Route 96 over Route 14 Intersection Redesign

Prepared for: Genesee Transportation Council

Prepared by: Stantec Consulting Inc.

August 2025

ROUTE 96 OVER ROUTE 14 STRATEGIC DIVESTMENT ANALYSIS

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Project Number:
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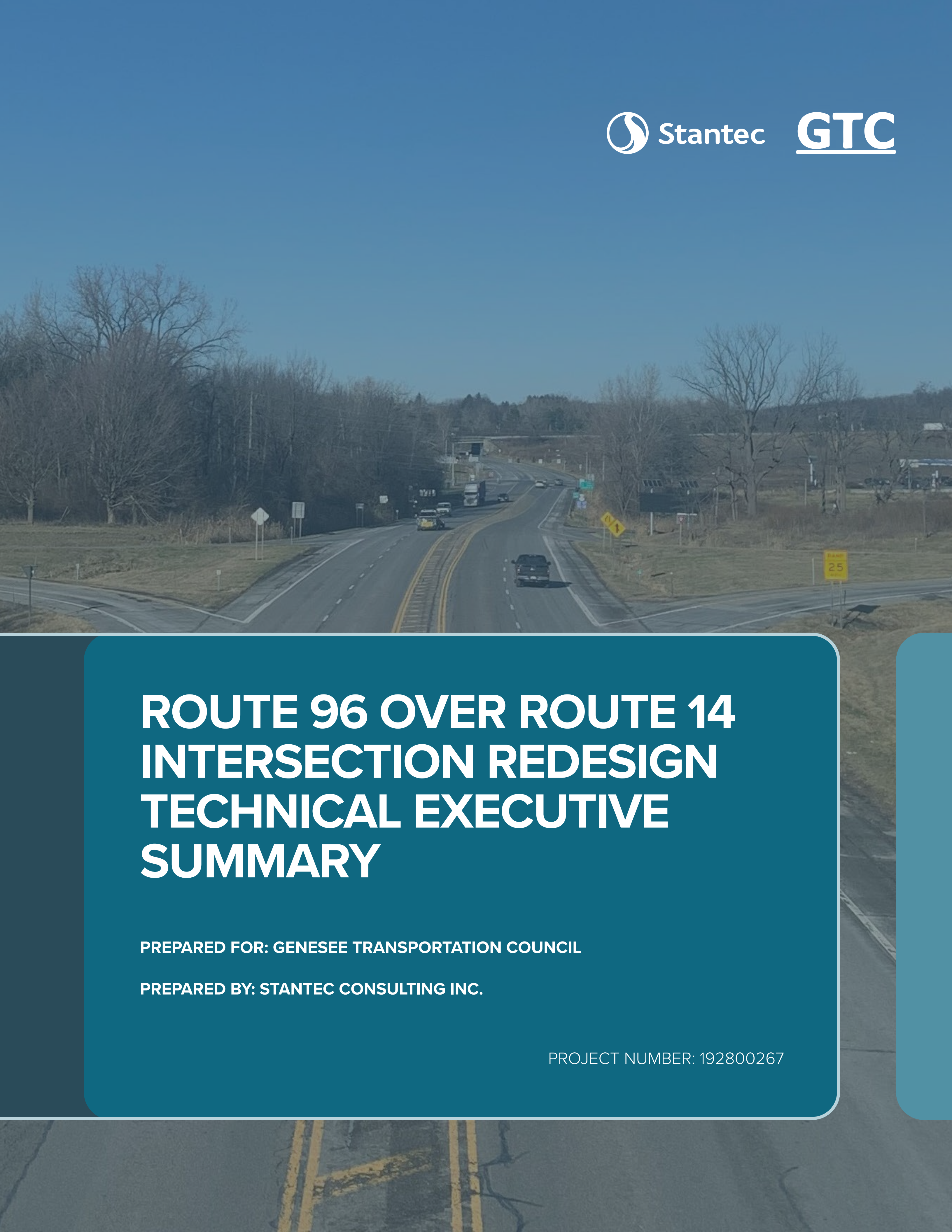


ROUTE 96 OVER ROUTE 14 INTERSECTION REDESIGN TECHNICAL EXECUTIVE SUMMARY

PREPARED FOR: GENESEE TRANSPORTATION COUNCIL

PREPARED BY: STANTEC CONSULTING INC.

PROJECT NUMBER: 192800267

EXECUTIVE SUMMARY

BACKGROUND

The interchange of New York State (NYS) Routes 96 and 14, known as the **Five Points Interchange**, is located just south of NYS Thruway Exit 42 and about five miles north of the City of Geneva. Originally designed as a clover-leaf interchange meant to handle significant traffic, the interchange has not seen growth in traffic volumes consistent with its design. Given the age of the Route 96 bridge (built in 1957), the bridge's current condition, and the extensive footprint of the interchange, the New York State Department of Transportation (NYSDOT) is investigating options for reconfiguring the interchange to address life cycle costs and community development goals. NYSDOT initiated the Route 96 over Route 14 Strategic Divestment Analysis to **explore the feasibility and identify potential benefits of eliminating (divesting) the existing, grade-separated intersection.** Typically, strategic divestment analyses are initiated when infrastructure assets are underutilized, increasingly costly to maintain and repair, subject to recurring damage from natural hazards (flooding, erosion, washout, etc.), or if the asset forms a physical and economic barrier within a community. As part of this project, the Strategic Transportation Asset Redesign Screening Tool was developed to help identify the Five Points Interchange as a candidate for divestment.

THIS STUDY HAS THE FOLLOWING OBJECTIVES:

1. Determine the feasibility and any benefit to eliminating the existing grade-separated Route 96 and Route 14 intersection.
2. Identify flood mitigation strategies concerning the railroad underpass on Route 96 to the east of the intersection.
3. Identify a set of lessons learned that NYSDOT Region 4, the Genesee Transportation Council, and other transportation facility owners can apply when using a strategic divestment approach for asset management when such infrastructure has reached the end of its useful life.

FIGURE 1
EXISTING ROUTE 96 OVER ROUTE 14 INTERSECTION

STUDY AREA

The Route 96 over Route 14 intersection is located in the Town of Phelps, New York (Ontario County). The project Study Area includes the entire cloverleaf interchange and four-lane segments of both Route 96 and Route 14.

The Study Area occupies approximately **42 acres** of land. There are 13 parcels within the Study Area or directly adjacent to the Study Area, encompassing a total of 462 acres of land. Approximately 85 acres are classified as vacant residential or commercial land.

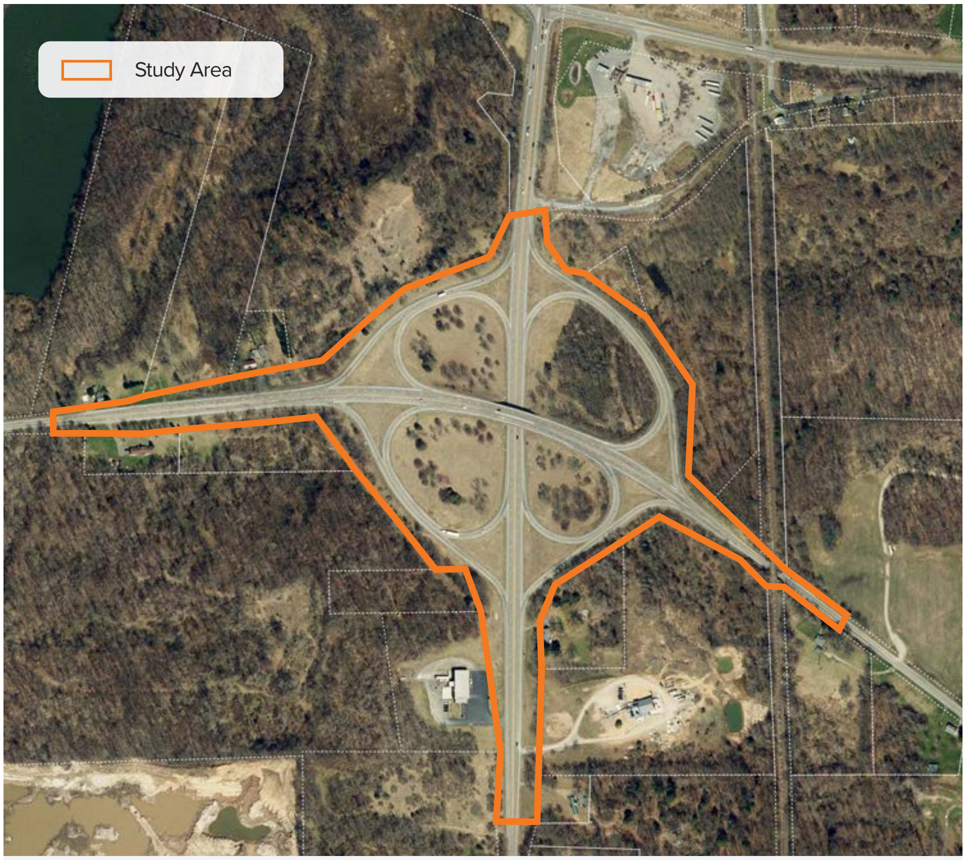


FIGURE **2**
ROUTE 96 OVER ROUTE 14 STUDY AREA

N 0 500 1,000 FEET

PROJECT STEPS

The project unfolded over six steps, each building upon another (**Figure 3**).

1. Existing Conditions Assessment
2. Initial Needs Identification
3. Public Engagement
4. Needs and Goals & Alternative Development
5. Benefit Cost Analysis
6. Alternatives Assessment & Final Recommendations

FIGURE **3**
PROJECT STEPS

FINDINGS

NYSDOT and GTC jointly evaluated two alternatives to replace the intersection: **(1) a roundabout**; and **(2) an at-grade signalized intersection**. These alternatives were compared to the "baseline," which would maintain the existing facility. The evaluation of these alternatives, a process completed in Steps 5 and 6 of this project, considered multiple criteria, including safety, cost, efficiency, resilience, and truck/emergency vehicle access.

The roundabout alternative emerged as the best option based on these criteria, as it would be safer and more cost effective than the existing interchange or a signalized intersection, while maintaining acceptable performance and levels of service. Based on the evaluation conducted as part of this study, the roundabout is the best alternative for the following reasons:

IMPROVED SAFETY

By incorporating roadway designs that reduce travel speeds, the roundabout option is expected to have **decreased crash frequency and severity** compared to both the signalized and existing intersections. With several roundabouts already in Ontario County, drivers are more likely to be familiar with navigating this type of intersection.

LOWER COST

The evaluation showed that the roundabout alternative would be **more cost effective**. The overall maintenance costs for the roundabout are estimated at approximately **$29 million** compared to almost **$64 million** for the existing intersection.

REDUCED PAVEMENT

Replacing the current intersection with a roundabout will decrease the pavement footprint by **53%**.

ECONOMIC DEVELOPMENT

The reduced project footprint area would reclaim **25.2 acres** of land that could be repurposed, which could lead to **increased economic activity and job creation.**

WAYFINDING & CIRCULATION

Simplifying the layout from an interchange to an intersection will **greatly improve wayfinding and navigation** especially for visitors. This also offers **opportunities for gateway features.**

GREATER RESILIENCE

The roundabout is **less vulnerable to weather events**. The current intersection risks bridge failure and flooding due to the underpass. A roundabout eliminates these risks by removing the underpass and improving the roadway profile. Additionally, while a signalized intersection can be disrupted by power outages, a roundabout continues to function without electricity.

PROJECT STEP 1: EXISTING CONDITIONS ASSESSMENT

This step assessed the **existing infrastructure conditions, operations, and maintenance responsibilities** of the Five Points Interchange to help define the goals, strategies, and future needs.

THE ASSESSMENT LOOKED AT THE FOLLOWING:

- Bridge conditions
- Pavement conditions
- Existing utilities (water, electric, telecoms, etc.)
- Lighting, signage and pavement markings
- Maintenance history
- Traffic volumes, types of vehicles, and average speeds
- Pedestrian and cyclist infrastructure
- Crash and safety history
- Land use types (residential, commercial, etc.)
- Demographics

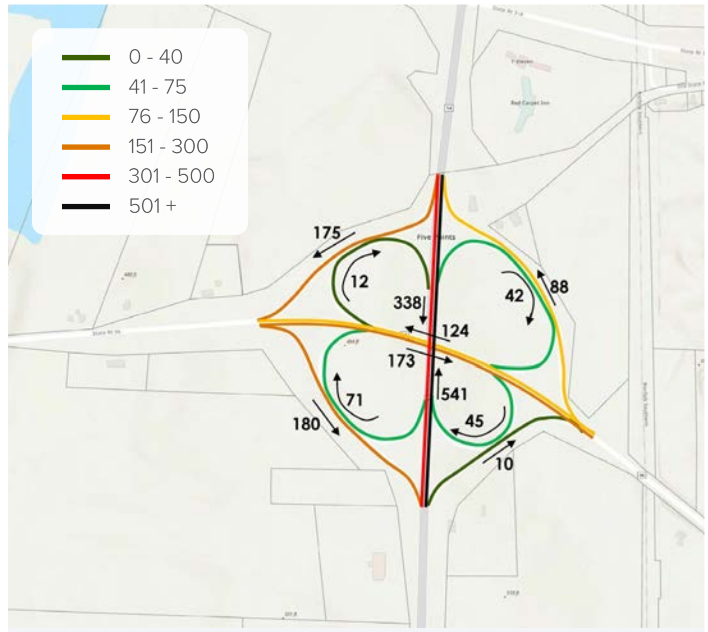


FIGURE **5**
2023 PEAK HOUR VOLUMES
N 0 750 FEET

FIGURE **4**
ROUTE 96 RAILROAD UNDERPASS LOOKING EASTBOUND

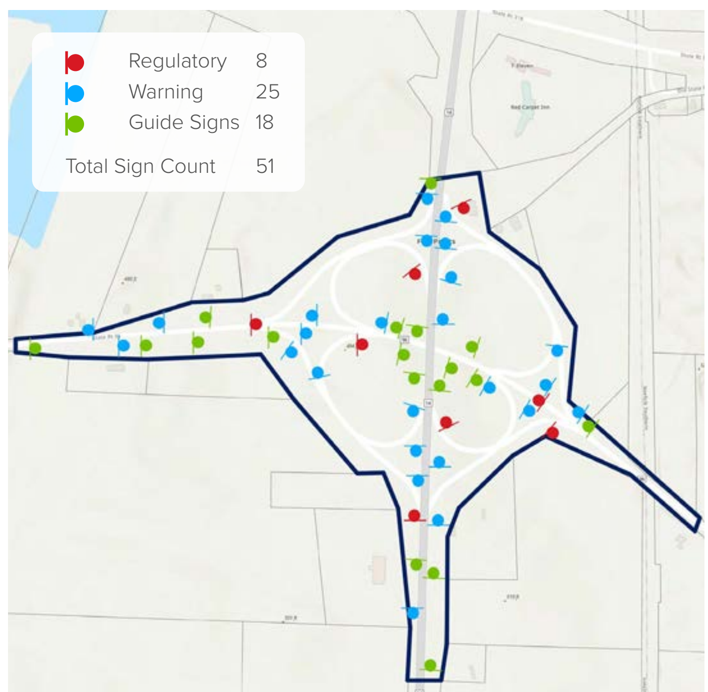


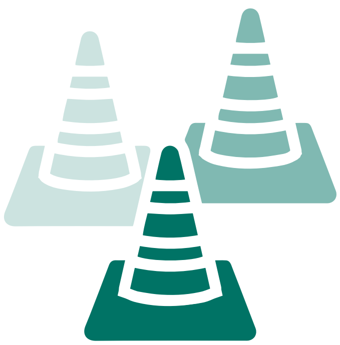
FIGURE **6**
EXISTING SIGN INVENTORY
N 0 750 FEET

PROJECT STEP 2: INITIAL NEEDS IDENTIFICATION

The inventory of existing conditions in Step 1 helped identify a set of initial needs for the Five Points Interchange.

INFRASTRUCTURE NEEDS

- Reduce maintenance costs
- Improve utility access
- Improve storm resilience



TRANSPORTATION NEEDS

- Support regional bicycle activity on Route 14
- Ensure commercial traffic can easily navigate area
- Accommodate any projected traffic growth
- Maintain existing emergency detour routes G and H
- Maintain low levels of crashes

LAND USE NEEDS

- Attract commercial and industrial developers
- Align industrial opportunities with adjacent railway
- Support future freight-oriented uses

COMMUNITY NEEDS

- Increase employment opportunities
- Provide better wayfinding for both local and non-local users
- Create a gateway for local communities and regional attractions

PROJECT STEP 3: PUBLIC ENGAGEMENT

ROUND 1 (JULY-AUGUST 2023)

Provided information about the project and gathered feedback on people's experiences travelling through the Five Points Interchange by tabling at a community event and via an online survey.

Main themes that emerged:

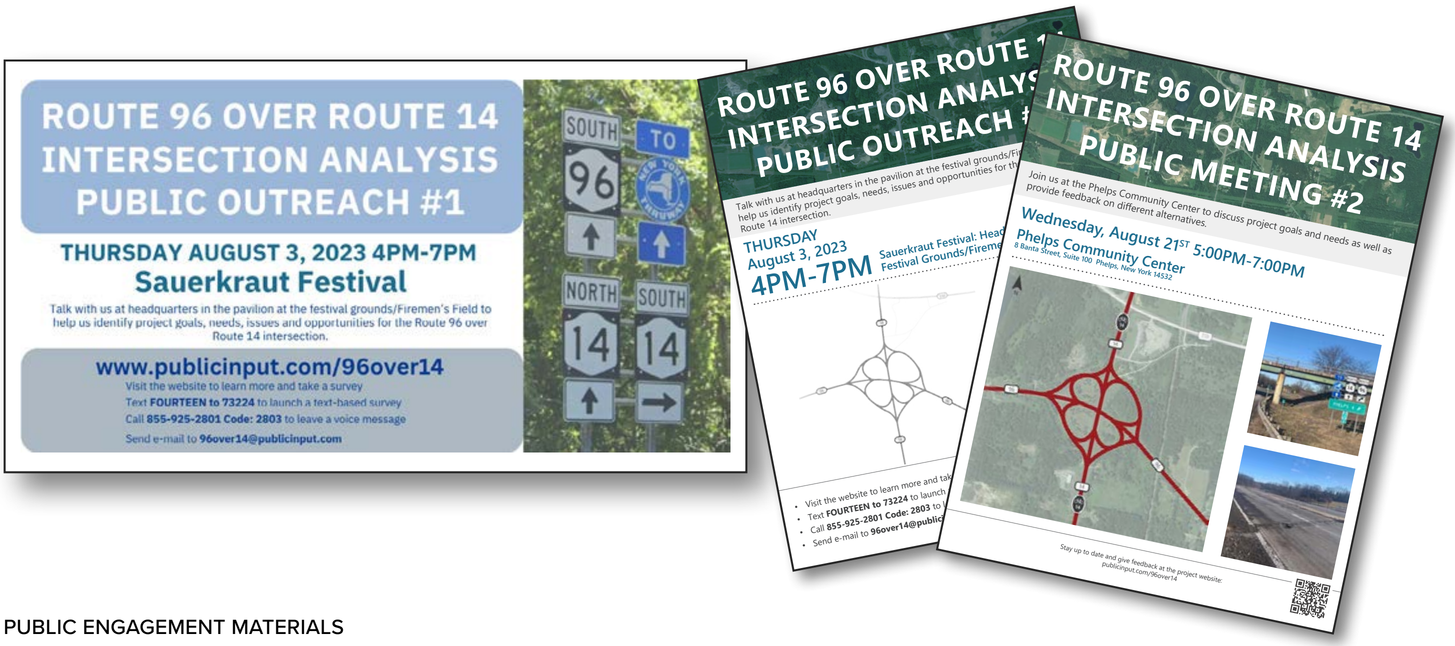
- Most respondents travel the interchange daily.
- People favor the current interchange because they can navigate without stopping.
- There are standing water and flooding issues underneath the railroad bridge.
- Cyclists perceive the interchange as unsafe and uncomfortable to navigate.
- It feels out of place and is not aesthetically pleasing.

ROUND 2 (AUGUST-SEPTEMBER 2023)

Presented alternatives (see Step 5) and gathered feedback on preferred alternatives at a community event (20 people attended) and via an online survey (20 respondents).

Main themes that emerged:

- General support of the roundabout, however people have concerns about heavy truck traffic using it.
- People like the ease of the existing interchange.
- Concerns for traffic backups if the interchange is brought down to grade.



PUBLIC ENGAGEMENT MATERIALS

PROJECT STEP 4: NEEDS AND GOALS & ALTERNATIVE DEVELOPMENT

This step first identified the project's primary and secondary needs and goals to help focus the project and create potential alternatives. These needs and goals are based on community feedback, the original project purpose, and NYSDOT's statewide goals related to safety and mobility for local and regional traffic.

PRIMARY NEEDS AND GOALS

- Reduce maintenance costs of aging bridge infrastructure and pavement
- Maintain safe and efficient roadways
- Accommodate traffic growth based on projected regional growth
- Maintain existing emergency detour routes
- Maintain easy to navigate infrastructure for commercial traffic
- Improve resilience of infrastructure during storm events

SECONDARY NEEDS AND GOALS

- Increase employment opportunities
- Create a gateway for local communities and regional attractions
- Attract commercial and industrial developers to the area
- Support future freight-oriented uses
- Align industrial opportunities with adjacent railway
- Support bicycle activity on Route 14
- Improve access for all users
- Establish utility access

POTENTIAL ALTERNATIVES

In addition to the "No Build" alternative of maintaining the existing infrastructure, two other alternatives were created: **1) a signalized intersection**; and **2) a roundabout.** Both would involve the following:

- Removal of the Route 96 Bridge over Route 14
- Removal of the existing ramps
- Potential adjustment of the vertical alignment for both Route 14 and Route 96

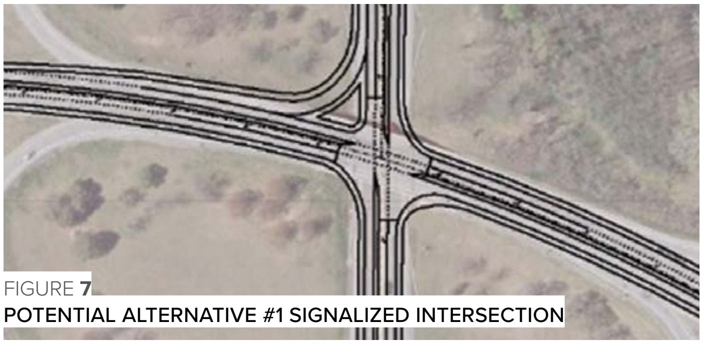


FIGURE **7**
POTENTIAL ALTERNATIVE #1 SIGNALIZED INTERSECTION

FIGURE **8**
POTENTIAL ALTERNATIVE #2 ROUNDABOUT

PROJECT STEP 5: COST-BENEFIT ANALYSIS

A Benefit-Cost Analysis (BCA) provides an objective, quantified basis to inform and support the selection of a project alternative. This analysis closely followed the U.S. Department of Transportation Benefit-Cost Analysis Guidance and uses a 50-year evaluation period reflecting the project's useful life (2030-2080). **Table 1** shows the categories included in the analysis and the BCA results for a Signalized Intersection and a Roundabout Alternative compared to the "No Build" Baseline Alternative.

The BCA results suggest that both the Signalized Intersection and Roundabout Alternatives would provide favorable outcomes in comparison to the "No Build" Baseline Alternative (the positive values represent benefits and negative values are costs).

COST-BENEFIT CATEGORIES	SIGNALIZED INTERSECTION (#1)	ROUNDABOUT (#2)
Project Construction	$ 22,156,431	$ 20,943,013
Repairs	$ 4,494,956	$ 4,629,955
Maintenance	$ 1,398,687	$ 1,432,292
Travel Time	-$ 22,156,260	-$ 14,986,547
Operating Costs	$ 1,715,722	$ 706,783
Safety	-$ 533,496	$ 403,568
Emissions	$ 183,804	$ 85,909
Repurposed Land Value	$ 1,923,539	$ 2,014,646
Residual Value	-$ 1,845,819	-$ 1,845,819
Net Present Value (NPV)	$ 7,337,563	$ 13,383,800
Benefit-Cost Ratio (BCR)	**1.30**	**1.81**

TABLE **1**
BENEFIT-COST ANALYSIS RESULTS

The following local economic benefits are not included in the BCA, but were also considered in the evaluation:

- Reduced project footprint allows adjacent land to be repurposed.
- Community services, economic activity, and job creation associated with alternative use of this land in the future.
- Proximity to the NYS Thruway corridor and access to connected markets.
- Increased opportunities for improvements of accommodations for multi-modal transportation options (e.g., walking, biking).

