lemoyne Avenue. These facilities would enhance bicycle connections in the local street network within the Project Area and improve connectivity between neighborhoods, the Downtown business district, and other key destinations.

Pedestrian and Bicycle Level of Service

Table 5-64 summarizes the pedestrian and bicycle LOS for the Community Grid Alternative. Under the Community Grid Alternative, two facilities would operate at an unacceptable LOS - westbound Harrison Street for pedestrians and northbound Crouse Avenue for bicyclists.

Table 5-64
2026 and 2056 Community Grid Pedestrian and Bicycle Level of Service Analysis

Facility Type	Facility Name		2026				2056			
			AM		PM		AM		PM	
			LOS Score	LOS	LOS Score	LOS	LOS Score	LOS	LOS Score	LOS
Pedestrian	Adams Street	EB	3.60	D	3.40	C	3.65	D	3.47	C
	Almond Street	NB	3.19	C	3.30	C	3.20	C	3.25	C
		SB	3.29	C	3.59	C	3.30	C	3.65	D
	Crouse Avenue	NB	3.46	C	3.68	D	3.45	C	3.76	D
		SB	3.29	C	3.31	C	3.23	C	3.36	C
	Erie Boulevard	EB	3.44	C	3.59	D	3.45	C	3.58	D
		WB	3.39	C	3.60	D	3.42	C	3.61	D
	Harrison Street	EB	3.62	D	3.65	D	3.73	D	3.70	D
		WB	3.74	D	3.79	D	3.75	D	3.81	D
Bicycle	Almond Street	NB	3.48	C	3.50	D	3.49	C	3.50	D
		SB	3.35	C	3.38	C	3.34	C	3.39	C
	Crouse Avenue	NB	4.44	E	4.56	E	4.45	E	4.59	E
		SB	3.43	C	3.49	C	3.47	C	3.52	D
	Harrison Street	EB	3.91	D	3.93	D	3.93	D	3.94	D
		WB	3.44	C	3.44	C	3.46	C	3.47	C
	Water Street	EB	3.59	D	3.58	D	3.61	D	3.65	D
		WB	3.52	D	3.45	C	3.49	C	3.47	C

A slight decrease in bicycle LOS would occur for Crouse Avenue compared to the No Build Alternative. This is due to proposed changes in on-street parking, lane configurations and widths, and traffic volume increase from the new I-690 interchange. Water Street would experience a minor deterioration in LOS compared the No Build Alternative, due to the increase in traffic volumes, without improvements to the roadway for bicyclists.

Transit

No changes in bus service are proposed under the Community Grid Alternative. However, potential minor impacts on existing operations are projected due to the proposed modifications of the following freeway and arterial roadways:

- Traffic from northbound Almond Street to eastbound and westbound I-690 would need to use new I-690 Interchange at North Crouse and Irving Avenues
- Existing Pearl Street and Butternut Street on-ramps would be replaced with a single on-ramp at Pearl Street
- Realignment of Butternut Street bridge
- Existing Franklin Street/West Street and Clinton Street/Salina Street off-ramps would be replaced with a single off-ramp at Clinton Street
- I-690 Interchange 11 (West Street) and removal of the West Street Overpass

These roadway modifications under the Community Grid Alternative may require rerouting of buses for portions of their existing bus service routes. This may subsequently affect bus stop locations and possibly schedules. Based on the Centro route guide, potential bus routes affected include:

- Route 22 James Street – Route 298
- Route 45 Destiny USA
- Route 46 Liverpool – Route 57 – Great Northern Mall
- Route 48 Liverpool – Morgan Road – Avon Parkway – Grampian Road
- Route 50 Destiny USA via I-81
- Route 82 Baldwinsville
- Route 84 Mattydale
- Route 86 Henry Clay Boulevard
- Route 88 North Syracuse
- Route 148 Liverpool – Morgan Road
- Route 162 Manlius via I-690 – Widewaters Parkway
- Route 184 Mattydale – Allen Road
- Route 186 Henry Clay Boulevard – Wetzel Road
- Route 188 North Syracuse - Cicero
- Route 246 Oswego – Syracuse via Fulton/Phoenix
- Route 248 Liverpool – Morgan Road
- Route 286 Henry Clay Boulevard – Wetzel Road
- Route 288 North Syracuse – Cicero – Central Square
- Route 362 DeWitt – Widewaters Parkway
- Route 323x James Street – East Syracuse – Minoa Express
- Route 388 Central Square
- Route 550 Destiny USA

Although many bus routes potentially would be affected by the implementation of the Community Grid Alternative, the impacted portions of the existing bus routes would not be long (compared to the entire length of the routes) and, therefore, the expected delays, detours, and bus stop relocations should be minimal. As part of the development of the Community Grid Alternative, NYSDOT has and will continue to coordinate with Centro on potential street improvements (including transit amenities such as bus stops and shelters, bus turnouts, and layover and turnaround places) in the project limits to enhance and support Centro's transit initiatives.

Airports, Railroad Stations, and Ports

No changes are proposed; no conflicts are expected.

Access to Recreation Areas (Parks, Trails, Waterways, and State Lands)

No changes are proposed to preclude access to any recreation area, and no conflicts are expected.

At Almond Street and Genesee Street, pedestrian access to Forman Park would be improved via the removal of an existing east-bound to west-bound vehicular turn lane for Genesee Street. Forman Park, Wilson Park, the Connective Corridor, and the Empire State Trail will be more accessible for bicycle users with the addition of new bicycle infrastructure on Almond Street.

The Project changes at West Street and Genesee Street will improve access and connectivity for pedestrians and bicyclists to the Onondaga Creekwalk via new sidewalk and shared-use (pedestrian and bicyclist) path segments. The bicycle facility at Lodi Street, Canal Street, and Walnut Street will improve accessibility to Ormand Spencer Park.

Trucks

Under the Community Grid Alternative, truck travel patterns (in terms of travel routes and traffic volumes) on the highways and local streets would differ from No Build conditions (refer to **Section 6-3-2, Local and Regional Economies** for additional information). In general, trucks would use BL 81 (former I-81) less extensively for north-south travel through the Syracuse region. Instead, more trucks would use the new I-81 (former I-481) for north-south travel and for pick-up and delivery to distribution centers within the project area. Sections of I-690 west of the BL 81/I-690 Interchange would have less truck traffic, whereas truck volumes on the sections of I-690 east of BL 81/I-690 Interchange would increase due to the construction of new I-690 interchange at Crouse and Irving Avenues. Compared to the No Build Alternative, the Community Grid Alternative would more evenly distribute truck traffic on the local street system. This is because that parallel to Almond Street, many southern roadways into downtown are available to disperse traffic and provide more direct routes to various destinations. However, truck traffic would increase more substantially on roadways adjacent to BL 81 (e.g., Almond Street, Clinton Street, Salina Street).

5.6.3 INFRASTRUCTURE

Proposed Highway Section

Refer to **Appendix A-1** for a typical section.

Right-of-way

Section 6.3.1, Land Acquisition, Displacement, and Relocation identifies the property needs for each project alternative.

Curb

Within the I-81 Viaduct Study Area, the majority of I-81 and I-690 non-bridge sections, including the ramps, would include a mountable curb (Type PT100). The mountable curb would be placed at the outside edge of shoulder to help reduce the amount of untreated storm water by directing runoff to the new closed drainage system. Curbing would not be provided along the reconstructed sections of I-81 in the I-481 South Study Area, I-481 East Study Area, and the I-481 North Study Area where adequate right-of-way exists for open ditches and swales.

Six-inch-high non-mountable curbing would be provided along both sides of city streets within limits of reconstruction, and existing curbing would be preserved in sections programed for mill and inlay treatment. Refer to typical sections in **Appendix A-1** for more specific detail of curbing types and limits.

Grades

All segments of I-81 and I-690 within the project limits, and their associated ramps, would meet the maximum grade criteria listed in **Appendix C-6.** In addition, the proposed grades for reconstructed local streets also would meet maximum grade criteria, except at the existing grade of Van Buren Street, which will be retained as a non-standard feature. Refer to **Appendix A-1** for profiles of all reconstructed sections of highway and local streets.

Intersection Geometry and Conditions

Under the Community Grid Alternative, numerous intersections would be reconstructed to meet geometric standards and traffic operational needs, and to address pedestrian and bicycle accommodation. Some of the more substantial intersection work will include:

- West Street/W. Genesee Street – This grade separated crossing currently has no direct connection between West Street and Genesee Street. The eastbound I-690 exit ramp connects to both West Street and Genesee Street. The West Street overpass would be removed as part of this alternative and replaced with an at-grade signalized intersection. The new intersection would provide for all traffic movements as well as greatly enhance pedestrian and bicycle accommodation.
- Colvin Street/former I-81 northbound ramps – with the addition of a new northbound BL 81 off-ramp to Colvin Street, a new signal will be installed on Colvin Street at the ramp intersection.
- MLK, Jr. East/Renwick Avenue – MLK, Jr. East would terminate at the driveway of the Dr. King Elementary School (instead of at Renwick Street as it does today). BL 81 would not be signalized at MLK, Jr. East, and there would be no vehicular connection between BL 81 and MLK, Jr. East. Pedestrians and bicyclists would use a new shared use path along the west side of BL 81 to travel between MLK, Jr. East and the Almond Street/Burt Street intersection.
- Renwick Avenue/Fineview Place – The section of Fineview Place between Raynor Street and Renwick Avenue would be removed; therefore, the Renwick Avenue/Fineview Place intersection would be eliminated.
- Renwick Avenue, Van Buren Street/Almond Street intersection – Renwick Avenue would be reconstructed as a southern extension of Almond Street, and a new roundabout would be constructed at the Van Buren Street, Almond Street intersection. The new roundabout would

provide for all traffic movements and would serve as the main vehicular entrance from the south to University Hill.