PROJECT STEP 6:
ALTERNATIVES ASSESSMENT & FINAL RECOMMENDATIONS

Each alternative ("No Build", Signalized Intersection, and Roundabout) was evaluated against the project goals using an evaluation matrix (**Table 2**).

EVALUATION MATRIX LEGEND
High Benefit
Slight Benefit
No Benefit/Impact
Slight Impact
High Impact

ALTERNATIVE EVALUATION MATRIX

PRIMARY GOALS	PERFORMANCE METRIC	ALTERNATIVES		
		MAINTAIN EXISTING (BASELINE)	SIGNALIZED INTERSECTION (#1)	ROUNDABOUT (#2)
Overall Maintenance costs	Maintenance Intervals/cost	$63,816,281	$28,140,587	$29,781,339
Pavement maintenance costs	Pavement Area	668,956 sq ft	364,982 sq ft	317,632 sq ft
Roadway safety	Expected Total Crash Frequency	5.11 crashes/year	7.20 crashes/year	5.74 crashes/year
	Expected Fatal/ Injury Crash Frequency	1.28 Crashes/year	1.33 Crashes/year	1.19 crashes/year
Roadway Efficiency	Vehicle Level of Service	"Average LOS: A Max LOS: A"	"Average LOS: B Max LOS: D (EB T)"	"Average LOS: B Max LOS: C (WB & NB)"
	Delay	"Average Delay: 1.0s Max Delay: 3.6s (EB LT)"	"Average Delay: 16s Max Delay: 37.2s (EB T)"	"Average Delay: 10.6s Max Delay: 19s (WB LT)"
Accommodate traffic growth	Vehicle Level of Service	"Average LOS: A Max LOS: A"	"Average LOS: B Max LOS: D (EB T)"	"Average LOS: B Max LOS: C (WB & NB)"

TABLE **2**
SNAPSHOT OF THE ALTERNATIVE EVALUATION MATRIX

(Continue on next page)

ALTERNATIVE EVALUATION MATRIX				
PRIMARY GOALS	PERFORMANCE METRIC	ALTERNATIVES		
		MAINTAIN EXISTING (BASELINE)	SIGNALIZED INTERSECTION (#1)	ROUNDABOUT (#2)
NYSTA emergency detours	Excess Capacity	"Average LOS: A Max LOS: A"	"Average LOS: B Max LOS: D (EB T)"	"Average LOS: B Max LOS: C (WB & NB)"
	Flexibility	Grade Separation	Event Signal Phasing	Fixed Operations
Commercial Truck Traffic Mobility	Level of Truck mobility	High Mobility	Moderate Mobility	Moderate Mobility
Resiliency	Potential Major Failure Event	Bridge failure	Traffic Signal Disruption	Roundabout Pavement Issues
	Underpass Flooding	No Profile Change	Profile improvements	Profile improvements

TABLE **2 (CONTINUED)**
SNAPSHOT OF THE ALTERNATIVE EVALUATION MATRIX

RESULTS:

- Alternative #2 Roundabout (Figure 7) has a higher overall Benefit-Cost ratio.
- However, it is recommended to explore both alternatives (#1 and #2) for further analysis.
- Community members generally support a roundabout, but concerns remain about safety, traffic congestion, and large truck mobility.
- Further public input and vetting of alternatives is recommended to continue through any future project phases.
- This planning study will help NYSDOT secure funding and progress to scoping, design and construction.

FIGURE **9**
POTENTIAL ALTERNATIVE #2 ROUNDABOUT

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1 Introduction & Overview

The interchange of New York State (NYS) Routes 96 and 14, known as the Five Points Interchange, is located just south of NYS Thruway Exit 42 and about five miles north of the City of Geneva. Originally designed as a clover-leaf interchange meant to handle significant traffic, the interchange has not seen growth in traffic volumes consistent with its design. Given the age of the Route 96 bridge (built in 1957), the bridge's current condition, and the extensive footprint of the interchange, the New York State Department of Transportation (NYSDOT) is investigating options for reconfiguring the interchange to address life cycle costs and community development goals.

NYSDOT initiated the Route 96 over Route 14 Strategic Divestment Analysis to explore the feasibility and identify potential benefits of eliminating (divesting) the existing, grade-separated intersection. Typically, strategic divestment analyses are initiated when infrastructure assets are underutilized, increasingly costly to maintain and repair, subject to recurring damage from natural hazards (flooding, erosion, washout, etc.), or if the asset forms a physical and economic barrier within a community. As part of this project, the Strategic Transportation Asset Redesign Screening Tool was developed to help identify the Five Points Interchange as a candidate for divestment.

This report focuses on the redesign/divestment evaluation completed specifically for the Route 96 and 14 interchange. Figure 1 illustrates the overall project process, which was completed in six steps: (1) Existing Conditions, (2) Initial Needs, (3) Public Engagement, (4) Needs Assessment and Benefit/Cost Analysis, (5) Alternative Development, and (6) Final Recommendations.

This report combines the analysis and findings contained in three technical memos:

- Technical Memo #1: Existing Conditions and Needs Assessment
- Technical Memo #2: Goals, Alternatives Evaluation, and Benefit Cost Analysis
- Technical Memo #3: Recommendations and Implementation Plan.

This combined report includes references to each of the above technical memos, which are included under separate cover. The larger Strategic Divestment process is described in more detail in Attachment A. Public engagement was undertaken throughout the project, and is summarized in Attachment B.

Step 1 – Existing Conditions

Identify Existing Conditions Such As:

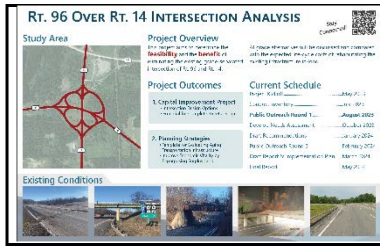
- Traffic Conditions
- Crash History
- Past Maintenance Records
- Upcoming Maintenance work

Step 2 – Initial Needs

Identify Needs and Strategies

- Current Capacity/Operations Issues
- Safety Deficiencies
- Structural Integrity
- Economic Development

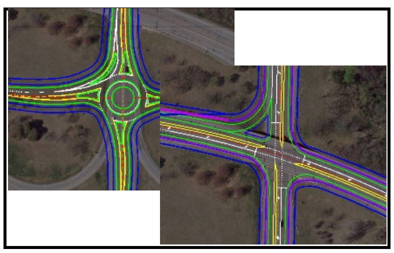
Step-3 Engage the Public



Session 1: Learn insight from Public on Existing Infrastructure

Session 2: Present initial findings and alternatives and gain valuable feedback.

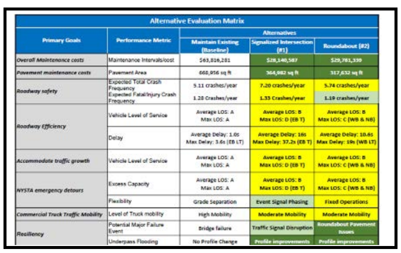
Step 4 - Transportation Needs Assessment & Benefit Cost Analysis



Define the Primary and Secondary Goals for the future of the infrastructure and shape the potential alternatives

- Maintenance Costs
- Capacity/Safety
- Wayfinding
- Commercial Efficiency
- Multi-modal Access

Step 5 - Alternative Development



Alternative Evaluation Matrix

Primary Goals	Performance Metric	Alternatives: Maintain Existing (Baseline)	Alternatives: Signalized Intersection (#1)	Alternatives: Roundabout (#2)
Overall Maintenance costs	Maintenance Intervals/cost	$63,816,281	$28,140,587	$29,781,339
Pavement maintenance costs	Pavement Area	668,956 sq ft	364,982 sq ft	317,632 sq ft
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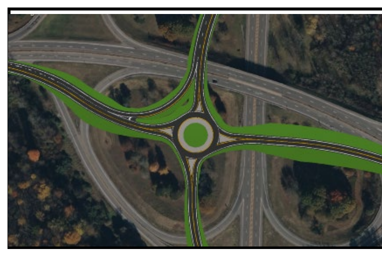
	Delay	Average Delay: 1.0s Max Delay: 3.6s (EB LT)	Average Delay: 16s Max Delay: 37.2s (EB T)	Average Delay: 10.6s Max Delay: 19s (WB LT)
Accommodate traffic growth	Vehicle Level of Service	Average LOS: A Max LOS: A	Average LOS: B Max LOS: D (EB T)	Average LOS: B Max LOS: C (WB & NB)
NYSTA emergency detours	Excess Capacity	Average LOS: A Max LOS: A	Average LOS: B Max LOS: D (EB T)	Average LOS: B Max LOS: C (WB & NB)
	Flexibility	Grade Separation	Event Signal Phasing	Fixed Operations
Commercial Truck Traffic Mobility	Level of Truck mobility	High Mobility	Moderate Mobility	Moderate Mobility
Resiliency	Potential Major Failure Event	Bridge failure	Traffic Signal Disruption	Roundabout Pavement Issues
	Underpass Flooding	No Profile Change	Profile improvements	Profile improvements

Define feasible alternatives from the potential alternatives defined in Step-4

Step 6 - Final Recommendations



Recommend preferred strategy for the future of the facility and develop plan to execute

Figure 1 : Intersection Redesign Process

2 Existing Conditions and Needs Assessment

To successfully define the goals, strategies, and future needs of the Five Points Interchange, an assessment of the existing operations, challenges, and maintenance responsibilities is required. To make this assessment, the following sources of information were utilized:

- The New York State Department of Transportation Traffic Data Viewer
- NYSDOT CLEAR Portal (crash history and analysis)
- Past studies completed within the project area and corridors
- Available design record plans
- NYSDOT reports

Using the above information, the following sections will summarize the existing conditions to frame the opportunities of Rt. 96 and Rt. 14.

2.1 Existing Infrastructure Condition/Maintenance History

The following section outlines the existing condition of the current infrastructure including the Rt. 96 Bridge (BIN 1010999), pavement surfaces, guiderail, signage, and the Norfolk Southern RR Bridge over Rt. 96. Following a field review conducted in December 2022, NYSDOT reports were referenced for a complete visual assessment of the existing interchange.

2.1.1 BRIDGE STRUCTURE CONDITION

The conditions noted in the December 2022 visual assessment were consistent with NYSDOT reports. Observations include, but are not limited to:

- Cracking and hollow sounding concrete girders under the bridge
- Cracked pavement (especially along asphalt joints) observed in 2022. *A 2023 Route 96 pavement maintenance project has improved this condition.*
- Areas of the structure have peeling and blistering paint with rust bleeding and areas of exposed steel.
- The bridge received a significant impact in 2017 which resulted in damage to (3) of the girders over the NB drive lanes. *Repairs were completed in August 2023*

NYSDOT has indicated that due to the age of the bridge structure the next major maintenance milestone for the interchange would likely include a complete replacement of the structure.

2.1.2 PAVEMENT CONDITION

In general, the pavement surface on Route 96 and the interchange ramps is in good condition after the completion of the NYSDOT resurfacing project in the 2023 season. Conditions on Route 14 have remained consistent with the December 2022 visual assessment. During the assessment, Rt. 14 was noted to have had recent crack repair to fix visible surface cracks, and asphalt patching. The ride quality of Rt. 96 is good while Rt. 14 is diminished but not yet categorized as poor condition. Reoccurring feedback from the community is that the riding surface through the interchange is poor however most of the pavement deterioration was addressed with the 2023 Route 96 paving. The following pictures from

December 2022 and September 2023 show the overall pavement condition and distresses evident at that time.

Figure 2: Pavement condition on EB off Ramp to Route 96 (September 2023)

Figure 3: Pavement Condition on WB on Ramp to Route 14 (September 2023)

Figure 4: Pavement Condition on Route 14 looking NB (December 2022)

2.1.3 EXISTING UTILITIES

Several public utilities are located within the study area including watermain, telecommunications, and stormwater facilities. Based on available NYSDOT project record plan information, many of these facilities are likely original facilities that were either installed or modified under those contracts. Figure 5 below, displays the approximate location of each utility. The age of each known utility ranges from 1957 to 1985 with most of the subsurface drainage system being near 60+ years old. The Town of Phelps has noted that a future sanitary sewer line is planned for NYS Route 14.

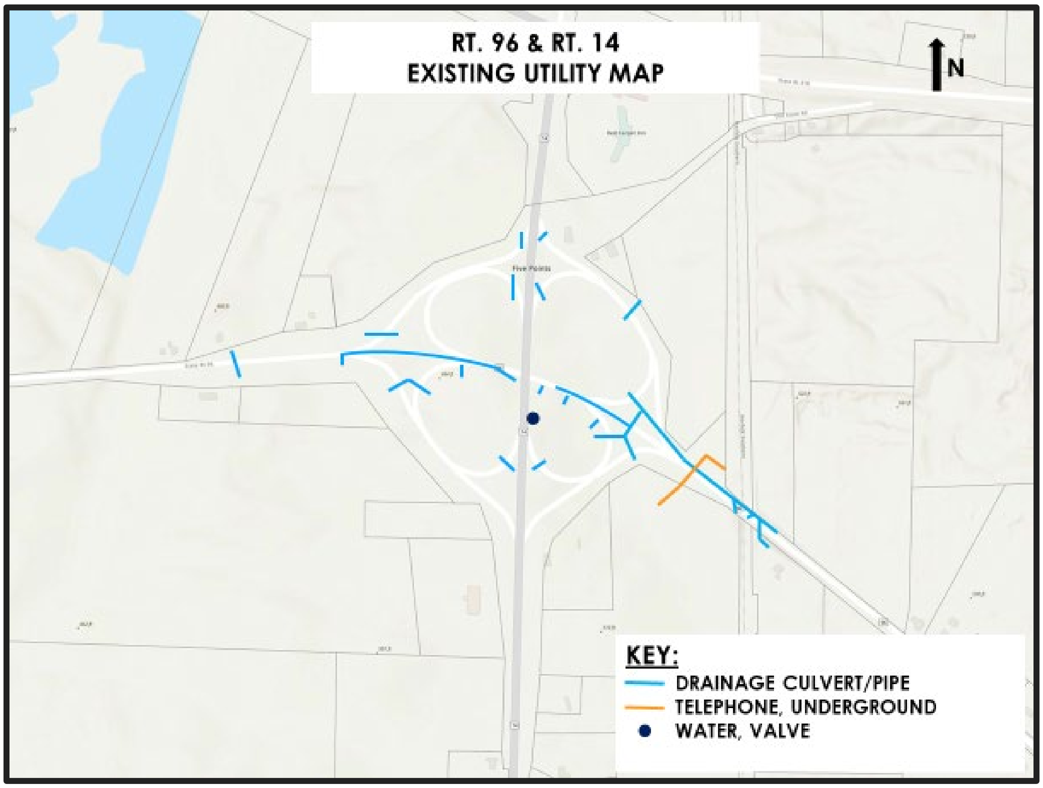


Figure 5: Existing Public Utilities within Study Area

2.1.4 HIGHWAY LIGHTING

The existing NYSTA lighting system terminates just north of the interchange between Old State Rd and Exit 42. There is currently no highway lighting located within the interchange.

2.1.5 HIGHWAY SIGNAGE, WAYFINDING, AND PAVEMENT MARKINGS

There are currently 51 highway sign locations consisting of 25 warning sign assemblies, 8 regulatory assemblies, and 18 destination/guide assemblies within the study limits. Figure 6 on the following page displays the approximate location of each assembly and the type. Note that the number of assemblies does not include the inventory of individual sign panels at each location. The sign panels are all in good condition little to no deterioration (see figure 7). Wayfinding around the interchange is mostly facilitated by guide signs and NYS and NYSTA (I-90) route markers with directions to major destinations such as

Waterloo, Geneva, Phelps, Lyons, and Clifton Springs. Since both Rt. 96 and Rt. 14 are not limited access roadways, the interchange is signed according to conventional roadway guidance provided by the Manual of Uniform Traffic Control Devices (MUTCD). Based on public input, daily users stated that the interchange is relatively easy to travel though and not confusing. However, other community members have stated that the changes in number of travel lanes can create confusion, especially in the northbound and southbound directions.

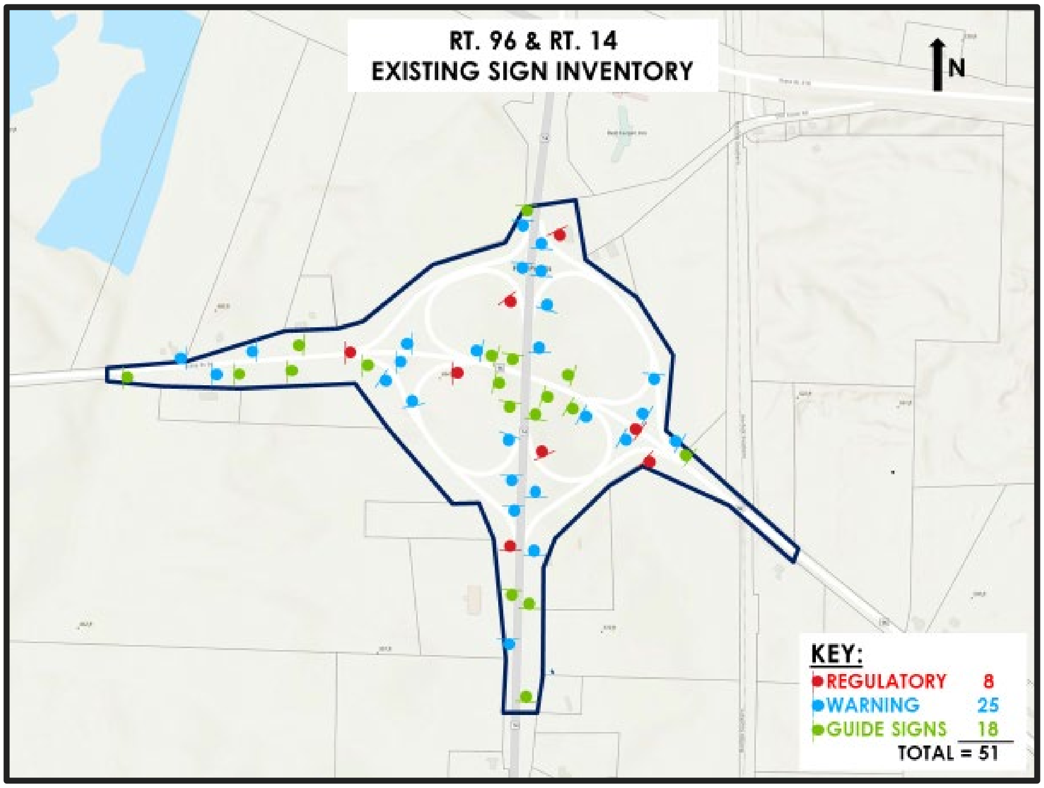


Figure 6: Existing Sign Assembly Inventory

Figure 7: Existing Sign Condition

The existing pavement markings on Rt. 14 are showing signs of wear/fading; however, most are still in-place but subject to less-than-ideal pavement conditions. As noted above, NYSDOT completed a pavement rehabilitation project on Route 96 during the 2023 season which included restriping the existing pavement markings on that facility and the ramps to/from Route 14.

Figure 8: Existing pavement marking condition on Route 14

2.1.6 RAILROAD BRIDGE OVER RT. 96 OBSERVATIONS

<u>Vertical Clearance</u>

The current grade separated railroad crossing was originally constructed in 1931 to remove the at grade crossing on Rt. 96 (formerly known at that time as Lynches Road). The bridge was originally constructed to maintain a minimum of 14’ vertical clearance between the bottom of the girders to the top of the pavement surface. It is not apparent (and/or verified) from the available record drawings that superseded the original interchange construction that the minimum 14’ vertical clearance has been modified. The Town of Phelps has expressed a concern that the top of tractor trailers traveling under the bridge appear to be very close to the bottom of the bridge girders. This concern is likely the result of a slight vertical clearance reduction for longer vehicles when traversing sag vertical curves. However, there is no history of crashes or bridge maintenance that indicate an issue.

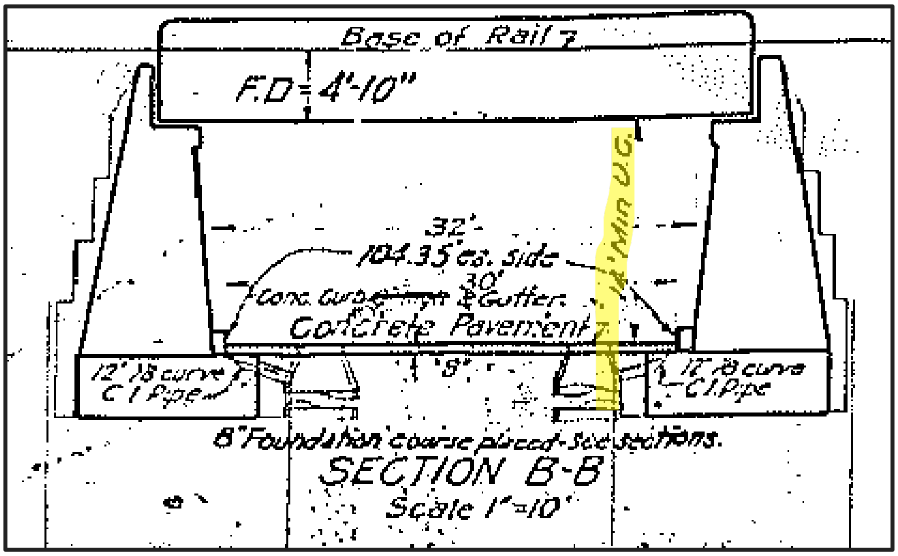


Figure 9: 1931 As-built Cross Section of Route 96 underpass

Figure 10: Existing Condition of Route 96 underpass facing EB

Flooding History

Based on conversations with the Town, County, and NYSDOT this underpass is an identified low point that is susceptible to flooding due to the current road profile and drainage configuration. These low points tend to accumulate leaves, debris, and silt which can limit maintenance abilities to convey water away from the low point. If short term closures are needed at this underpass, motorists typically end up bypassing the closure via Preemption Street north to State Route 318 or south to Cross Road which both have intersections with State Route 14. In either case, these alternative routes are less than 2 miles in length, see Figure 11.

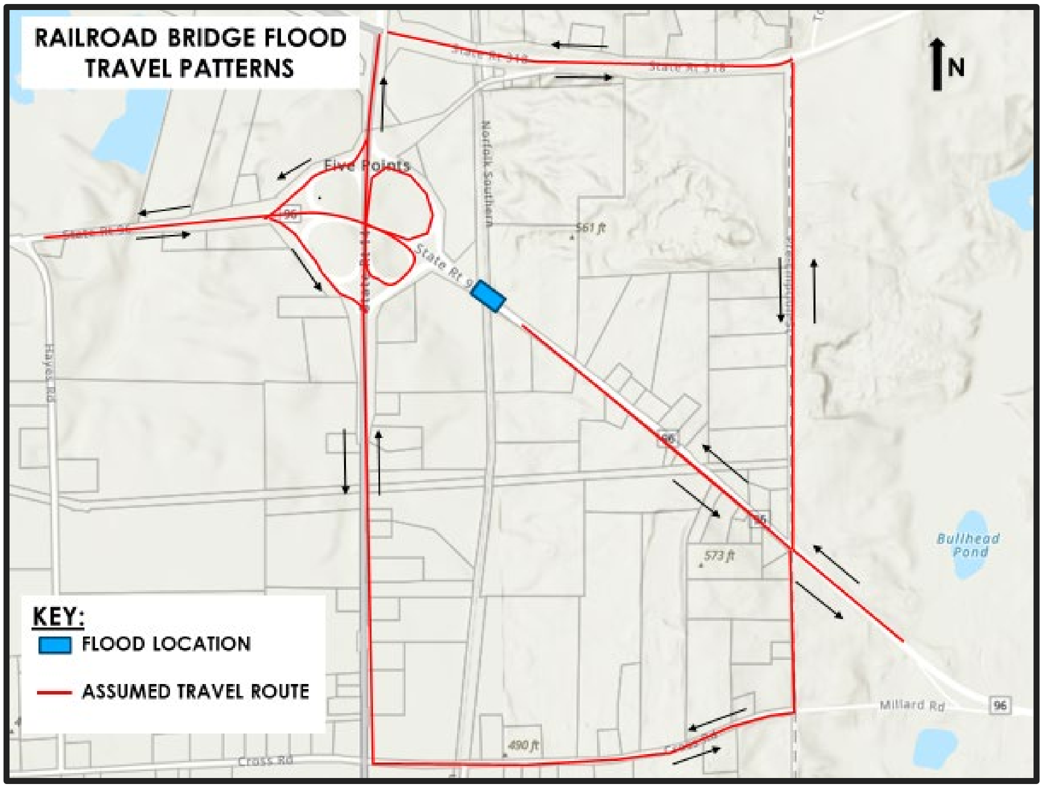


Figure 11: Route 96 underpass closure travel patterns

2.1.7 EXISTING RIGHT OF WAY ACCESS

The current interchange limits were established during original construction with Right-of-way ‘without access’ that by deed restricts any driveway access within these limits. There is one residential driveway located south of the interchange that has been granted access within these limits. By definition ‘without access’ right-of-way restricts direct access to the public highway and is typically found at interchanges and other access-controlled highways (such as I-90) due to the potential safety and operational concerns that may arise. Figure 12 shows the current limits of the without access ROW.

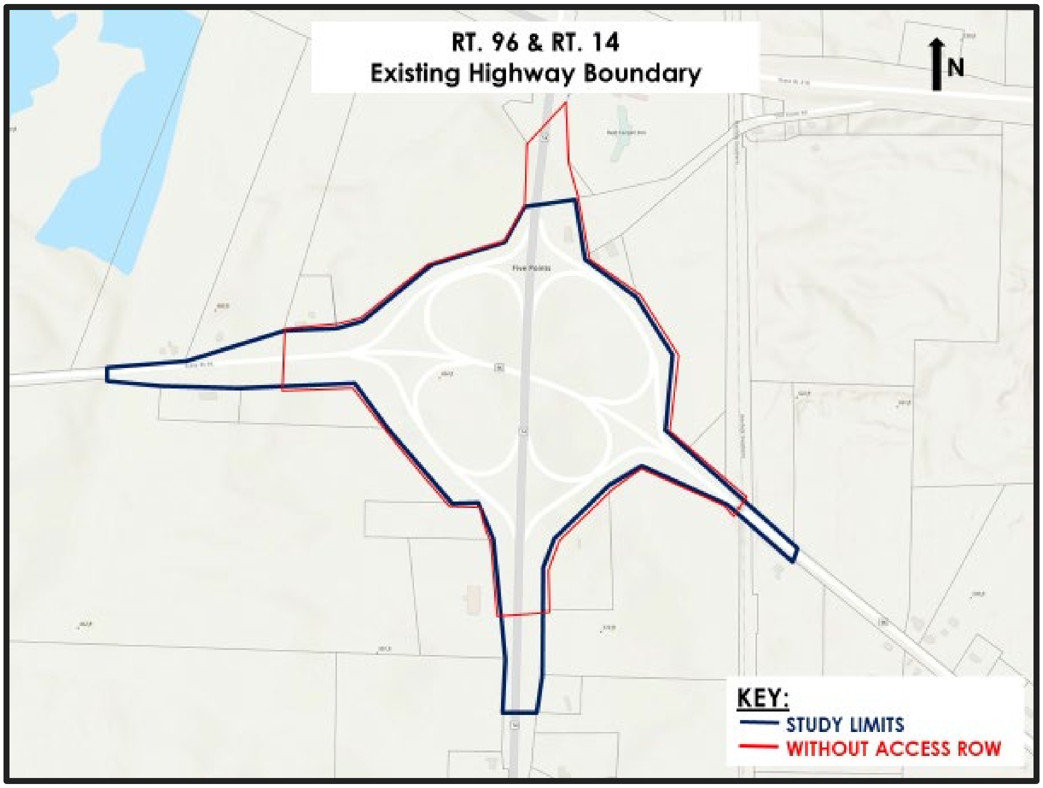


Figure 12: Existing Right-of-way without access boundary

2.1.8 MAINTENANCE HISTORY

The current existing full cloverleaf interchange was originally constructed in 1957. Various maintenance projects have been completed since that time along each corridor and the adjoining ramps. The most recent maintenance of Route 96 was completed during the 2023 season to rehabilitate the asphalt pavement for the travel lanes and ramps as well as replacing the asphalt wearing surface for the existing bridge over Route 14. Route 14 had similar rehabilitation work completed in 2010. Table 1 below describes the various maintenance work history.

Table 1: Maintenance History for Route 96 & Route 14

Year	Description of work
1957	Original Construction of grade separated interchange facility of Rt. 96 over Rt. 14
1967	Roadside Development and Misc. Work
1976	Bridge work at Rt. 96 over Rt. 14
1985	Reconstruction of Rt 96 between Rt 14 and Railroad Bridge. Limits did not include Ramps or Bridge over Rt. 14
1990	Resurfacing and Guide Rail Replacement on Rt. 14 between the NYS Thruway and 1000’ south of interchange. Limits include interchange Ramps
1993	Rt. 96 over Rt. 14 Bridge Painting
2010	Rt. 96 over Rt. 14 Bridge Painting
2010	Resurfacing of Rt. 14
2023	Resurfacing of Rt. 96 between Village of Phelps and Ontario County line. Includes replacing existing asphalt wearing surface on Rt. 96 over Rt. 14 bridge.

Winter Maintenance

The town of Phelps has indicated that snow plowing the interchange takes on average over an hour to complete. Several passes are needed to clear the cloverleaf ramps and snowplow operators have to execute weaving patterns as they enter and exit the ramps which can create safety issues.

2.2 Transportation

2.2.1 ESTABLISHING TRAFFIC VOLUMES

Using the most recent data documented on NYSDOT's Traffic Data viewer, baseline traffic volumes were established for Route 96 and Route 14. The following diagram documents the most recent year that historical count information was available and used to establish existing volumes for the transportation analysis. There are temporal differences between mainline (Rt. 14 and Rt. 96) and the connecting interchange ramps. As shown in Figure 13, the most recent data available for the ramps was collected in 2016 while the most recent mainline volumes are from 2017 & 2019. Based on a regression analysis performed with the latest three (3) available years of volume data on the NYSDOT Traffic Data viewer between 2006 and 2019, the mainline volumes on Rt. 14 have grown by an average of 1.9% per year and Rt. 96 have decreased by 0.33% per year. Consistent with the latest NYSDOT Traffic Data Collection Guidance; Post COVID-19 Pandemic Traffic Safety & Mobility Instruction, this data is considered acceptable to use for planning purposes without adjustment as it was collected prior to March 1, 2020.

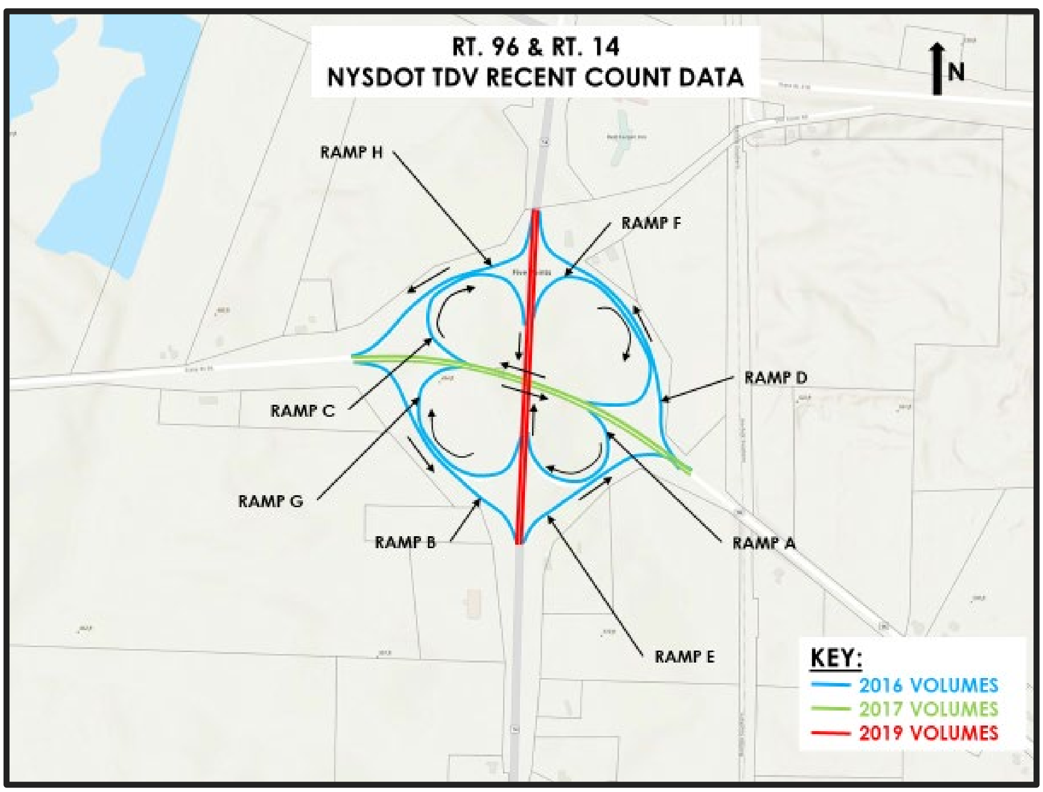


Figure 13: Most recent data years from NYSDOT Traffic Data Viewer

To establish base traffic volumes for the interchange the 2016 ramp volumes were grown at a rate of 1.5% per year from 2016 to 2019 to bring them in-line with the 2019 mainline volumes. The 2017 Rt. 96 volumes were also grown by this same percentage to reach 2019 levels. The original volumes and 2019 baseline volumes are shown in Table 2.

Table 2: Route 14 & Route 96 Ramp Peak Hour Volumes

Location	Baseline Volumes	2019 Volumes
Rt. 96 EB	168 (2017)	173
Rt. 96 WB	121 (2017)	124
Rt. 14 NB	540 (2019)	540
Rt. 14 SB	337 (2019)	337
Ramp A (EB to NB)	43 (2016)	45
Ramp B (EB to SB)	172 (2016)	180
Ramp C (WB to SB)	11 (2016)	12
Ramp D (WB to NB)	84 (2016)	88
Ramp E (NB to WB)	40 (2016)	42
Ramp F (NB to EB)	10 (2016)	10
Ramp G (SB to EB)	68 (2016)	71
Ramp H (SB to WB)	167 (2016)	175

By applying the GTC & NYSDOT established project growth rate of 0.5% to the baseline 2019 interchange volumes, projected 2023 existing study volumes were established and are displayed in Figure 14.

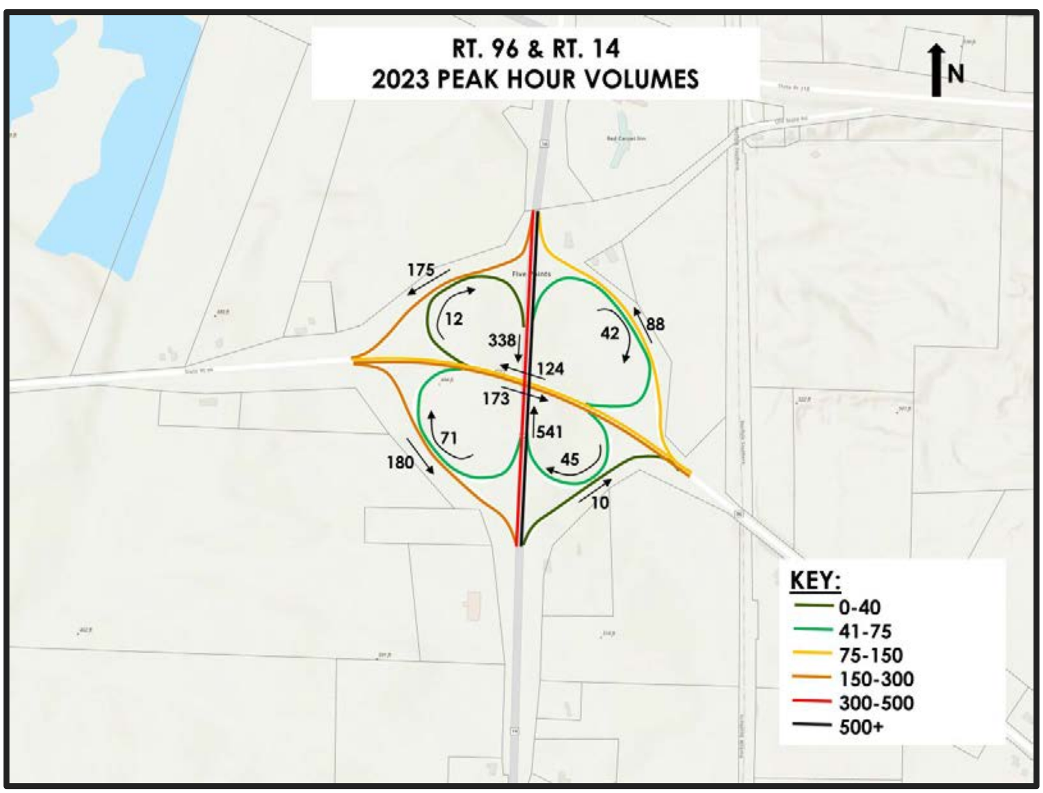
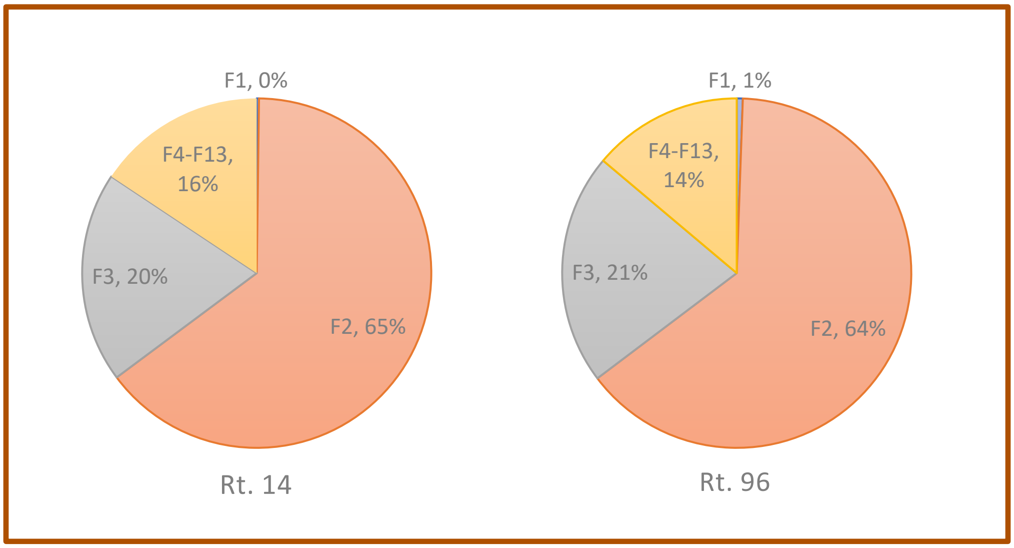


Figure 14: 2023 Peak Hour Volumes

2.2.2 EXISTING VEHICLE CLASSIFICATIONS

As a gateway to the Finger Lakes Region the Five Points interchange services over 16,000 vehicles per day. Most vehicles that travel through this facility are passenger vehicles however, as noted in the 2003 NYS Route 14 Truck Study, Rt. 14 supports a substantial amount of truck traffic that is traveling from the NYS Thruway to the City of Geneva. Local truck generators/attractors include businesses such as Heidelberg Materials, Elderlee, Inc., and Sheppard Grain. Regional contributors include Ontario County Sanitary Landfill, Seneca Meadows Landfill, and G.W.Lisk Company, Inc. Truck volumes on Rt 14 have continued to show steady growth over the past 10 years between 2003 and 2023 and are expected to continue this trend into the future as the surrounding commercial area is unlocked for development. Shown in Figure 15 are the existing vehicle classifications within the Five Points interchange.



KEY:

F1- Motorcycles
F2- Passenger Cars
F3- Other Two axel, four tire, Single unit Trucks
F4- Buses
F5-Two-Axel,Six tire, Single Unit Trucks
F6- Three-axel, Single Unit Trucks
F7- Four or more Axel, Single Unit Trucks
F8-Four or less Axel, Single Trailer Trucks
F9- Five Axel, Single Trailer Trucks
F10- Six or more, Single Trailer Trucks
F11-Five or Less Axel, Multi-Trailer Trucks
F12- Six-Axel, Multi-Trailer Trucks
F13- Seven or more Axel, Multi—Trailer Trucks

Figure 15: Route 96 & Route 14 Vehicle Classification Summary

2.2.3 MULTI-MODAL USE

Pedestrian

The existing interchange currently provides pedestrian facilities via roadway shoulders on both Route 14 and Route 96. While there are no signs that communicate that pedestrians are prohibited from using the cloverleaf ramps, it may not be known that pedestrians can use the ramps on this interchange as NYS law states that pedestrians are prohibited on entrance and exit ramps to limited-access roads. The public may apply this understanding to interchanges between two arterial streets. However, due to the rural character and no presence of pedestrian generators nearby, the need for higher quality/comfort facilities is low.

Bicycle

NYS Bike Route is part of the Route 14 corridor and extends 95 miles from the Pennsylvania State line near Elmira to Sodus Point on the shores of Lake Ontario, see Figure 16. The route also connects with Pennsylvania State Bicycle Route G, NYS Bike Route 5, NYS Bike Route 17, NYS Canalway Trail, and the Seaway Trail. 8' shoulders are located on both sides of the roadway through the interchange as well as NYS Bike Route 14 signs to reinforce wayfinding through the interchange. Like the existing pedestrian accommodations, it is likely unknown that bicyclists can use the interchange ramps to make connection between Route 96 and Route 14 as the NYS law prohibits cyclists on exit and entrance ramps to controlled access facilities. Cyclists in the community have stated that they perceive the interchange to be unsafe and uncomfortable to navigate due to the number of merge points.

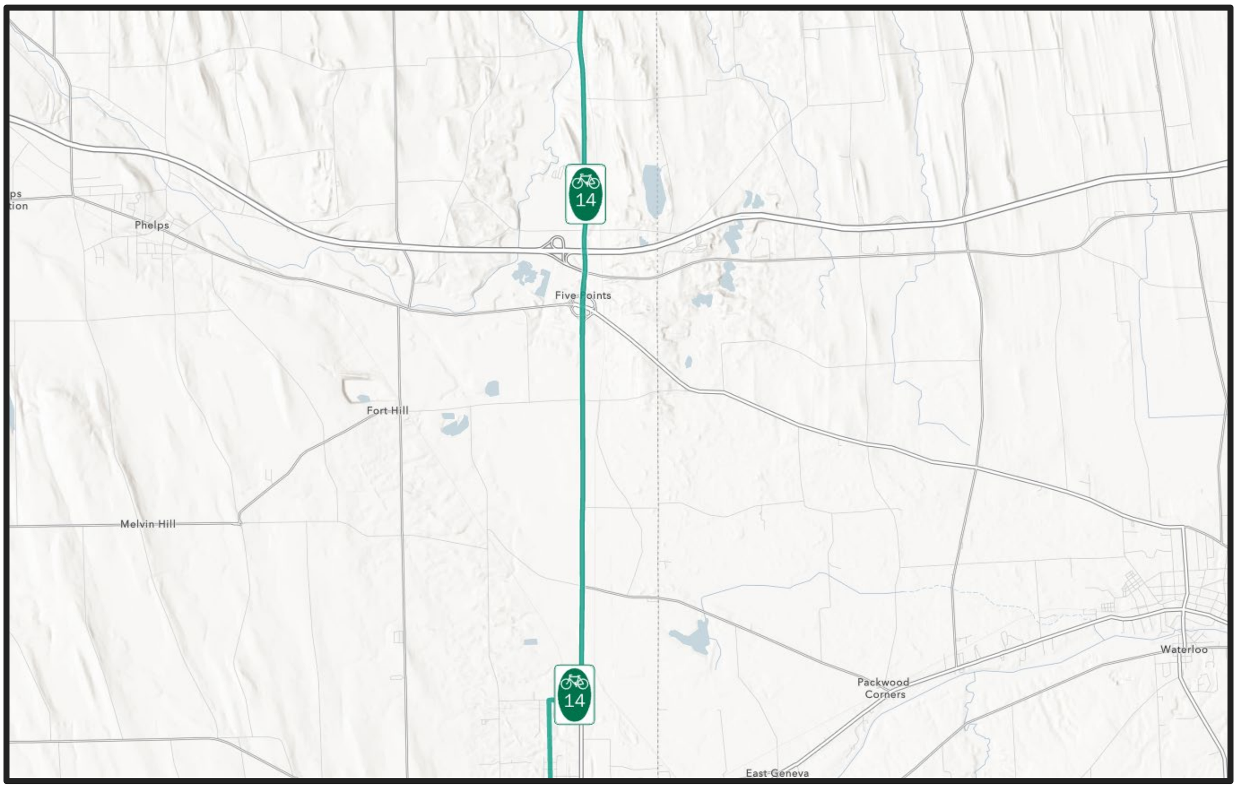


Figure 16: NYS Bike Route 14

Transit

The portion of Rt. 14 and Rt. 96 within the Five Points Interchange are not part of an RTS Ontario transit route.

Motorcyclists

Motorcyclists that ride through the area have stated that the interchange is uncomfortable to drive on due to the existing riding surface (feedback collected prior to the completion of the Route 96 surface repairs in 2023) and interactions with heavy truck traffic.

Commercial/Freight

During the peak hour, most of the truck traffic is heading NB on Rt. 14 towards the NYS Thruway. There is also a moderate amount of truck traffic heading west toward the Village of Phelps. Two Heidelberg

Materials quarries are west of the study area and most likely contributing to most of the westward truck traffic. Figure 17 shows the peak hour truck volumes that pass thru the Five Points interchange.

<u>Agricultural Vehicles & Equipment</u>

A substantial number of farms are within the region and occasionally farm equipment operators will travel along Route 14 or Route 96. However, these users have indicated that they often avoid the interchange between Route 14 and Route 96 and Rt. 96 due to its complexity.

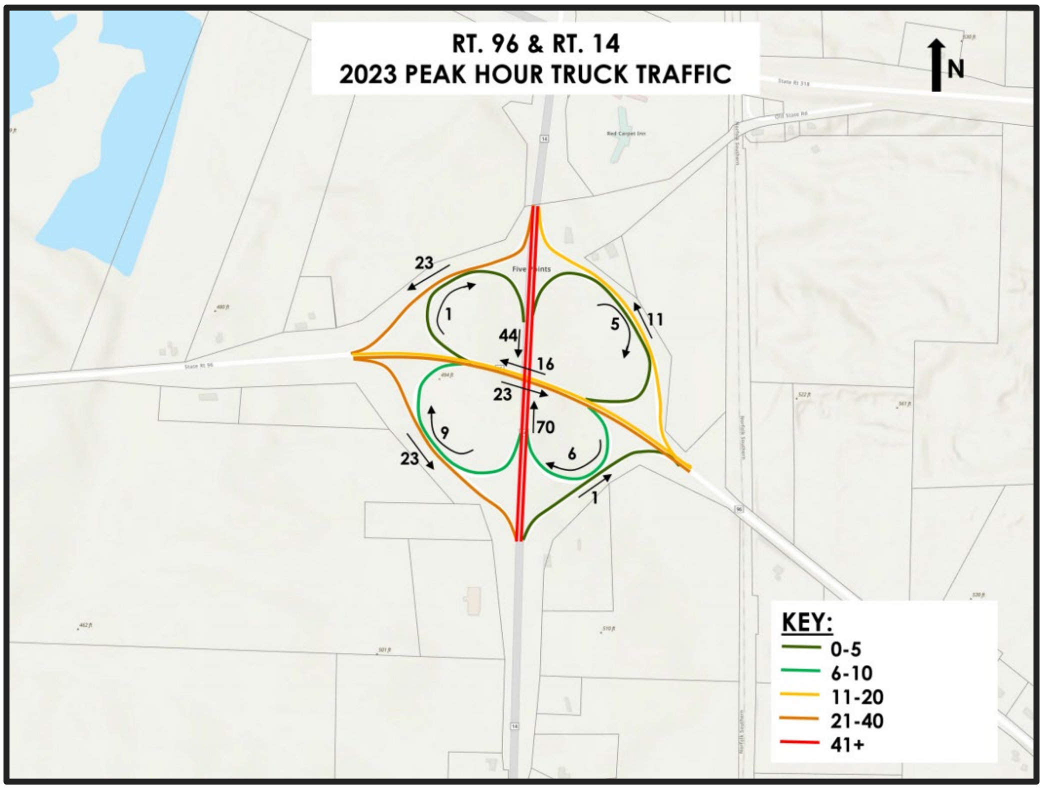


Figure 17: 2023 Truck Volumes

2.2.4 NYSTA DETOUR ROUTES G & H

NYSTA Detour Routes G (Int. 42 to 44) and H (Int 44 to 42) are currently signed through the Five Points interchange. Figure 18 shows the detour routing as it is currently posted.