- Van Buren Street/Irving Avenue – This signalized intersection would be modified slightly to accommodate separate turn lanes at the intersection. The intersection modifications would primarily involve repaving, restriping, and replacement of the signals and signing. In addition, sidewalk ramps would be reconstructed as needed to meet current standards, and deteriorated sections of curbing and sidewalk would be replaced.
- Almond Street/Catherine Street Corridor, Burt Street to Burnet Avenue – All intersections along the Almond Street/Catherine Street corridor would be reconstructed. The intersections would be designed to accommodate traffic operational needs and improve pedestrian and bicycle accommodation. All signals and traffic control systems would be replaced.
- Crouse Avenue, Adams Street to Burnet Avenue – The section of Crouse Avenue between Adams Street and E. Genesee Street would be converted from a one- way to a two-way street. The intersection modifications would primarily involve repaving, restriping, replacement of the signals and signing, replacement of deteriorated sections of curbing and sidewalk, and replacement sidewalk ramps as needed to meet current standards. The remaining section of Crouse Avenue between E. Genesee Street and Burnet Avenue would be reconstructed, including signals, curbing, and sidewalks, to support the traffic operational needs related to the new I-690 interchange ramps as well as to enhance pedestrian and bicycle accommodation.
- Butternut Street, Spencer Street, Court Street, and Bear Street – Due to the widening and reconstruction of the northern section of BL81, the various crossing street bridges would be replaced, and the adjoining intersections on both sides of BL81 would be modified or reconstructed as necessary. All impacted intersections would be modified to meet geometric requirements, accommodate traffic operational needs, and enhance pedestrian and bicycle accommodation.
- Irving Avenue - The section of Irving Avenue between Adams Street and E. Fayette Street would be converted to three travel lanes by primarily repaving, restriping, replacement of the signals, replacement of deteriorated sections of curbing, and sidewalk and replacement sidewalk ramps as needed to meet current standards. In addition, Irving Avenue would be extended to the north, through vacant property, to connect to the new I-690 interchange. The extension would create new intersections at Water Street and Erie Boulevard. The new intersections would be signalized to support the traffic operational needs as well as enhance pedestrian and bicycle accommodation.
- Oswego Boulevard – The existing Oswego Boulevard/Erie Boulevard intersection would be reconstructed to support a new southbound exit ramp from BL 81. In addition, Oswego Boulevard would be extended to the northwest to form a new intersection with E. Willow Street and the existing intersection with James Street would be reconstructed. All three intersections would be signalized to support the traffic operational needs as well as enhance pedestrian and bicycle accommodation.
- Pearl Street - The existing Pearl Street/E. Willow Street intersection would be reconstructed to support a new northbound entrance ramp connecting to former BL81. In addition, Pearl Street would be extended to the southeast to form new intersections with James Street and Erie

Boulevard. All three intersections would be signalized to support the traffic operational needs as well as enhance pedestrian and bicycle accommodation.

- Butternut Street, Spencer Street, Court Street, and Bear Street – Due to the widening and reconstruction of the northern section of BL81, the various crossing street bridges would be replaced, and the adjoining intersections on both sides of BL81 would be modified or reconstructed as necessary. All impacted intersections would be modified to meet geometric requirements, accommodate traffic operational needs, and enhance pedestrian and bicycle accommodation.
- Clinton Street – All intersections from Bear Street south to the realigned Butternut Street, and beyond on the Clinton Street extension to Franklin Street would be reconstructed. A new, signalized intersection would be created at the southbound I-81 exit and entrance ramps. The intersections would be designed to accommodate traffic operational needs and improve pedestrian and bicycle accommodation in designated segments. All signals and traffic control systems would be replaced.
- Genant Drive – Due to the widening of the northern section of BL 81, and reconfiguration of the SB exit and entrance ramps connecting to North Clinton Street and Bear Street, Genant Drive would be removed just north of Court Street, and between Spencer Street and just north of West Division Street. Genant Drive would be two-way from its northern termination to Spencer Street, one way south bound from just north of West Division Street to just east of Clinton Street, and two-way from Clinton Street to just east of Clinton Street. All impacted intersections would be modified to meet geometric requirements, accommodate traffic operational needs, and enhance pedestrian accommodation.
- Brighton Avenue and East Glen Avenue – This intersection will be aligned opposite the southbound I-81 exit ramp to Brighton Avenue.
- NY 5/92/existing I-481 southbound off ramp – The interchange improvements at existing I-481 Interchange 3 will include improving the existing southbound I-481 to westbound NY 5/92 ramp to provide for both eastbound and westbound NY 5/92 movements. The existing southbound I-481 to eastbound NY 5/92 loop ramp would be removed. A new signal system on Route 5/91 at the southbound ramp intersection would be installed to improve traffic operations, and pedestrian accommodation.
- NY 5/NY 92 Intersection – the existing intersection would be widened, and the existing signal replaced, to provide for an additional right turn lane from eastbound Route 5 to eastbound Route 92 to improve traffic operations.

The full extent of intersection work under the Community Grid Alternative is shown on the plans in **Appendix A-1**.

Roadside Elements

- Where appropriate, snow storage areas would be provided adjacent to the curbs on all reconstructed streets.
- A shared-use (bicycle and pedestrian) path would be provided along the west side of the new southern arterial between MLK, Jr. East and Adams Street, along the west side of Almond Street between Van Buren Street and Burt Street. One-way cycle tracks would be provided along both

the east and west sides of Almond Street between Adams Street and Burnet Avenue. In addition, a network of shared-use (bicycle and pedestrian) paths would be constructed in the West Street area to enhance connectivity to the existing Creekwalk.

- With few exceptions, minimum five-foot-wide sidewalks would be constructed along both sides of all reconstructed city streets and all sidewalk ramps would be upgraded to meet current ADA standards.
- Driveways would be modified to comply with City of Syracuse standards and current NYSDOT "Policy and Standards for Design of Entrances to State Highways."
- Clear Zone - The design clear zones shown in **Table 5-65** were established in accordance with the NYSDOT HDM and the AASHTO Roadside Design Guide. Clear zones will be further evaluated when design advances to adjust for slopes, roadway curvature, etc. Where fixed objects and other hazards within the clear zone cannot be removed, roadside appurtenances, such as guide rail, would be considered.

Table 5-65
Roadside Elements – Clear Zone

Route Name	Design Speed	Clear Zone[1]
New I-81 (former I-481), between existing I-481 south interchange and existing I-481 north interchange.	70 mph	30 ft.
Former I-81, between existing I-481 south interchange and MLK, Jr. East.	60 mph	30 ft.
Former I-81, between I-690 and Hiawatha Boulevard.	60 mph	30 ft.
I-690, Leavenworth Avenue to Beech Street		
Ramps (45-50)	45-50 mph	26 ft.
Ramps (40)	40 mph	17 ft.
City Streets	35 mph	Note 2

Notes:
1. Clear zone values taken from Table 10-1 from the NYSDOT Highway Design Manual are un-adjusted. When design advances, adjusted clear zone will be determined from adjustments made from minimum curvature and Table 10-2 from the NYSDOT Highway Design Manual.
2. Suggested clear zone is 1.5 ft. and 3.0 ft. at intersections.

Special Geometric Design Elements

Non-standard Features

During the project alternatives development phase, efforts were made to ensure that the design complied with the geometric features and cross-sectional elements set forth in **Section 5.4, Design Criteria for Reasonable Alternatives**. In addition, existing roadside design features within the project corridor were analyzed against these criteria to identify existing features that did not meet the current design standards. For any feature that does not meet the criteria, a completed Non-Standard Feature Justification Form is required. For the Community Grid Alternative, a total of 21 non-standard geometric features are recommended to be retained. As shown in **Table 5-66**, the geometric features include seven non-standard features on the interstate mainline segments of the Project, five interstate ramp locations and nine non-standard features on local streets within the Project Area. See **Appendix A-3** for the Non-Standard Feature Justification forms for each of these design elements that are recommended to be retained.

Non-Conforming Features

In addition to the critical design elements depicted in Chapter 2 of the NYSDOT HDM, many other design features were taken into consideration during the development of the Community Grid Alternative following normally accepted engineering policies. Due to the confined right-of-way, location of some buildings, and limited distance between adjacent intersections, some design elements, such as ramp spacing, broken back curves, compound curve ratio and level of service, were adjusted to meet the Project's purpose and need while minimizing undesirable impacts. Refer to **Appendix A-3, Table A.3.4** for a listing of non-conforming design elements, followed by a justification of the retention of each non-conforming feature. **Table A.3.4** also includes a listing of Control of Access locations that do not meet recommended design standards. **Table A.3.4** is followed by Access Control Justification forms for each of the non-conforming Control of Access locations.

Pavement and Shoulder

Due to a number of factors, including profile changes, horizontal alignment changes, and construction phasing implications, it was determined that pavement rehabilitation for existing I-81 (from E. Kennedy Street to MLK, Jr. East and from Butternut Street to Hiawatha Boulevard) and I-690 (from Leavenworth Avenue to Lodi Street), within the I-81 Viaduct Study Area would not be considered and the pavement would be reconstructed. In addition, the Project also includes a variety of work on city streets. Due to the nature of the work, the anticipated amount of utility relocation work, and the anticipated disturbance from highway and bridge reconstruction, it is assumed that city streets that will be widened or re-aligned would be reconstructed, and that city streets proposed for traffic signal replacement and pavement re-striping would be milled and inlaid. In accordance with the NYSDOT Comprehensive Pavement Design Manual, a Pavement Evaluation and Treatment Selection Report (PETSR) has been prepared. The report provides recommendations regarding pavement type and pavement thickness design for new and reconstructed interstates, ramps, state routes, and local roads for the I-81 Viaduct Project. A life cycle cost analysis of both rigid and flexible pavement alternatives was developed. Refer to **Appendix A-4** for a copy of the PETSR.

Drainage Systems

The existing storm sewer systems that serve the I-81 and I-690 highway segments within the I-81 Viaduct Study Area are tributary to Onondaga County and City of Syracuse combined sewers. The I-481 North, East, and South Study Areas are tributary to Mud Creek, Butternut Creek, and Onondaga Creek, respectively. The entire project area is subject to the requirements of the New York Department of Environmental Conservation's (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity (GP-0-20-001). A Stormwater Pollution Prevention Plan (SWPPP) with the appropriate stormwater management and sediment and erosion control measures would be developed for the Project during final design. Stormwater quality treatment would be required for this Project, and the county and city both require a reduction in the amount of stormwater runoff volume that would be discharged into their combined sewer systems.