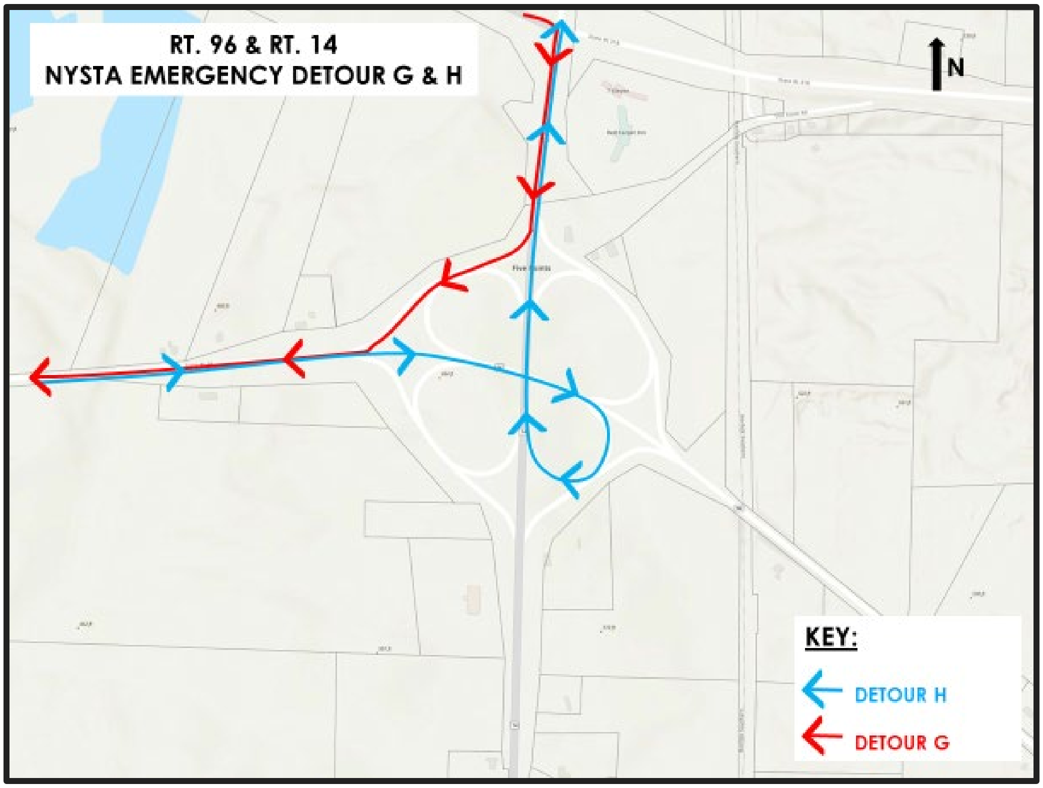


Figure 18: New York State Thruway Authority Detour Routes G & H

2.2.5 AVERAGE OPERATING SPEEDS & TRAVEL TIMES

Travel time runs were completed in May of 2023 using the floating car method during the PM peak hour. Four check points were established within the study area to delineate start and stop of each travel time run. These check points are as follows:

- Western Leg – residence located at #323 NY Route 96
- Eastern Leg – railroad bridge crossing over NY Route 96
- Northern Leg – unsignalized intersection at old state road and NY Route 14
- Southern Leg – Parmenter Auto Service located on NY Route 14

The four check points accommodated collection of travel times runs for all interchange movements. Table 3 shows a summary of the volume, travel time, and average speeds of each movement.

Table 3: Existing Travel Time Measurements

Movement		Volume [1] (vph)	Travel Time [2] (seconds)	Avg. Speed (mph)
NY Route 96	EB to NB	46	68	41
	EB – Thru	176	37	56
	EB to SB	183	45	39
	WB to SB	12	67	43
	WB – Thru	127	35	58
	WB to NB	90	35	39
NY Route 14	NB to WB	43	76	45
	NB – Thru	551	26	56
	NB to EB	11	33	37
	SB to EB	73	70	39
	SB – Thru	344	26	56
	SB to WB	178	40	36

Volume [1] – Volumes have been tabulated as shown in Figure 14
Travel Time [2] – Floating car method was used to gather the travel times in seconds for each of the movements.

Travel times were used to calculate average speeds from check point to check point by dividing the average measured time it takes to travel from one point to the other, and then dividing by the distance traveled. It is noted that these calculated speeds are an average of the entire movement. For example, the eastbound to Northbound movement (from western leg to northern leg as documented above) includes a 55-mph speed limit along Eastbound Route 96 until reaching an advisory speed of 25-mph on the ramp, and then another 55-mph speed limit along Northbound NY Route 14. Although the average speed does not account for these fluctuations, it gives another metric to calibrate the traffic model against, as discussed in the following Traffic Operations section of this report.

2.2.6 TRAFFIC OPERATIONS

Traffic operations analyses were conducted to determine existing intersection operating levels of service to be used as a comparison for various alternatives.

2.3 Level of Service

Level of service (LOS) is a term used to describe the quality of traffic flow on a roadway facility at a point in time. It is an aggregate measure of travel delay, travel speed, congestion, driver discomfort, convenience, and safety based on a comparison of roadway system capacity to roadway system travel demand. Operating levels of service are reported on a scale of A to F with A representing the best operating conditions with little or no delay to motorists and F representing the worst operating conditions with long delays and traffic demands sometimes exceeding roadway capacity. Procedures for calculating intersection operating levels of service are defined in the *Highway Capacity Manual*, published by the Transportation Research Board.

The level of service for an intersection or a lane group is based on delay. Delays can be measured in the field or calculated as a function of several factors including traffic volume; peaking characteristic of the traffic flow; percentage of heavy vehicles in the traffic stream; the number of travel lanes and lane use; intersection approach grades; and pedestrian activity. The calculations also yield volume-to-capacity ratios for lane groups and the intersection overall. A volume-to-capacity ratio of 1.0 indicates that the lane group or the critical movements at the intersection are operating at theoretical capacity. The specific delay criteria applied per the *Highway Capacity Manual – 6th Edition* to determine operating levels of service are summarized in Table 4.

Table 4: Intersection Level of Service Criteria

Level of Service	Average Delay per Vehicle (Seconds)		
	Signalized	Unsignalized	Roundabout
A	<10.0	<10.0	<10.0
B	10.1 to 20.0	10.1 to 15.0	10.1 to 15.0
C	20.1 to 35.0	15.1 to 25.0	15.1 to 25.0
D	35.1 to 55.0	25.1 to 35.0	25.1 to 35.0
E	55.1 to 80.0	35.1 to 50.0	35.1 to 50.0
F	>80.0	>50.0	>50.0

2.3.1 CALIBRATION

VISSIM software was used to determine the density of segments within the existing grade separated facility. The travel time runs were used to calibrate the model by comparing existing travel times and speeds to an average of 10 simulations. It is noted that in each of the 10 simulations, the model was permitted to “seed” the network for a period of 15-minutes before capturing operations of the PM peak for a duration of 60-minutes per each run.

2.3.2 EXISTING LOS RESULTS

Table 5 shows existing parameters of the calibrated model that will be used in a further benefits/cost analysis of alternatives to determine the preferred alternative such as the maximum observed queue measured in feet, the average delay per vehicle measured in seconds, fuel consumption per vehicle measured in grams, and emissions of carbon monoxide, nitrogen oxides, and volatile organic compounds all measured in grams.

Table 5: VISSIM Results

Movement		Max Queue Length (ft)	LOS	Delay (Seconds)	Emissions CO (grams)	Emissions Nox (grams)	Emissions VOC (grams)	Fuel Consumption (liquid gram)
NY Route 96	EB to NB	31	A	3.2	76	15	18	1.09
	EB – Thru	--	A	0.2	161	31	37	2.31
	EB to SB	31	A	0.7	134	26	31	1.91
	WB to SB	11	A	1.9	21	4	5	0.29
	WB – Thru	--	A	0.1	112	22	26	1.60
	WB to NB	38	A	1.9	82	16	19	1.17

Table 5 (cont.): VISSIM Results

Movement		Max Queue Length (ft)	LOS	Delay (Seconds)	Emissions CO (grams)	Emissions Nox (grams)	Emissions VOC (grams)	Fuel Consumption (liquid gram)
NY Route 14	NB to WB	16	A	1.2	76	15	18	1.09
	NB – Thru	--	A	0.3	478	93	111	6.84
	NB to EB	17	A	0.9	6	1	1	0.09
	SB to EB	29	A	1.0	122	24	28	1.75
	SB – Thru	--	A	0.6	304	59	70	4.34
	SB to WB	30	A	0.6	123	24	29	1.77

As seen in the table the existing interchange operates exceptionally well with very low delays. Queueing results are also low however, feedback from the public has described that northbound queuing often extend back from the Route 14 & I-90 intersection to Old Stone Road on Sunday evenings and Fridays in the summer potentially coinciding with events in Watkins Glen.

2.3.3 SAFETY HISTORY

The most recent available crash information was provided by NYSDOT CLEAR Crash Data Viewer for the interchange of Rt. 96 & Rt. 14. Information available represents a 3-year period between January 2020 to December 2022. The crash history within the project limits identified a total of fifteen (15) crashes. There was only one crash that resulted in an injury and no crashes were reported that resulted in a fatality. Table 6 summarizes the crash types for the entire study area.

Table 6: Crash Summary for Route 96 & Route 14 (Years 2020-2022)

Year	Left-Turn		Overtaking		Rear End		Animal		Collision w/ Earth/Snow/ Bridge Structure		Total	PDO	Injury	Fatal
	PDO	Injury	PDO	Injury	PDO	Injury	PDO	Injury	PDO	Injury				
'20	0	0	0	0	0	0	2	0	1	0	3	3	0	0
'21	0	0	1	0	1	0	0	0	2	0	4	4	0	0
'22	1	0	1	0	2	0	1	0	2	1	8	7	1	0
Subtotal	1	0	2	0	3	0	3	0	5	1	15	14	1	0
Total	1		2		3		3		6					

Several performance measures exist to conduct a safety screening to determine at a high level if any safety issues exist beyond the expected norm. For this analysis a comparison between the observed crash frequency and the expected crash frequency has been selected as a suitable performance measure based on the availability of crash data and traffic volumes. The observed crash frequency and expected crash frequency were calculated based on the NYSDOT Highway Safety Improvement Program Procedures and Techniques. The expected crash frequency for the entire interchange has been developed by combining the NYSDOT Safety Performance Functions (SPF's) for entry ramps, exit ramps, outer connection ramps, and a rural 4- lane section. Table 7 summarizes the results of this analysis.

Table 7: Observed Crash Frequency vs. Expected Crash Frequency

Crash Frequency (Includes Reportable and Non-Reportable)			
Intersection	# of Crashes	Observed Crash Frequency	Expected Crash Frequency (Based on compound SPF)
Rt. 96 & Rt. 14	15	**5 Crashes/year**	**5.6 Crashes/Year**

The actual crash frequency of the study area was found to be 5 crashes per year from the years 2020 to 2022 which is less than the predicted crash frequency of 5.6 crashes per year.

2.4 Context and Existing Land Use

2.4.1 EXISTING LAND USE

The Rt. 96 & Rt.14 intersection redesign study area includes the entire cloverleaf style interchange and 4-lane segments of Rt. 14 and Rt. 96 in the Town of Phelps as shown on Figure 19. Based on the study area limits, the interchange currently occupies approximately 42 acres of land. 13 parcels for the boundary along the limits of the interchange with various classifications. The parcels encompass a total of 462 acres of land with 84.57 acres being classified as either vacant residential or commercial land. Land use and assessed land values are shown in Table 8.

Table 8: Route 14 & Route 96 Adjacent Land Values

Map ID	Class Code	Acreage	Land Assessed Value
1	240 - Rural Residence	19.60	$61,100
2	314 - Rural Lot 10 Acres or Less	12.10	$27,800
3	330 - Vacant Commercial Land	35.60	$113,000
4	210 - Single Family Residence	1.50	$20,500
5	330 - Vacant Commercial Land	1.56	$18,600
6	330 - Vacant Commercial Land	12.30	$90,000
7	322 - Rural Lot 10 Ac or More	17.41	$95,000
8	210 - Single Family Residence	3.30	$25,900
9	449 - Distribution Facility	5.70	$46,000
10	330 - Vacant Commercial Land	2.50	$19,700
11	720 - Mining and Quarrying	345.80	$609,000
12	311 - Residential Vacant Land	3.10	$4,700
13	210 - Single Family Residence	1.60	$20,800
	TOTAL	**462.07**	**$1,152,100**

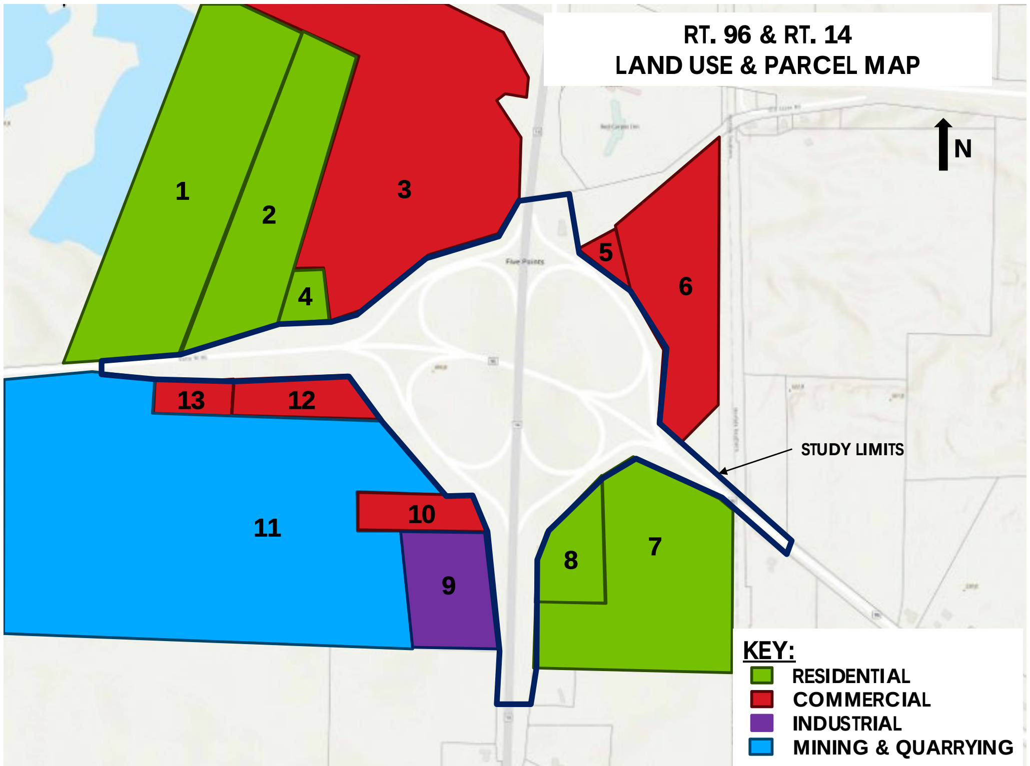


Figure 19: Existing land use and zoning

2.4.2 EXISTING ZONING

According to current Ontario County data, all properties surrounding the Five Points interchange are zones C-1 Commercial.

2.4.3 DEVELOPMENT POTENTIAL

As supported by both 2007 Route 14 Corridor Management plan and the 2009 Route 96 & 318 Rural Corridor Study, the potential for future commercial development is high due to the existing traffic volumes and access to the NYS Thruway. With vacant parcels close to Thruway Exit 42, the ability to attract travelers outside of the corridor is sizeable. Classified as an Interchange Commercial Area in the 2009 study, the Five Points interchange is a gateway into corridor communities and the Finger Lakes Region. Context is key and developments that bolster the rural and agricultural character are best fit for this area if opportunities to utilize vacant land come to fruition.

Large, wooded areas surround the study area, however, there are no delineated wetlands within the existing limits without access which can be favorable for development.

2.4.4 LOCAL BUSINESS EXPANSION OPPORTUNITIES

As referenced above, the Five Points interchange area holds a favorable location that is readily accessible to and from the NYS Thruway via Exit 42, as well as points east and west via NYS Route 96 and points south via NYS Route 14. As a “gateway area” to the Finger Lakes region, the site offers visibility and relatively high traffic counts in comparison to comparable sites in surrounding communities by virtue of its location at the intersection of two state routes.

This accessibility is likely the site's most favorable asset in terms of market positioning, as the surrounding area is sparsely developed except for the interchange commercial development to the immediate north, mining- and aggregate-related uses to the east, and standalone commercial uses to the south along Route 14. Much of the surrounding land area is agricultural or forested, and population density is low.

In terms of business entry or expansion opportunities, uses benefitting from proximity to the NYS Thruway corridor and access to connected markets are most likely to locate at the project site. At a scale of 30-40 acres, the site has potential to hold a large-scale, single user or multiple smaller users as a subdivided or planned property. Uses suited to this context would generally include warehousing & distribution, light manufacturing or assembly, office/industrial park, destination-oriented retail or entertainment, hospitality, senior care, or other uses benefiting from access to the Thruway corridor. Note that warehousing/distribution or light industrial uses that may otherwise constitute highest and best use of the site may not be permitted under the C-1 commercial zoning assigned to surrounding properties. A potential future development constraint is the lack of available sewer facilities in the area.

2.4.5 LAND FOR SALE

Real estate brokerage and market data list eight land-only properties currently on market within a 10-mile radius from the Five Points interchange site. Table 9 and Figure 20 display the location of each property relative to Route 14 & Route 96.

Table 9: Commercial and Residential Properties for Sale

Address	Municipality	Type	Acres	Asking $	$/Acre
Nathaniel Way	Newark	Residential	16.36	$950,000	$58,068
0 State Route 14	Geneva	Commercial	2.40	$269,000	$112,083
463 Hamilton St	Geneva	Commercial	1.10	$300,000	$272,727
2344 Route 414	Waterloo	Commercial	13.50	Not Disclosed	---
1029 Route 5 & 20	Geneva	Commercial	35.79	$975,000	$27,242
State Route 14	Geneva	Commercial	3.41	$249,000	$73,021
2430 State Route 14	Geneva	Commercial	10.80	$99,900	$9,250

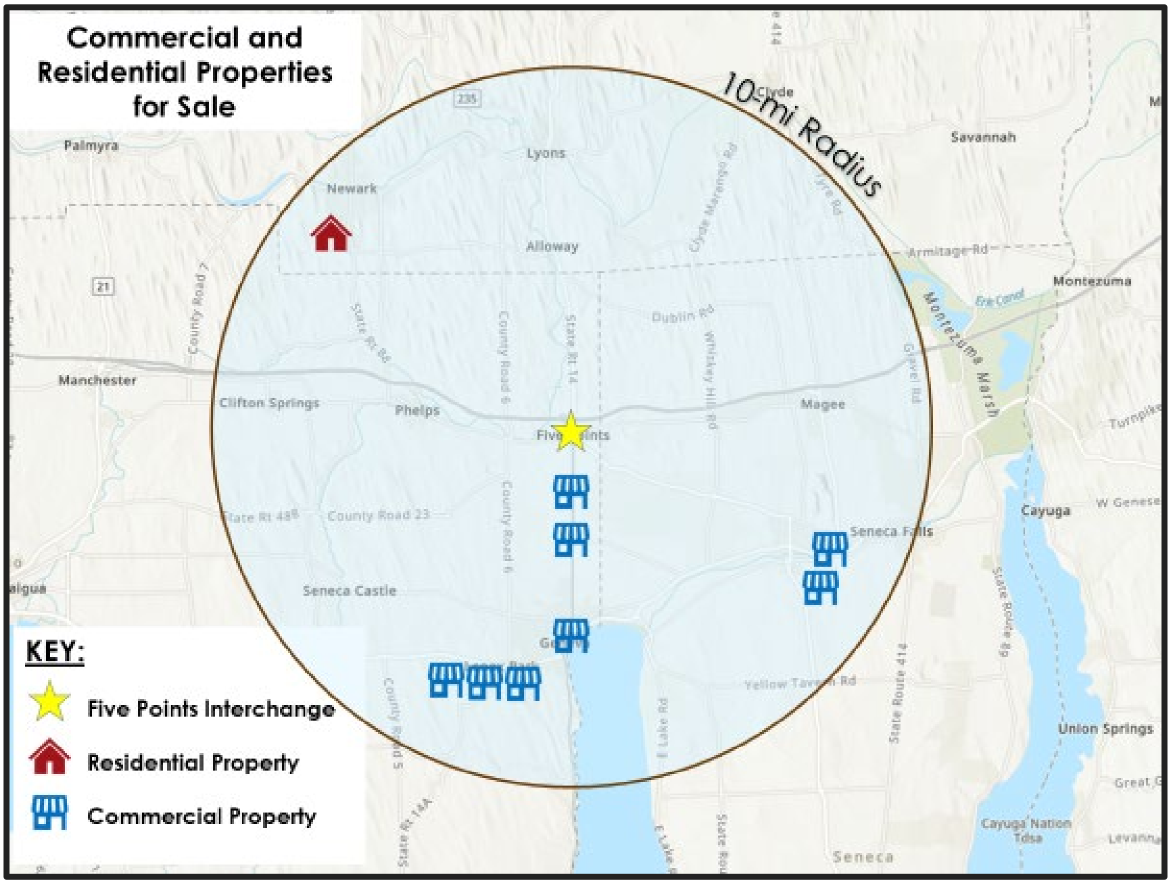


Figure 20: Location of Commercial and Residential Properties for Sale

These available sites are located primarily south of the project site, along the Route 14 corridor and near the City of Geneva and Village of Waterloo. The two Route 14 properties measure 10.8 and 13.5 acres, and the 35.88-acre site in the Geneva vicinity is comparable in size to the Five Points interchange site. On a per-acre basis, asking prices for these sites generally range between $50,000-$100,000 per acre with exceptions in either direction. Land values are influenced by a variety of factors, and these asking prices may or may not be reflective of the subject site’s market value.

2.5 Demographics/Community Profile

2.5.1 DEMOGRAPHICS

The Five Points interchange site is located in the town of Phelps, within Ontario County in the Finger Lakes Region of Upstate New York. The following Community Profile table summarizes demographic conditions for the Town of Phelps and Ontario County, and overall New York State values are provided in Table 10 for reference and comparison.

Table 10: Current Demographics within the Town of Phelps and Ontario County

	Town of Phelps, NY	Ontario County, NY	New York State
Total Population, 2023 (% Annual Change, 2023-2028)	6,545 (-0.34%)	113,182 (+0.03%)	20,113,414 (-0.12%)
Total Housing Units (Owner Occupied %)	2,959 (75.6%)	53,872 (63.6%)	8,602,791 (48.5%)
Median Household Income, 2023	$77,157	$78,181	$77,077
Median Home Value, 2023	$188,582	$219,188	$416,411
Median Age	45.9	44.2	39.8
% Minority Population*	7.7%	12.4%	45.5%

Source: ESRI Demographics
** Defined as all residents identifying as other than “white alone.”*

The Town of Phelps is home to 6% of Ontario County’s residents; Ontario County’s population represents 0.5% of the overall statewide population. The town of Phelps and Ontario County are sparsely populated with low population density. Population centers in the vicinity of the Five Points interchange site include the small cities of Geneva (south), Seneca Falls (southeast), Canandaigua (southwest), and the Village of Newark to the north. It should be noted that NYSTA Interchange 42 also provides the closest Thruway access to the Village of Newark.

The Ontario County population is expected to remain stable over the next five years, while the Town of Phelps is expected to decrease slightly.

Median household incomes are similar across the town, county, and state levels, with 2023 levels ranging between approximately $77,000-$78,000 for these geographies.

Home values in Phelps and Ontario County are significantly lower than in New York State overall, which is typical for rural upstate communities where housing and property are much more affordable than in downstate communities. However, according to the Ontario County Housing Assessment, home sale values have still risen dramatically in the town over the last 5 years from $115,000 (2017) to $175,000 (2022).

The median age of Phelps residents is nearly 46 years, which is 1.7 years older than the median age of Ontario County residents and 6.1 years older than the median age statewide.

Town of Phelps (7.7%) and Ontario County (12.4%) are much less diverse than at the state level (45.5%).

2.5.2 MULTI-MODAL GENERATORS

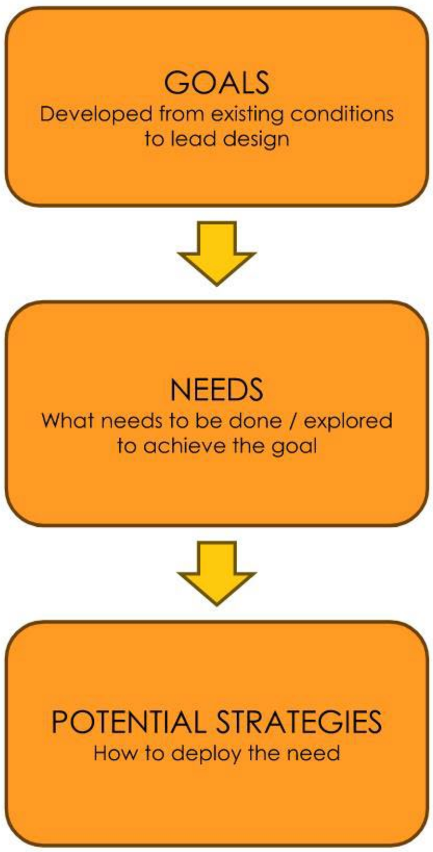
Given the Five Points interchange site’s location and surrounding land use context – sparsely developed with agricultural, forested, commercial, mining/industrial, very limited retail/service use, and low population density – very little pedestrian activity or demand for pedestrian facilities currently exists. A hotel located near the intersection of Route 14 and Route 318 was demolished in 2019.

As indicated above, NYS Bike Route 14 follows the Route 14 corridor through the interchange area, connecting the Pennsylvania State line and points south with the shore of Lake Ontario and points north. The designated bicycle route carries some volume of destination-oriented and recreational users. The interchange area and immediate vicinity include no significant generators of bicycle traffic along Bicycle Route 14.

Truck traffic generators in the Five Points interchange include commercial traffic between the NYS Thruway and City of Geneva, along with local distribution of goods and materials from nearby operations including Heidelberg Materials (aggregate and concrete), Elderlee, Inc., Sheppard Grain, and the Ontario County and Seneca Meadows Landfills. It should be noted that the Ontario County Landfill is scheduled to close in 2028.

2.6 Step 2 - Existing Conditions Needs Assessment

From the inventory of existing conditions, several needs and goals have been identified related to each of the components that were discussed under Step 1. The following table outlines specific goals and potential strategies to achieve those goals that pertain to four (4) major categories of Infrastructure, Transportation, Land Use/Development, and Demographics/Community Profiles. This will be used as the road map in the upcoming benefit cost analysis and alternative assessment.



Infrastructure

Goals Developed from Existing Conditions	Needs What needs to be done/explored to achieve goal?	Potential Strategies How to deploy the need?
Find opportunities to reduce maintenance costs of aging infrastructure	Reduce costs associated with upkeep of existing bridge over Route 14	Perform Benefit Cost Analysis (BCA) of maintaining existing bridge or re-designing the interchange to remove the need for a bridge
Find opportunities to reduce maintenance costs of pavement surface	Reduce costs associated with upkeep of pavement maintenance	Study options to reduce pavement square footage to reduce maintenance costs
Improve marketability of adjacent land by establishing utility access	Provide sanitary sewer connections to un-developed parcels surrounding the interchange	Review feasibility of establishing sanitary sewer connections to surrounding parcels
Bring regional recognition to the Finger Lakes area upon exiting the NYS Thruway	Create welcoming gateway feature and wayfinding to the Finger lakes Region	Study opportunities to establish gateway features and improved regional wayfinding through future design alternatives
Improve resilience of infrastructure during storm events	Reduce flooding under the R.R underpass during storm events	Study opportunities to reduce incoming grades to the R.R bridge to reduce storm flow intensities

Transportation

Goals Developed from Existing Conditions	Needs What needs to be done/explored to achieve goal?	Potential Strategies How to deploy the need?
Support Regional Bicycle Activity on Bike Route 14	Explore opportunities to increase user comfort connections from Phelps and Waterloo to NYS Bike Route 14 via Rt. 96 as the grade separated interchange can be a barrier for cyclists due to high entry and exit speeds on the cloverleaf ramps.	Review opportunities to improve perceived comfort for cyclists that are connecting to and from Bike Route 14 by reinforcing existing connectivity through desgin improvements and public awareness.
Maintain Easy to navigate infrastructure for Commercial Traffic	Continue to accommodate WB-67 design vehicles that travel from I-90 to the various Finger Lakes regions	Maintain design criteria that accommodates heavy vehicles traveling through the area for all future alternatives studied
Maintain existing emergency detour routes G and H	Continue to support the NYSTA's ability to efficiently detour traffic from I-90 on routes G & H	Maintain detour signage postings, establish adequate design to accommodate NYS Thruway Detour Traffic
Accommodate Traffic growth based on projected Regional Growth	Mitigate northbound queuing extending back from Exit 42 and support safe and efficient travel	Study impacts of traffic growth on various design alternatives address feasibility based on several performance metrics
Maintain low levels of reportable road user crashes	Provide infrastructure that facilitates safe travel for all users	Review opportunities to limit increases in crash statistics both at conflict points

Land Use/Development

Goals Developed from Existing Conditions	Needs What needs to be done/explored to achieve goal?	Potential Strategies How to deploy the need?
Attract commercial and industrial developers to the area	Increase access developable land within the corridor	Review opportunities to improve access for both traffic, RR, and utilities to reach surrounding parcels
Support future opportunities for freight-oriented uses (NYSTA access)		Develop an access management policy for new developments to limit access points along Rt 96 and Rt 14
Synergize potential industrial opportunities with adjacent railway		

Demographics/Community Profiles

Goals Developed from Existing Conditions	Needs What needs to be done/explored to achieve goal?	Potential Strategies How to deploy the need?
Increase employment opportunities to attract workforce and build community growth	Increased access developable land within the corridor	Review opportunities to improve access for both traffic, RR, and utilities to reach surrounding parcels
Support mode choice and access to new development via multimodal options	Provide connectivity for multimodal users to new developments	Review opportunities to connect people to new developments via alternate modes and support multi-modal circulation within developments
Improve access for all users through simplified context sensitive rural infrastructure	Provide better wayfinding through the area for both local and non-local traffic	Review ways to reduce weaving through the intersection via wayfinding or design alternatives
Create a gateway for local communities and Regional Attractions	Establish gateway features to highlight Finger Lakes region and celebrate regional communities	Review opportunities to incorporate gateway features to the intersection

3 Goals and Alternative Evaluation

3.1 Introduction & Overview

The analysis in this chapter builds on Steps 1 and 2 of the scope of work, which were Existing Conditions and Initial Needs Assessment (summarized in Chapter 2). This step in the scope of work includes a transportation needs assessment and benefit cost analysis. The purpose of the analysis is twofold:

1) Assign primary and secondary priority to the goals identified in the Initial Needs Assessment to focus the project and define potential alternatives.

2) Identify and shape the potential solutions to develop a high-level Benefit Cost Analysis to evaluate each project.

This step represents a preliminary screening of the potential alternatives to better understand whether and how well each alternative satisfies the goals of the project.

3.1.1 GOAL SETTING: "WHAT ARE WE TRYING TO ACHIEVE?"

During the initial stages of the project, stakeholders identified and agreed on 17 goals. Each goal was paired with a strategy to set the foundation for the exploration of each goal. Overall, the most common strategy that was identified to explore these goals was to consider alternative designs for the future of the Route 14 and Route 96 interchange. This strategy includes assessing alternative designs in comparison with maintaining the existing the interchange.

This chapter evaluates potential alternatives at a high level to develop both quantitative and qualitative performance metrics for a benefit cost analysis (BCA) of each potential solution. The BCA will form the basis of an overall evaluation of each alternative and any subsequent iterations (this is identified as step 5 in the overall intersection redesign process in figure 21). To begin this assessment, the 16 goals identified under the Existing Conditions Needs assessment were identified as either primary and secondary goals based on the project purpose and stakeholder input. These goals were then used to screen potential alternatives in order to identify the highest performing options that will be carried through the BCA. **Table 11** provides primary and secondary goals for this project.

Table 11: Primary and Secondary Goals

Primary Goals	Secondary Goals
Find opportunities to reduce maintenance costs of aging bridge infrastructure	Increase employment opportunities to attract workforce and build community growth
Find opportunities to reduce maintenance costs of pavement	Create a gateway for local communities and regional attractions
Maintain safe, efficient, and reliable travel through the intersection	Attract commercial and industrial developers to the area
Accommodate future traffic patterns	Support future opportunities for freight-oriented uses (NYSTA access)
Maintain existing NYSTA emergency detour routes G and H	Synergize potential industrial opportunities with adjacent railway

Maintain easy to navigate infrastructure for commercial traffic	Support regional bicycle activity on Bike Route 14
Improve resilience of infrastructure during storm events	• Improve access for all users through simplified context-sensitive rural infrastructure • Implement access management strategies for redeveloped properties • Improve marketability of adjacent land by establishing utility access • Bring regional recognition to the Finger Lakes area upon exiting the NYS Thruway

The primary goals noted in Table 11 were identified based on the original project purpose, (to reduce future maintenance costs of the aging infrastructure) and NYSDOT's statewide goals of maintaining a high level of safety and mobility for local and regional traffic. Secondary goals pertain to non-technical factors, such as economic development and wayfinding will be used to further evaluate and differentiate each alternative in the future stages of this analysis. The preferred alternative selected will be the solution that performs the best across multiple categories.

3.2 Overview of Potential Alternatives

The potential alternatives that best meet the primary goals include:

1. At-Grade Signalized intersection and;
2. Roundabout.

Each of these alternatives allows for the removal of the existing bridge structure, consolidation of the overall interchange footprint and potential significant reduction in overall maintenance costs. Maintaining the existing interchange has been identified as the Baseline Alternative. The Baseline Alternative will be used as a basis to compare and assess the performance of each potential alternative. Other options considered include various grade separated interchange types, such as a diamond interchange and a single point urban interchange (SPUI). However, these were not considered for further evaluation due to the significant initial construction costs as well as minimal or no reduction in the current maintenance responsibilities. In addition, these options did not perform well when evaluated against the secondary goals.

3.2.1 BASELINE ALTERNATIVE: MAINTAIN EXISTING INFRASTRUCTURE

Maintaining the existing interchange has been identified as the Baseline Alternative. The interchange was likely built to support significant traffic growth over its lifetime. Recognizing that the interchange is not being utilized to its full potential, maintaining the existing interchange comes at a cost, as NYSDOT has indicated that a bridge replacement will be required within the next 10 years. This will result in a significant and ongoing maintenance responsibility (of the bridge and pavement). The Baseline alternative would limit access to developable land and as well as limiting the type of improvements possible to geometric updates necessary during bridge replacement along with any future reconstruction to address service life of the current pavement, ramps, and highway features. There are benefits to maintaining the existing interchange including safety and mobility for commercial and regional trips. While public feedback indicates there is some support among the community to keep the interchange is high due to its high level of mobility for automobile and commercial traffic there is also a belief that the interchange is overbuilt for the rural context.

3.2.2 POTENTIAL ALTERNATIVE # 1: AT-GRADE SIGNALIZED INTERSECTION

Alternative #1 includes an at grade signalized intersection, which is anticipated to reduce maintenance costs compared to the existing condition by eliminating the bridge and reducing the overall interchange footprint by 45%. This reduction in footprint will create developable surplus land with improved access. This alternative may underperform in overall safety goals due to the increase in number of conflict points from 16 to 32. Public feedback has indicated that there is some concern with how a signalized intersection could operate especially with proximity to the NYS Thruway exit intersection. These potential issues will need to be evaluated. Maintenance responsibilities, although expected to be much lower than existing levels, would also change as the new infrastructure would include a traffic signal and additional pavement wear due to more frequent vehicle braking, especially by heavy vehicles.

3.2.3 POTENTIAL ALTERNATIVE #2: ROUNDABOUT

Per the NYSDOT Highway Design Manual, when a project includes reconstructing or construction of new intersections, a roundabout alternative is to be analyzed to determine if it is a feasible solution. Unlike constrained urban environments, a roundabout would easily be accommodated within the existing ROW of the Route 14 & Route 96 interchange. By removing the bridge and decreasing the pavement footprint by 53%, a roundabout alternative would provide the most significant decrease in maintenance costs compared to the other options being considered. A roundabout also results in a lower expected crash frequency and severity when compared to a signalized intersection. Even though the number of conflict points of a roundabout is even lower than the existing interchange (8 vs 16), the expected crash frequency is anticipated to be higher than the baseline alternative due to the increase in conflicting volumes. However, the level of severity for crashes is expected to decrease due to slower vehicle speeds. There are some limitations of roundabouts with respect to traffic operations and commercial traffic navigation. Operationally, roundabouts are generally limited to 25,000 vehicles per day for a single roundabout and 45,000 vehicles per day for a multi-lane roundabout. Currently, the level of traffic volumes using the existing interchange is likely to be within the bounds of a single lane roundabout however queuing and commercial vehicle mobility will need to be evaluated further. Also, given the prevalence of roundabouts in Ontario County, driver familiarity is not expected to be a significant concern.

3.3 Shaping the potential alternatives

To begin the benefit cost analysis and high-level evaluation of each of the potential alternatives, each alternative will need to be shaped by basic geometric components. These geometric components will help to measure the performance of each goal. For example, future pavement maintenance costs can be evaluated if the total area of pavement is known. The total pavement area is defined by geometric elements such the number of lanes, lane and shoulder widths, and design vehicle turning radii. Table 12 and Table 13 illustrates performance metrics for both the primary and secondary goals and the corresponding geometric design elements that are relevant to each performance metric.

Metrics noted in these tables, such as predicted crash frequency, travel time, delay, emissions, fuel consumption, preliminary construction costs, maintenance costs, and operation costs, are all directly influenced by the geometry of each intersection. To establish a starting point for the geometries, inputs such as traffic volumes and vehicle classifications can be useful.

Table 12: Geometry influences on primary goal outcomes and metrics

Primary Goal	Performance Metric	Geometric Design Element
Find opportunities to reduce maintenance costs of aging bridge infrastructure	Maintenance Intervals specific to intersection type	Intersection type (at-grade vs grade separated)
Find opportunities to reduce maintenance costs of pavement	Total Area of pavement to be maintained	Intersection Type Shoulder widths Lane Widths Corner radii By-pass Lanes/Channelization
Maintain safe and efficient roadway	Expected Total Crash Frequency Expected Fatal/Injury Crash Frequency	Intersection Type
Accommodate traffic growth based on projected regional growth	Vehicle Level of Service Delay Travel Time Queuing Emissions	Intersection Type Number of Lanes
Maintain existing NYSTA emergency detour routes G and H	Operational Flexibility Vehicle Level of Service Delay Queueing	Intersection Type Number of Lanes
Maintain easy to navigate infrastructure for commercial traffic	Vehicle Level of Service Turning Movement Paths	Intersection Type Lane Widths Corner Radii By-pass Lanes/Channelization
Improve resilience of infrastructure during storm events	Total area of Pavement Time of concentration for stormwater to reach RR under pass	Intersection Type Shoulder widths Lane Widths By-pass Lanes/Channelization

Table 13: Geometry influences on secondary goal outcomes and metrics

Secondary Goal	Performance Metric	Geometric Design Element
Increase employment opportunities to attract workforce and build community growth	Vehicle Level of Service Turning Movement Paths Total area of accessible developable land	Intersection Type Shoulder widths Lane Widths Corner radii By-pass Lanes/Channelization
Attract commercial and industrial developers to the area		
Support future opportunities for freight-oriented uses (NYSTA access)		
Synergize potential industrial opportunities with adjacent railway		
Support mode choice and access to new development via multimodal options		
Create a gateway for local communities and Regional Attractions	Aesthetic and context reinforcing potential	Intersection Type
Support Regional Bicycle Activity on Bike Route 14	Bicycle Quality of Mobility	Intersection Type Shoulder Width
Improve access for all users through simplified context-sensitive rural infrastructure	Simplification of geometric layout and signage.	Intersection Type Context appropriate design

3.3.1 OTHER CONSIDERATIONS

Traffic Volume Projections and level of service goal

Based on an estimated time of completion (ETC) occurring in 2030, the base traffic volumes summarized in previous chapters were estimated using the GTC & NYSDOT established annual growth rate for traffic volumes of 0.05%. As part of the benefit cost analysis, the NYSDOT recommended service life duration of 50 years beyond initial project completion. ETC+50 volume projections have also been established by applying the annual 0.05% growth rate over the 50-year service life.

Based on the NYSDOT Highway Design Manual, the level of service goal for rural areas is LOS C. However, some projects may show levels of service below LOS C due to social, economic, environmental, and or policy/intergovernmental decisions made during scoping and design. For this initial screening, the number of lanes will be established to achieve the goal of a minimum LOS C in ETC.

Vehicle classifications

Existing vehicle classifications noted in previous chapters indicated that truck traffic makes up 14-16% of the overall volumes. Large vehicles, such as tractor trailers, farm equipment, and fire trucks require additional space to navigate roadways and intersections based on their minimum turning radii. For this project, a WB-67 has been selected as the design vehicle based on the current vehicle classifications. Forty percent of the heavy vehicles classifications are class F9 Five Axel, Single Trailer Trucks. Based on the turning radius of a WB-67 truck, the potential alternatives will be developed to accommodate the turning envelope of a WB-67.

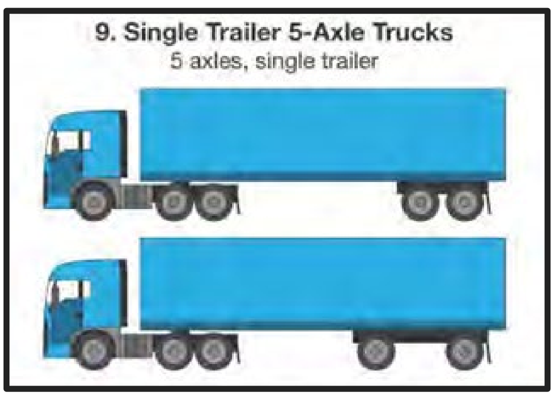


Figure 21: F9 Vehicle Classification (FHWA)

Also unique to this area is the presence of Bicycle Route 14. While bicycle activity is not expected to be high, alternatives that can support higher quality rural bicycle facilities, such as paved shoulders will receive higher performance based on the established secondary goals related to mobility.

Pavement Area, Lane Widths, and number of lanes

The lane widths and pavement area will be determined by a combination of the WB-67 design vehicle as well as base design criteria summarized in the NYSDOT HDM for rural arterials. Route 14 is part of the National Highway System (NHS) and is classified as a principal arterial. Based on the current and future AADT exceeding 2,000 vehicles per day (vpd), the minimum lane width required is 12 feet. Route 96 is not part of the NHS system and is an access highway (not a qualifying highway) the minimum lane width required for Route 96 is 11 feet. The number of lanes will be determined by a basic capacity analysis for each alternative. If an approach meets the minimum LOS C under ETC conditions, then the number of lanes is deemed adequate for this initial evaluation.

3.4 Evaluation of Potential Alternatives

3.4.1 BASELINE ALTERNATIVE: MAINTAIN EXISTING INFRASTRUCTURE

Maintaining the existing cloverleaf interchange would involve several short-term projects to continue to support the existing and future transportation needs. Based on conversations with NYSDOT, the next maintenance interval for the interchange would involve the replacement of the existing Route 96 bridge over Route 14. In addition, resurfacing or reconstruction of Route 14 would likely be necessary within the next five to ten years, as the last maintenance on Route 14 was completed in 2010.

With this alternative, there are several considerations that can be made such as anticipated benefits and challenges.

Anticipated benefits of maintaining the current configurations would be:

- Maintained mobility and safety for primary users (automobiles and commercial vehicles)
- Excellent operational performance

Anticipated Challenges of maintain the current configuration would be:

- No decrease in required maintenance costs
- No increase in potential for access to developable land
- No improvements to wayfinding
- Low potential for aesthetic gateway feature to be established
- No change in multi-modal accommodations
- No mitigations for existing drainage issues
- No changes to improve existing ramp geometries and weave movements created by ramp connections

Shaping the Baseline Alternative

The following section outlines the performance of the interchange with respect to future traffic volume projections for ETC and ETC+50 (Figure 23 and Figure 24) as well as any anticipated changes needed to accommodate the design vehicle (WB-67). No geometric changes are anticipated to be needed to support capacity under both ETC and ETC+50 conditions.

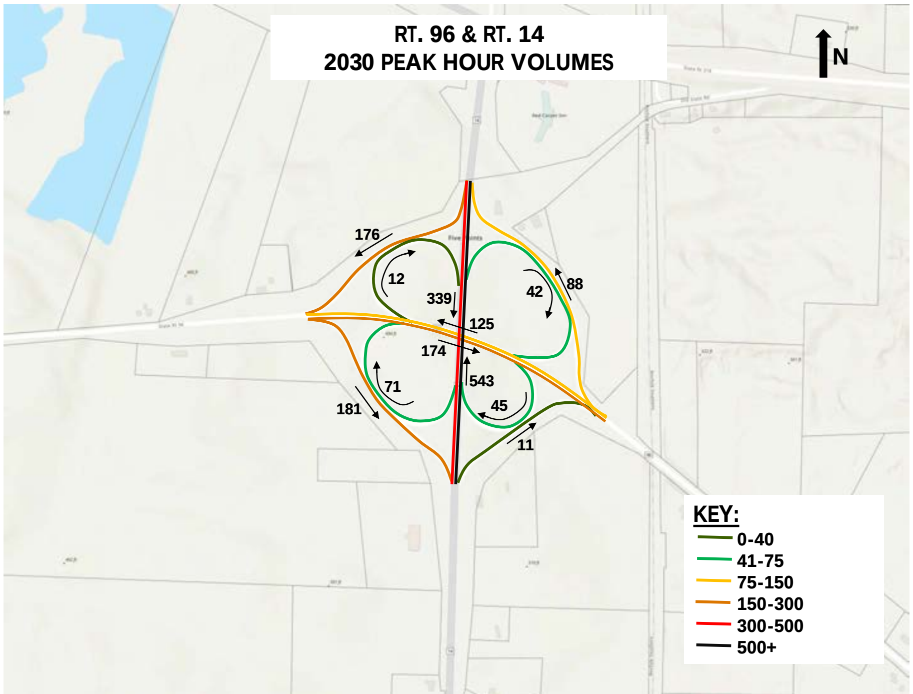


Figure 22: ETC 2030 Peak Hour Volumes

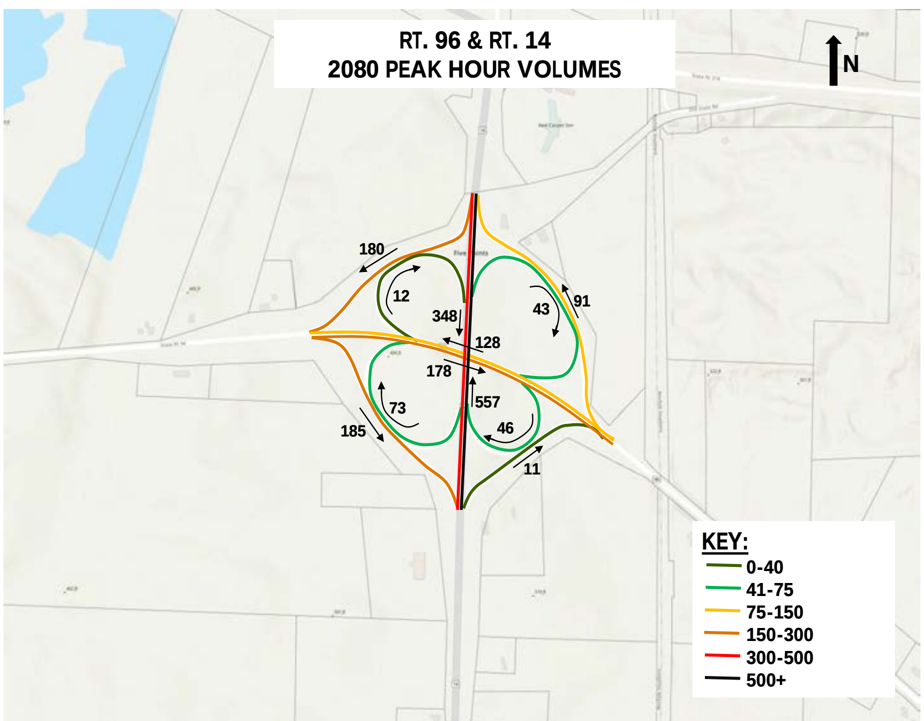


Figure 23: ETC+50 Peak Hour Volumes

Anticipated Future Traffic Operations (Vehicle Level of Service, Delay, Emissions, and Fuel Consumption):

As recreational/commuter and commercial vehicular traffic is expected to grow in the future, the existing infrastructure may need to adapt to those levels to maintain the high level of safety and mobility that exists today. **Table 14** and **Table 15** summarize the Baseline Alternative traffic performance ETC at 2030 and 2080, showing that performance of all movements remains at LOS A. While this LOS represents high quality of service, it is often the result of designs that provide excess capacity than needed for the current and future demand. Based on these results, geometric improvements to support the future demand are anticipated to be needed in ETC and ETC+50.