Table 5-66
Non-Standard Features Recommended to be Retained – Community Grid Alternative

Location	Design Element (1)	Design Criteria (2)	Proposed Design (3)
Northbound I-81 (at south interchange)	HSSD	730 ft.	679/524 ft.
Southbound I-81 (at south interchange)	HSSD	730 ft.	542/703 ft.
Interstate Ramp, Southbound BL 81 to new Northbound I-81	HSSD	305 ft.	236 ft.
Southbound I-81 (at north interchange)	HSSD	730 ft.	542/703 ft.
Northbound and southbound I-81, Route 5/92 to Kinne Rd.	Left Shoulder Width	10 ft.(3-lane) 4 ft.(2-lane)	5 ft. 2.5 ft.
Northbound and southbound I-81, at Route 5/92 bridge area	Right Shoulder Width	10 ft.	2.5 ft.
Southbound I-81 at existing I-481 Interchange 4	Horizontal Curve	1,815 ft.	1,235 ft.
I-81 Northern Segment, Butternut St. to Hiawatha Blvd.	Shoulder Width	10 ft.	7 ft.
Interstate Ramp, Eastbound I-690 to off-ramp to Irving Ave.	Horizontal Curve	214 ft.	158 ft.
Interstate Ramp, Eastbound I-690 to off-ramp to Irving Ave.	HSSD	200 ft.	129 ft.
Interstate Ramp, Westbound I-690 on-ramp from Irving Ave.	Horizontal Curve	214 ft.	159 ft.
Interstate Ramp, Southbound I-81 off-tamp to N. Clinton St.	Horizontal Curve	214 ft.	167 ft.
Van Buren Street, Almond Street to Henry Street	Grade	8% max.	15.52%
Genant Drive, N. Clinton St. to W. Division St.	Horizontal Curve	188 ft.	76 ft.
Erie Boulevard, Salina St. to Crouse Ave.	Shared Lane Width	13 ft.	12 ft.
Oswego Boulevard, Erie Blvd. to E. Willow St.	Shared Lane Width	13 ft.	12 ft.
Pearl Street, Erie Blvd. to BL 81 ramp.	Shared Lane Width	13 ft.	12 ft.
Harrison Street, Salina St. to State St.	Shared Lane Width	13 ft.	10.5 ft.
Crouse Avenue, Waverly Ave. to Genesee St.	Shared Lane Width	13 ft.	12 ft.
Irving Avenue, Van Buren St. to Erie Blvd.	Shared Lane Width	13 ft.	11 ft.
Van Buren Street, Almond St. to Irving Ave.	Shared Lane Width	13 ft.	12 ft.

Notes:
1. HSSD = Horizontal Stopping Sight Distance
2. Refer to Design Criteria Tables in Appendix C-6.3.
3. Refer to Appendix A-3.3 for Non-Standard Feature Justification Forms

An analysis of the existing and proposed drainage conditions was conducted for the Community Grid Alternative, including the I-81 Viaduct Study Area and the I-481 North, East, and South Study Areas. For the purposes of this analysis, the I-81 Viaduct Study Area was subdivided based on the project drainage outlets into areas south of Butternut Street, including the existing I-81/I-690 interchange, and areas north of Butternut Street to Hiawatha Boulevard. Areas south of Butternut Street within the I-81 Viaduct Study Area are highly urbanized and would require different drainage engineering solutions for managing runoff than the more suburban areas north of Butternut Street. The drainage analysis boundaries for each study area, along with drainage divides and drainage outlet locations, are shown on **Figure 5-41** (I-81 Viaduct Study Area), **Figure 5-42** (I-481 North Study Area), **Figure 5-43** and **Figure 5-44** (I-481 East Study Area), and **Figure 5-45** (I-481 South Study Area). The ultimate objective of the drainage analysis is to verify that the Community Grid Alternative would reduce peak runoff from the Project Area and that stormwater runoff quantity and quality requirements would be met as defined by the NYSDEC Stormwater Design Manual.

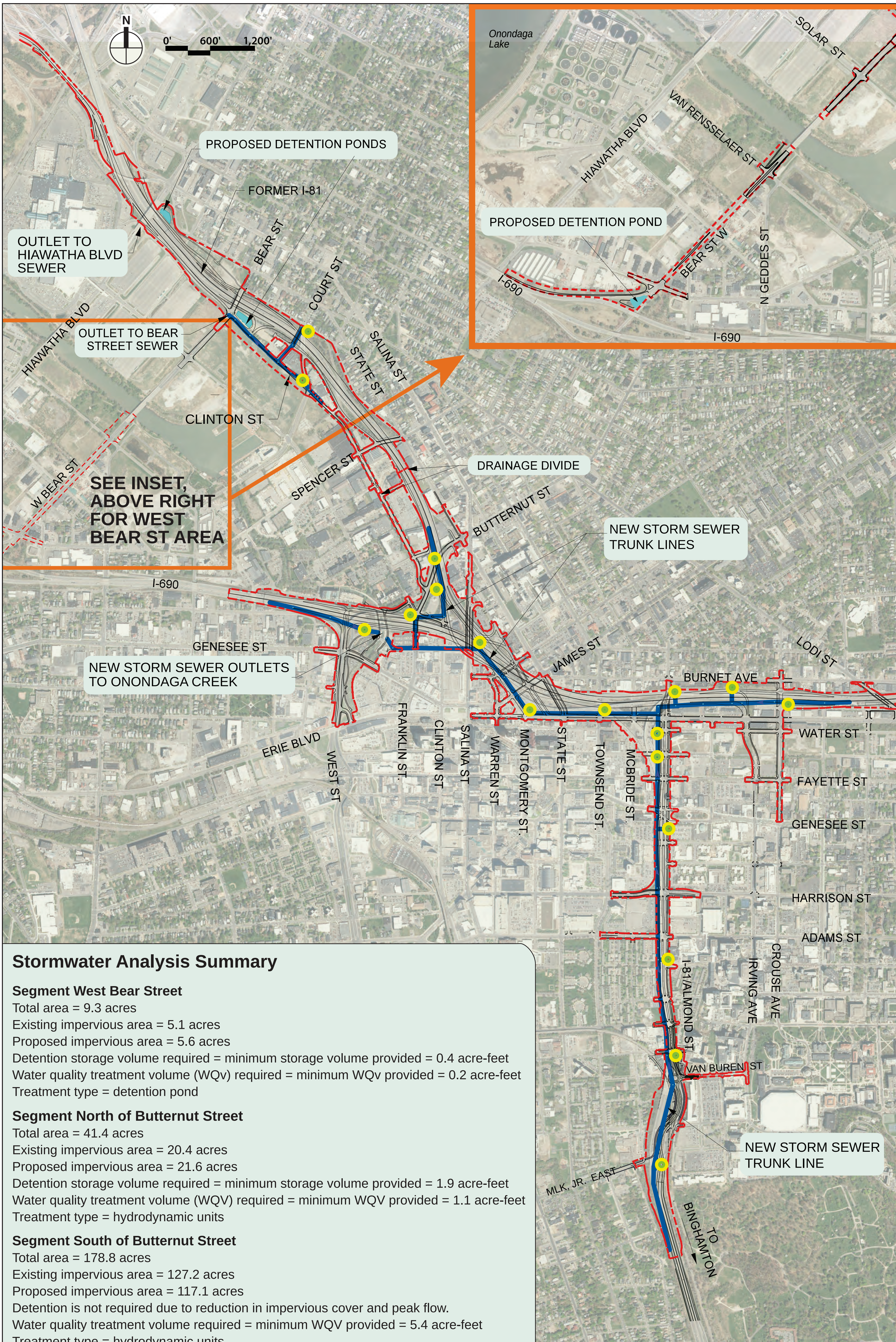
The proposed solutions to meet water quantity and quality treatment goals vary depending on the nature of the site. Generally, dense urban settings such as those occurring in the I-81 Viaduct Study Area provide limited space to incorporate open drainage systems. At these locations, much of the existing surfaces and infrastructure are impervious, resulting in in a high volume of stormwater runoff with few means for ground infiltration. Within these dense urban environments, it is advantageous to manage stormwater runoff and water quality through a reduction in impervious area and using compact water treatment devices rather than open detention or infiltration basins. In suburban areas of the project, such as the I-481 North and East Study Areas, open drainage and detention systems would be a more suitable method for controlling runoff and improving water quality. At the South Study Area, open drainage and dry swales would be more appropriate than detention or infiltration basins due to known underground limestone formations within the south study area. The NYSDEC storm water management design guidelines restrict the use of large infiltration areas in locations with karst geology.

Surface runoff within the I-81 Viaduct Study Area drains to catch basins and inlets that are connected to the City of Syracuse combined sewer system, which in turn discharges into the Onondaga County combined sewer system. The existing combined sewer systems are overburdened during wet weather events and do not meet current design standards. As such, the combined sewer system is vulnerable to overflows, and the entire I-81 Viaduct Study Area is under substantial restrictions to control water quantity and quality, including a consent order to reduce flows to the combined sewer system.

A reduction in flow to the combined storm sewer can be accomplished south of Butternut Street within the I-81 Viaduct Study Area by installing a new separated drainage system consisting of large diameter storm sewer trunk lines along former I-81/Almond Street and I-690. The conceptual layout of the proposed drainage system is shown on **Figure 5-41** and is presented in more detail in the conceptual drainage plans included in **Appendix A-1**. The proposed system would include a new outfall to Onondaga Creek and would be subject to permit requirements by the NYSDEC and the U.S. Army Corps of Engineers. To obtain the required permits, a detailed hydraulic analysis would be conducted during final design to demonstrate the project development would have no adverse impacts to the downstream watercourses.