Table 14: Baseline Alternative Traffic Performance ETC (2030)

	Movement	LOS	Delay (Seconds)	Average Queue (ft)	Max Queue (ft)	Emissions CO (grams)	Emissions Nox (grams)	Emissions VOC (grams)	Fuel Consumption (liquid gram)
NY Route 96	EB - Left	A	0.8	N/A	N/A	142	28	33	2
	EB - Thru								
	EB - Right								
	WB - Left	A	0.8	N/A	N/A	97	19	22	1
	WB - Thru								
	WB - Right								
NY Route 14	NB - Left	A	0.4	N/A	N/A	457	89	106	7
	NB - Thru								
	NB - Right								
	SB - Left	A	0.7	N/A	N/A	279	54	65	4
	SB - Thru								
	SB - Right	A	0.6	N/A	N/A	133	26	31	2

Table 15: Baseline Alternative Traffic Performance ETC+50 (2080)

	Movement	LOS	Delay (Seconds)	Average Queue (ft)	Max Queue (ft)	Emissions CO (grams)	Emissions Nox (grams)	Emissions VOC (grams)	Fuel Consumption (liquid gram)
NY Route 96	EB - Left	A	0.8	N/A	N/A	146	28	34	2
	EB - Thru								
	EB - Right								
	WB - Left	A	0.9	N/A	N/A	99	19	23	1
	WB - Thru								
	WB - Right								
NY Route 14	NB - Left	A	0.4	N/A	N/A	468	91	108	7
	NB - Thru								
	NB - Right								
	SB - Left	A	0.7	N/A	N/A	287	56	67	4
	SB - Thru								
	SB - Right	A	0.6	N/A	N/A	146	28	34	2

<u>Design Vehicle Accommodations:</u>

Under the baseline alternative, there are no anticipated changes to the interchange ramps on the Route 14 or Route 96 pavement sections. Therefore, there are no anticipated impacts to commercial vehicle mobility.

<u>Geometric Summary:</u>

Based on the results above, the geometry of the interchange would remain the same including the following features shown in **Table 16**.

Table 16: Baseline Alternative Geometric Summary

Feature	Number of Lanes	Lane Width	Shoulder Width
Route 14	4 (2 lanes NB & @ lanes SB)	12’	8’
Route 96	4 (2 lanes EB & @ lanes WB)	12’	8’
Ramps	1 lane per ramp	14’	3-8’
Additional Features	180’ Span Bridge Structure on Route 96 over Route 14		
Total Pavement Area	668,956 sq ft		

Note investigations into the current design’s compliance with the most recent NYSDOT standards was not performed, the values presented in this table may be different than what is designed under a future project.

Anticipated Maintenance & Construction Activities of the Baseline Alternative

Based on the geometry summary above, Table 17 shows the typical maintenance intervals provided by the NYSDOT Red Book for the existing infrastructure.

Table 17: Typical and Anticipated Maintenance Activities for the Baseline Alternative

Intervals	Typical Maintenance Activities
0-5 years	- Pavement Markings - Delineators
10-20 years	- Pavement Resurfacing - Signage
20-50 years	- Major Pavement maintenance or reconstruction - Bridge Rehabilitation

Table 18 and **Table 19** provide the anticipated 50-year life cycle costs for the bridge and highway components of the baseline alternative which were developed in consultation with NYSDOT. Initial construction costs that would occur in Year 2030 include replacing the bridge along with reconstruction of the existing interchange ramp pavement.

Table 18: Anticipated 50-year life cycle Bridge costs for the Baseline Alternative

Description	Year	[1]Present Cost (2024)
Bridge Replacement	0	$25,482,600
Bridge Washing & Bridge Inspection	2	$25,410
Bridge Washing & Bridge Inspection	4	$25,410
Bridge Washing & Bridge Inspection	6	$25,410
Bridge Washing & Bridge Inspection	8	$25,410
Bridge Washing, Bridge Inspection & Metallizing Touch Up	10	$69,705
Bridge Washing & Bridge Inspection	12	$25,410
Bridge Washing & Bridge Inspection	14	$25,410
Thin Polymer Overlay	15	$363,000
Bridge Washing & Bridge Inspection	16	$25,410
Bridge Washing & Bridge Inspection	18	$25,410
Bridge Washing, Bridge Inspection, & Metallizing Touch Up	20	$116,160
Bridge Washing & Bridge Inspection	22	$25,410
Bridge Washing & Bridge Inspection	24	$25,410
Bridge Washing & Bridge Inspection	26	$25,410
Bridge Washing & Bridge Inspection	28	$25,410
Inlay, Bridge Washing, Bridge Inspection & Metallizing Touch Up	30	$2,475,660
Bridge Washing & Bridge Inspection	32	$25,410
Bridge Washing & Bridge Inspection	34	$25,410
Bridge Washing & Bridge Inspection	36	$25,410
Bridge Washing & Bridge Inspection	38	$25,410
Bridge Washing, Bridge Inspection & Metallizing Touch Up	40	$116,160
Bridge Washing & Bridge Inspection	42	$25,410
Bridge Washing & Bridge Inspection	44	$25,410
Bridge Washing & Bridge Inspection	46	$25,410
Bridge Washing & Bridge Inspection	48	$25,410
Deck Replacement, Bridge Washing, Bridge Inspection & Metallizing Touch Up	**50**	$3,927,660
Total Present Value Costs for 50-year Bridge Maintenance		**$33,059,145**

Table 19: Anticipated 50-year life cycle Pavement costs for the Baseline Alternative

Description	Year (n)	[1]Present Cost (2024)
Reconstruct Ramps	0	$16,166,931
Crack Seal	3	$25,000
Crack Seal	5	$30,000
Crack Seal	7	$35,000
Mill & Fill	15	$2,957,180
Crack Seal	18	$25,000
Crack Seal	20	$30,000
Crack Seal	22	$35,000
Mill & Fill	30	$2,957,180
Crack Seal	33	$25,000
Crack Seal	35	$30,000
Mill & Fill	40	$2,957,180
Crack Seal	42	$25,000
Crack Seal	44	$30,000
*Rehabilitate	50	$5,428,665
Total Present Value Costs for 50-year Pavement Maintenance		**$30,757,136**

[1]Costs include contingency, mobilization, engineering, construction inspection, survey & WZTC

Anticipated Safety Performance of the Baseline Alternative

The expected crash frequency is determined by following the procedure outlined in Part C of the AASHTO Highway Safety Manual and the NYSDOT Red Book. For the purposes of this project, the interchange including the segments of Route 14 and Route 96 within the boundary shown on Figure 25 are included in the development of the expected crash frequency over the 50-year service life.

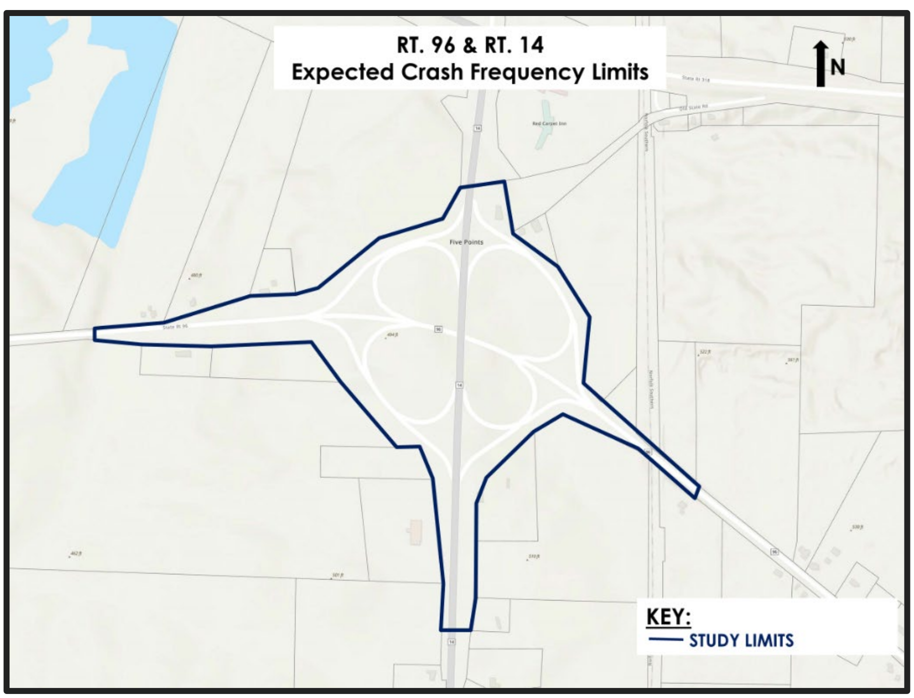


Figure 24: Crash Frequency Limits

NYSDOT has developed safety performance functions for each component of the interchange including clover leaf loop ramps, outer connection ramps, and four lane undivided highway segments. The expected crash frequency of the entire facility can then be determined by summing the individual crash frequencies from each component. This analysis follows guidance provided in both the NYSDOT Red Book and the AASHTO Highway Safety Manual Anticipated safety performance is measured by the expected crash frequency related to the intersection or segment.

Table 20 displays the expected average crash frequency for the facility over the 50-year analysis period.

Table 20: Expected Crash Frequency for Baseline Alternative

Intersection	Expected Crash Frequency Total Crashes	Expected Crash Frequency Fatal & Injury Crashes
Rt. 96 & Rt. 14	5.11 Crashes/Year	1.28 Crashes/Year

3.4.2 POTENTIAL ALTERNATIVE # 1: AT-GRADE SIGNALIZED INTERSECTION

Reconfiguring the interchange into an at-grade signalized intersection would involve several major construction activities such as:

- Removal of the Route 96 Bridge over Route 14
- Removal of the existing ramps
- Potential adjustment of the vertical alignment for both Route 14 and Route 96
- Potential roadway re-alignments to facilitate construction.

With this alternative, there are several considerations that can be made prior to conceptualization such as anticipated benefits and challenges.

Anticipated benefits of Potential Alternative #1 would be:

- Decrease in maintenance costs as a result of bridge removal and significant reduction in pavement area.
- Improved wayfinding through simplification of the overall intersection.
- Supports opportunity for access to developable land.
- Supports potential for improved access and mobility for all non-motorized users.
- Supports regional bicycle activity on Route 14 and improved access from Route 96.
- Opportunity to lower existing roadway profile and improve resilience during storm events.
- Better opportunity to establish gateway features for local communities and regional attractions.
- Could potentially be built off-alignment to help mitigate major disruption to traffic.

Anticipated Challenges of Potential Alternative #1 would be:

- Potential safety and efficiency impacts including increases in crash frequency, severity, and delay.
- Additional maintenance would be required for signal equipment (but there would still be an overall reduction, relative to the Baseline alternative)
- Operations during emergency detour operations will no longer be “free flow” and traffic could experience higher delays.

Shaping Build Alternative #1

The initial layout that was developed for potential Alternative #1 was developed using the Highway Capacity Manual’s (HCM) procedure for completing an Intersection Sufficiency Assessment. This planning level assessment is commonly used to quickly assess whether and intersection’s lane geometry is sufficient to accommodate the projected demand volumes. The level of capacity sufficiency is measured by the Critical Intersection Volume-to Capacity-Ratio and compared to thresholds set by the HCM and shown in

Table 21: Exhibit 31-37 from the Highway Capacity Manual, Planning -Level Analysis: Intersection Volume to Capacity Ratio Assessment Levels

Critical Intersection Volume-to-Capacity Ratio	Description	Capacity Assessment
<0.85	All demand is able to be accommodated; delays are low to moderate	Under
0.85-0.98	Demand for critical lane groups is near capacity and some lane groups require more than one cycle to clear the intersection: all demand is able to be processed within the analysis period; delays are moderate to high.	Near
>0.98	Demand for critical lane groups is just able to be accommodated within a cycle but often requires multiple cycles to clear the intersection; delays are high and queues are long.	Over

Several assumptions were made to complete this analysis such as the intersection peak hour factor, phasing (2-phase operation with permissive left turns assumed), cycle length, and base saturation flow rate. A more in-depth description of this analysis and the assumptions can be found in appendix A.

Two scenarios were run in this analysis.

Scenario 1: Intersection with one shared lane (left, thru, right) on each approach
Scenario 2: Intersection with one shared lane (thru, right) and one left turn lane on each approach

Results from the analysis indicate that under ETC conditions, Scenario 2 will perform significantly better than Scenario 1. The Critical Intersection Volume-to-Capacity Ratios that were calculated are displayed in **Table 22**.

Table 22: Critical Intersection Volume-to-Capacity Ratios for Alternative #1 Scenarios

Scenario	Critical Intersection Volume-to-Capacity Ratio	Capacity Assessment
Scenario 1	**0.9**	**Near Capacity**
Scenario 2	**0.74**	**Under Capacity**

While left turn volumes do not meet the HCM thresholds for a left turn lane, a left turn lane on each approach would add a significant safety and operational benefit by reducing the potential for rear end collisions queues due to left turning vehicles. According to FHWA, left turn lanes at intersections can reduce rear-end crashes by 60-88%.

As an addition to the geometrics outlined above, a channelized right-turn lane was also included for the initial analysis to accommodate NYSTA Detour Route G. **Error! Reference source not found.** displays the preliminary concept for Alternative #1.

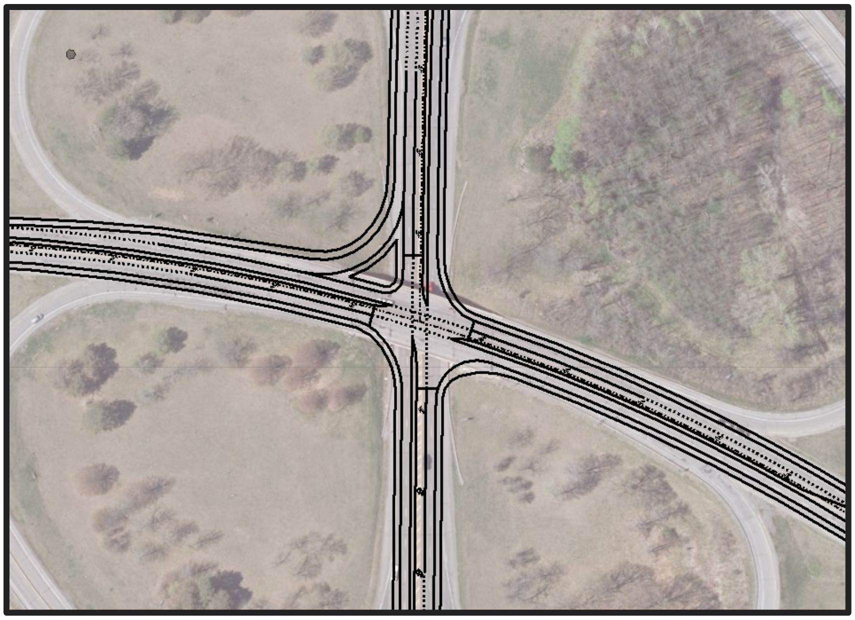


Figure 25: Alternative #1 Preliminary Concept

Anticipated Future Traffic Operations (Vehicle Level of Service, Delay, Emissions, and Fuel Consumption):

With the initial layout of Alternative #1, a traffic analysis was performed using both Synchro and VISSIM to determine the density of segments within the proposed at-grade signalized intersection. For the initial assessment, a traffic signal with two primary phases was tested with a cycle length of 65 seconds (cycle lengths and phase splits were chosen based on Synchro's cycle length optimization). **Table 23** and **Table 24** summarize the traffic performance for Alternative #1 (for ETC 2030 and ETC+50 2080).

Table 23: Build Alternative #1 Traffic Performance ETC (2030)

	Movement	LOS	Delay (Seconds)	Average Queue (ft)	Max Queue (ft)	Emissions CO (grams)	Emissions Nox (grams)	Emissions VOC (grams)	Fuel Consumption (liquid gram)
NY Route 96	EB - Left	C	33.3	77	400	362	70	84	5
	EB - Thru								
	EB - Right								
	WB - Left	B	15.7	23	163	130	25	30	2
	WB - Thru								
	WB - Right								
NY Route 14	NB - Left	B	9.5	30	304	428	83	99	6
	NB - Thru								
	NB - Right								
	SB - Left	A	1.1	23	218	227	44	53	3
	SB - Thru								
	SB - Right	A	0.3	0	0	31	6	7	0

Table 24: Build Alternative #1 Traffic Performance ETC+50 (2080)

	Movement	LOS	Delay (Seconds)	Average Queue (ft)	Max Queue (ft)	Emissions CO (grams)	Emissions Nox (grams)	Emissions VOC (grams)	Fuel Consumption (liquid gram)
NY Route 96	EB - Left	D	34.0	80	391	372	72	86	5
	EB - Thru								
	EB - Right								
	WB - Left	B	15.4	23	179	131	26	30	2
	WB - Thru								
	WB - Right								
NY Route 14	NB - Left	B	9.8	32	351	449	87	104	6
	NB - Thru								
	NB - Right								
	SB - Left	B	10.7	26	213	259	50	60	4
	SB - Thru								
	SB - Right	A	0.3	8	0	0	0	35	7

Geometric Summary:

Based on the results in **Table 23** and **Table 24**, the initial geometry for the at-grade, signalized intersection meets the minimum level of service criteria from the NYSDOT HDM in ETC. Over the 50-year service life, additional left-turn phasing may improve operations in the future (such as protected-permissive left turn phasing for the northbound and southbound directions) or a channelized right turn for the eastbound approach. **Table 25** below summarizes the geometric features included in the initial analysis of the signalized intersection.

Table 25: Alternative #1 Geometric Summary

Feature	Number of Lanes	Lane Width	Shoulder Width
Route 14	3 (1 Thru Rt Lane and 1 left Turn pocket on each approach)	12' (12' minimum based on HDM Section 2.7.2.2 and projected AADT of 13.800)	8' (8' minimum for based on HDM Section 2.7.2.2 and projected AADT of 13,800)[1]
Route 96	3 (1 Thru Rt Lane and 1 left Turn pocket on each approach)	12' (11' minimum based on HDM Section 2.7.2 and projected AADT of 7,027)	8' (4' minimum for based on HDM Section 2.7.2 and projected AADT of 7,027)[1]
Additional Features	1 southbound Channelized Right Turn Lane	12' (12' minimum based on HDM Section 2.7.2.2 and projected AADT of 13.800)	8' (8' minimum for based on HDM Section 2.7.2.2 and projected AADT of 13,800)
Total Pavement Area	364,982 sq ft		

[1] *The recommended shoulder width for arterials with bicyclist activity is 7-8ft based on the FHWA Small Town and Rural Multimodal Networks Report, December 2016.*

Anticipated Maintenance & Construction Activities of Build Alternative #1

Table 26 shows the typical maintenance intervals provided by the NYSDOT Red Book for a signalized intersection with asphalt pavement.

Table 27 provides the anticipated 50 year life cycle costs for Alternative #1 (the Route 14 and Route 96 at-grade signalized intersection) which were developed in consultation with NYSDOT. Alternative #1 initial construction costs (Year 2030) include the following work:

- Removal of the existing bridge and excess bridge embankment material;
- Removal of excess pavement with turf establishment;
- Construction of new full depth asphalt pavement;
- Installation of a new 3-color mast arm type traffic signal;
- New lighting and drainage system repairs/upgrades;
- Landscaping.

Table 26: Typical Maintenance Activities from NYSDOT Red Book

Intervals	Typical Maintenance Activities
0-5 years	- Pavement Markings - Delineators
10-20 years	- Pavement Resurfacing - Signage - Signal Maintenance and Upgrades
20-50 years	- Major Pavement maintenance or reconstruction - Signal Replacement

Table 27: Anticipated 50-year life cycle costs for Alternative #1

Cost Description	Year	[1]Present Cost (2024)
Existing Bridge and Embankment Removal	0	$2,822,325
Existing Excess Pavement Removal	0	$3,575,550
New Asphalt Signalized Intersection	0	$13,095,225
Asphalt Pavement Crack Sealing	3	$13,750
Asphalt Pavement Crack Sealing	5	$16,500
Asphalt Pavement Crack Sealing	7	$19,250
Pavement Milling & Resurfacing	15	$1,679,783
Asphalt Pavement Crack Sealing	18	$13,750
Asphalt Pavement Crack Sealing	20	$16,500
Asphalt Pavement Crack Sealing	22	$19,250
Pavement Milling & Resurfacing	27	$1,679,783
Asphalt Pavement Crack Sealing	29	$13,750
Asphalt Pavement Crack Sealing	31	$16,500
Pavement Milling & Resurfacing	37	$1,679,783
Asphalt Pavement Crack Sealing	39	$13,750
Asphalt Pavement Crack Sealing	41	$16,500
Asphalt Pavement Rehabilitation	47	$3,434,888
Asphalt Pavement Crack Sealing	**50**	$13,750
Total Present Value Costs for 50-year Pavement Maintenance		**$28,140,587**

[1]Costs include contingency, mobilization, engineering, construction inspection, survey & WZTC

Anticipated Safety Performance of Potential Alternative #1

Based on the preliminary geometry for the at-grade signalized intersection, the predicted crash frequency was determined by the NYSDOT SPF for a Signalized Rural Intersection with known Major and Minor Street AADT's as well as Rural Two-Lane undivided highways. Both Intersection and segment crash frequencies were included to cover the same study limits as the existing interchange. The anticipated safety performance is measured by the expected crash frequency related to the intersection or segment.

Following guidance provided in both the NYSDOT Red Book and the AASHTO Highway Safety Manual, the expected average crash frequency for the facility over the 50-year analysis period is displayed in **Table 28**.

Table 28: Expected Crash Frequency for Alternative #1

Intersection	Expected Crash Frequency Total Crashes	Expected Crash Frequency Fatal & Injury Crashes
Rt. 96 & Rt. 14	7.20 Crashes/Year	1.33 Crashes/Year

3.4.3 POTENTIAL ALTERNATIVE # 2: ROUNDABOUT

Reconfiguring the existing interchange into a roundabout would involve several major construction activities similar to Potential Alternative #1, including:

- Removal of the Route 96 Bridge over Route 14.
- Removal of the existing ramps.
- Potential adjustment of the vertical alignment for both Route 14 and Route 96.

Anticipated benefits of Potential Alternative #2 would be:

- Decrease in maintenance costs as a result of bridge removal and reduction in pavement area.
- Improved wayfinding through simplification of the overall intersection (when compared to the baseline alternative). Due to the prevalence of roundabouts in Ontario County, local user experience is high.
- Supports opportunity for access to approximately 25 acres of developable lands previously contained in the interchange.
- Supports potential for improved access and mobility for all non-motorized users.
- Supports regional bicycle activity on Route 14 and improved access from Route 96.
- Opportunity to lower existing roadway profile and improve resilience during storm events.
- Better opportunity to establish gateway features for local communities and regional attractions.
- Could potentially be built off-alignment to help mitigate major disruption to traffic.

Anticipated challenges of Alternative #2 would be:

- Potential increase in total crash frequency, however severity of crashes is may decrease.
- Delay for motorists will increase but not beyond acceptable levels.
- Roundabouts can be more challenging for trucks to navigate; however, several design options can help minimize these concerns.
- The ability for a roundabout to accommodate traffic under emergency detour operations may be impacted by the increase in volume during detours.