Under the Community Grid Alternative, the conceptual drainage plan in **Appendix A-1** has been designed to collect the majority of stormwater runoff from roadway improvements within the I-81 Viaduct Study Area, south of Butternut Street, although isolated drainage connections to the existing combined sewer system would be needed to avoid substantial utility relocations. Construction of a new storm sewer trunk line may cause conflicts with utilities, which would need to be relocated. The conceptual drainage plans in **Appendix A-1** identify potential conflict locations and potential avoidance or relocation options, which would be further developed in final design if the Community Grid Alternative is constructed. The proposed drainage system also would have the capacity to intercept minor storm sewer flows from offsite; however, it is important to water quality goals that the proposed system does not capture any combined or sanitary sewer flows. The exact alignment and

10.26.21



Stormwater Analysis Summary

Segment West Bear Street
Total area = 9.3 acres
Existing impervious area = 5.1 acres
Proposed impervious area = 5.6 acres
Detention storage volume required = minimum storage volume provided = 0.4 acre-feet
Water quality treatment volume (WQv) required = minimum WQv provided = 0.2 acre-feet
Treatment type = detention pond

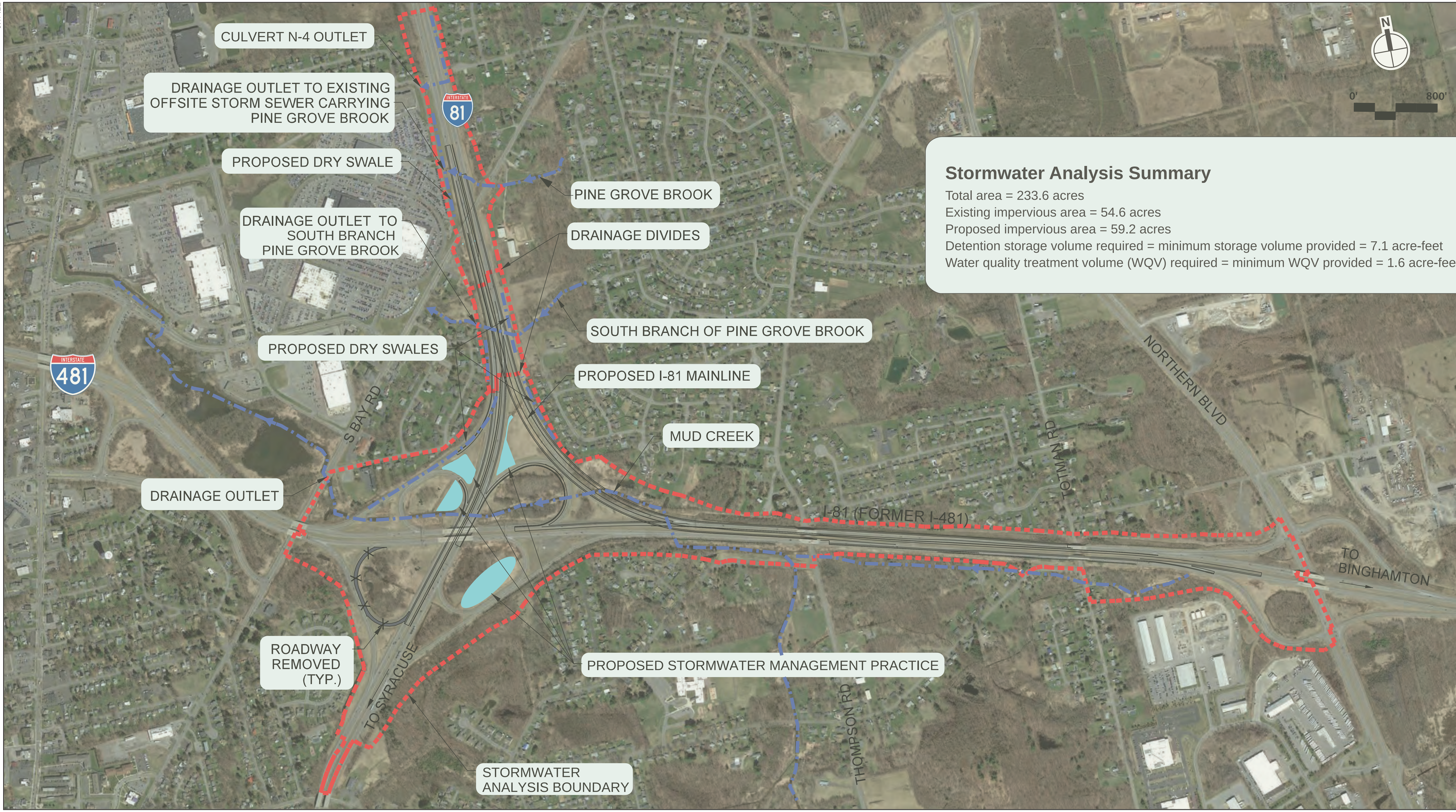
Segment North of Butternut Street
Total area = 41.4 acres
Existing impervious area = 20.4 acres
Proposed impervious area = 21.6 acres
Detention storage volume required = minimum storage volume provided = 1.9 acre-feet
Water quality treatment volume (WQV) required = minimum WQV provided = 1.1 acre-feet
Treatment type = hydrodynamic units

Segment South of Butternut Street
Total area = 178.8 acres
Existing impervious area = 127.2 acres
Proposed impervious area = 117.1 acres
Detention is not required due to reduction in impervious cover and peak flow.
Water quality treatment volume required = minimum WQV provided = 5.4 acre-feet
Treatment type = hydrodynamic units

Hydrodynamic Unit
Stormwater Analysis Boundary
Proposed Storm Sewer Trunkline
Detention Pond

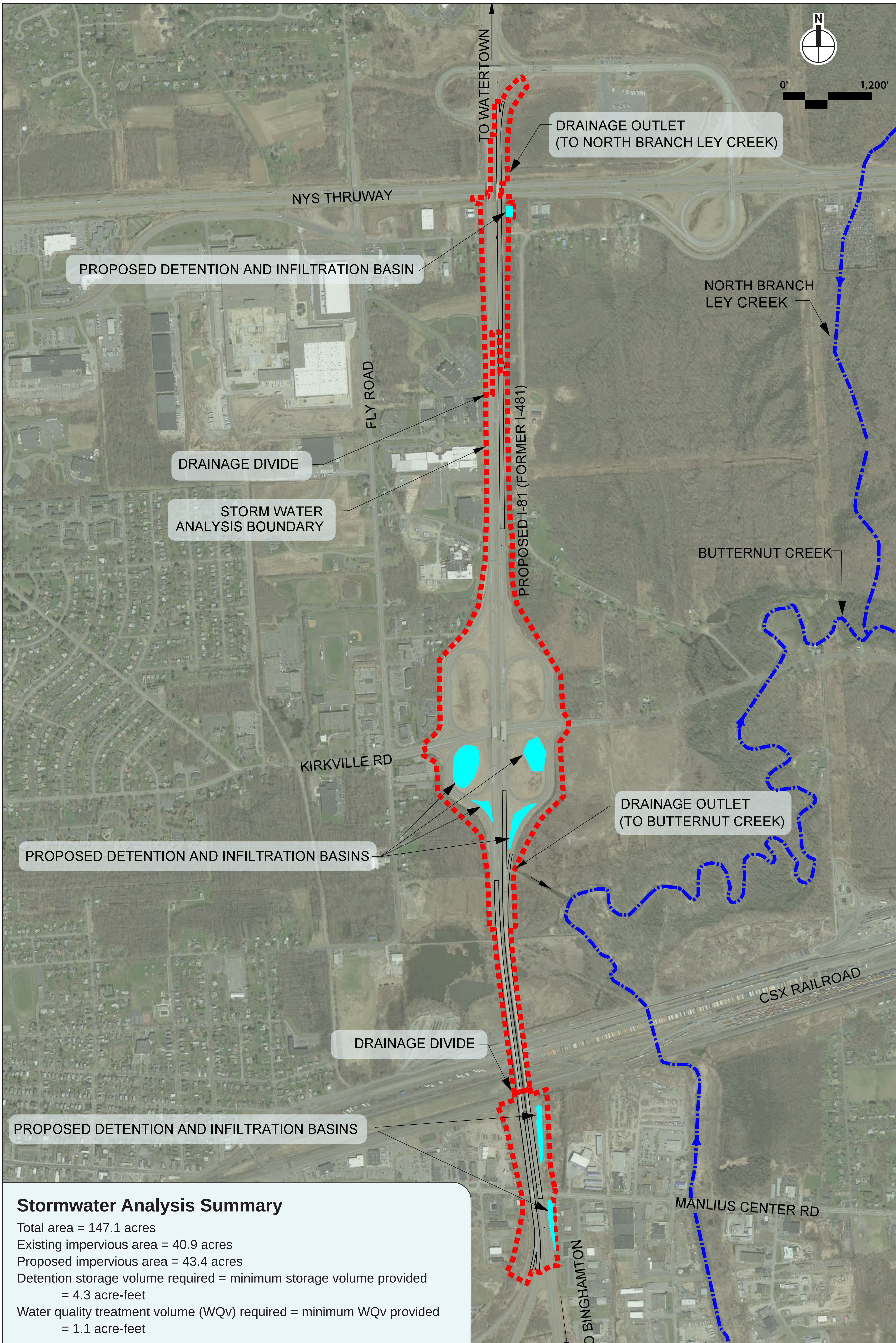
Community Grid Alternative — Stormwater Management and Treatment, Central Study Area

Figure 5-41



Stormwater Analysis Boundary
Creek or Pond
Detention Pond

Community Grid Alternative — Stormwater Management and Treatment, North Study Area
Figure 5-42



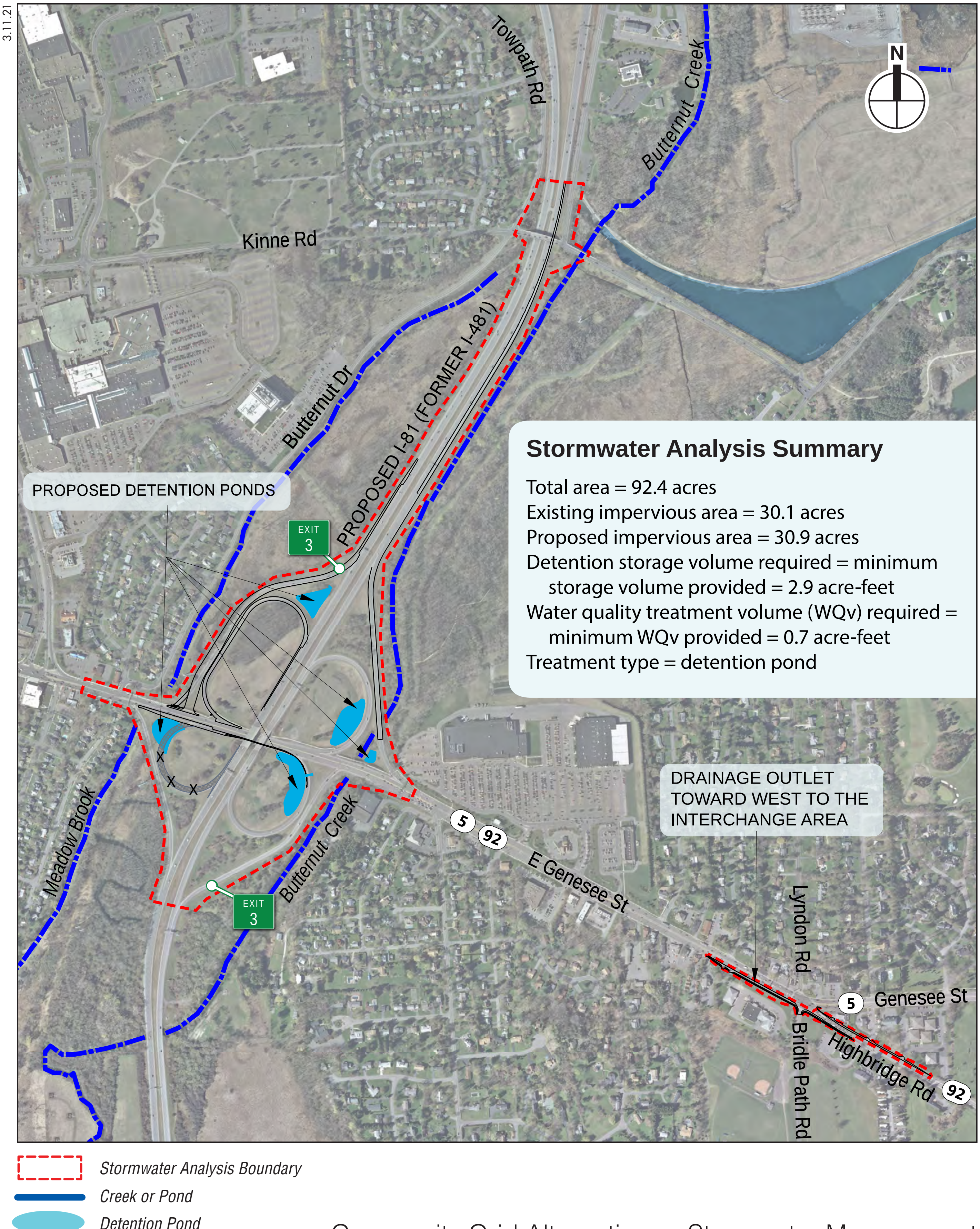
Stormwater Analysis Summary

Total area = 147.1 acres
Existing impervious area = 40.9 acres
Proposed impervious area = 43.4 acres
Detention storage volume required = minimum storage volume provided
= 4.3 acre-feet
Water quality treatment volume (WQv) required = minimum WQv provided
= 1.1 acre-feet

Stormwater Analysis Boundary
Creek or Pond
Detention Pond

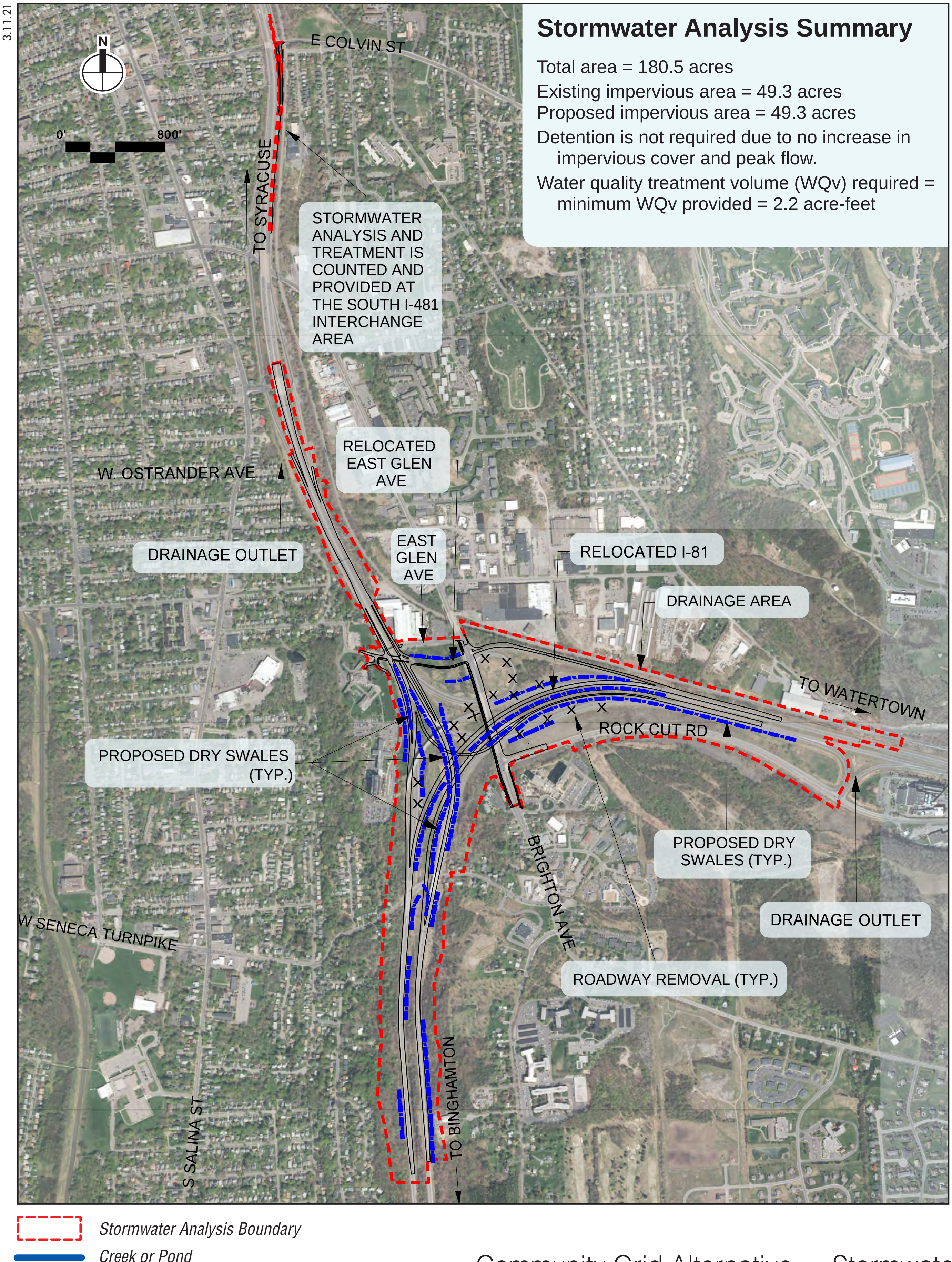
Community Grid Alternative — Stormwater Management and Treatment,
I-481 East Study Area - I-690 to I-90

Figure 5-43



Community Grid Alternative — Stormwater Management and Treatment, I-481 East Study Area - Interchange 3 and Lyndon Corners

3.11.21



Community Grid Alternative — Stormwater Management and Treatment, South Study Area scope of the Community Grid drainage system would be modified in future design phases pending further coordination with property owners, NYSDEC, and NYSDOT. The proposed drainage plan and profile presented on the conceptual drainage plan sheets has been designed to accommodate both the Community Grid and Viaduct Alternatives for the purposes of this study and would be refined during final design based on the chosen alternative.

The main branch of the proposed storm sewer trunk line would begin as a 30-inch pipe south of MLK, Jr. East and drain north along Almond Street to Erie Boulevard. The main branch would continue west along Erie Boulevard, then northwest along Oswego Boulevard to Herald Place, and terminate at a new 96-inch outfall to Onondaga Creek near Herald Place. The proposed drainage system also would include branches along Erie Boulevard east of Almond Street extending to University Avenue and along former I-81 north of I-690 to the Butternut Street area. The proposed drainage system would include the construction of approximately 18,000 linear feet of storm sewer trunk line.

The proposed Community Grid drainage system would fulfill the requirements of Onondaga County's "Save the Rain" initiative, as it would separate the stormwater runoff from former I-81, I-690, and associated local roads from the existing combined sewer system within the I-81 Viaduct Study Area. Separating storm and sanitary flows from the existing combined system is a primary goal of the initiative and would be an effective way of improving the water quality of Onondaga Lake. The total runoff to the existing combined sewer system and the county sanitary sewer treatment facility would be substantially reduced by the proposed system, thereby decreasing the likelihood of combined sewer overflows. In addition, the proposed storm sewer system would update a portion of the City of Syracuse's drainage infrastructure to current design standards and improve the safety of flood prone areas, including the existing locations with known drainage issues, such as the I-81 underpass at Butternut Street, West Street near I-690 and the northbound I-81 to eastbound I-690 ramp locations described earlier. In addition, the new storm sewer trunk line has been designed to accommodate a 50-year storm event as compared to the normal 10-year storm event standard. The higher storm event design standard will provide for resiliency for increased storm events as well as provide for additional future capacity.

Although the proposed drainage system would substantially decrease stormwater runoff to the existing combined sewer system, it would not necessarily reduce the total runoff from the Project Area. The NYSDEC Stormwater Management Design Manual requires runoff to be attenuated to pre-development conditions using detention and green infrastructure practices. Restricting the Project's flow rates to pre-development flow rates would avoid adverse impacts to downstream watercourses and satisfy permit requirements by the NYSDEC and the Army Corps of Engineers.

Within the I-81 Viaduct Study Area, under the Community Grid Alternative, peak flow and the total volume of runoff are directly attributable to the total impervious area on the site. Peak flow can be attenuated with reduction techniques such as the removal of parking areas in the I-81 and I-690 right-of-way or by using pervious pavements in replacement parking lots as well as other green infrastructure practices. At grade or below grade detention basins also would control runoff, but these methods would not be practical at more densely developed locations. Within the I-81 Viaduct Study Area, south of Butternut Street, attenuating stormwater runoff by decreasing impervious cover would be less costly than the use of detention facilities, which in some cases would be less effective in the dense urban setting. North of Butternut Street, as well as within the I-481 North and East Study Areas, detention basins would be used for rate control since these locations are less congested and offer more opportunities for open drainage systems.