Shaping Build Alternative #2

The initial layout for Potential Alternative #2 was developed using the capacity assessment procedure outlined in the NYSDOT Highway Design Manual. This planning level assessment is similar to what was conducted for Potential Alternative #1 however, in this case, the assessment is specific to a roundabout, rather than a signalized intersection. This assessment is commonly used to quickly assess whether a roundabout will be able support current and future traffic volumes and indicate how many lanes will potentially be needed. The level of capacity sufficiency is measured as the sum of the entering and circulating volumes for each approach, compared to the thresholds displayed in

Table 29: Thresholds from the NYSDOT HDM Chapter 26, Exhibit 26-2 for Roundabout Capacity

Threshold (sum of Entering and Circulating Volume)	Description
0-1,100 vph	a single lane roundabout is acceptable and can be progressed to preliminary design
1,100-1,400 vph	a single lane roundabout is acceptable and can be progressed to preliminary design but may require right-turn only lanes or other modification.
1,400 – 2,300 vph	a 2-lane roundabout is acceptable, it can be progressed to preliminary design. Please note that is does not mean that a full 2 lane roundabout is now required – as mentioned above, the addition of right-turn only lanes may be sufficient and should be checked before adding additional though or left turn only lanes. Lanes should only be added as necessary, and this will be determined once a full capacity analysis is performed
2,300 – 2,800 vph	a 2-lane roundabout is acceptable and can be progressed to preliminary design but may require right-turn only lanes or other modification.
>2,800 vph	a 3-lane roundabout may be a potential solution

Based on the annual growth rate of 0.05% per year, projected entering and circulating volumes are estimated for ETC (2030) and ETC+50 (2080) and shown in Figure 27.

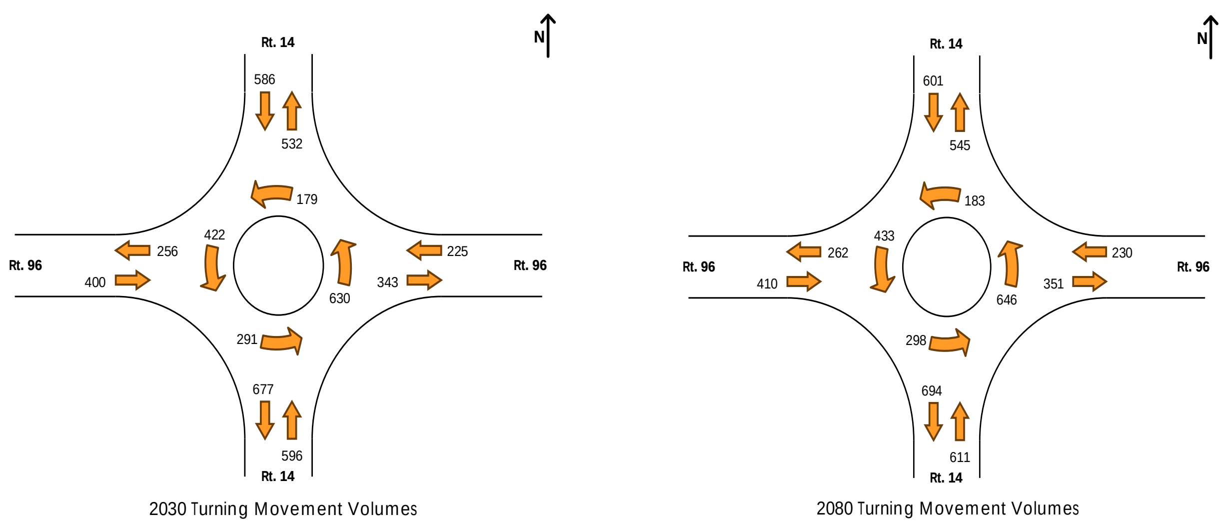


Figure 26: Entering and Conflicting Volumes for ETC and ETC+50

Based on these volumes, a roundabout is expected to perform acceptably as a single lane roundabout with no additional modifications in 2030. The highest conflicting volume (931 vph) is the northbound entering volume and the circulating volumes from the westbound and southbound directions. This is under the limit for a single lane roundabout. Under ETC+50 conditions, it is anticipated that each approach will possibly need to be considered for either right turn by-pass lanes or upgraded to be multi-lane approaches as each approach experiences conflicting volumes above 1,100 vph.

Similar to Alternative #1; at-grade signalized intersection, a channelized right-turn lane was also included for the initial analysis to accommodate NYSTA Detour Route G. **Figure 28** displays the preliminary concept for Alternative #2.

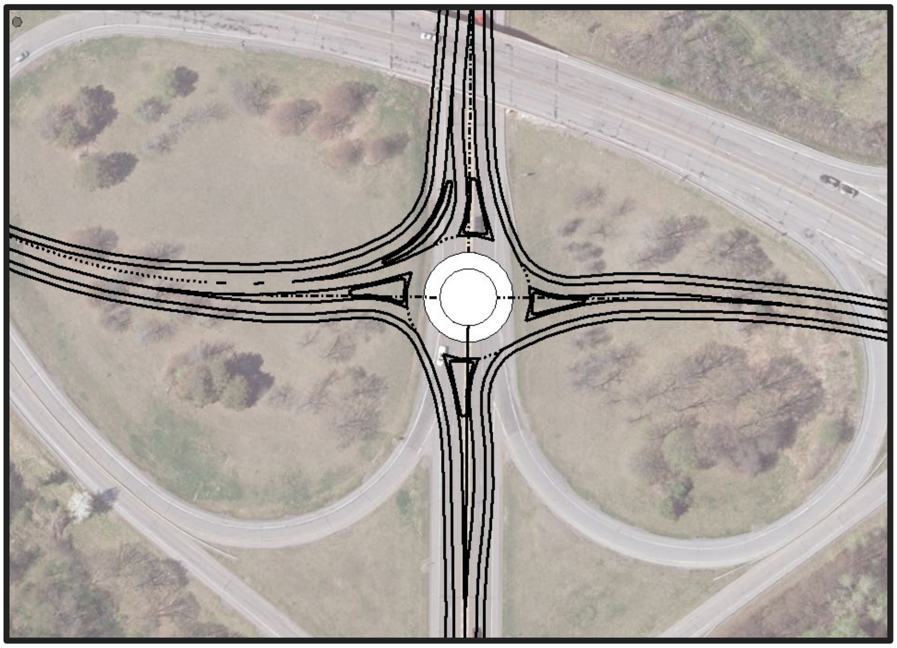


Figure 27: Alternative #2 Preliminary Concept

Anticipated Future Traffic Operations (Vehicle Level of Service, Delay, Emissions, and Fuel Consumption):

With the initial layout of Alternative #2, a traffic analysis was performed using VISSIM to determine the density of segments within the proposed roundabout. **Table 30** and **Table 31** shows estimated results of the proposed model such as level of service, queueing, emissions, and fuel consumption.

Table 30: Potential Alternative #2 Traffic Performance ETC (2030)

	Movement	LOS	Delay (Seconds)	Average Queue (ft)	Max Queue (ft)	Emissions CO (grams)	Emissions Nox (grams)	Emissions VOC (grams)	Fuel Consumption (liquid gram)
NY Route 96	EB – Left	A	6.3	15	202	179	35	42	3
	EB – Thru								
	EB – Right								
	WB – Left	B	17.3	21	211	283	55	66	4
	WB – Thru								
	WB – Right								
NY Route 14	NB – Left	B	15.2	72	493	1096	213	254	16
	NB – Thru								
	NB – Right								
	SB – Left	A	4.3	7	172	222	43	51	3
	SB – Thru								
	SB – Right	A	0.3	1	99	44	9	10	0.6

Table 31: Potential Alternative #2 Traffic Performance ETC+50 (2080)

	Movement	LOS	Delay (Seconds)	Average Queue (ft)	Max Queue (ft)	Emissions CO (grams)	Emissions Nox (grams)	Emissions VOC (grams)	Fuel Consumption (liquid gram)
NY Route 96	EB – Left	A	7.1	18	231	213	41	49	3
	EB – Thru								
	EB – Right								
	WB – Left	B	18.8	24	231	312	61	72	5
	WB – Thru								
	WB – Right								
NY Route 14	NB – Left	B	17.0	92	616	1263	246	293	18
	NB – Thru								
	NB – Right								
	SB – Left	A	4.4	8	197	243	47	56	4
	SB – Thru								
	SB – Right	A	0.4	2	122	47	9	11	0.7

Geometric Summary:

Based on the results above, the initial geometry for the roundabout meets the minimum level of service criteria from the NYSDOT HDM in ETC. Over the 50-year service life, the northbound and westbound movements see an increase in delay and the northbound queuing doubles in length. The roundabout may benefit from having an additional circulating lane in the future. Roundabouts have the benefit of being able to be sized as 2-lane roundabouts before the capacity is needed. **Table 32** below summarizes the geometric features included in the initial analysis of the roundabout.

Table 32: Alternative #2 Geometric Summary

Feature	Number of Lanes	Lane Width	Shoulder Width
Route 14	1	12' (12' minimum based on HDM Section 2.7.2.2 and projected AADT of 13,800) Entry width of Roundabout will be between 17-21'	8' (8' minimum for based on HDM Section 2.7.2.2 and projected AADT of 13,800)[2]
Route 96	1	12' (11' minimum based on HDM Section 2.7.2 and projected AADT of 7,027) Entry width of Roundabout will be between 17-21'	8' (4' minimum for based on HDM Section 2.7.2 and projected AADT of 7,027)[2]
Circulatory Roadway	1	21' based on WB-67 turning radius (Typical 18'-20' per HDM Section 26.4)	N/A
Additional Features	1 SB Channelized Right Turn lane	14' (12' minimum based on HDM Section 2.7.2.2 and projected AADT of 13,800)	8' (8' minimum for based on HDM Section 2.7.2.2 and projected AADT of 13,800)
Inscribed Circle Diameter	134' (Based on WB-67 Turning Radius)		
Truck Apron	17' Wide Truck Apron		
Total Pavement Area	317,632 sq ft (with hardscaped center island)		

Anticipated Maintenance & Construction Activities of Build Alternative #2

Table 33 shows the typical maintenance intervals provided by the NYSDOT Red Book for a roundabout. Table 34 provides the anticipated 50 year life cycle costs for Alternative #2 (the Route 14 and Route 96 roundabout) which were developed in consultation with NYSDOT. Alternative #2 initial construction costs (Year 2030) include the following work:

- Removal of the existing bridge and excess bridge embankment material;
- Removal of excess pavement with turf establishment;
- Construction of new full depth concrete pavement within the roundabout and approaches;
- Construction of new full depth asphalt pavement outside of the concrete pavement limits;
- New lighting and drainage system repairs/upgrades;
- Landscaping.

Table 33: Typical and Anticipated Maintenance Activities for Build Alternative #2

Intervals	Typical Maintenance Activities
0-5 years	- Pavement Markings - Delineators
10-20 years	- Pavement Resurfacing - Signage
20-50 years	- Major Pavement maintenance or reconstruction

[2] The recommended shoulder width for arterials with bicyclist activity is 7-8ft based on the FHWA Small Town and Rural Multimodal Networks Report, December 2016.

Table 34: Typical and Anticipated Maintenance Activities for Build Alternative #2

Description	Year	[1]Present Cost (2024)
Bridge Removal	0	$2,822,325
Pavement Removal	0	$4,083,750
New Concrete Roundabout	0	$13,800,443
Crack Seal	3	$11,750
Crack Seal	5	$14,100
Crack Seal	7	$16,450
Mill & Fill	15	$1,157,063
Crack Seal	18	$11,750
Saw & Reseal Joints	20	$190,575
Crack Seal	20	$14,100
Crack Seal	22	$16,450
Mill & Fill	27	$1,157,063
Crack Seal	29	$11,750
Light CPR	30	$394,762
Crack Seal	31	$14,100
Mill & Fill	37	$1,157,063
Crack Seal	39	$11,750
Light CPR	40	$598,950
Crack Seal	41	$14,100
Rehabilitate Asphalt	47	$2,835,938
***Rehabilitate* PCC**	**50**	*$1,447,107*
Total Present Value Costs for 50-year Pavement Maintenance		**$29,781,339**

3.4.4 COSTS INCLUDE CONTINGENCY, MOBILIZATION, ENGINEERING, CONSTRUCTION INSPECTION, SURVEY & WZTC

Anticipated Safety Performance of Potential Alternative #2

Based on the preliminary geometry for the roundabout, the predicted crash frequency was determined by the NYSDOT SPF for a Rural Roundabout with known Major AADT's[3] and Rural Two-Lane highways. Following guidance provided in both the NYSDOT Red Book and the AASHTO Highway Safety Manual, the expected average crash frequency for the facility over the 50-year analysis period is displayed in **Table 35**. Overall, it is anticipated that the roundabout would provide a lower expected crash frequency when compared to the signalized intersection.

Table 35: Expected Crash Frequency for Build Alternative #2

Intersection	Expected Crash Frequency Total Crashes	Expected Crash Frequency Fatal & Injury Crashes
Rt. 96 & Rt. 14	5.74 Crashes/Year	1.19 Crashes/Year

[3] There are several safety performance functions for roundabouts defined in the NYSDOT Red Book. The SPF for Rural Roundabouts that uses known Major and Minor AADT's was not used as the projected AADT of Route 14 was higher than the upper limits of the AADT range for the SPF. Instead, the SPF that corresponds to roundabouts in a rural setting but only requires the Major AADT was used to determine the expected crash frequency as the volume thresholds were more representative of the actual volumes being used.

3.5 Benefit Cost Analysis

3.5.1 BCA INTRODUCTION/BACKGROUND

The purpose of this Benefit-Cost Analysis (BCA) is to provide an objective, quantified basis to inform and support the selection of a project alternative. This analysis has closely followed the U.S. Department of Transportation (USDOT) Benefit-Cost Analysis Guidance for Discretionary Grant Programs, using this guidance to define methodologies and standardized values for the various costs and benefits evaluated. In addition to 2024 USDOT Guidance, data sources include engineering reports and model output, cost estimates, and additional resources as noted herein and in **Attachment A of Appendix 'B',** Key Notes and Assumptions.

Following is a summary of the BCA process and categories of benefits and costs considered for the analysis.

3.5.2 BCA OVERVIEW

The Route 96 Over Route 14 Intersection Redesign Project BCA uses a 50-year evaluation period reflecting the project's useful life. Project construction is assumed to occur in 2030 (Year 0) and the BCA timeframe extends through 2080 (Year 50). Benefits and costs associated with Project construction and its ongoing operation are quantified annually throughout this timeframe.

Consistent with USDOT Benefit-Cost Analysis Guidance dated December 2023, this BCA uses a real discount rate of 3.1% - this means that future benefit and cost values are discounted from present values by 3.1% for each year into the future in order to represent future values as present-value equivalents. As an exception, the monetized value of CO_2 emissions has been discounted at the annual rate of 2.0%, in line with USDOT guidance. All dollar values are presented as current (2024) US dollar values.

Project cost and benefit categories evaluated for each alternative include the following; please see **Attachment A of Appendix 'B'** for key notes and assumptions related to each category.

- **Project Construction:** Costs to remove existing infrastructure and construct new infrastructure.
- **Repairs:** The cost of scheduled repair needs over the project's useful life as identified in previous chapters.
- **Maintenance:** Weather-related surface treatment (i.e. rock salt application) and maintenance of landscaped/vegetated site area.
- **Travel Time:** Applies the time value of passengers to anticipated passenger volumes and delay times according to Vissim output for each alternative.
- **Operating Costs:** Costs associated with the operation of passenger cars and commercial trucks according to traffic volumes and the distance traveled within the project study area.
- **Safety:** Costs associated with vehicular accidents involving vehicle damage and/or physical injury or mortality, based on projected accident rates.
- **Emissions:** Monetized value of CO_2, NO_x, and PM 2.5 emissions according to standardized emission factors and values from USDOT Guidance.
- **Repurposed Land Value:** The project area footprint would be reduced from No Build to project conditions under either Potential Alternative; the market value of this land is treated as a benefit under project alternatives that enable its reuse in line with USDOT guidance.
- **Residual Value:** The remaining value of infrastructure that has not reached the end of its useful life at the conclusion of the 50-year BCA timeframe. The Bridge replacement element of the No Build Alternative is assumed to have a 75-year useful life and therefore holds a residual value at Year 50; road construction is assumed to have a 50-year useful and holds no residual value.

Monetized values were developed for each benefit and cost category at annual intervals throughout the 50-year BCA timeframe for the No Build, Signalized Intersection, and Roundabout Alternatives.

3.5.3 RESULTS

The BCA used methods and standardized values consistent with USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs.

Attachment B of Appendix 'B' provides BCA results for the Signalized Intersection and Roundabout Alternatives. These values represent the ***difference between*** discounted "No Build" Baseline Alternative benefits and costs, and discounted Signalized Intersection and Roundabout Alternative benefits and costs. In other words, BCA values are calculated by subtracting discounted values for the Signalized Intersection and Roundabout Alternatives from discounted Baseline Alternative values.

In the BCA results summarized below, ***positive values are interpreted as benefits and negative values as costs*** *– relative to the "No Build" Baseline Alternative.*

BCA metrics include Net Present Value (NPV) and Benefit-Cost Ratio (BCR). As BCA outcomes, a NPV > 0 and/or BCR > 1 suggest that a project alternative provides overall economic benefits relative to the "No Build" Baseline Alternative. Conversely, a NPV < 0 or BCR < 1 suggest that a project alternative is less beneficial than the "No Build" Baseline Alternative.

Table 11 summarizes BCA results for each Potential Alternative.

Table 36: Benefit-Cost Analysis Summary

Cost-Benefit Categories	Signalized Intersection (#1)	Roundabout (#2)
Project Construction	$ 22,156,431	$20,943,013
Repairs	$4,494,956	$4,629,955
Maintenance	$1,398,687	$1,432,292
Travel Time	-$22,156,260	-$14,986,547
Operating Costs	$1,715,722	$706,783
Safety	-$533,496	$403,568
Emissions	$183,804	$85,909
Repurposed Land Value	$1,923,539	$2,014,646
Residual Value	-$1,845,819)	-$1,845,819
Net Present Value (NPV)	**$7,337,563**	**$13,383,800**
Benefit-Cost Ratio (BCR)	**1.30**	**1.81**

Please see Appendix 'B' for a detailed description of the BCA results for each alternative.

Non-Monetized Benefit Considerations

The following localized economic benefits have not been monetized or included in the monetized BCA results, however, these project outcomes warrant qualitative consideration given the significant potential positive impact.

- *Reduced project footprint area would allow 24.0 acres of land to be repurposed under the Signalized Intersection Alternative and 25.2 acres under the Roundabout Alternative.*
- *Community services, economic activity, and job creation associated with alternative use of this land in the future.*
- *Proximity to the NYS Thruway corridor and access to connected markets.*
- *Increased opportunities for improvements of accommodations for multi-modal transportation options*

Each use would provide services and support economic activity and job creation at a strategic location at the intersection of these two state highways.

Evaluation of Signalized Intersection and Roundabout Potential Alternatives

BCA results suggest that both the Signalized Intersection and Roundabout Alternatives would provide favorable outcomes in comparison to the "No Build" Baseline Alternative. NPV and BCR metrics are more favorable for the Roundabout Alternative than the Signalized Intersection by a monetized value of $6.0 million over the BCA timeframe**.**

As noted above, each Potential Alternative would involve localized economic benefits in the form of service provision, economic activity, and job creation, therefore, their additional contributions to the community should be considered in addition to the monetized benefits and costs reflect in BCA metrics.

4 Analysis Overview and Implementation Plan

4.1 Introduction & Overview

This chapter summarizes Steps 5 and 6 of this project: Alternative Development and Final Recommendations. The contents of this chapter build on the analysis completed as part of the *Transportation Needs Assessment and Benefit Cost Analysis* as detailed in Chapter 3. This chapter defines a preferred alternative and outline future steps for the New York State Department of Transportation (NYSDOT) to consider for sustaining momentum toward construction. The selection of a preferred alternative at this early stage of project development will be guided by the prior Needs Assessment, Benefit-Cost Analysis, and public engagement efforts. Additionally, there will be a brief discussion of potential future project phases that NYSDOT will need to undertake, including scoping, preliminary design, and final design.

4.2 Revisiting the Alternatives

Three alternatives were evaluated:

1. Baseline Alternative: Maintain Existing Infrastructure
2. **Alternative #1**: At Grade Signalized Intersection
3. **Alternative #2**: At Grade Roundabout

Alternative Development and Analysis

Each alternative was tested against a series of primary and secondary goals that were defined in coordination with the stakeholder committee. The needs assessment was guided by performance metrics including traffic Level of Service, pavement area, crash frequencies, etc. defined under each goal. Each performance metric was also tied to a geometric design element such as, number of lanes, lane widths and turning radii. Alternatives 1 and 2 were then shaped based on the performance metrics related to mobility and safety.

Benefit Cost Analysis (BCA)

The BCA was developed from the following alternative components:

1. Preliminary alternative construction cost estimates
2. Estimated maintenance intervals/costs.
3. Anticipated safety and traffic operations performance defined in terms of crashes per year, travel times and average vehicle delay.
4. Development potential based on anticipated changes in developable land acreage.

An alternative evaluation matrix was developed based on the above and defines how each alternative is anticipated to perform under each primary and secondary goals.

Table 36: Alternative Evaluation Matrix

Alternative Evaluation Matrix				
Primary Goals	Performance Metric	Alternatives		
		Maintain Existing (Baseline)	Signalized Intersection (#1)	Roundabout (#2)
Overall Maintenance costs	Maintenance Intervals/cost	$63,816,281	$28,140,587	$29,781,339
Pavement maintenance costs	Pavement Area	668,956 sq ft	364,982 sq ft	317,632 sq ft
Roadway safety	Expected Total Crash Frequency	5.11 crashes/year	7.20 crashes/year	5.74 crashes/year
	Expected Fatal/Injury Crash Frequency	1.28 Crashes/year	1.33 Crashes/year	1.19 crashes/year
Roadway Efficiency	Vehicle Level of Service	Average LOS: A Max LOS: A	Average LOS: B Max LOS: D (EB T)	Average LOS: B Max LOS: C (WB & NB)
	Delay	Average Delay: 1.0s Max Delay: 3.6s (EB LT)	Average Delay: 16s Max Delay: 37.2s (EB T)	Average Delay: 10.6s Max Delay: 19s (WB LT)
Accommodate traffic growth	Vehicle Level of Service	Average LOS: A Max LOS: A	Average LOS: B Max LOS: D (EB T)	Average LOS: B Max LOS: C (WB & NB)
NYSTA emergency detours	Excess Capacity	Average LOS: A Max LOS: A	Average LOS: B Max LOS: D (EB T)	Average LOS: B Max LOS: C (WB & NB)
	Flexibility	Grade Separation	Event Signal Phasing	Fixed Operations
Commercial Truck Traffic Mobility	Level of Truck mobility	High Mobility	Moderate Mobility	Moderate Mobility
Resiliency	Potential Major Failure Event	Bridge failure	Traffic Signal Disruption	Roundabout Pavement Issues
	Underpass Flooding	No Profile Change	Profile improvements	Profile improvements
Secondary Goals				
Attract development	Surplus land/access	Limited lands and access	24 acres	25 acres
Employment opportunities	New Business Potential	Limited development potential	Increased development	Increased development
Freight-oriented development	Surplus Developable Land adjacent to NYSTA	Limited lands	Surplus land/parcel size	Surplus land/parcel size
Industrial growth opportunity with railway	Development Access to Rail	Limit land and access	10 acre parcel adjacent to rail	11 acre parcel adjacent to rail
Gateway Opportunities	Aesthetic and context reinforcing potential	Rural Interchange Context	At-grade Intersection	At-grade Roundabout
Bike Route 14 Connections	Bicycle Quality of Mobility	Rural Interchange Context	At-grade Intersection	At-grade Roundabout
Utility Access Benefits	Surplus land marketability	Limited land and access	Surplus Land	Surplus Land
Multi-modal infrastructure	Simplification of geometric layout and signage.	Ramp/Multi-lane	Multi-modal options	Multi-modal options
Benefit Cost Analysis				
		Benefit/Cost Ratio	1.3	1.81

Evaluation Matrix Legend
High Benefit
Slight Benefit
No Benefit/Impact
Slight Impact
High Impact

4.3 The Preferred Alternative | Roundabout

With a higher overall Benefit-Cost ratio, Alternative #2 Roundabout has been identified as the preferred alternative under this study. In future project phases, it is recommended to revisit both Alternative #1 Signalized Intersection and Alternative #2 Roundabout alternatives for further analysis prior to design approval. During these future phases it is possible that other viable alternatives or sub-alternatives may be identified however we would expect these will be limited to variations on the current at-grade options. Based on public input that was focused on existing and expected experiences, the public supported the roundabout over maintaining the existing interchange and Alternative #1 Signalized intersection. Reasons sighted for a roundabout over maintaining the existing interchange were that the current interchange was too expensive to maintain and some noted safety issues with weaving and merging movements. Reasons sighted for a roundabout over a traffic signal were that a signal could potentially cause traffic backups between the intersection and Interstate 90. However, there were also concerns expressed regarding the roundabout including familiararity with roundabouts, traffic congestion, and large truck mobility. Further public input and vetting of alternatives is recommended to continue through any future project phases.