The existing 1-, 10-, and 100-year storm event flow rates for the Project Area were calculated using the TR-55 method (see **Table 5-67**). These existing flow rates were used to establish the criteria for proposed condition runoff rates and would be used to determine the measure of runoff reduction techniques and detention storage volumes required for each study area.

The Community Grid Alternative would require the acquisition of right-of-way and the removal of several existing bridges, buildings, structures, and parking lots along the existing I-81 and I-690 corridors in the I-81 Viaduct Study Area. The Community Grid Alternative would result in the removal of approximately 5 acres of road and highway pavement. As a result of the Community Grid Alternative, a number of areas, referred to as "open areas," would result (see **Figure 5-46**). These areas would include locations within the highway right-of-way; their eventual use is undefined, and the type of surface restoration would be under the control of NYSDOT. The total impervious cover on the project site would ultimately vary depending on the type of surface restoration (i.e., pervious or impervious) chosen for these open areas.

The analysis of the proposed conditions runoff rates for the I-81 Viaduct Study Area south of Butternut Street assumed a range of impervious cover ratios for the open areas. The proposed conditions analysis concluded that if the open areas are restricted to contain a maximum of 35 percent impervious cover then the total runoff to the drainage outlet at Onondaga Creek south of Butternut Street would be reduced for all design storms and no further detention or rate controls would be required for this outlet. The proposed conditions flow rates resulting from the analysis have been tabulated in **Table 5-67**. The 35 percent impervious cover restriction to the open areas can be waived if these areas employ other methods of restricting runoff, such as on-site detention storage or pervious pavement with infiltration trenches. These alternative methods of restricting flow would require that peak flow and quantity of runoff generated from the other open areas would be equivalent or less than the peak flow and total runoff generated by the total of the open areas redeveloped to the 35 percent impervious cover target.

The runoff to the drainage outlet north of Butternut Street, as well as the drainage outlets in the I-481 North and East Study Areas, would be controlled using at-grade detention basins in lieu of a reduction to project impervious area. These detention basins have been sized based on NYSDEC criteria and their locations are shown on **Figures 5-41, 5-42, and 5-43**. These locations would be revised in future design phases pending coordination with NYSDEC and NYSDOT. The total storage volume of each basin typically would be reflective of the channel protection storage volume, or the volume required for 24 hour extended detention of the post-developed 1-year, 24-hour storm event. The channel protection storage volume requirement often exceeds NYSDEC volume requirements for the overbank flood (10-year storm) and extreme flood (100-year storm) and is therefore the controlling volume used for detention design. The total required and provided storage volumes of the proposed basins are included in **Table 5-67** for each study area.

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*Open areas**   *Total open area = 14.5 acres*

** Areas within highway right-of-way where surface restoration type (impervious or pervious) can be controlled*

Community Grid Alternative
Open Areas
Figure 5-46

Table 5-67
Stormwater Peak Flow Attenuation (Quantity Control) - Community Grid Alternative

	Peak Flow (cfs)					
	Existing[1]			Proposed [1,2]		
	1-yr	10-yr	100-yr	1-yr	10-yr	100-yr
I-81 Viaduct Study Area (Drainage Outlet South of Butternut St.)	Total Drainage Area = 178.8 acres					
Total Peak Flow	231	470	870	218	454	856
Detention Volume Required	Detention not required as peak flow is reduced under the proposed condition.					
I-81 Viaduct Study Area (Drainage Outlet North of Butternut St.)	Total Drainage Area = 41.4 acres					
Total Peak Flow	24	58	117	25	60	119
Proposed Peak Flow Control Practice	Detention Basins					
Storage Volume (ac-ft.)	Detention Storage Required			Detention Storage Provided		
	1.9 ac-ft.			minimum 1.9 ac-ft.		
I-81 Viaduct Study Area (Bear St. Corridor)	Total Drainage Area = 9.3 acres					
Total Peak Flow	6	14	27	7	15	28
Proposed Peak Flow Control Practice	Detention Basins					
Storage Volume (ac-ft.)	Detention Storage Required			Detention Storage Provided		
	0.4 ac-ft.			minimum 0.4 ac-ft.		
I-481 North Study Area	Total Drainage Area = 233.6 acres					
Total Peak Flow	67	204	457	67	204	457
Proposed Peak Flow Control Practice	Detention basins					
Storage Volume (ac-ft.)	Detention Storage Required			Detention Storage Provided		
	7.1 ac-ft.			minimum 7.1 ac-ft.		
I-481 East Study Area I-690 Interchange to I-90 Interchange	Total Drainage Area = 147.1 acres					
Total Peak Flow	30	91	202	33	94	207
Proposed Peak Flow Control Practice	Detention basins					
Storage Volume (ac-ft.)	Detention Storage Required			Detention Storage Provided		
	4.3 ac-ft.			minimum 4.3 ac-ft.		
I-481 East Study Area (I-481 Interchange 3 & Lyndon Corners)	Total Drainage Area = 92.4 acres					
Total Peak Flow	38	108	237	38	108	237
Proposed Peak Flow Control Practice	Detention basins					
Storage Volume (ac-ft.)	Detention Storage Required			Detention Storage Provided		
	2.9 ac-ft.			minimum 2.9 ac-ft.		
I-481 South Study Area	Total Drainage Area = 180.5 acres					
Total Peak Flow	65	192	432	65	192	432
Detention Volume Required	Detention not required as peak flow is reduced under the proposed condition.					

Notes:
1. Rainfall intensity based on NYSDEC Stormwater Management and Design Manual, 1-yr, 10-yr, and 100-yr storm event figures.
2. Of the total disturbed area within the I-81 Viaduct Study Area, approximately 8.4 acres of impervious cover would be removed from the site. The calculations are based on the premise that subsequent restoration of open areas shown in **Figure 5-46** would be controlled so that no more than 35 percent of these areas would be constructed as an impervious surface.
3. The 1-year storage volume required to meet channel protection criteria, in accordance with NYSDEC standards, has been included in the overall storage requirement analysis. The 1-year peak flow reduction would be confirmed during final design.

North of Butternut Street within the I-81 Viaduct Study Area, runoff would be conveyed by storm sewers to proposed detention facilities at Bear Street and Hiawatha Boulevard. These detention facilities discharge to existing 48" and 33" combined sewers tributary to Onondaga Creek. These open detention basins would provide some benefit to water quality since some groundwater infiltration of stormwater runoff would be likely. New storm sewers to Onondaga Creek along Hiawatha Boulevard and Bear Street would not be proposed since these roadways are outside of the project limits of reconstruction under the Community Grid Alternative.

Within the I-481 North Study Area, runoff generally would drain west across the I-81/I-481 northern interchange through a series of ditches, channels, and culverts to Mud Creek. Along with Mud Creek, there are two additional outlets and stream crossings north of the interchange (unnamed tributaries to Mud Creek), both of which are ultimately tributary to Mud Creek. Stormwater runoff rates would be controlled within the I-481 North Study Area by proposed detention basins within the infield of the I-81/I-481 northern interchange and along northbound I-81 near South Bay Road. These proposed detention basins (shown in **Figure 5-42**) would be located outside of the FEMA 100-year floodplain limits so that tailwater conditions would not affect the performance of the basins.

Mud Creek, and the unnamed tributaries to Mud Creek consist of FEMA mapped floodplains and floodways. Relocated I-81 would cross over and run adjacent to Mud Creek, its associated floodplains, and environmentally sensitive wetlands. To avoid or minimize impacts to the floodway and wetlands, retaining walls and bridge structures would be constructed along the new I-81 at the Mud Creek crossing. **Section 6-4-7, Water Resources**, includes additional information concerning potential impacts and proposed mitigation.

The East Study Area is divided into two sections. One section begins just north of the former I-481/I-690 interchange and continues north along former I-481 to the New York State Thruway (I-90) interchange. The second section includes the former I-481 interchange 3 at Route 5/92 and a segment of Route 5 and Route 92 (Lyndon Corners intersection) just east of the interchange area. The segment between I-690 and I-90 includes two primary drainage outlets tributary to Butternut Creek and the North Branch of Ley Creek. Stormwater runoff rates would be managed through the detention facilities located along former northbound I-481 near the CSX Intermodal Terminal, within the former I-481/Kirkville Road interchange, and near the former I-481 overpass at the New York State Thruway. These proposed detention basins, along with drainage outlet locations and drainage divides for the East Study Area, are depicted on **Figure 5-43**. The former I-481 Interchange 3 & Lyndon Corners Area would include two primary drainage outlets tributary to Butternut Creek. Stormwater runoff rates would be managed through the detention facilities located within the former I-481 interchange 3 area. These proposed detention basins, along with drainage outlet locations and drainage divides are depicted on **Figure 5-44**.

The South Study Area contains the BL 81/I-481 southern interchange and the new northbound BL 81 off-ramp to Colvin Street off-ramp area. There are two primary drainage outlets which ultimately are tributary to Onondaga Creek and Butternut Creek. Runoff along the existing I-81 corridor is conveyed from south to north via ditches, culverts, and storm sewer. This runoff leaves the project area in an 84" storm sewer pipe at West Ostrander Avenue that drains west to Onondaga Creek. East of the interchange and along former I-481, runoff is conveyed offsite to the east through ditches and culverts towards Butternut Creek. The overall project improvements for the South Study Area would result in a net no-change in impervious cover due to the removal of some roadway pavements, including existing ramps from former I-81 and East Brighton Avenue, which offset the new pavement areas. Detention facilities would not be proposed within the I-481 South Study Area since the overall runoff and peak discharge would not increase for all storm events with the reconfigured interchange and the net no-change in impervious surfaces. The drainage outlet locations and drainage divides for the South Study Area are depicted on **Figure 5-45**.

The drainage analysis completed for the FDR/FEIS includes an assessment of NYSDEC water quality requirements. Water quality treatment is required for the entire Project Area and is based on the total amount of disturbed and impervious area.