The following discussion is related to recommendations specifc to the Alternative #2 Roundabout that address the noted public concerns.

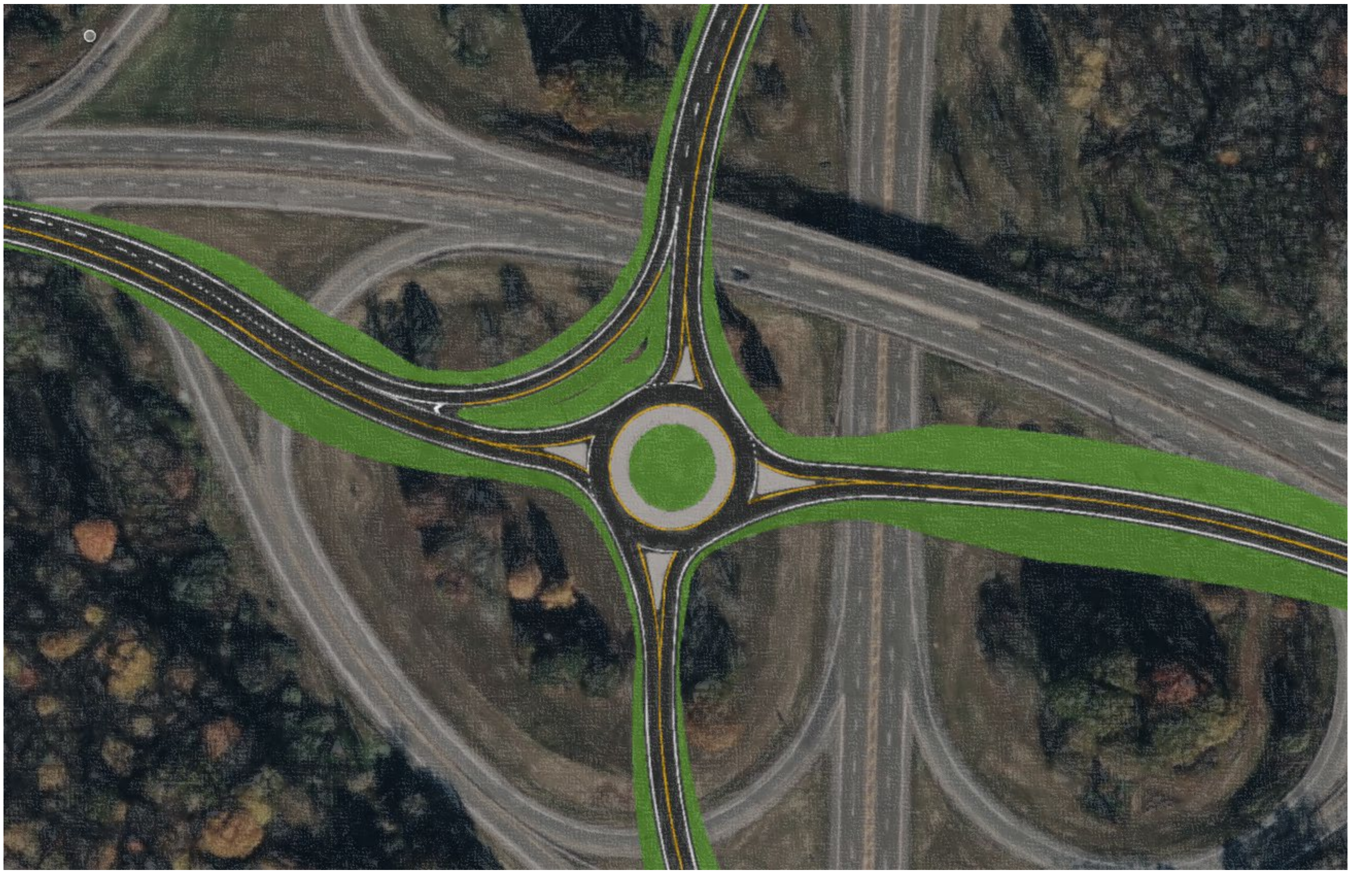


Figure 28: Alternative #2 Concept Design

4.3.1 SUMMARY OF ENGINEERING CONSIDERATIONS & OPPORTUNITIES

Operations | Traffic, Safety, & Maintenance

Traffic Operations & Safety

Alternative #2 Roundabout is expected to operate well within NYSDOT's desired operation thresholds. While drivers may experience slight increases in travel time due to slowing down to enter the intersection and yielding to vehicles circulating within the roundabout, these operations are not expected to adversely impact travel within the area. In addition, by introducing roadway geometries that slow travel speeds down it is anticipated that the severity of crashes will decrease especially in relationship to Alternative #1 Signalized Intersection.

Another aspect is the flexibility to construct the new facility within one (1) of the existing large cloverleaf infield areas. This may offer an advantage in offsetting the roundabout as far south as possible from the New York State Thruway Authority (NYSTA) Exit 42 ramp intersection thereby maximizing available queueing storage from both facilities. The public noted queueing that has at times extended from the Exit 42 ramp intersection south to the Route 96 bridge and may be even more important during implementation of any NYSTA emergency detours.

Truck Circulation

As noted from the public's input, there are concerns with the ability of larger vehicles to navigate a roundabout. The current concept was designed to accommodate a WB-67 (large tractor trailer) through the use of a mountable truck apron however future design iterations may also incorporate mountable splitter islands or larger lane widths to further accommodate trucks by allowing them to remain within their lane while navigating the roundabout. During any subsequent project development stages NYSDOT and stakeholders are encouraged to consider guidance provided in NCHRP Report 1043 *Guide for Roundabouts (2023)* which distinguishes between designing for larger vehicles and accommodating larger vehicles. With 14-16% of the overall traffic volumes represented by larger (Heavy) vehicles, and 40% of those classified as F9 Five Axel, single trailer trucks (tractor trailers), NYSDOT may want to prioritize the more prevalent truck movements, such as the northbound and southbound movements between the thruway Exit 42 and Geneva. Other movements such as the southbound Route 14 to westbound Route 96 and eastbound Route 96 to southbound Route 96 should also be considered based on the 2023 truck traffic volumes identified in previous chapters.

Figure 29: Large Vehicle turning within a roundabout. Source: Stantec

Work Zone Traffic Control

Construction of Alternative #2 will likely involve development a detailed work zone traffic control plan that maintains current traffic operations and minimizes delays to the traveling public . Fortunately, the large project area combined with the interchange configuration (grade separation with large infield areas) offers unique opportunities to stage construction in a way that minimize major disruptions to traffic operations. For example, the new intersection could be placed within the greenspace interiors of the existing clover leaf ramps thereby providing the opportunity to construct the majority of roundabout outside of the existing travel lanes. In addition, use of the ramps may be helpful during bridge removal operations to maintain traffic on both roadways. Final construction staging and phasing will be a function of existing grades, availability of offsite detours, and constructability considerations and will be evaluated during subsequent project stages.

Figure 30: Workzone Traffic Control within a roundabout. Source: Cardno

Additional Maintenance Activities

Maintenance after completion of the project beyond routine pavement and marking repairs also include winter maintenance and landscaping. As suggested by NCHRP Report 1043, a maintenance operation plan should be documented to help program realistic maintenance intervals. These maintenance intervals should be considered early on in the design so that features that warrant more frequent maintenance can either be removed from the design or assigned to a maintenance group. Landscaping features such as trees and bushes should be selected to not inhibit sight distance within the roundabout but also have a maintenance level that is appropriate for the capabilities of the jurisdiction.

NYSDOT has a winter maintenance plan documented for roundabouts in the Snow and Ice Guidelines. If a truck apron is proposed for the design in the future, NYSDOT guidance outlines that the apron should be maintained for functionality during winter. Snow storage and snow build up should also not create any adverse sight distance obstructions. If snow build up does reach levels where sight distance is restricted, then the build up should be reduced by removing the snow, as necessary.

Multimodal

Based on discussions with the public and stakeholders, considerations for pedestrians and cyclists for the roundabout should be explored. As documented in the initial needs assessment, the rural character and absence of pedestrian generators cause the need for higher quality/comfort facilities to be low. However, in the future based on development patterns for the area, it may be a desire by the Town of Phelps to consider enhanced pedestrian accommodations in the area. In rural areas, pedestrians are typically accommodated on the shoulders, however roundabout designs typically omit shoulders within the circulatory roadway as drivers would be unable to pass pedestrians safely while in the roundabout. For this reason, even at rural roundabouts, pedestrians are accommodated by sidewalks that circulate the outside of the roundabout with crossings at each splitter island. However, based on other rural roundabouts within Ontario County such as County Route 4 at Country Route 20, sidewalks are not likely to be provided. If utility access is provided for future development that may spur pedestrian activity at the intersection, these features could be considered during preliminary design as well as discussions with stakeholders and the public in the future.

Bicyclists would need accommodations along Route 14 as it is designated as a NYS Bike Route. There are a few options that could be considered to design for bicyclists in the area, including:

- Merging with vehicular traffic and taking the lane within the roundabout. This is only recommended for facilities that see low traffic volumes and are single lane roundabouts
- Dismount and use the sidewalk (if present)
- Use a shared use path or dedicated facility built around the roundabout (if present)

Under projected traffic volumes, the roundabout is anticipated to only need to be designed as a single lane roundabout. It is also anticipated that shoulders would be provided on each approach to the roundabout for cyclists and then they would enter the roundabout as a motor vehicle by occupying the center of the circulating lane. However, with the approach speeds prior to the roundabout between 55-60 mph for vehicles, consideration may be warranted for alternative bicycle accommodations and speed mitigation measures to avoid speed differential issues when cyclists are merging. In addition, heavy vehicle volumes and movements will also need to be considered as it relates to potential for conflicts with cyclists. Should public involvement during preliminary design and refinement of the alternative indicate that cyclists desire a separated facility or sidewalk, that option would be explored at that time.

Figure 31: Bicyclist entering the roundabout in lane. Source: Stantec

Right of Way

Due to the size of the current interchange, Alternative #2 Roundabout would easily fit within the current Right-of-way boundaries, therefore Right-of-way impacts are not anticipated to be an issue. Current Right-of-Way limits and access restrictions would likely be updated during design so that adjacent land parcels could have access to the existing NYS roadways while still providing adequate driveway offsets from the new facility. This process will be further evaluated and defined during preliminary design and will also be a component of economic development as it relates to providing improved roadway access for current vacant parcels as well as defining surplus property that currently surrounds the existing interchange for future development opportunities.

Gateway Features

Roundabouts themselves are aesthetically unique and present a perfect opportunity for landscaping and monument features over other at-grade intersections. In addition to the center of the roundabout, the splitter islands have also been used for landscaping and artistic features to help establish a gateway into the surrounding area. Early planning with maintenance crews and community stakeholders as well as awareness of sight distance requirements will be important to establish the type and location for landscaping areas and artistic features.

The non-traversable portion of the central island of a roundabout is typically where most of the landscaping features are located as they provide the following benefits (sourced from NCHRP Report 1043):

- Improve Intersection Conspicuity
- Promote lower approach speeds
- Limit “through” sight distance and reduce headlight glare
- Focus driver attention to the left at the approach entry to look for oncoming vehicles

Typically, an outer zone and inner zone are established within the non-traversable portion of the center island. The outer zone primarily includes lower height features, shrubs, and grasses that still allow for adequate sight distance within the roundabout. The inner zone includes “center piece” features, trees, aesthetic walls, and art that help to reduce sight distance through the roundabout and encourage slower entry speeds. Landscaping features such as grasses, plants, shrubs, and trees should be selected to match maintenance abilities and withstand colder climate conditions. Aesthetic/colored pavement treatments for the central island and truck aprons are also ways to enhance the appearance of the roundabout. Art and other fixed objects are alternatives to landscaping features and often are used to promote surrounding community. During planning & design, these features have the ability to attract a deeper interest from the community. With the roundabout in a location that would serve as a gateway to the Finger Lakes Region, there are several opportunities to promote the Ontario County, the Finger Lakes, vineyards, parks, surrounding Towns of Phelps and Waterloo, Geneva, and Watkins Glen. Figures 34 through 37 are examples of center island gateway features.

Figure 32: Gateway feature used in a residential roundabout. Source: Stantec

Figure 33: Center Island Monument Feature. Source Stantec

Figure 34: Center Island Structures. Source: Stantec

Figure 35: Wine Barrels in the center island of a roundabout. Source: Stantec

Smaller scale art and landscaping features can also be installed within the splitter islands on each approach however consideration should be given to maintaining intersection sight distance and obstructing approach signage. Figures 39 & 40 on the following page are examples of treatments that have been used within the splitter islands.

Figure 36: Splitter Island Landscaping. Source: Stantec

Figure 37: Approach Median Features. Source: Stantec

4.3.2 SUMMARY OF SOCIAL, ECONOMIC, AND ENVIRONMENTAL CONSIDERATIONS

Economic Development

The development potential for the area that is currently occupied by the interchange is high. Based on the results of the Benefit Cost Analysis, Alternative #2 Roundabout is expected to enable 24 acres of land valued at $2 million to be repurposed. As this land is adjacent to the NYS Thruway, this is a substantial opportunity for Ontario County and the Town of Phelps to attract developments that align with the 2009 Routes 96 & 318 Rural Corridor Study recommendations to establish an Interchange Commercial District. Commercial and industrial facilities. Potential uses include retail, warehousing and distribution, light manufacturing or assembly, office/industrial park, hospitality, senior care, or other uses benefiting from access to the Thruway corridor.

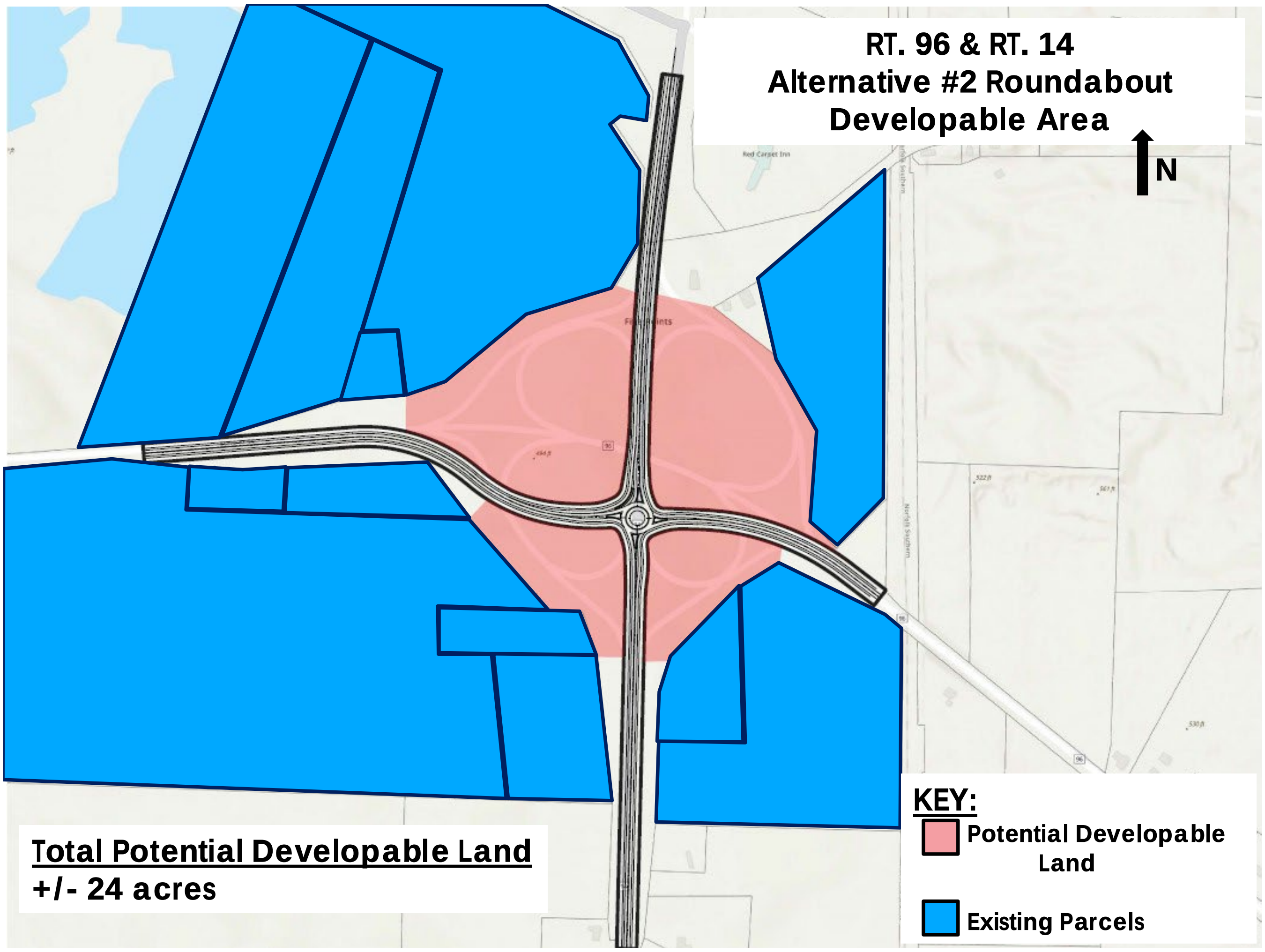


Figure 38: Alternative #2 Development Potential

As recommended by the 2009 study, the design and layout of buildings and developments should match the context of the surrounding area as well as compliment gateway features installed at the roundabout. Rural characteristics such as agricultural themed façades, fencing, and vineyards are options to consider. Developments should also be designed to accommodate few access points with interior parking lots to further establish a gateway to the region.

Under FY 2025, The Town of Phelps has received a Community Project Funding Grant for the Route 14 Sanitary Sewer Extension Project. The project involves construction of a 4.3 mile long low pressure sanitary sewer system along Route 14 from the Town of Phelps north of the i-90 to the Town of Geneva. This will potentially generate interest in potential development of the lands near the interchange. Access to other utilities such as water should be explored by the Town in the near future to further solidify the potential for economic growth in this area. There are several funding opportunities for both at the state level and federal level such as NYS Water Infrastructure Improvement (WIIA) program.

Zoning

The existing parcels surrounding the interchange are zoned as C-1 Commercial which provides locations where groups of small establishments may be located to serve frequent commercial and personal needs within a convenient travel distance. Permitted uses include:

- Retail
- Bakeries
- Pharmacies
- Hair Salons
- Gas Stations
- Grocery Stores
- Laundromats
- Banks
- Detached single family homes

A redesigned interchange area could provide alignments with different and/or additional uses of surrounding land. As the project progresses, the Town of Phelps may wish to consider zoning modifications to encourage development opportunities that align with its vision for this area.

Resiliency

There are several aspects of this project that offer resiliency benefits including:

- **Removing the existing bridge over Route 14 and replacing with an at-grade roundabout** avoids any future potential for a catastrophic bridge failure. A roundabout does not have the same structural components as a bridge nor does is it rely on electrical components (like a traffic signal) to operate and therefore not subject to the same ‘failure’ modes or impacts.

- **The overall pavement area reduction** in comparing the current interchange to a roundabout is over 52%. This reduction in pavement (impervious) area and increase in grass/landscaping (pervious) area will significantly reduce runoff and flooding potential to the surrounding drainage system and downstream water bodies.

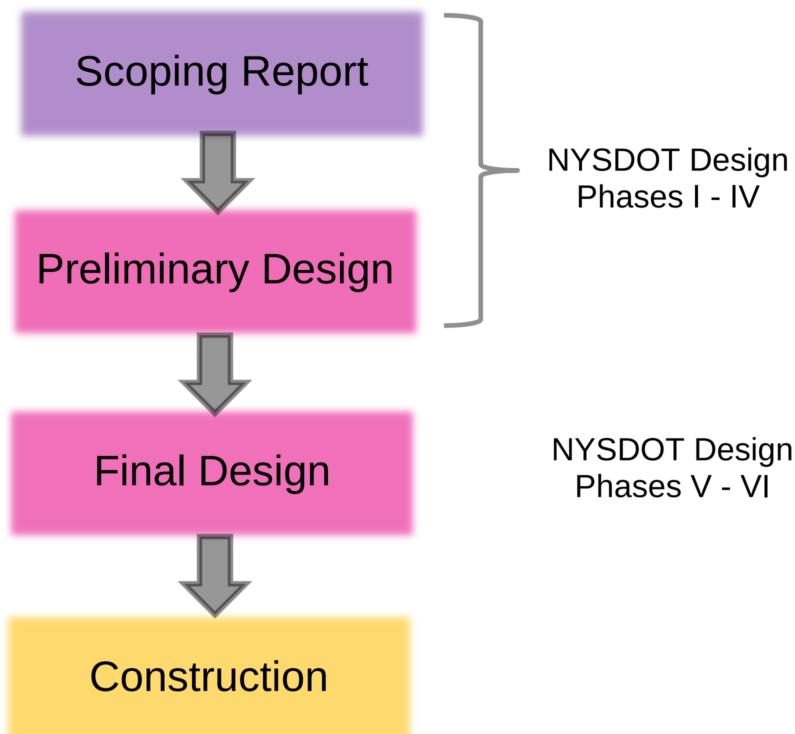
- **RR underpass flooding**. The removal of the bridge combined with NYS Route 96 roadway profile adjustments and reduction in impervious area opens up opportunities to minimize flooding potential under the existing RR bridge.

4.4 Implementation Plan

Project Phasing, Timeframes and Estimated Costs

In consideration of the potential alternative merits identified in this planning study, the NYSDOT now has the ability to continue down the path toward implementation by securing funding and progressing to scoping, design and construction. Next steps will require significant financing as well as on-going community and stakeholder support. This planning study and the completed benefit cost analysis should assist in securing support for funding and also providing a solid base from which to build upon during next steps.

Moving forward the project will follow the NYSDOT Project Development Manual (PDM) with the following primary project phases anticipated:



The following are initial estimates of funding needs and timeframes for next steps:

Table 37: Alternative #2 funding needs and timeframes

ALTERNATIVE #2 ROUNDABOUT ESTIMATED PROJECT PHASING FUNDING AND TIMEFRAMES			
PHASE	**% OF CONSTRUCTION**	**ESTIMATED COST**	**POTENTIAL TIMEFRAME**
Scoping/Preliminary Design	8%	[2]$1,714,568	2026 thru 2027
Final Design	12%	[2]$2,571,852	2028 thru 2029
Construction **(2030)**	N/A	[1]$21,432,102	2030 thru 2032
Construction Inspection	15%	[2]$3,214,815	
TOTAL		**$28,933,337**	

[1] 2030 Dollars

[2] Engineering and Construction Inspection costs calculated as a percentage of 2030 Construction costs

With the potential for development of adjacent existing parcels and creation of surplus NYSDOT right-of-way, the need to coordinate these opportunities will be a significant component of next steps and may influence the estimated timeframes identified.

Funding Opportunities

NYSDOT will need to secure funding for the next steps and has a variety of options available. The following U.S. DOT funding sources should be reviewed for applicability based on the overall project goals and objectives.

Rebuilding American Infrastructure Sustainably and Equitably (RAISE)

From U.S. DOT website: '*The eligibility requirements of RAISE allow project sponsors at the State and local levels to obtain funding for multi-modal, multi-jurisdictional projects that are more difficult to support through traditional DOT programs…'*

National Infrastructure Project Assistance (MEGA)

From U.S. DOT website: '*The Mega Program (the National Infrastructure Project Assistance program) supports large, complex projects that are difficult to fund by other means and likely to generate national or regional* ***economic****, mobility, or safety benefits.'*