Water quality solutions varied according to the nature of the Project Area (urban or suburban) and space constraints. Typically, water quality treatment volumes for new bridges and roadway pavements would be accommodated using infiltration basins, pervious pavements, vegetative buffers, and other green infrastructure practices that promote ground infiltration. These types of traditional green infrastructure practices would be used within the I-481 North, East, and South Study Areas; however, within the I-81 Viaduct Study Area, more compact treatment devices would be used due to space constraints and the highly developed nature of the site. These treatments would include hydrodynamic treatment systems, offered by several manufacturers, which can be custom engineered to fit site constraints and operate under gravity flow conditions. The need for periodic maintenance and associated costs would be considered in the selection of the required treatment system. A detailed evaluation of these devices, including coordination with NYSDEC, would be conducted in future design phases to select the appropriate water quality treatment system for each treatment location. The conceptual drainage plan, included in **Appendix A-1**, assumes the use of a hydrodynamic type treatment system, which would consist of a sediment basin and baffle plate inside a vault, typically 12 feet in diameter or smaller. The locations of these treatment devices are shown on **Figure 5-41** and the conceptual drainage plan sheets in **Appendix A-1**. **Table 5-68** contains the required and proposed water quality treatment volumes for each study area under the Community Grid Alternative.

Outside of the I-81 Viaduct Study Area, water quality treatment would consist of a combination of green infrastructure practices. These practices include but are not limited to infiltration basins, dry swales, infiltration trenches, rain gardens, vegetative buffers, and filter strips. Each study area was examined to determine if additional roadway right of way would be required to meet water quality treatment requirements. The Project would require right-of-way acquisitions within the I-481 North Study Area just south of East Pine Grove Road and within the I-481 East Study Area just south of the New York State Thruway. Both water quality treatment locations would include storage for detention. The green infrastructure practices assumed in the analysis of each study area as well as the required and provided water quality treatment volumes are included in **Table 5-68**. The stormwater quality treatment locations are shown on **Figures 5-41 through 5-45**.

The proposed drainage analysis, summarized in **Tables 5-67 and 5-68**, concluded that all regulatory and permitting requirements for the Community Grid Alternative would be met through use of a combination of impervious cover targets, detention, hydrodynamic treatment systems, and proposed storm sewers. These proposed drainage systems would reduce combined sewer overflows at affected drainage outlets, reduce wet weather flow burden at the county sanitary sewer treatment facility, reduce the likelihood of pavement flooding, and improve water quality in Onondaga Lake.

Table 5-68
Stormwater Quality Control - Community Grid Alternative

	Existing Impervious Area (ac)	Proposed Impervious Area [1] (ac)	Disturbed Area (ac)	WQv Target Volume [2] (ac-ft)	RRv Min. [3] Required Volume (ac-ft)
I-81 Viaduct Study Area [4] Drainage area south of Butternut Street.	127.2	117.1	178.8	5.4	0.17
Proposed Water Quality Practice	Hydrodynamic Stormwater Treatment Units and Infiltration/Detention Basins Total Treatment Volume provided > 5.4 ac-ft.				
Proposed Green Infrastructure Practice	Overall reduction in impervious area. In addition, other potential practices will be considered in final design, such as; vegetated swale, tree planting /tree pits/conservation of existing trees; stormwater planters; rain gardens; infiltration practice.				
I-81 Viaduct Study Area [4] (Drainage area north of Butternut Street)	20.4	21.6	41.4	1.10	0.03
Proposed Water Quality Practice	Hydrodynamic Stormwater Treatment Units and Infiltration/Detention Basins Total Treatment Volume provided > 1.10 ac-ft.				
Proposed Green Infrastructure Practice	Overall reduction in impervious area. In addition, other potential practices will be considered in final design, such as; vegetated swale, tree planting /tree pits/conservation of existing trees; stormwater planters; rain gardens; infiltration practice.				
I-81 Viaduct Study Area [4] (Bear St. Corridor)	5.1	5.6	9.3	0.15	0.01
Proposed Water Quality Practice	Vegetated Swales and Infiltration Basins Total Treatment Volume provided > 0.15 ac-ft.				
Proposed Green Infrastructure Practice	Overall reduction in impervious area. In addition, other potential practices will be considered in final design, such as; vegetated swale, tree planting /tree pits/conservation of existing trees; stormwater planters; rain gardens; infiltration practice.				
I-481 North Study Area	54.6	59.2	233.6	1.6	0.08
Proposed Water Quality Practice	Infiltration Basins, Dry swales w/check dams; infiltration trenches Total Treatment Volume provided > 1.6 ac-ft.				
Proposed Green Infrastructure Practice	Vegetated Dry Swales and Infiltration Basins.				
I-481 East Study Area I-690 interchange to I-90 interchange	40.9	43.4	147.1	1.13	0.06
Proposed Water Quality Practice	Infiltration basins Total Treatment Volume provided > 1.13 ac-ft.				
Proposed Green Infrastructure Practice	Vegetated Swales and Infiltration Practice.				
I-481 East Study Area (I-481 Interchange 3 & Lyndon Corners)	30.1	30.9	92.4	0.73	0.02
Proposed Water Quality Practice	Infiltration basins Total Treatment Volume provided > 0.73 ac-ft.				
Proposed Green Infrastructure Practice	Vegetated Swales and Infiltration Basins.				

Table 5-68
Stormwater Quality Control - Community Grid Alternative

	Existing Impervious Area (ac)	Proposed Impervious Area (1) (ac)	Disturbed Area (ac)	WQv Target Volume (2) (ac-ft)	RRv Min. (3) Required Volume (ac-ft)
I-481 South Study Area	49.3	49.3	180.5	2.23	0.0
Proposed Water Quality Practice	Dry swales w/check dams. Total Treatment Volume provided > 2.23 ac-ft.				
Proposed Green Infrastructure Practice	Overall reduction in impervious area. In addition, other potential practices would be considered in final design such as vegetated swales and other practices.				

Notes:
1. Approximately 8.4 acres of impervious surfaces would be removed from the I-81 Viaduct Study Area.
2. Water Quality Target Volume (WQv) is calculated per NYSDOT HDM Chap. 8 Appendix B for a Redevelopment Project. Rainfall intensity is based on NYSDEC Stormwater Management and Design Manual, 90 percent storm event for non-phosphorus watersheds (I-481 North Study Area and I-481 East Study Areas), and 1-yr storm event for phosphorus watersheds (I-81 Viaduct Study Area and I-481 South Study Area).
3. For a Redevelopment Project, Minimum Runoff Reduction volume is calculated in accordance with the NYSDEC Stormwater Management Design Manual.
4. MS4 permit requirements would be met through a combination of hydrodynamic treatment systems and green infrastructure practices such as vegetated swales, stormwater planters, and rain gardens.

Geotechnical

Study of the overall existing soil borings data and record plans indicated that the underlying soils at the Project Area are generally consist of silt and clay with bedrock or shale. The depth of bedrock varies along the project alignment from approximately 20 feet to 70 feet below ground. Specific foundation treatments for new structures in the area would be determined during final design, and depending on the location of the proposed substructures and the underlying soils at those locations, the substructures may be founded on deep foundations, spread footings, and/or rock. In addition, under the Community Grid Alternative, there is known karst topography and two known sinkholes within the I-481 South Study Area. Reconstruction of the southern interchange would require special geotechnical consideration when design advances to mitigate the sinkholes before the proposed roadway and bridges construction in the area. Additional geotechnical explorations and geophysical techniques would be performed to identify the extent of existing or potential sinkholes. There are several sinkhole solutions available depending on subsurface conditions and site restrictions. The mitigation techniques include but are not limited to compaction to pre-collapse sinkholes, densify and reinforce loose overburden soils, dynamic compaction to densify underlying soils and collapse voids, and compaction grout. Following the sinkholes mitigation, post-mitigation monitoring would be implemented to reduce the likelihood of sinkholes resurfacing at or near the site of mitigated sinkholes. Post-mitigation monitoring would involve routine visual inspections and potentially installation of permanent survey markers.

Structures

As part of the Community Grid Alternative, the existing I-81 viaduct between the New York, Susquehanna and Western Railway bridge and I-690 would be removed. In total, 53 existing bridges within the project area would be replaced with approximately 49 new bridges, having a total deck area of about 1,038,000 square feet. In addition, 11 existing bridges would be widened and rehabilitated, and one bridge would be removed (see **Appendix C-6**). All existing structurally deficient bridges within the project area will be replaced, including the three bridges (see **Table 1-1**) within the I-81 Viaduct Study Area. All new bridges would conform to the NYSDOT Bridge Manual standards and would incorporate aesthetic treatments where appropriate. Within the I-481 South Study Area, the I-481 East Study Area, and the I-481 North Study Area, there would be a combination of bridge replacements and bridge widening and rehabilitations (see **Appendix C-6**). The reconfiguration of the north and south I-81/I-481 interchanges would require some of these bridges to be replaced and the addition of auxiliary lanes and wider shoulders would require some of the existing bridges to be widened. To accommodate the auxiliary lanes and wider shoulders, these bridges would require new bridge deck, girders, and foundation to be installed. In addition to the widening, these bridges would also be rehabilitated to increase the loading capacity and to meet current design standards for the future traffic demands. The rehabilitation work would address structural and geometric deficiencies, include upgrades to the bearings, as well as localized repair at the superstructure and substructure components as necessary to restore long-term service life expectancy. Refer to Preliminary Structure Plans in **Appendix A-1** for a listing of new bridges as well as more detailed information for the proposed replacement bridges.

Hydraulics of Bridges and Culverts

As previously noted, only the replacement bridges carrying I-690 and the I-690 ramps over Onondaga Creek would need a hydraulic analysis and there are no known hydraulic issues associated with the existing retaining walls and existing bridge piers. As part of this alternative, the existing piers would be reconstructed as necessary and any replacement piers would be placed further back from the creek than the existing piers. Existing retaining walls would either be removed or partially left in place to help minimize disturbance to the creek and the existing Creekwalk. New retaining walls would also be placed further from the existing creek. As a result, no adverse effects on hydraulics are anticipated, as the existing conditions would be either maintained or improved. In addition, due to the topography of the area and the elevation of the bridges over the creek, it is anticipated that the freeboard provided below all structures at the 100-year flood will be much greater than the 2-foot minimum required; therefore, a hydraulic study will not be required until detailed structural design advances. A Coast Guard Checklist is not required.

Guide Railing, Median Barriers and Impact Attenuators

All guiderail within the project limits including bridge railing will be evaluated when design advances for conformance to design standards and replaced or repaired, if necessary. Replacement guide rail, median barrier and impact attenuators would meet the Manual for Assessing Safety Hardware (MASH) 2016 standards or the most recent version of MASH at time of construction.

Utilities

Due to the urban nature and size of the Project Area, there are an extensive number and network of utilities, both private and public, above ground and below ground. A summary of the utilities, the utility owners, and the potential conflicts associated with the Community Grid Alternative is included in **Appendix C-6**. For the purposes of this report, major utilities are defined as: all underground electric, fiber optic, or steam facilities (not including services), overhead fiber optic, underground gas lines (8 inches diameter or larger), water mains 16 inches in diameter or larger, and sanitary sewer and storm sewer trunk lines 24 inches in diameter or larger. Utilities of unknown size are also included.

Because the depth of many underground utilities is not known, and because the depth of impacts from proposed construction is uncertain, impacts are assumed for any major underground utility in a reconstruction area.

There will be many more impacts to non-major utilities within the project area that are not included in this table, including such things as hydrants, valves, and services. The impacts to those items will need to be addressed as design advances. The cost to relocate all municipally owned utilities (i.e., water, sewer, etc.) would be fully reimbursable; non-municipally owned utilities (i.e., Transportation Corporations or private utilities) would only be reimbursable when on private right-of-way or for lateral crossings of interstate highways. Refer to **Appendix C-6, Table C-6.11** for a listing of potential utility relocations and whether a utility would be reimbursable. The construction cost estimate for the alternative includes the cost for reimbursable utility relocations.

Railroad Facilities

Under the Community Grid Alternative, both the northbound and southbound I-481 bridges over the CSX mainline, which is also utilized by Amtrak, would need to be widened to three lanes and the shoulders would be widened to meet current standards. While there is not expected to be any direct impact to the railroad caused by the bridge widening and rehabilitation work, coordination with CSX has been initiated in preliminary design and will continue as design advances and throughout construction. No other impacts to CSX, Amtrak or the Amtrak Syracuse station will be caused by this alternative. Refer to **Appendix C-6, Table C-6.4-5** for bridge design criteria that shall be used for widening of the existing I-481 Bridge over CSX Railroad.

Under this alternative, the existing New York Susquehanna & Western Railway Bridge will be replaced and approximately 1,600 linear feet of track will be realigned. The bridge replacement and track re-alignment is necessitated by the alignment of the new southern arterial between MLK, Jr. East and Van Buren Street. Coordination with the NYS&W Railroad has been initiated in preliminary design and will continue as design advances and throughout construction. Preliminary plans showing the track re-alignment and bridge replacement are included in **Appendix A-1**. Refer to **Appendix C-6, Table C-6.4-5** for bridge and track design criteria that shall be used for the NYS&W Railroad Bridge.

5.6.4 LANDSCAPE AND ENVIRONMENTAL ENHANCEMENTS

The design concepts and possibilities for enhancements described in this section would be developed and refined, in consideration of public input, during the final design phase of the Project (see **Chapter 9, Agency Coordination and Public Outreach**).

Landscape Development and Other Aesthetics Improvements

NYSDOT would provide or replace landscaping as a part of the overall enhancement and aesthetic improvements for this Project. Streetscape enhancements would be provided along Almond Street and portions of Erie Boulevard, West Street, and Crouse and Irving Avenues, as well as portions of connecting streets. Streetscape enhancements could include sidewalks, specialty pavements, and aesthetic treatments for walkways, site furnishings such as benches and trash receptacles, landscape plantings, and green infrastructure. Streetscape enhancements would be designed to provide an overall sense of visual cohesiveness. Almond Street would include a landscaped median from MLK, Jr. East to I-690, lending a distinctive character to the length of the roadway. The streetscape design would promote safe and effective pedestrian and bicyclist circulation and comfort and help facilitate social interaction. Landscape and environmental enhancements outside the pavement area of the highway would be the responsibility of the municipality, pursuant to a maintenance agreement between the State and municipality.

Visual resources within the project site and surrounding area are described in **Section 6-4-3, Visual Resources**.

Environmental Enhancements

Important points of entry from the proposed Interstate Highway system to the street network would be enhanced as gateways. Gateway enhancements would be developed to create a distinct and identifiable sense of entry and sense of place. These enhancements include establishment of a consistent theme or motif, use of specialty materials and site elements, historical elements, landscaping, signage, aesthetic earth forms, and sculptural elements to mark the entrance to the city. Gateways have been identified at the new West Street and Genesee Street intersection, new James Street exit at Oswego Boulevard through the creation of a new "Canal District," at the new Crouse and Irving Avenues interchange with I-690, and at the new MLK, Jr. East entrance to the city.

The West Street and Genesee Street Gateway would be achieved by the elimination of the elevated highway infrastructure, bringing West Street to surface, and the creation of a normalized intersection. Pedestrian, bicycle, and visual connectivity across West Street would be greatly enhanced. Aesthetic treatments would be used at this intersection to create a heightened sense of arrival into the city. Pedestrian areas at the intersections would be enlarged to accommodate more amenity and for visual impact. Sculptural lighting elements would serve as vertical markers, reinforcing a sense of arrival. The use of color would be used to enliven and punctuate the space. Sculptural sign walls, landscape and seat walls, and enhanced landscaping would all be used to define a gateway area. Specialty pavements and patterning would be utilized on sidewalks, and interpretation on the history of the location would be incorporated into the pavements and plazas. Signage would orient visitors to the Creekwalk, Downtown, and surrounding neighborhoods.

The removal of the highway infrastructure in this location also would allow for the creation of shared-use (bicycle and pedestrian) paths along the west side of Onondaga Creek and the creation of an overlook at the historic Erie Canal Aqueduct under Erie Boulevard. A historic canal theme that builds on the newly visible Erie Canal Aqueduct could provide the basis for the design vocabulary at this location. Canal themed materials could include rustic stone and wood, as well as other industrial themed materials. Consideration of existing Onondaga Creekwalk elements, such as lighting, interpretive signage, furnishings, and pavement materials would be included to integrate with existing adjacent Onondaga Creekwalk segments north and south of the Project Area.

The Clinton Street Gateway is a gateway to the heart of the Downtown business district. Gateway enhancements would include landscape, low site walls, and aesthetic landforms just before passing under the elevated I-690. Other components of the gateway could include lighting, and sculptural elements. Aesthetic enhancements to the I-690 Bridge would reinforce the sense of gateway and arrival. Gateway enhancements could be continued south to Herald Place on Clinton Avenue to further reinforce the gateway corridor experience and establish a rhythm of street trees and streetlights to transition to the city streets beyond the project limits.

Under the Community Grid Alternative, the new interchange at Crouse and Irving Avenues would create a new gateway to University Hill's educational and medical facilities. A contemporary theme could be adopted for the design vocabulary at this location, reflecting technology and the progressive nature of the institutions. The design vocabulary could be extended along several blocks of both Crouse and Irving Avenues to create gateway corridors and reinforce the sense of arrival along these streets. The vocabulary would primarily consist of streetscape elements such as lighting, pavements, landscaping, and street furnishings that reflect a dynamic, forward-thinking community. The strategic use of color could underscore the sense of a dynamic environment. The Crouse and Irving Avenues Gateway would be provided only under the Community Grid Alternative.

Van Buren Street would become the new gateway to the city when arriving from the south under the Community Grid Alternative. A gateway corridor would be developed beginning approximately 2,700 feet south of south of Van Buren Street. South of Van Buren Street, landscape plantings along either side of the road would provide a transition from the more rural Tully Valley to the south and would heighten the sense of arrival into the city. Plantings in this zone could also complement traffic calming in this area as the highway comes down to grade. Street tree plantings, including a center planted median, would line the corridor. Artistic site walls could be combined with landscape planting, and street lighting would be a signature motif in this gateway corridor. The walls could incorporate local stone, signage, and artistic metal and would be repeated, with variation, along the corridor. Signage would address both the city, as well the universities. The Almond Street/Van Buren Street intersection would be developed as a gateway to the universities. Reconstruction of the railroad bridge could be considered as part of the gateway experience, incorporating aesthetic treatments to reinforce the sense of arrival. The Van Buren Street Gateway would be provided only under the Community Grid Alternative.

The Northern Gateway along the northern segment of former I-81 would be achieved with landscape enhancements and aesthetic treatments to structures. Reconstructed bridges, abutments, and retaining walls would receive aesthetic treatments. Plantings along the highway would be provided to enhance the travel experience and create a sense of arrival. Under the Community Grid Alternative, a new exit from the former I-81 south would connect to the northern end of Oswego Boulevard, creating an entrance to Downtown that coincides with the historic alignment of the Oswego Canal. One block to the east, Pearl Street would be extended south, re-establishing its historic alignment, and would provide access to a northbound interstate on-ramp from Erie Boulevard. The new on-ramp and off-ramp, combined with a reinstated street grid, provide an opportunity to create a gateway district centered on the historic confluence of the Oswego and Erie Canals. A lumberyard and railroad also occupied the site historically. Their presence, combined with the canal, suggest the use of industrial themed materials such as stone and wood.

The Erie Canal Museum and mule driver's monument on the historic location of the towpath would be located at the heart of the district. Streetscape improvements along Erie Boulevard, including an interpretive towpath, would connect historic Clinton Square to the museum and to the mule driver's monument across the street.

Low, rustic stone walls that are evocative of the canal could potentially be located along Oswego Boulevard and Erie Boulevard, marking the entrance to the city. Sculptural banners that interpret canal boats, placed at intersections, would reinforce the sense of arrival. There is the potential for a fountain to evoke the historic presence of water on the site, and the incorporation of water in a rustic stone sign wall. An overhead pergola that incorporates supports that are reminiscent of historic structures on the site could define an outdoor event space. The Canal District Gateway would be provided only under the Community Grid Alternative.

Improvements to BL 81 between Bear Street and Hiawatha Boulevard will replace an existing concrete retaining wall with a planted embankment adjacent to the highway. The new embankment will allow for the creation of a shared-use (bicycle and pedestrian) path and overlook. The overlook would interpret the history of the site related to the Oswego Canal and industrial past and distant views of the Tully Valley to establish a site design vocabulary. Elements such as lighting, interpretive signage, furnishings, and pavement materials would be included to integrate the path and overlook with the adjacent Washington Square Park area.